



SUNCEP RESEARCH REPORT

Enhancing the practice of Intermediate, Senior and Further Education and Training phase mathematics teachers in the Western Cape Province, South Africa, via an Advanced Diploma in Education (ADE) programme.

Level 1: Perceptions of participating in an ADE: Mathematics Teacher training programme.

Level 2: Perceptions of participants professional learning in an ADE: Mathematics Teacher training programme.

Principal Investigator:	Dr Ramesh Jeram
E-mail:	ramesh@sun.ac.za
Designation:	Component Head: Research
Co-investigator:	Ms Precious Simba
Institution:	Stellenbosch University
Department:	Centre for Pedagogy (SUNCEP)

Contents

1. ABBREVIATIONS	4
2. EXECUTIVE SUMMARY	5
3. BACKGROUND TO STUDY	6
4. LITERATURE REVIEW.....	7
4.1 Teacher perceptions of professional development	7
4.2 Professional Learning	10
4.3 Practice-based professional learning	12
5. COMPONENTS AND FORMAT OF THE PRACTICE BASED PROFESSIONAL LEARNING PROGRAMME	14
Contact sessions	14
Support sessions.....	15
Assessments.....	16
6. THE ADVANCED DIPLOMA IN EDUCATION.....	16
6.1 Western Cape Province	16
7. THEORETICAL FRAMEWORK	17
7.1 Level 1: Participants perceptions	18
7.2 Level 2: Participants learning	18
8. RESEARCH QUESTIONS	19
8.1 Main research Question	19
8.2 Sub-questions.....	19
9. METHODOLOGY.....	19
9.1 Research design.....	19
9.2 Population and sampling.....	19
9.3 Methods of data collection	19
9.4 Data analysis procedures.....	20
10. ETHICAL CONSIDERATIONS	20
10.1 Validity and reliability of instruments	20
10.2 Risks and Benefits	20
10.3 Consent	21
10.4 Voluntary participation	21
10.5 Coercion and perverse incentives	21
10.6 Confidentiality	21
11. FINDINGS FROM DATA	21
11.1 Evidence of applying theory learnt into practice	22

11.1.1	Analysis and discussion.....	23
11.2	Evidence of learning that addresses teaching context.....	23
	Analysis and discussion.....	24
11.3	Collegial and collaborative spaces must be created to socially mediate learning through self-reflection and sharing of teaching practices to develop best practices	24
	11.3.1	Analysis and discussion.....
		25
11.4	Evidence of learning new content and pedagogies and application in the classroom	25
	11.4.1	Analysis and discussion.....
		26
11.5	Modelling of appropriate pedagogies by facilitators to positively influence change in teaching practice	27
	11.5.1	Analysis and discussion.....
		29
11.6	Confidence/comfortable in delivering the curriculum	29
	11.6.1	Analysis and discussion.....
		31
11.7	Course material supported course learning and professional learning	31
	11.7.1	Analysis and discussion.....
		32
11.8	Mentoring supported professional learning but was a challenge for some.....	33
	11.8.1	Analysis and discussion.....
		34
11.9	Programme was delivered with integrity and that the academic quality was not compromised.....	35
	11.9.1	Analysis and discussion.....
		35
12.	CONCLUSION	36
13.	WITH APPRECIATION.....	37
14.	APPENDIX A.....	38
15.	References.....	40

1. ABBREVIATIONS

ACE	Advanced Certificate in Education
ADE	Advanced Diploma in Education
ANA	Annual National Assessments
CPL	Continuous Professional Learning
CTLI	Cape Teaching and Leadership Institute
ETDP-SETA	Education, Training and Development Practices, Sector Education and Training Authority
FET	Further Education and Training Phase
INSET	In-service training
IP	Intermediate Phase
ISPFTEDSA	Integrated Strategic Planning Framework for Teacher Education and Development in South Africa
ITE	Initial teacher education
LDoE	Limpopo Department of Education
NCED	Northern Cape Education Department
NEEDU	National Education Evaluation Development Unit
NGO	Non-governmental organization
NQF	National Qualifications Framework
NSC	National Senior Certificate
PD	Professional development
SACE	South African Council of Educators
SAQA	South African Qualifications Authority
SP	Senior Phase
SU	Stellenbosch University
SUNCEP	Stellenbosch University Centre for Pedagogy
WCED	Western Cape Education Department

2. EXECUTIVE SUMMARY

The ADE is an NQF level 7 qualification designed and developed by SUNCEP in accordance with the Minimum Requirements for Teacher Education Qualifications (MRTEQ) policy and aligned to Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (ISPFTEDSA). The aim is to fulfil the recognized need of providing a well-rounded, broad education that equips currently serving teachers with the subject content knowledge base, pedagogical theory and methodology that will enable them to demonstrate competence and responsibility as academics and professionals. The ADE qualification is also intended to create opportunities for capacity enhancement for currently serving teachers in a specific learning area/subject, by demonstrating focused knowledge and pedagogy in any teaching context. This qualification is designed to develop, mentor- and lead teachers, which are the target categories stipulated in the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa.

Utilising and adapting Guskey's (2002) framework for evaluating professional development, the purpose of this study is to determine the influence the ADE in Mathematics teacher training has on currently serving mathematics teachers in the IP, SP and FET phase, in the Western Cape Province, utilising a practice based teacher professional learning approach.

The findings indicate that the respondents perceived their experiences and professional learning on the ADE programme as positive and that the programme addressed most of the respondent's content and pedagogical needs. The findings indicate that the respondents:

- Are applying their new content into their teaching practice.
- Professional learning was linked to their teaching context
- Appreciated the creation of collegial and collaborative spaces to socially mediate learning through self-reflection and sharing of teaching practices.
- Found the modelling of appropriate pedagogies by the facilitators and their peers as positively influencing their own teaching practices.
- Were more confident and comfortable with delivering the curriculum in their classrooms.
- Found the course material suitable for the classroom
- Found the mentoring sessions supportive but for some it came with challenges

Overall, the respondents appreciated the efforts made by all role players to ensure that the programme was delivered with integrity and that the academic quality was not compromised.

