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Teachers' Professional Development's Enhancement of Knowledge about the Teaching of Mathematics

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ABSTRACT

The purpose of this research was to investigate how teachers' Professional Development (PD) improves their expertise of Mathematics teachers. It used a qualitative case study and was based on the qualitative method. The study's population included two Mathematics Curriculum Advisors (CAs), six Mathematics teachers, and six principals, for a total of 14 participants. Purposive and snowball sampling were used to choose the participants. Semi-structured interviews were used to collect data, which was then analysed using theme analysis. The study followed ethical standards to protect the rights of participants. According to the findings, teachers can improve their understanding of Mathematics teaching by enrolling in studies at accredited institutions of Higher Education such as universities and teachers' training colleges, as well as attending workshops, subject Meetings, and staff meetings.

Keywords: Enhancement; knowledge, Mathematics teachers, principals, professional development.

Introduction

Most teachers throughout the world and locally appear to have insufficient knowledge and abilities to teach mathematics, so they must engage in PD to advance their careers. According to the literature research, there are numerous problems that contribute to this issue. According to Yang, Sianturi, Chen, Su, and Trakulphadetkrai's (2022) research, factors contributing to poor mathematics teaching and learning include a lack of time, confidence, and instructional knowledge. The evidence suggests that teachers fail to manage their time well when it comes to teaching and learning. To avoid this difficulty, they can participate in PD which will help them accomplish their teaching schedules on time. Furthermore, they can participate in PD to provide them with the necessary information and abilities to instill confidence when teaching and learning, as well as to gain the trust of learners. Alamri, Aldahmash, and Alsharif (2018) discovered that teachers should participate in professional development to learn about new teaching approaches that are emerging to help them do their professional tasks well. The evidence suggests that when teachers participate in professional development, they can learn a variety of teaching strategies that will assist them in teaching a variety of subjects with comprehension. This can also help their students understand the subject matter better, resulting in greater performance. Apart from the necessity for teachers to be trained in teaching methods, Rana and Rana (2020) reveal that most teachers have limited ICT knowledge and skills, which makes it difficult for them to utilise resources during teaching and learning. Scholars believe that in order to transform traditional education, teachers should undergo ICT training. This demonstrates that professional development for teachers is a necessity, not a luxury, as it is required to impart modern skills that can assist teachers in performing classroom activities.

Teachers, according to Prenger, Poortma, and Handelzalts (2019), should participate in teacher professional development to improve their professional competencies and obtain a quality education. According to the study, PD should be provided to aspiring teachers, newly qualified teachers, and experienced teachers to assist them in acquiring new knowledge as education

evolves. In their study conducted in Israel, Assadi, Murad, and Khalil (2019) discovered that preservice teachers should be integrated with experienced teachers into the education system in order to acquire abilities as well as teach and learn from them during their teacher training. The concept is that allowing preservice teachers to witness real-life scenarios allows them to master teaching activities before becoming full-time teachers.

The purpose of this research is to investigate how teachers' professional development can improve their expertise of mathematics teachers. Literature review, research design and methodology, discussion of findings and outcomes, and recommendations are all included.

Review of literature

This research's literature review focuses on how professional development for teachers enhances their expertise of mathematics teachers. It defines the "concept" of professional development, as well as ways for developing teachers and the benefits of PD. Professional development is defined by Singha and Sikdar (2018) as an activity that broadens teachers' knowledge and skills, contributes to their development, and improves learners' performance. According to Ozdemir (2019), professional development is a lifelong process that needs teachers to expand their knowledge and skills via ongoing and aggressive study. Prestige (2019) refers to Professional Learning (PL) rather than PD. These two terms can be used interchangeably to refer to teachers' professional development. This implies that PL can be used in place of PD or vice versa, as both terms apply to the professional development of teachers.

According to the available literature evaluation, PD is practiced all over the world. According to Prestridge (2019), professional learning in ICT arose in countries such as Australia, Europe, and the United States of America. According to the scholar, these countries are known for their ICT professionals who have demonstrated a strong interest in pushing and maintaining cutting-edge concepts in this ever-changing environment. PD is also found in Afghanistan, the United Kingdom, the United States, and Bangladesh, according to UNESCO (2015). The organization

discovered that professional development plays a vital role in the development of teachers in schools, resulting in better education. It was also discovered that schools are backed by states, which develop rules and allocate funding to them. The PD support provided to schools by system organisations and states demonstrates that developed countries are committed to providing great education. South Africa, like other developed countries, has its own policies that guide PD; The evidence suggests that if teachers are provided with a sufficient professional development program, they will have a higher chance of providing quality education to their students, and their performance will increase dramatically.

