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Mentoring: A Professional Development Approach for Mathematics Teachers in the 21st Century

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ABSTRACT Mentoring has been described as the process where a novice employee learns from a knowledgeable and experienced colleague. This form of knowledge acquisition has been employed in many professions such as teaching. Due to its value and relevance, mentoring plays an important role in the professional development of teachers. However, the process of professional development of mathematics teachers through mentoring is not very common in the South African school system. This paper therefore seeks to highlight the role of mentoring in the professional development of mathematics teachers, especially in the 21st century. Consequently, the paper is grounded in the situational learning theory, which was first proposed by Jean Lave and Etienne Wenger. Relevant literature on mentoring and professional development has been reviewed. Furthermore, the experience of the author as a mathematics teacher contributed to the discussion. The paper concludes that mentoring could be used to compliment other professional development initiatives.

INTRODUCTION

Mentoring is described as the establishment of a personal relationship for the purpose of professional growth and guidance. This relationship is usually between a novice employee and a knowledgeable and experienced colleague. The experienced colleague is usually referred to as a mentor while the novice employee is the mentee (or protégé). There is a general acceptance that most people achieve better levels of professional proficiency if they have the guidance and help of a mentor. The modern study of mentoring and other supporting relationships and their roles in adult development started in the 1970s as stated by Chamberlain (2001: 20). Chamberlain (2001) also alluded to the fact that mentoring relationships became a hot topic in business literature starting in the 1970s, when several seminal articles trumpeted the benefits and the necessity of having, or being a mentor. Kochran and Pascarelli (2003) affirm that the importance of mentoring for an individual's educational and continuing career progression is becoming more and more widely recognized. Reh (2016) has also alluded to the fact that an effective mentor is a potential difference-maker in the careers of the individuals he/she serves. Therefore, the use of mentoring as professional development tool in the 21st century cannot be taken for granted. Furthermore, the advent and improvement of Information and Communication Technology (ICT) gives a greater boost to the use mentoring as a professional development tool.

The focus of this paper is the use of mentoring as a professional development tool for beginning or inexperienced mathematics teachers. The level of content knowledge of many mathematics teachers, especially in the rural schools, is of much concern to the education authorities. In affirming this situation, McCarthy and Oliphant (2013) alluded to the fact that the poor quality of teachers and the poor mathematics teaching in particular are some of the factors limiting the quality of mathematics education in South Africa. In order to improve the teaching of mathematics, many resources in the form of personnel and funds, have been spent by the government in an attempt to improve the content knowledge of mathematics teachers, particularly in rural areas. For example, Khumalo et al. (2016) report that some rural schools in South Africa's KwaZulu-Natal Province have been provided with DSTVs to access the teaching of mathematics. Furthermore, several workshops have been organized so as to improve these teachers' mathematics content and pedagogical knowledge. Despite these initiatives, the author

believes that little or not much has been achieved as far as improving both content and pedagogical knowledge of these teachers are concerned. The author is therefore of the opinion that in addition to these workshops, mentoring could be used in the professional development of mathematics teachers in the South African school system. In this paper, the concept of mentoring is described as the process of knowledge acquisition by an inexperienced mathematics teacher through social interaction with a knowledgeable and experienced colleague. Such knowledge, be it content or pedagogical knowledge, is acquired in the same context in which it is applied. Through mentoring, the knowledgeable and experienced mathematics teachers would be able to help their inexperienced colleagues as they interact with one another. Social interaction is very critical as far as the process of mentoring is concerned. Hence, situated learning theory was chosen as an appropriate theoretical framework for the study.

OBSERVATIONS AND DISCUSSION

Theoretical Framework

The study is about the use of mentoring as a professional development tool for mathematics teachers. It is therefore grounded in the situated learning theory, which was first proposed by Lave and Wenger (1991). Lave and Wenger indicate that learning should not be viewed simply as the transmission of abstract and decontextualized knowledge from one individual to another, but as a social process in which knowledge is co-constructed. They also suggest that such learning is situated in a specific context and embedded within a particular social and physical environment. Brown et al. (1989) also alluded to the fact the situated learning theory is a general theory of knowledge acquisition that recognizes the critical importance of the social setting to knowledge construction. Lave and Wenger (1991) concur that situated learning is primarily social rather that psychological. Similarly, the learning that takes place through mentoring is also primarily social. Rather than viewing learning as the acquisition of certain forms of knowledge, Lave and Wenger (1991) have tried to position learning within the context of social relationships and situations of participation.