3. BACKGROUND TO STUDY

The National Education Evaluation Development Unit (NEEDU, 2012) report states that the problem of generally low educator capacity has been recognised for some time, and efforts to address it through in-service training (INSET), from both the public and NGO sectors, with support from international and local corporate donors, have a long history. In any profession, continuous professional development (PD) remains an important mechanism for keeping professionals up to date with the latest developments.

According to Van der Berg, Spaul, Wills, Gustafsson, & Kotze (2016) a range of research suggests that in-service teacher development is most likely to be effective when it builds on and strengthens what teachers already do in the classroom, rather than introducing sudden and fundamental changes in teaching practice from outside sources. In-service courses that lack relevance to the day-to-day work of teachers in schools (decontextualized) make it less likely that training will be reflected in improved classroom practices. The effectiveness of approaches to in-service teacher development will be significantly influenced by factors such as the knowledge and skills of participating teachers (content and pedagogy), the characteristics of their teaching environments (teaching context) and the expectations of the school curriculum (what I need to know).

Currently, the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (ISPFTEDSA), 2011–2025, (Department of Higher Education and Training and Department of Basic Education, 2011) is government's plan for inset training of teachers. The ISPFTEDSA places teachers at the centre of efforts to improve their capacity, encouraging them to take responsibility for their own development. The main intended outcome is to improve the quality of teacher education and development in order to improve the quality of teachers and teaching.

Aligning to ISPFTEDSA mandate, SUNCEP has recently developed new Continuing Professional Learning (CPL) programmes called the Advanced Diploma in Education (ADE), accredited by the South African Qualifications Authority (SAQA). Contained in these CPL programmes are short courses aligned to the ADE in Mathematics, Natural-, Life- and Physical Sciences, and endorsed by the South African Council of Educators (SACE). The ADE is an NQF level 7 qualification designed and developed to fulfil a recognized need of providing a well-rounded, broad education that equips currently serving teachers with the subject content knowledge base, pedagogical theory and methodology that will enable them to demonstrate competence and responsibility as academics and professionals.

The ADE qualification is intended to create opportunities for capacity enhancement for currently serving teachers in a specific learning area/subject, by demonstrating focused knowledge and pedagogy in any teaching contexts. This qualification is designed to develop, mentor- and lead teachers, which are target categories stipulated in the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa.

This research study will focus on the influence/impact that an Advanced Diploma in Education in Mathematics Teaching will have on the practices of currently serving (INSET) mathematics teachers, in the Intermediate, Senior and Further Education and Training phase, in the Western Cape Province of South Africa.

4. LITERATURE REVIEW

4.1 Teacher perceptions of professional development

According to Avidov-Ungar (2016) professional development (PD) takes place throughout the professional life of the teacher and it is governed by personal perceptions (cognitive), personal commitment (affective) but at the same time also influenced by regulations and policy within a system that manages PD from the top down. However, the need for the teacher to be part of any professional development is ultimately linked to their worldview and how it can contribute to this worldview. It is also vital to the development of curriculum change and teacher professional knowledge (Ha, Lee, Chan, & Sum, 2004). At any given moment, teachers are placed at various stages on the professional development continuum, informed by various needs whilst reflecting on their personal motivations and aspirations. For some teachers, perceptions on PD are linked to their personal values, beliefs and ideologies. Teachers perceptions on PD are also linked to intrinsic motivation, that is, sense of self-satisfaction by embracing the challenges that come with learning and applying new knowledge and skills, and extrinsic motivations, that is, seeking appreciation for the work they have done from others and the associated expectations others have for or of their work (Avidov-Ungar, 2016; McMillan, McConnell, & O'Sullivan, 2016). This leads Avidov-Ungar (2016) to note that when teachers are involved in any sort of PD, some want to develop laterally, that is, becoming an expert in a certain area of teaching, and some do it to develop horizontally, that is, to acquire skills and knowledge to occupy more senior positions. However, it must be noted that PD must viewed as a process and not as an event; implying that PD should not be a once off event, but a continues and sustained process, if it is to address a personal, professional and institutional need.

It also requires that the leader of the school/educational institution, play an active role in initiating and supporting collaboration amongst teachers, government, parents and educational experts to maintain and nurture a healthy learning environment within the school or institution. Successful reforms, via PD, requires the commitment of all stakeholders, especially the teachers.

In studies done by Badri, Alnuaimi, Mohaidat, Yang, & Al Rashedi (2016), Hustler, McNamara, Jarvis, Londra, & Campbell (2003) and McMillan et al. (2016) the authors purport that the availability of collaboration, time, long-term commitment and resources are important for the successful implementation of PD. They also noted that:

- Teachers found PD meaningful when the impact was transferable in the classroom and guided their practice
- Professional development programmes had the most impact on teaching if it focused on knowledge of curriculum, content knowledge, student evaluation and assessment.
- Within PD, policy makers should consider including professional learning spaces to address the medium- and long-term needs of teachers, whereby teachers are involved and take ownership of their own PD.
- Most notable barriers to PD for teachers are linked to conflicts with their personal and professional work schedules, financial costs of courses, travelling vast distances to attend PD and the lack of incentives associated with PD.
- Teachers find PD most meaningful if it could be customized to their personal, professional and linked to their institutional needs.
- Teachers noted that some of the most formative learning experiences occur when there is any form of peer-to-peer interactions with colleagues. This could be done via mentoring, establishing professional learning communities, etc. any opportunity that could create a platform to share and exchange knowledge of content, contexts, skills and resources.
- Sometimes, institutional needs take preference over professional needs. Professional development programmes should strike a balance between the two.
- Older (especially male teachers) tended to have a more negative attitude towards PD. They linked their involvement in PD to institutional and national policy interests. Younger teachers (irrespective of gender), on the other hand, were more positive attitude towards PD. They perceived PD as being of professional interest to them.
- Mentoring was viewed as adding value to their professional learning. The notion of having an objective voice guide you and being privy to outside experiences and opinions from others and exchanging ideas with others are appreciated.