Educational organizations should employ a variety of ways to train their teachers in order to achieve great teaching and learning. According to More (2016), school principals have a responsibility to develop teachers by sending them to seminars, linking them with other knowledgeable teachers, and encouraging them to engage in self-study by enrolling with approved institutions. The first technique for developing teachers in the profession is lesson study. Ozdemir (2019) states that lesson study is employed across the country to handle numerous challenges that teachers encounter in the classrooms when instructing their students, and it is more practical than the old way. According to the scholar, this method was also employed in Turkey to boost teachers' professional development in reading comprehension and expression skills. This means schools should encourage their teachers to congregate with cohorts as a way of professional development since this would allow them to question their co-workers in areas where they are struggling.

Cluster meetings are another method. According to Ngema (2016), cluster meetings are a virtuous practice of PD because they allow teachers from different schools to meet at a common location to perform school activities such as lesson preparation, question paper setting, and assessment program. According to the scholar, cluster meetings with teachers of the same grades and disciplines allow them to exchange important ideas that help them better in the subject. Furthermore, Mukhamedov, Khodjamkulov, Shofkorov, and Makhmudov (2020) emphasize that the cluster's educational institutions collaborate with a shared purpose; they train and retrain teachers on new technological difficulties, and as a result, they get more knowledge and abilities in the field. The fact that teachers from various schools gather for the same objective and are schooled in new technology challenges aids them in acquiring skills required in today's teaching.

Tertiary colleges can help prepare aspiring teachers to gain the core competencies and skills required in schools before they begin full-time employment. According to Looney, Perry, and Steck (2017), most mathematics prospective teachers are challenged by fear and low self-esteem when solving mathematical issues. They believe mathematics is extremely tough, thus they struggle to grasp it. Prospective teachers who have a negative attitude toward specific subjects, according to Looney et al. (2017), should attend courses in tertiary institutions that can modify their beliefs and attitudes so that they can learn the subjects without fear but with comprehension. Furthermore, Dollar and Mede (2019) demonstrate that pre-service programs expose potential teachers to reflective activities that help them recognize their strengths and weaknesses and develop a better understanding of teaching exercises, classroom supervision, and resource use, allowing them to be more productive in the workplace. This implies that prospective teachers who

participate in PD programs have a better possibility of being exposed to their own weaknesses and strengths, which are crucial for their learning because their reflections will encourage them to fix their mistakes and embrace their strong points.

After completing their teacher education, newly qualified teachers should be given induction before they begin working to equip them with the necessary skills and knowledge. According to the Department for Education (2018), newly certified teachers in the United Kingdom are offered an induction program that focuses on mentoring, assessing, and helping them in acquiring appropriate skills and knowledge. According to Zhukova (2018), the goal of induction is to assist newly certified teachers in adjusting to the new curriculum and environment, as well as interacting with their new colleagues. This implies that when newly trained teachers begin working, they should receive a formal introduction from experienced teachers to assist them cope with the new curriculum and relate with their new colleagues, so that they can be productive and feel accepted in the organization.

Teachers who participate in professional development can improve their career qualifications in a variety of ways. According to Salmeron Aroca, Moreno Abellan, and Martinez de Miguel Lopez (2022), teachers employ information technology (ICT) during teaching and learning. Scholars claim that teachers use ICT services and knowledge to retrieve educational content from the internet and WhatsApp to communicate educational difficulties with their co-workers and students. Furthermore, it develops and supports teachers in classroom methods and topic content (Alkamel and Chouthaiwale; 2018), and it produces a conducive learning atmosphere (Das; 2019). This implies that all teachers should become acquainted with the usage of ICT, as it is critical in both acquiring material from the internet and teaching and learning. Furthermore, Ngwenya (2020) demonstrates that an ideal PD results in the supervisor and the supervisee being able to recognize the supervisee's flaws and strengths, and that the supervisor then provides the supervisee with appropriate assistance and growth. The idea is that if the supervisor can identify the supervisee's strengths and weaknesses, it will be easier for the supervisor to develop and support the supervisee, as the core purpose of the PD is to assist the person experiencing a challenge in developing strategies to solve it and providing ongoing support. According to Moekwa (2020), re-skilling and up-skilling teachers increase their knowledge and abilities, making them more useful in the company. School administrators are also expected to develop their teachers, provide them with the resources and attention they require, and provide ongoing support to encourage them to work with enthusiasm (Kukano 2020). According to the study, before offering PD to teachers, a requirements analysis should be performed to help identify their flaws and strengths so that they may be developed correctly rather than being developed generally. Teachers who are developed in general typically do not receive specific PD; therefore, needs analysis should be performed prior to PD; additionally, when teachers are provided with the necessary resources and support, they become eager, as a lack of resources and support discourages teachers from working with passion and implementing PD programs well.