In this study, the novice and inexperienced mathematics teachers are expected to acquire the necessary knowledge and skills through their interactions with the experienced and knowledgeable colleagues. Each (or a small group) of these novice teachers could be assigned a mentor. The mentors and their mentees may have regularly interactions. Each interaction is supposed to create a specific setting or context towards the acquisition of the necessary knowledge and skills to teach mathematics.

The mentees could also learn from their mentors through classroom observations. The mentors (experienced and knowledgeable mathematics teachers) could invite their mentees to observe them as they teach particular topics. Through such observations, the mentees will learn many things like lesson preparation, instructional skills and content knowledge from their mentors. Similarly, mentors could observe their mentees in their various classrooms as well. After such observations there is always a need to offer feedback on what has been observed.

With the advent and improvement in ICT, most of the social interactions between the mentor and the mentee could take place through social media rather than face-to-face. Both the mentor and the mentee could use phone calls, WhatsApp messages, e-mails and SMS to communicate with each other. It is therefore necessary to note that in the 21st century, mentees have various channels to interact with their mentors. The following section therefore discusses mentoring and teacher development in the 21st century.

Mentoring and Teacher Development in the 21st Century

Traditionally, mentoring is perceived as one-on-one interaction between the mentor and the mentee, where the mentee gets the opportunity to learn directly from the mentor. However, with the advent and improvement of ICT, mentor and mentee interactions could take place even when both are in different geographical areas. With the use of digital technologies such as computers, handheld devices and software applications, both the mentor and the mentee can communicate with ease without necessarily being in physical contact. Such form of mentoring is described as E-mentoring, which is a means of providing a guided mentoring relationship using online soft-

ware or email. The emergence of e-mentoring has developed as a result of the invention of the Internet. Some of the mediums in e-mentoring include video chat services such as Face Time, Skype and video chat through Facebook. The importance of e-mentoring include accessibility. Many experts therefore consider e-mentoring as an effective option to face-to-face model since it allows the mentor to reach as many mentees as possible in a short space of time. However, in a profession like teaching, the importance of physical contact cannot be taken for granted. In using mentoring as teacher development, it is imperative for mentors to demonstrate some of their teaching skills for their mentees to observe, and mentors also need to observe their mentees as well. In that respect, e-mentoring may not be able to cater to such observations.

Despite some advantages derived from e-mentoring, it cannot completely replace the traditional face-to-face model, especially in circumstances where both the mentor and mentee do not have regular access to computer and the Internet services. In this paper, the focus is therefore on mentoring of mathematics teachers who reside and teach in rural areas and for that matter e-mentoring may not be a preferred option. However, other communication channels such as phone calls, e-mails, WhatsApp messages and SMS could be used to interact with their mentors where possible. Therefore, both mentoring models (face-to-face and e-mentoring) could be used where necessary. The next section presents global perspectives of mentoring.

Global Perspectives of Mentoring

Throughout the world, mentoring has been used as part of the professional development of teachers. In this section some previous studies on mentoring are reviewed. There could be many reasons for establishing mentorships at school levels, but Andrews and Quinn (2005) believe that one main reason is to retain qualified beginning teachers and to assist them to become effective practitioners as soon as possible.

In a study by Hobson et al. (2009), it was found that early-career teachers generally appeared to receive sufficient help from their mentors in order to improve their instructional skills and teaching strategies. According to Hubson et al. (2009), mentoring has emerged as an effective process for developing early-career teachers' practices over the last few decades. Similarly, in this paper it is expected that the experienced and knowledgeable mathematics teachers would help their novice and inexperienced colleagues to develop their instructional skills and teaching strategies in addition to content knowledge.