Highlighting the challenges around teacher training in South Africa, another report entitled *Identifying binding constraints in education* by Van der Berg, Spaull, Wills, Gustafsson, & Kotze (2016, 8) indicates that

A large body of local research has shown that many teachers lack basic levels of content knowledge and pedagogical skills. The Southern Africa Consortium for Monitoring Educational Quality (SACMEQ) 2007 study assessed Grade 6 Mathematics teachers as well as their learners. This study showed that only 32% of Grade 6 Mathematics teachers in South Africa had desirable subject knowledge in Mathematics, compared with considerably higher proportions in other countries such as Kenya (90%), Zimbabwe (76%) and Swaziland (55%).

Offering further evidence of the above, Van der Berg et al. (2016), state that as a consequence of these finite workshops with no practical implementing component, teacher training had not produced the quality of teachers South Africa needed – a testament to this is the poor results of our systemic (WCED), ANA and NSC examinations. They also revealed that the methods of teacher training in South Africa are still unsuitable as the training does not address the challenges of transforming content knowledge into practice. Van der Berg et al. (2016) indicate that a range of research suggests that in-service teacher development is most likely to be effective when it builds on and strengthens what teachers already do in the classroom, rather than introducing sudden and fundamental changes in teaching practice from outside sources. In-service courses that lack relevance to the day-to-day work of teachers in schools (decontextualized) make it less likely that training will be reflected in improved classroom practices. The effectiveness of approaches to in-service teacher development will be significantly influenced by factors such as the knowledge and skills of participating teachers (content and pedagogy), the characteristics of their teaching environments (teaching context) and the expectations of the school curriculum (what I need to know). Teachers still lack the basic content and pedagogical skills required to adapt their practices to ever-changing contexts in order to teach effectively. This aligned to the NEEDU (2012) report that after evaluating teacher education programmes, and acknowledging the success of some of these programmes, much still needs to be done to bridge the gap between theory and practice. To bridge the theory-practice divide, researchers such as Webster-Wright (2009) and Boud & Rooney (2011) suggest that we make the paradigm shift from viewing professional development to professional learning. We should reframe professional development as continuous professional learning and thus move away from the notion of development being once off, to learning being a lifelong concept; embedding the notion of continuous professional learning into the reality of what we do and not outside of where teachers practice.

4.2 Professional Learning

Mccormack, Gore, & Thomas (2006) purports that traditional modes of teacher learning have been linked to formal, planned in-service activities utilising a deficit model where “experts” from outside, with no knowledge of the teacher’s context, would share knowledge, skills and resources with teachers. Knowledge and skills were transmitted to teachers and the expectation is that teachers, without any support, would have to implement this new knowledge and skills. However, a shift has recently been taking place where teacher training activities encourage teachers to reflect on and participate actively in their own learning. This mode of teacher training has been termed as professional learning, where teachers knowledge, understanding and skills are transformed as they practice; either on their own or as a collective. According to Keay, Carse, & Jess (2019), professional learning is starting to be acknowledged globally as a way of strengthening teachers’ motivational beliefs, confidence and capacity to improve the quality of their teaching and students learning.

For Bruce, Esmonde, Ross, Dookie, & Beatty (2010) teacher professional learning can be conceptualised as learning that is entrenched in the classroom context and knowledge and skills are constructed via experiences and practices in a sustained continuous cycle made up of the following components: goal setting, planning, practicing (teaching) and reflecting. The classroom becomes the context of learning to sustain this learning cycle. Akiba & Liang (2016) notes that the literature is beginning to challenge the traditional transmission modes of professional learning and is shifting towards establishing a context for professional learning that is transformative, participative, situated, recursive and long term. By utilising this recursive and non-linear process, Akiba & Liang (2016) notes that teachers will actively engage in attempts to negotiate the many tasks and obstacles they will encounter in their professional learning. And as the process becomes explicit, teachers must also be supported to elaborate and deepen their knowledge, skills and relationships via a mixture of experiences that consolidate, challenge and support their creativity.

According to Opfer & Pedder (2011) the activities to sustain teacher professional learning should be continuous or sustained over a period of time and not a once-off training session as per the traditional modes of teacher training. It should also be intensive and not be sporadic, brief and superficial. Professional learning for teachers is most effective when they engage with materials of practice, when the learning activity addresses their teaching contexts and is integrated into their professional lives and linked to pedagogies that allow for reflection on their own teaching practice. Opfer & Pedder (2011) also note that there are three sources of teachers’ pedagogical beliefs which are determinants in how teachers learn.

These are personal experience, experience with school and instruction, and experience with formal knowledge. It is these pedagogical beliefs which determine the teacher's attitude towards teaching and learning and as such, the most recent trend amongst teachers is to seek knowledge that is specific to their contexts i.e. distinct knowledge which is applicable to their own teaching situation, as opposed to generic knowledge.

Another effective aspect of teacher professional learning is when teachers are involved in collegial teams from various schools engaging in similar teaching and learning activities. In their review of literature related to professional learning, Opfer & Pedder (2011) noted, from the literature, that collaborative professional learning could produce changes in teachers' practice, attitudes, beliefs and student achievement. When teachers come together to form a learning community, teachers are more likely to discuss problems, strategies and solutions, which could lead to positive changes in teacher behaviour. Similarly, in their study with mathematics teachers, Akiba & Liang (2016) noted that teacher-centred collaborative learning activities on mathematics teaching and learning (teacher collaboration and informal communication) seem to be more effective in improving student achievement than learning activities that do not necessarily involve such communications (professional development programs, university courses, individual learning activities). Within these collaborative and collegial spaces, teachers were more honest and open about their teaching thus strengthening their beliefs and approaches about teaching. These collaborative and collegial spaces also promote collective reflections, which lead to the construction of new knowledge and skills and changes in practice. For Akiba & Liang (2016), through a collaborative and research-based learning process promoting in-depth discussions and reflections on specific teaching approaches and student learning, it is likely that these investments in promoting teachers' professional learning activities will result in improved student learning. To help bridge the theory-practice divide, leading researchers such as Timperley (2008), Boud & Rooney (2011) and Raelin (2007) suggest that professional learning should be based on practice theory. A professional learning approach that infuses elements of practice theory, intermingling theory and practice that could create a kind of teaching and learning for teachers in which teachers become serious learners in and around their practice, rather than superficially implementing strategies and activities learnt at workshops.