Research design and methods

This research was conducted as a qualitative study to better understand the participants' reactions and meanings, as well as the

researcher's role (Bell & Waters, 2018). The researchers gathered data in the participants' natural environment by questioning them about the topic under investigation. This research was classified as a qualitative case study. Case studies, according to Leedy and Ormrod (2015), can be utilized to grasp data from single or collective situations. In this research, collective case studies were used to investigate how teachers' professional growth improves their expertise of mathematics teachers.

Sample size and population

This research's population included teachers, principals, and Curriculum Advisors (CAs). There were six Mathematics teachers, three men and three women. There were also six principals, three males, and three women. There were two CAs, one male and one female. This research's participants were 14. Gender and experience were used to identify participants. More experienced participants were found, and gender equality was achieved. Purposive sampling and snowball sampling were utilized in order to find suitable subjects. It was used to identify participants who could contribute valuable information to the study (Cohen, Manion, & Morrison; 2018). Its purpose was to locate the principals and CAs operating in the Mopani district's remote public schools. The researchers requested a list of Mopani district public schools from which to hand-pick six principals with more experience and enrolment. The list was presented, and six principals were chosen on purpose. Purposive sampling was used to pick two CAs who supervise mathematics from the Mopani area. The first was in charge of the foundation phase (grades R-3), while the second was in charge of INTERSEN (grades 4-9), and they all belonged to the General Education and Training band. Snowball sampling was also used in the study. Cohen et al. (2018) state that the initial participants can be employed as informants to pick appropriate candidates. Through snowballing, each principal from the six schools supported the researcher in locating one mathematics teacher in charge of grade 6. Mathematics teachers were chosen because their work is routinely monitored by district administrators.

Data collection tools, procedure, and analysis

Semi-structured interviews were used to collect data from Mopani district Mathematics teachers, principals, and CAs. The researchers sampled the participants prior to the interviews. The participants were interviewed in their normal context to encourage them to speak freely, disclose dense information, and act spontaneously (Creswell & Creswell, 2018). The research questions guided all of the questions asked of the participants. Before the interviews began, the researchers made certain that he had secured venues, dates, and times that were convenient for the participants. The researchers practiced the questions three days before the interviews to get familiar to them (Meriam and Tisdell 2016). The researchers interviewed the participants in person, and their roles were to observe, listen, and record information provided by the participants in the notes book and record devices. Open-ended questions were posed to the participants in order to encourage them to communicate freely and share excellent information. If participants gave insufficient information, they were probed to offer more specific information. The interview questions were asked in English, however participants who did not feel comfortable responding in English were allowed to share their thoughts in their

native language. The goal was to allow participants to effectively share their information. Data collection took two days due to the postponing of some appointments due to personal commitments of participants. New appointments were made for those who postponed, but some participants declined and were replaced later. The interviews lasted 30 to 60 minutes. Because they could explain themselves well in English, principals and CAs spoke for longer than Mathematics professors. Most teachers struggled to communicate effectively in English and had to resort to their native language.

This research's data analysis mirrored the stages proposed by Creswell & Creswell (2018). Arranging data, capturing and coding data, developing themes, and discovering patterns were among the stages. Data was collected and then transformed into useful information. The data was then coded into sub-themes and themes, which were then used to create the final report.

Validity and dependability

According to Bell and Waters (2018), dependability is demonstrated when the same findings are obtained when a trial or procedure is applied repeatedly in subsequent settings. The researchers employed member checking to confirm the study's credibility and validity. The researchers presented the semi-polished data to the participants to see if they were correct. The participants were pressed for clarification on the ambiguous statements. Following the end of the data analysis, participants were consulted to determine whether the information presented was accurately interpreted; draft notes were reviewed and revisions were made as needed.

The researchers made certain that the study included all the material that led to the conclusions (Creswell & Creswell, 2018). To make the research intelligible to the readers, facts on the participants and the circumstances in which the interviews were conducted were extensively disclosed. The researchers also engaged with participants for an extended period of time in order to develop friends with them, examine ambiguous themes, and guarantee that the issue under study has saturated data. The information provided by the participants was also recorded by the researchers using field notes and an audio recorder. The data was recorded to assist the researchers in ensuring correctness.