Hudson et al. (2010) employed an empirically based survey to measure mentees' perceptions of their mentors. The study reported that mentors exhibited the desired personal attributes for mentoring. Some of the personal attributes include being a good listener, approachable and being passionate. It was also found that mentors displayed sound pedagogical knowledge. The survey further reported that most mentees did not observe their mentors in model/classroom teaching. In the current study it is also envisaged that the mentors will exhibit desired personal attributes and earn the trust of their mentees. When there is a mutual trust in mentoring relationship, mentees will be prepared to disclose their weaknesses to their mentors. It is also expected that mentors will display sound content and pedagogical knowledge and allow their mentees to visit them in their classrooms.

In South Africa, a study was conducted by Luneta (2006) to investigate mentoring and its relevance to continuous professional development of mathematics teachers. The mentor teachers in the study reported that supervising student teachers was a useful source of professional development for them as mentors as well. This means mentoring as a learning process does not benefit the mentee alone, but the mentor as well. By interacting with the mentees, the mentors take the opportunity to review their own teaching skills and practices. In this case the experienced teachers who are mentors will take time to reflect and evaluate their own instructional approaches and perspectives. For this reason, it is important that schools create a structure that allows experienced mathematics teachers to work with their novice colleagues so as to assist in the improvement of the latter's content and pedagogical knowledge. Mentors therefore fulfill successful roles in a wide range of professional learning environments.

Despite the fact that mentoring is seen as a successful professional development tool, there could be instances where the outcomes are not always positive. For example, Okan and Yildirim (2004) interviewed pre-service teachers and their

mentors to evaluate their experiences. It was concluded that there was little evidence indicating effectiveness of the mentoring program. Furthermore, there was a study by Gomleksiz et al. (2006) on pre-service teachers' views about their mentors. It was reported that these pre-service teachers felt dissatisfied with their university supervising teachers.

Nonetheless, mentoring still plays a key role in career development. McCarthy (2016) affirms that mentoring can be a great way for a mentee to develop skills, gain experience, receive feedback and get exposure to people and processes that they might not in the course of their daily work. The next section discusses some of the characteristics of effective mentors.

Characteristics of Effective Mentors

Despite the improvement of ICT and its relevance in a mentoring relationship, the value of one-on-one mentoring model cannot be underestimated. In such a mentoring model, the mentor plays a very critical role in achieving the objectives of such mentoring relationship. This then demands that the mentor needs to exhibit certain characteristics to ensure the effectiveness of the mentoring program. Literature on mentoring identifies certain predominant characteristics of effective mentors. These include subject knowledge, commitment and communication skills. However, one should always expect a measure of variation in the levels of commitment, capability, confidence and support that mentors provide in the mentoring program.

Different authors have proposed different characteristics depending on what they expect to see in a mentoring relationship. Sweeny (2002) asserts that the effectiveness of a mentoring program is a function of the objectives of the program, for example, a particular mentoring program may target mentoring purely as a means to orientate new employees while another may provide mentoring to support professional development of all employees. In this paper, the purpose of the mentoring relationship is primarily to support and improve the mathematical knowledge and skills of novice and inexperience mathematics teachers, particularly those in rural areas.

Starcevich (2005) points out that mentors should possess well-developed communication skills and a self-awareness and genuine belief in the mentee's potential. Starcevich (2005) further adds that for many mentoring relationships, it is important that the mentors possess a substantial base of knowledge and experience in the area they are mentoring. Consistent with Starcevich's (2005) claim, the author believes that experienced and knowledgeable mathematics teachers be identified to mentor the novice and inexperienced colleagues, especially in schools located in rural areas.

In addition to the above characteristics of an effective mentor, the following have also been identified as key to effective mentoring.

Willingness to Serve as a Mentor and to be Approachable

It is very necessary that the identified experienced and knowledgeable mathematics teachers should be willing to be mentors. In a situation where one expresses unwillingness to be a mentor, it will be difficult to enforce any social relationship. Therefore in this paper it is expected that the experienced colleagues shall be willing to be mentors and hence be approachable.