4.3 Practice-based professional learning

When the current literature on teacher education is reviewed, one challenge is beginning to appear as a crucial factor as to why teacher education activities are generally not delivering on the enhanced teaching practices of teachers, and improved student learning. This challenge around teacher education is mainly aimed at the inability of teacher training activities to influence teaching positively because the activities are mainly linked to theory with no link to teachers practice within his or her context (D. L. Ball & Cohen, 1999; D. Ball & Bass, 2000; McCormack et al., 2006; Opfer & Pedder, 2011; NEEDU, 2012; Akiba & Liang, 2016). In an attempt to address this challenge, Heather Timperley (2008) and Boud & Middleton (2003) promote professional learning as a means of minimising the theory-practice gap. Timperley (2008) claims that to promote teacher understanding and effective changes in practices, it is essential that teacher knowledge and skills be integrated. In any successful teacher professional learning programme, theories of curriculum, effective teaching and assessment should be developed alongside their applications to practice. Approaches that combine theory with practice have a positive effect on the efficacy of teaching practice, as opposed to approaches that expound theoretical constructs to teachers without methods to convert theory into sound teaching practice. Boud and Middleton (2003) suggest that for any meaningful professional learning to take place, learning should be integral to practice. Learning as a practice should be examined, as learning is not a practice that exists separate from other practices, and learning should be sustained and perpetuated in any given organisational context.

Practice-based professional learning has increasingly being touted as an alternative means of teacher education to address the impediments linked to teacher training that is too focussed on theory and not linked to the context in which teachers work, that is, their practice (R Jeram, 2018; Jeram & Davids, 2020). This implies that, in order to bridge the theory-practice gap, we need to make the shift from professional development to professional learning, and we need to consider teacher education initiatives from a perspective of practice theory. Extending on the notion of using practice theory within professional learning programmes as a mechanism to bridge the theory-practice gap in teacher professional learning programmes, researchers Korthagen et al. (2006) and Ball (2000) suggest ideas or principles to intermingle theory with practice, within professional learning programmes, and consequently reduce the dichotomous nature of theory and practice.

Common to both researchers' suggestions is that teachers must have a deeper understanding of the content or subject matter knowledge in order to understand the purpose and the usage of such knowledge to improve their teaching – suggesting therefore that focussing on deep conceptual understanding of the subject matter knowledge/content should be a core feature of any teacher professional learning programme. Collegial and collaborative spaces must be created to socially mediate learning through self-reflection and sharing. This helps teachers to build their experience and thus create an organically evolving pedagogy of appropriate practices within various contexts. Modelling by experts should also form another key component of the teacher professional learning process as teachers should be taught to take appropriate professional risks, so as to develop their own teaching practice, alluding to mentoring and support. From the literature studied pertaining to teacher professional learning and practice theory, researchers Boud & Rooney (2011), Webster-Wright (2009); Raelin (2007), Ball (2000) and Ball & Cohen (1999) recommend an approach to teacher education in which teachers become serious learners in and around their practice, rather than superficially implementing strategies and activities learnt at workshops that are episodic and finite in nature.

Taking the above into consideration, and through an in-depth study on the required literature, SUNCEP explored, analysed and critically evaluated theories, approaches and practices related to professional learning, teacher education and practice. This led SUNCEP to adopt a very broad philosophical positioning of learning as being an embodied, continuous and lifelong process; focussing on the professional learning of teachers within an epistemological framework linked to knowledge acquisition as a human activity related practice. This philosophical and epistemological positioning led SUNCEP to shift towards a practice-based approach to teacher professional learning, using practice theory as a theoretical framework. This reflection was initiated by data on learner performance, such as the grade 12 National Assessment results and the grade 4 to 6 Annual National assessments. Various South African reports, inter alia the National Education Evaluation Development Unit (NEEDU, 2012) report, and “South Africa’s Education Crisis: The quality of education in South Africa 1994-2011” (Spaull,2013), were also studied. Focussing on teacher training initiatives for currently serving teachers, the NEEDU (2012) report concluded, that although teachers were exposed to the appropriate theory during training, not much was being done to transform that theory into practice. The report recommends that much needs to be done to explore alternative modes of teacher education to bridge this theory-practice gap.

Using this philosophical positioning and epistemological approach led SUNCEP to conceptualise components of its practice-based teacher professional learning approach within its Advanced Diploma in Education (ADE) Mathematics teacher training courses for Intermediate Phase (IP), Senior Phase (SP) and Further Education and Training Phase (FET). These components include contact sessions for learning new knowledge or strengthening and transforming existing knowledge; mentoring to offer support for the teacher to bridge the theory-practice divide in teaching; practice-based assignments to introduce new strategies and ideas in their teaching, and e-resources to offer teachers ideas on e-learning in the classroom.

Utilising and adapting Guskey's (2002) well known framework for evaluating professional development, the purpose of this study is to determine the influence the ADE, in Mathematics teaching, has on currently serving mathematics teachers in the IP, SP and FET phase, in the Western Cape province, utilising a practice based teacher professional learning approach.

5. COMPONENTS AND FORMAT OF THE PRACTICE BASED PROFESSIONAL LEARNING PROGRAMME

Operationalising the practice-based teacher professional learning approach for teacher training, SUNCEP decided on the following components of the approach, which could minimise the theory-practice gap within teacher training programmes:

Contact sessions

The contact sessions comprise face-to-face tuition sessions held with teachers over a specific period. During these sessions, intense training takes place which focuses on conceptual development and understanding of the specified content and pedagogy. Expert subject facilitators engage in modelling and discussion around content and pedagogy to highlight differences in teaching in different contexts. These sessions are also opportunities for peer learning, during which teachers can share ideas on best practice within a safe, collegial and collaborative space. The contact sessions are structured over consecutive school holiday periods. The reason for consecutive contact sessions is to ensure that learning is continuous, reflexive and experiential.