Ethical considerations

The researchers employed several ethical guidelines to ensure that the study followed appropriate procedures. Participants were asked to complete consent forms that included information such as the researchers' information, the nature of the research, possible benefits, any expected risks, time to be used during interviews, and procedures (Bell & Waters; 2018). Participants were informed that their participation was entirely optional and that they might opt out at any moment.

Anonymity and confidentiality were considered. The researchers took precautions to conceal any information that could expose their identity (Cohen et al., 2018). Instead of their own names, they used pseudonyms.

The researchers were also considerate of their privacy. They avoided queries that would jeopardize their privacy. Participants' privacy, according to Leedy and Ormrod (2015), should be protected. During the interviews, the researchers listened to and

respected the participants as they spoke, and they avoided interfering with them. The conclusions were properly documented, and all information cited from other experts was properly cited.

Findings and discussion of results

This research highlights four important findings: holding staff meetings, encouraging teachers to attend subject meetings, attending workshops, and enrolling in higher education institutions.

Convening of staff meeting

Principals use regular staff meetings as a tool for training teachers in their profession. Some principals stated that the purpose of holding staff meetings was to provide feedback to teachers on school-related matters. Teachers, according to them, were engaged in talks and given the opportunity to express their problems, frustrations, and triumphs in their careers. One of the teachers stated:

First and foremost, I ensure that staff meetings are held. These staff meetings are frequently used to provide feedback on teachers' work. I also use these staff meetings to involve teachers in discussions about their job responsibilities. I also allow them the opportunity to express their problems, difficulties, and triumphs in their field.

This implies that when school principals held frequent meetings with teachers, they were given the opportunity to communicate and discuss professional difficulties with them. As a result, teachers gained knowledge about difficulties concerning their work. The findings are consistent with Maimela (2015). According to the scholar, teachers should be equipped with knowledge about their vocation so that they can practice freely and eliminate fear and feelings of ineptitude.

Encouraging teachers to conduct subject meetings

Another technique that principals use to train teachers is to encourage teachers to hold subject meetings. The majority of principals stated that they encouraged their DHs to hold monthly or quarterly subject meetings in order to assess pupils' performance in their subjects. Another principal stated that principals mandated that DHs who supervise specific subjects meet with teachers in those courses. The DHs and their teachers addressed how to improve their subjects, such as lesson preparation, assessment curriculum coverage, and general teaching and learning. The majority of the principals mentioned:

I constantly encourage DHs to organize meetings in conjunction with their subject meetings. During the meetings, the DHs communicate subject-related information, which helps them improve in the subjects. Some of the principals stated:

We encourage DHs to hold subject meetings on a monthly and quarterly basis to assess the progress of their subjects. This allows them to assess whether they are still aligned with the subject policies, which must be followed. One of the Principals went on to say:

Subject meetings are organized by teachers from various disciplines, and immediate seniors provide comments to me every two weeks.

The notion is that if teachers attended subject meetings on a monthly basis, they would be able to acquire solutions to problems

that were troubling them while there was still time to attend them. Paton, Parker, and Tannehill (2015:29) agreed that teachers should meet twice a week in a school context to address curriculum-related issues and that the meetings should be conducted by experienced teachers. The notion is that administrators should encourage teachers to hold subject meetings in order to assist one another in doing school activities that challenge them in order to improve learner performance. This could imply that principals see gatherings, including subject meetings, as a sure way of developing teachers in their respective disciplines.

Encouraging teachers to participate in workshops

Another technique that principals employ to enhance teachers is to encourage them to attend workshops. The principals feel that teachers can gain broad knowledge of their field by attending workshops. Teachers attended department workshops at the circuit, district, and provincial levels, according to one of the principals, where they were further groomed to excel in their fields. The principals also said that the departmental workshops were supervised by experienced topic specialists who gave presentations on various aspects linked to teaching and learning such as lesson planning, course presentation, and assessment. According to one of the Principals:

I also encourage teachers to participate in departmental workshops organized at the circuit, district, and provincial levels, where they can further strengthen their teaching themes. They should attend workshops since they are given by facilitators who are experts in a variety of fields.

This shows that principals encouraged teachers to attend workshops on topics related to their disciplines that were organized by the department and led by specialized facilitators. The discovery contradicts Umugiraneza, Bansilal, and North (2017:11), who advocated for facilitators to hold workshops for teachers in their own workplaces so that they may learn in practice and receive support from them.