Committed to the Success of the Mentee

It is not enough to accept a mentorship role if one is not fully committed to the success of the mentee. This means that a mentor will make all efforts to ensure that their mentees attain a desirable level of improvement as far as the profession demands. It is therefore the wish of this paper that the experienced and knowledgeable mathematics teachers will be highly committed to the development of their inexperienced colleagues and bring them to a level that they will confident in their duties as mathematics teachers.

An Excellent Role Model as a Professional Educator

Mentors generally occupy a position where they need to exhibit acceptable behaviors that are worthy to be emulated. In fact, mentors do not only need to possess the knowledge and skills akin to their profession but also to be a role model within the largest society in which they are expected to function. Therefore it is expected that the experienced mathematics teachers will also be role models not only to their mentees but the larger school community. Other characteristics of an effective mentor include being sensitive to the evolving develop-

mental needs, feelings and skills of others, being a continual learner who is open to the views and feedback of others.

The above characteristics imply that for a mentoring process to be effective, the mentor must have the appropriate content knowledge and be committed to the success of the mentee. Above all, mentors should be able to uphold confidentiality and maintain respect for their mentees. A mentoring relationship can be a positive experience for both mentors and mentee, however, it can also be challenging. Often, such challenges lead to the early dissolution of the mentoring relationship.

Challenges of Mentoring as Professional Development

Although mentoring as a professional development tool has become widespread in recent years, there are significant challenges to its effectiveness. Such challenges usually have a potential to prevent mentoring programs from being as successful as they should be. This paper identifies some of the challenges in a mentoring relationship. These include lack of effective communication skills, lack of trust and culture of isolation among teachers, desire to avoid conflict, different beliefs about teaching and time.

Communication Skills

Mentoring is a two-way conversation and for that matter effective communication is very critical in such a relationship. The nature of communication that develops between the mentor and the mentee is a vital component of mentoring relationship. Bradbury and Koballa (2008) assert that most tension within such a relationship could be minimized through effective communication. Both the mentor and the mentee need to possess or develop good listening skills.

Lack of Trust

Mentoring is a relationship of trust that ensures that the mentor and mentee can talk confidently about important problems and areas that may require attention. Stanulis and Russel (2000) affirm that in several studies of mentoring relationships, participants emphasized the importance of developing a level of trust that would allow for productive conversations leading to greater learning on the part of the mentee. Where there is a level of trust in a relationship, both parties will be more open to one another.

Culture of Isolation

One of the challenges of a mentoring relationship is the culture of isolation that exists in the case of many would-be mentors. Since teachers work mostly in the privacy of their own classrooms, they have little opportunity to engage with others in discussions about the details of their work. Therefore, the practical knowledge that experienced teachers use to direct their day-to-day teaching functions, remain hidden from the mentee. However, with mentoring relationships making significant inroads in education, the culture of isolation may be reduced. Compatibility is another challenge for mentoring programs. The mentor and the mentee in a mentoring relationship need to get along well.

Beliefs About Teaching

The respective beliefs about teaching that mentors and mentees bring to the partnership can influence the development of their relationship. Stanulis and Ressel (2000) affirm that difficulties in communication could emerge when mentors and mentees hold different opinions about teaching and mentoring. Mentees are therefore advised to be aware of their mentor teachers' beliefs and values about teaching. This may help in developing a proper understanding of their mentors' teaching and mentoring practices.

Time

Another major challenge in a mentoring relationship is time. Both the mentor and mentee need to have respect for time. Situations where any of the parties fail to show up for a meeting or keeps on cancelling meetings have to be minimized. It is necessary that mentors appreciate the importance of their role and that they are ready to keep their commitment to their mentees.

CONCLUSION

The current trends and societal demands call for a renewed approach for professional devel-

opment in the education system. Rather than relying on workshops only, this paper concludes that mentoring could also be used to assist novice and inexperienced teachers to improve in both content and pedagogical knowledge.

RECOMMENDATIONS

The paper therefore recommends that mentoring be part of the process of professional development of early-career teachers, especially in the teaching and learning of mathematics. The study also recommends that experienced teachers who are willing to be mentors be given some form of incentives.

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