Support sessions

Mentoring, for SUNCEP, addresses the supportive nature of learning and forms a crucial component of the SUNCEP practice-based teacher professional learning approach. By supporting the teachers, mentoring addresses the issue mentioned in the NEEDU (2012) and the Van der Berg et al. (2016) report relating to the disjuncture between theory and practice. Mentoring could provide the conduit to assist teachers in bridging the gap between theory (what they had learnt during the contact sessions) and practice (classroom implementation of the content and pedagogy learnt in the contact or training sessions). After each contact session, highly competent, experienced mentors¹ support teachers, either collectively in a cluster, and/or individually at their school. It is within these mentoring sessions that issues around the assignment and implementing the new knowledge and skills are discussed. Teaching practices would be shared within a safe collegial and collaborative space and ideas around teaching practices would be discussed to offer advice and insights on how to improve their practices; a socially mediated safe space is created to encourage the sharing of best practices.

A cluster support session would focus on:

- progress on the portfolio;
- progress on the practice-based assignment;
- sharing and discussing challenges, and finding solutions to teaching and classroom challenges;
- sharing and discussing best practices using the activities for teaching and learning;
- sharing and discussing resources and the access to resources; and
- reflecting on the intervention and the effect it had on their teaching practice and offering insights for improvement regarding the intervention.

In addition, and under the guidance of the mentor, teachers are expected to create a portfolio of evidence containing work completed (such as assignments), and narratives of their reflections on the changes in their teaching practices, as evidence of competence whilst on the course. Portfolios would be handed in on the first day of every contact session, it would be assessed by the mentor, then during the contact sessions, a cluster support session would be held at the end of the day to address any concerns and guidelines offered by the mentor to strengthen certain aspects of the portfolio.

¹ These were usually retired teachers, with many years of teaching experience. Despite being pressed to retire as per state policy, many felt they still had much to offer teaching. They were also considered subject experts with high levels of pedagogical and content knowledge.

Assessments

On any SUNCEP practice-based teacher professional learning programme, teachers are required to complete rigorous practice-based assignments. The aim of the practice-based assignment is to address issues around teachers' ability to integrate theory and practice in a practical way. The assignment aims to prepare teachers to apply and reflect upon new pedagogical approaches, and the suitability of that pedagogy within their context. This entails designing, developing and implementing teaching activities in and around their teaching and reflecting upon the approach. Questions asked in the assignment relate to reflecting upon the teaching activity or activities, such as –

- What was your role, as the teacher, during the activity?
- How did the learners respond to the activity?
- Which aspects worked or did not work during the lesson?

These questions were aimed at contributing to the teacher becoming a reflective practitioner. The reflective aspect of the assignment forms the most crucial part of the assessment as it assists in developing an important skill linked to practice and lifelong learning – that is, the ability to review and refine their teaching practice.

6. THE ADVANCED DIPLOMA IN EDUCATION

6.1 Western Cape Province

The duration of these ADE programmes is two-years (24 months) part time. The three programmes in the Western Cape province of South Africa had all the components of the SUNCEP practice-based teacher professional learning approach. The funding granted to SUNCEP, in 2018, by the Education, Training and Development Practices, Sector Education and Training Authority (ETDP-SETA)² made provision for 100 mathematics teachers to register and complete an ADE in Mathematics teaching at Stellenbosch University. Recruitment of the course participants were done by the Western Cape Education Department (WCED) in late 2017. The teachers were recruited from all major education districts in the Western Cape. Initially, the 100 mathematics teachers were to be registered for an ADE in intermediate phase (IP), senior phase (SP) and further education and training

² The Education, Training and Development Practices Sector Education and Training Authority (ETDP SETA) was established in March 2000 and re-established in November 2010 for 2011 – 2016 in terms of the Skills Development Act (No. 97 of 1998) (as amended) of the Republic of South Africa. The mandate is to promote and facilitate skills development in the Education, Training and Development (ETD) sector for the benefit of employers, workers and employees in the sector to enable our people to participate actively in the South African economy. For more information, kindly click on the following link: <http://www.etdpseta.org.za/education/sites/default/files/2017-07/ETDP-SETA-Information-Brochure.pdf>

phase (FET) mathematics teaching. However, despite an extensive recruitment campaign by the WCED, only 75 teachers registered for the ADE programme. Due to personal and professional reasons, 5 teachers withdrew from the course during year 1. There are currently 70 teachers registered on the ADE programme and is made up of 33 IP, 17 SP and 20 FET mathematics teachers. This report is thus based on three practice-based teacher professional learning ADE programmes in the Western Cape. These are:

- ADE in Intermediate Phase Mathematics teaching (33 teachers)
- ADE in Senior Phase Mathematics teaching (17 teachers)
- ADE in Further Education and Training Phase Mathematics teaching (20 teachers)

The contact sessions were held at the Cape Teaching and Leadership Institute (CTLI) in Kuilsriver in the Western Cape. This is the official in-service teacher training institute for currently serving teachers of the WCED. The contact sessions were held during the school holidays, which meant that the teachers from the various education districts in the Western Cape had to travel to the CTLI. Those who came from rural areas were housed in the hostels at the training facility for the duration of the contact sessions. For this cohort of teachers, on which this research report is based, 2019 was second year of the programme. The successful candidates graduated with their diplomas in December 2019.

7. THEORETICAL FRAMEWORK

The theoretical framework used for this research report is based on an adaptation of the Guskey (2002) framework for evaluating teacher training programmes, and will focus on the following levels, namely, (1) Participants perceptions, (2) Participants learning, (3) Organisational support and change, (4) Participants use of new knowledge and skills. **As this is a longitudinal study this report focusses only on evidence linked to level 1 and 2 of the research study. Data for this report, linked to level 1 and 2, was created via semi-structured interviews from each respondent after being on the ADE programme for 18 months. To complete this study, further interviews will be conducted to collect data focusing on levels 3 and 4, with a subsequent report(s) to follow.**

This research report will thus focus on:

7.1 Level 1: Participants perceptions

This level focusses on the reactions/perceptions or the experiences of the participants whilst being part of a practice-based professional learning programme, such as the Advanced Diploma in Education (ADE): Mathematics Teaching. The information required to look at the course participants reactions whilst being on an ADE, will be gathered via a questionnaire and/or open-ended interview type questions. The aim of this part of the study is to determine the participants' satisfaction with the programme, and how the data can be used to improve programme delivery, for future ADE's.