Encouraging teachers to enrol in higher education institutions

Another technique used by principals to enhance teachers is to encourage them to enroll in higher education institutions. According to the findings, administrators actively pushed teachers to continue their education by enrolling in institutions of higher learning such as colleges and universities in order to increase their subject expertise. Some principals stated that they often encouraged teachers to enhance their education based on the subjects they taught. The principals also stated that they encouraged teachers to pursue education management since such teachers were easier to deal with. Teachers who studied education management, according to them, were confident when instructing their students and made great contributions to the school. Among the principles cited are:

I encourage teachers to engage in lifelong learning by enrolling in institutes of higher learning to further their education. However, some teachers particularly older teachers, are unwilling to strengthen their credentials because they fear they are about to leave the system. They also appear to be terrified of technology, despite the fact that most learning requires it.

Another principal said, as well:

As a principal, it is my responsibility to encourage teachers to enroll in higher education programs in order to further their careers. They must be motivated to increase their qualifications.

Another principle stated that in order for teachers to be committed to their studies, they needed to be motivated. As a result, the principal stated that she led by example, having completed a number of qualifications, including an honors degree in mathematics, to demonstrate that it was possible to acquire more than just a normal undergraduate degree. In addition, one of the principals explained:

I will encourage my teachers to participate in their own personal professional development. I plan to register with institutes of higher learning in order to urge them to participate in lifelong learning and so to learn.

The findings revealed that principals do play a good influence in encouraging their teachers to enroll in and extend their studies in order to develop them in their respective areas. The notion is that as teachers obtain new information through their studies, it will have a direct impact on their subject delivery, perhaps leading to enhanced student performance in mathematics. The findings back up Shabani's (2016:6) assertion that highly informative lecturers should encourage less-knowing students.

Conclusion

According to the findings of the survey, mathematics teachers can improve their skills by enrolling in courses at approved institutions of higher learning such as universities and colleges. In order to get additional skills and information in the field, they enroll in short and long courses that offer certifications, diplomas, and degrees. Some teachers advance their mathematical degrees, while others advance their qualifications in other disciplines because they believe mathematics is difficult. The study also discovered that teachers might be developed through school-based workshops as well as circuit and district-level workshops. Teachers who attend workshops improve in areas such as subject content, classroom procedures, lesson planning, lesson presentation, and assessment techniques, according to research. The survey also discovered that teachers are trained in schools. Teachers attend subject meetings at the school level to discuss concerns related to the subject. These sessions are led by immediate seniors or topic heads, who then provide input to the principal. CAs are invited to schools by principals to assist teachers with issues that are difficult for them.

They also hold staff meetings where the principals and teachers discuss school-related concerns. Teachers are given the opportunity to voice their issues, difficulties, and triumphs with their careers during these meetings.

Recommendations

This research recommends that:

- Department of Basic Education should hold workshops in residential areas such as lodges and hotels for several days so that teachers may devote more time to learning the programs and gaining new abilities.
- Department of Basic Education should implement ICT programs that focus on teaching old teachers to obtain

basic technology skills so that they feel confident participating in Professional Development.