7.2 Level 2: Participants learning

In addition to how the course participants experienced the ADE practice-based professional learning programme, the intention is also to ascertain the knowledge and skills gained whilst being on the programme. The focus of this level would be to determine whether the programme had any influence in changing the level of the course participants content knowledge and pedagogical skills. The data will be collected via a rated scale and/or open-ended questions. The questions, whether in a questionnaire or survey, will relate to changes in successful learning and skills acquisition that could influence their teaching practices. This could inform the programme's content, format and the organisation of the programme activities.

At this point it must be noted that this research report is a study on how the respondents on this research study perceived the ADE programme and what their perceptions are about their own professional learning whilst on the programme. Thus, despite utilising an evaluation framework, this framework was adapted to determine the influence which the ADE programme had on their perceptions about the programme and their perceptions on their own professional learning, whilst on the programme. This is therefore not an evaluation of the programme per se, but more of an exploratory study into what influence the ADE programme had on the respondents' teaching practice.

8. RESEARCH QUESTIONS

8.1 Main research Question

What influence does an Advanced Diploma in Education: Mathematics Teaching have on enhancing the teaching practices of currently serving mathematics teachers, in the Intermediate, Senior and Further Education Training phase, in the Western Cape province, South Africa?

8.2 Sub-questions

- What are the course participants' perceptions about attending an Advanced Diploma in Education programme?
- How has attending an Advanced Diploma in Education influenced participants' learning of new knowledge and skills?

9. METHODOLOGY

9.1 Research design

The aim of this study is to interpret the experiences and perceptions of mathematics teachers attending an ADE mathematics teacher training programme, utilizing a practice-based teacher professional learning approach. This study will thus adopt a qualitative interpretative approach.

9.2 Population and sampling

Participants for this study was drawn from teachers enrolled for the ADE Mathematics teacher training programme in the IP, SP and/or FET phase, from across the Western Cape. All students enrolled were invited to participate in the study. Those who agreed to be research participants or respondents were asked to complete and sign a research consent form, as prescribed by the ethics committee at Stellenbosch university.

9.3 Methods of data collection

A semi-structured interview schedule was used to gather information. All the interviews were conducted by a research assistant using a voice recorder. All protocols in terms of arranging the interviews were followed and a standard interview template was used for each interview (see Appendix A for the semi structured interview questions).

9.4 Data analysis procedures

Figure 1 below illustrates the data analysis process that was utilised for this research report. For this research study, an analytical style known as the template analysis style was used. According to McMillan and Schumacher (2006:365), this style logically applies derived sets of codes and categories to the data, from words or phrases in the data, called segments. These initial codes or categories were created from my interview schedule and were related to my research questions. Once the data was coded into categories, the categories were grouped in various ways to identify meanings, that is, patterns were looked for amongst and where necessary within the categories in order to understand and interpret the data and answer the research questions.

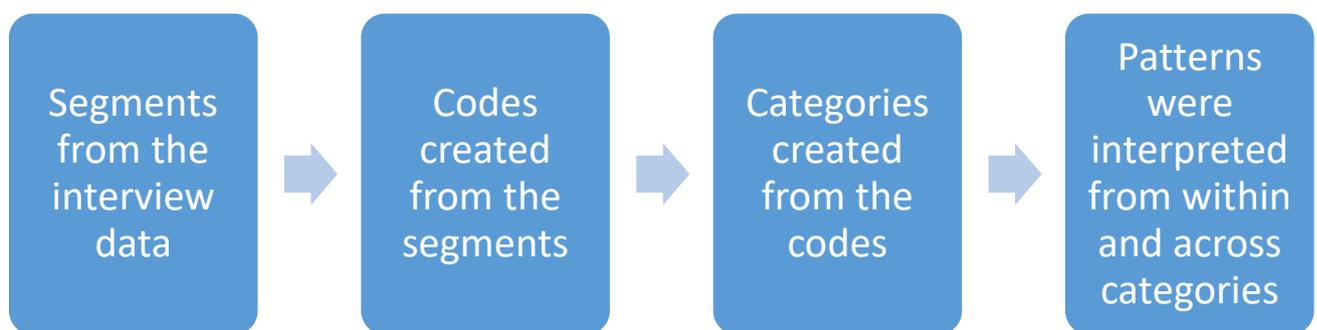


Figure 1: The data analysis process

10. ETHICAL CONSIDERATIONS

10.1 Validity and reliability of instruments

- Piloting of instruments to ascertain validity and reliability
- Proposal to be submitted to REC for ethical clearance after instruments have been finalized
- Institutional permission to be obtained from Stellenbosch University (SU) and the Western Cape Education Department (WCED) and principals of participating schools
- Consent forms to be completed by facilitators and participating teachers

10.2 Risks and Benefits

We do not foresee any appreciable risk or discomfort that will arise from participating in this study. Questions will be posed in general terms. This is a minimal risk and participants will not be asked to divulge personal information. There will be no direct benefit to learners participating in this study.

10.3 Consent

Written informed consent will be obtained from all ADE mathematics training students who volunteer to be research participants. Consent scripts will be in English.

10.4 Voluntary participation

Participants will be informed of their right to withdraw from the study at any point without facing any negative repercussions.

10.5 Coercion and perverse incentives

There will be no undue incentives to those who will consent to form part of the study when asked and participants will neither be intimidated nor compelled to participate in the study. Any kind of coercion and issuing of perverse incentives is seen as a breach of ethical conduct and is deemed to be unethical.

10.6 Confidentiality

SUNCEP will treat the information collected in the interviews and the client survey in a confidential manner. Information collected will only be made accessible to people authorised to assist with data capturing and the investigators involved in the analysis and write-up of study results. Data collected electronically will be stored on password-protected computers and network drives. Hard copies of questionnaires and/or interview transcripts will be stored in locked cupboards, offices or storerooms at the researcher's office when not in use for data entry or analysis. No names or personal identifiers will be recorded in any of the data collection tools.

11. FINDINGS FROM DATA

As indicated from the literature review, researchers and theorists claim that the efficacy of in-service teacher development and teacher learning will be significantly influenced by factors such as the knowledge and skills of participating teachers (content and pedagogy), the characteristics of their teaching environments (teaching context) and the expectations of the school curriculum (what I need to know). These factors also form an integral part of the practice-based teacher professional learning approach, which calls for an approach to teacher training that is content intensive, socially mediated and shared, embodied and context sensitive, with the intention of minimising the theory-practice gap, which according to the NEEDU report (2012), is crucially lacking in current teacher training programmes in South Africa.

In terms of the findings of the data, there were definite themes/categories and subsequent sub-themes/sub-categories linked to the aforementioned factors, that presented itself from the data, highlighting the perceptions and the professional learning of the course participants on the ADE mathematics teacher training programme. What follows are the findings, analysis and discussion of the findings from the data as obtained via semi-structured interviews with the research participants/respondents after being on the on the ADE programme for 18 months. Below each theme/category is listed the sub-themes/sub-categories (in bullet form), with evidence from the data in the form of quotations in *italics*.

11.1 Evidence of applying theory learnt into practice

- Course was practice-based or practical in nature in that you could implement in class what you have learnt: *“...approach of this programme with the practice-based teaching was uhm something that was really good...So the fact that you can go back to school and implement what you have learnt here...it’s something that’s good as well.”*
- Ability to learn and reflect on new learnings, becoming a lifelong learner: *“You do something then you go back , and you practice that which you have been taught and then you give reflections on that...I see myself as a lifelong learner”* and *“I reflected on myself, I reflected on my teaching practice and I really want to do, I want to make that a habit.”*
- Course encouraged teachers to try out new strategies in classroom because what was learnt was meaningful: *“...because we’ve been teaching for so long and when you hear a new approach and you never implement it before it challenges you to go and try out and I think that is what I love about it. That was one expectation that was immediately met”* and *“...it’s a little bit of our comfort zones are being changed are challenged...now you need to try and say ok let me try this because it’s new thing...”*
- Indications that the course could close the theory practice gap: *“...it did make a difference as well because of how you had the theory part and the practical part so you can combine the two uhm like if I would go to school next week and I still remember oh what we did this last week so I’m gonna try the first day at school or second day just to see how that works yah.”*
- Also changed teachers perceptions in their approaches to teaching and learning in the classroom. The learning of new knowledge and skills caused them to critically reflect on their own teaching practice; it gave them food for thought: *“But now what I’ve learned now is to be more interactive and let children be more engaged let the children engage more in the in do more activities that the children could engage into.”*

And this is what I have” and “ ...a lot more practical stuff can be done and not just a university type of lecture” and “As I said it boost my confidence uhm I have better understanding of certain mathematical concepts...the things that I have learned in the 2 years...I have better tools that I can use, that I have learned here” and “There is a great impact. Usually I just, I was just teaching for the sake of teaching and this curriculum required of me I was just teaching. Now I can zoom in, now I know what is the areas maybe that they will struggle with. Because this cause has given me that distinguished decision make to distinguish what is relevant what is not relevant.”

11.1.1 Analysis and discussion

From the findings above, it becomes apparent that there is evidence of applying the theory that was learnt during the contact training sessions within their own teaching practice. Some applied the new knowledge and strategies immediately; others might have taken a while. There was also evidence of the respondents approaching their teaching in the same way for a long time and not wanting to introduce new strategies due to their current teaching comfort zone(s). It would appear the ADE programme made them to critically reflect on their own practices and challenged them to implement or “try out” these new strategies. This alludes to changes in their own teaching practices after being exposed to new content and strategies during their training and trying to link the newly acquired theory with their own practice(s) and within their own teaching contexts.

11.2 Evidence of learning that addresses teaching context

- Some had issues around the context in which the problems were set. It did not relate to learner’s social context: *“I mean personally I would love to see examples South African examples uhm...”*
- Activities in the course booklets could be used in the classroom to offer an alternative approach to teaching but had to be adapted: *“...I could adjust some of the uhm the work that’s in the booklets. But most of it I find very uhm helpful and it also gave me another approach on how I can explain or yeah how I can explain work to the learners. It also gave me better resources...when I need an extra resource other than the textbooks...”*

- Evidence of change/adapting practice to address contextual needs: *“As or all the topics that are dealt with in at that level is I could I could tackle them quite well...it gives you a different way of doing what you always been doing and shows you ok you’re doing this this way but it could be better done that way. So you change and adapt as you go on”* and *“The course is quite current so we can give you a perspective on how to change things now in your classroom. It’s curriculum is based on CAPS so all of the things that you need to do is there. All of the resources you just have to prepare yourself and go on with teaching which is quite good.”*

Analysis and discussion

There is an indication from the respondents involved in this study that whilst they appreciated the resources used during the training, they realised that it had to be adapted to their own teaching context. There was also a request that some of the resources be more sensitive to the learners’ social context. The findings do highlight the notion of them being sensitive to their teaching contexts, which was also discussed and debated within their contact training sessions, facilitated by the course facilitator. SUNCEP will take cognizance of this recommendation as context sensitive resources do have an impact on learner’s development and understanding of the concepts.