References

- Alamri, N.M., Aldahmash, A.H. & Alsharif, K.M. 2018. Emerging trends in research on math teacher professional development. *International Journal of Instruction*, 11(3), 91-106.
- Alkamel, M.A.A. & Chouthaiwale, S.S. 2018. The use of ICT tools in English language teaching and learning: A literature review. *Veda's Journal of English Language and Literature-JOELL*, 5(2), 29-33.
- Bell, J. & Waters, S. 2018. *Doing your research project: A guide for first time researchers*. (7th ed.). England: McGraw-Hill Education.
- Cohen, L., Manion, L. & Morriison, K. 2018. *Research methods in education*. (8th ed.). New York: Routledge.
- Creswell, J.W. & Creswell, J.D. 2018. *Research design: Qualitative, quantitative, and mixed methods approaches*. (5th ed.). Thousand Oaks: SAGE.
- Das, K. 2019. The role and impact of ICT in improving the quality of education: An overview. *International Journal of Innovative Studies in Sociology and Humanities*, 4(6), 97-103.
- Department for Education (DFE). 2018. *Induction for newly qualified teachers: Statutory guidance for appropriate bodies, head teachers, school staff and governing bodies*. London: Cooper Gibson Research.
- Dollar, Y.K. & Mede, E. 2019. The impact of pre-service teachers' reflection on their instructional practices. In *Information Reso Management Association* (Ed.). *Pre-Service and In-Service Teacher Education: Concepts, Methodologies, Tools, and Applications*. Hershey: IGI Global. 223-233.
- Dollar, Y.K. & Mede, E. 2019. The impact of pre-service teachers' reflection on their instructional practices. In *Information Reso Management Association* (Ed.). *Pre-Service and In-Service*
- Leedy, P.D. & Ormrod, J.E. 2015. *Practical research: Planning and design*. Boston: Pearson.
- Looney, L., Perry, D. & Steck, A. 2017. Turning negatives into positives: The role of an instructional math course on preservice teachers' math beliefs. *Education*, 138(1), 27-40.
- Merriam, S.B. & Tisdell, E.J. 2016. *Qualitative research: A guide to design and implementation*. (4th ed.). New York: John Wiley & Sons.
- Moekwa, B.C. 2020. *The effects of continuing professional teacher development on teachers' workload in the Gauteng Province*. (Doctoral thesis. UNISA, Pretoria). <https://uir.unisa.ac.za/handle/10500/26912>
- More, T.E. 2016. *The role of the principal in educator professional development*. (Doctoral dissertation. University of Pretoria, Pretoria). https://repository.up.ac.za/bitstream/handle/2263/60964/More_Role_2016.pdf?sequence=1&isAllowed=y
- Mukhamedov, G., Khodjamkulov, U., Shofkorov, A. & Makhmudov, K. 2020. Pedagogical education cluster: content and form. *ISJ Theoretical & Applied Science*, 1(81), 250-257.
- Ngema, M. 2016. *Using individual needs analysis to promote the effectiveness of foundation phase teachers in Imfolozi Circuit, KwaZulu-Natal*. (Doctoral thesis. UNISA, Pretoria). <https://uir.unisa.ac.za/handle/10500/21509>.
- Ngwenya, V.C. 2020. School-based supervision enhances the professional development of teachers. *South African Journal of Education*, 40(3), 1-10

- Ozdemir, S.M. 2019. Implementation of the lesson study as a tool to improve students' learning and professional development of teachers. *Participatory Educational Research*, 6(1), 36-53.
- Patton, K., Parker, M. & Tannehill, D. 2015. Helping teachers help themselves: Professional development that makes a difference. *NASSP bulletin*, 99(1), 26-42.
- Prenger, R., Poortman, C.L. & Handelzalts, A. 2019. The effects of networked professional learning communities. *Journal of teacher education*, 70(5), 441-452.
- Prestridge, S. 2019. Categorising teachers' use of social media for their professional learning: A self-generating professional learning paradigm. *Computers & Education*, 129, 143-158.
- Rana, K. & Rana, K. 2020. ICT Integration in Teaching and Learning Activities in Higher Education: A Case Study of Nepal's Teacher Education. *Malaysian Online Journal of Educational Technology*, 8(1), 36-47.
- Salmeron Aroca, J.A., Moreno Abellán, P. & Martínez de Miguel López, S. 2022. Teachers' Professional Development and Intelligent Ways of Coping with It: A Systematic Review in Elementary and Middle School Education. *Journal of Intelligence*, 11(1), 1-18.
- school teachers in Seshego Circuit, Limpopo Province. (Doctoral dissertation. UNISA, Pretoria). <https://uir.unisa.ac.za/handle/10500/19836>
- Shabani, K. 2016. Applications of Vygotsky's sociocultural approach for teachers' professional development. *Cogent Education*, 3(1), 125-2177.
- Singha, S. & Sikdar, D. 2018. Professional development of teacher and professionalism in teacher education. *International Journal of Applied Social Science*, 5(8), 1320-1332.
- Umugiraneza, O., Bansilal, S. & North, D. 2017. Exploring teachers' practices in teaching mathematics and statistics in KwaZulu-Natal schools. *South African Journal of Education*, 37(2), 1-13.
- Yang, D.C., Sianturi, I.A.J., Chen, C.H., Su, Y.W. & Trakulphadetkrai, N.V. 2021. Taiwanese primary school teachers' perceived enablers for and barriers to the integration of children's literature in mathematics teaching and learning. *Educational Studies in Mathematics*, 1-24.
- Zhukova, O. 2018. Novice teachers' concerns, early professional experiences, and development: implications for theory and practice. *Discourse and Communication for Sustainable Education*, 9(1), 100-114.