11.3 Collegial and collaborative spaces must be created to socially mediate learning through self-reflection and sharing of teaching practices to develop best practices

- Indications that learning was socially mediated to reduce the theory-practice gap: *“yes you had the theoretical aspect and using the CAPS curriculum but it allowed us to implement some strategies in the class whether it be through few power points presentations that we had to do or just sharing with other colleagues and hearing what they are doing.”*

- Socially mediated learning and sharing practices with colleagues and facilitators created confidence to teach mathematics: *“And I’m very passionate and I’m like mad (crazy) in my class but being here learning from each other from from the other students, seeing how they are doing a certain topic, uhm looking at my listening to the lecturers this definitely helped me being a maths teacher...I’m more uhm uhm confident, I can call workshops, cluster workshops in my schools and I will give demonstration lesson...”* and *“Other than the need to be qualified, the need a better at mathematics teacher that made because I have become really more confident in class situation itself”* and *“And the thing about this course is we share best practices amongst each other as maths teachers because we love maths and we have a deeper understanding.”*

11.3.1 Analysis and discussion

The teachers who were part of this research study appreciated how the safe, collegial and collaborative spaces created opportunities for them to be involved with learning that was socially mediated and shared with either their peers and/or the course facilitator and/or the mentor. The sharing of teaching practices within these environments were for some more effective than the actual content training sessions, as this sharing created a deeper understanding of the teaching challenges experienced not just by themselves, but also by their peers. The notion of “sharing with colleagues and hearing what they are doing” highlighted the notion that they were not alone in experiencing similar challenges within their teaching practices and classrooms. It also gave them the confidence to apply their new knowledge and skills in their classroom(s), taking the theory and putting it into practice.

11.4 Evidence of learning new content and pedagogies and application in the classroom

- Meaningful content and strategies were learnt that can be transposed from one phase to another during this experience, thus boosting expectations of the course in a positive manner. Indications that knowledge learnt during the course is applicable in the classroom: *“I didn’t just teach intermediate phase I teach senior phase as well so that allowed me to use strategies in the course for my senior phase as well. So, whatever I learnt here could directly take it back into the classroom and try to implement it.”*

- Experience has exposed respondents to the constructivists/learner centered approach to teaching. Possible reference to content intensive training which challenges current thinking and practices around teaching: *“They concentrate on hands on, the learner must be hands on, learners must find themselves at the solutions even if they have got their different names its ok but that’s what is different in my olden way of teaching, because I’m 25 years into teaching practice, but this is very different to where learners are now.”*
- Not being a qualified mathematics teacher, this experience has taught me a lot about the teaching of mathematics: *“I’m not qualified in mathematics but I feel that at primary school so I have taught mathematics for the last three years...I really learnt a lot...”*
- Experience was about going beyond the curriculum for a particular grade. Understanding the content offered insights into what was important for the learner to know for the next grade in the phase: *“...we are not owned by the curriculum even though we take it as a starting point. We need you to know more than what the curriculum requires you to know. So, in that regard it was exciting for me because I got challenged a lot”* and *“I can also identify that this to be emphasis emphasized because this is gonna go for the next 3 years whereby you just teach the work before this, just to get it done for the sake of the curriculum but now you will stand still and zoom in because you need this for grade 10. See that, the course has developed that sense for me for me.”*
- Indications that some teachers ignored certain aspects of the content because they were not comfortable with the content knowledge: *“So for me it was just YES! You’ve been teaching but you’ve ignored some of the things that you learn as a teacher so now there’s a little bit of...yes the stuff you’ve got it but this is a new way of trying to approach it. The approach now it’s it’s it’s an old stuff but the approach now it’s a new approach and the emphasis in on the concrete.”*

11.4.1 Analysis and discussion

The findings indicate that the content and strategies discussed in the content training sessions, or cluster mentoring sessions formed a meaningful set of tools for adapting their teaching practices to suit their classroom context. The new knowledge and skills, as some indicated, were immediately applicable or could be transposed from the theory learnt during the contact or cluster mentoring sessions to their own teaching practices within their teaching contexts. There is also evidence of some respondents making the shift from using a behaviourists or teacher-centred approach to teaching in a more learner centred or constructivist approach in their teaching practice.

This alludes to evidence of critically reflecting on own practice and applying the new theory learnt to change one's teaching practice. More evidence of critically reflecting on their current teaching practices and adapting it to their current practices and context was how some viewed the importance of going beyond their grade specific curriculum content. This was done in order to prepare and provide their learners with a concrete foundation of content knowledge to assist them in their conceptual development of new concepts, not just in the next grade but also the next phase of the learners schooling. By minimising their own theory-practice gap, they offer learners the best opportunities for learning.

11.5 Modelling of appropriate pedagogies by facilitators to positively influence change in teaching practice

- Experienced has taught me to lay a concrete foundation of terms, principles and concepts: *"...we are taught to lay a concrete foundation so that learners could understand what they are talking about when it comes to numbers or when it comes to shapes, when it comes to whatever concept that the mathematics provide them."*
- Experience of interacting with facilitators and colleagues on the course has made the learning of new content and pedagogies enriching: *"We've learned a lot uhm just from the facilitators but from the colleagues as well uhm and there is a lot that we're going to take from here uhm and uhm introduce into your classroom" and "So I'm doing the subject modules and working with the mathematics and doing that we talk about experiences in classes and how the other experiences uhm how the other colleagues of mine experience their classes and how they teach and all of that then it become more relevant...during this ADE course honestly my teaching practice changed in class and I could see the difference with my kids as well."*
- Some indicated that time was an issue to get through the content, but acknowledged that the facilitators were doing their best: *"...some topics were really rushed through because we don't have a lot of time which is pretty much what we do at school...but we try to get through everything..."*

- New strategies that were discussed and debated in the contact sessions gave teachers confidence to try them in their classrooms, albeit introduced slowly for some: *“I could immediately try a new approach for the content area that I maybe might have taught in a specific way through my teaching career. That is what I think that was the biggest thing that I think impacted me was that there was certain strategies that you know you maybe knew of but were comfortable in teaching in a certain way but now I could relook at the content and teach it with the new strategy that I picked up during the course”* and *“And I also feel like I’ve tried a few things. I have let them play, I have let them draw and do things themselves and a lot of the kids don’t like it because they are used to a certain way of teaching...a lot of change isn’t very good so you’ve got to try subtly...so maybe in doing that uhm in doing that trying something new subtly...yup...”* and *“Oh a lot. I think a lot has changed. I mentioned some of the teaching models that I got introduced to and I’ve since I got attached to them. I got attached to them because now that’s how I do my lessons.”*
- Most agreed that the facilitators had the necessary passion, experience and knowledge to facilitate on the course: *“...most of the facilitators there passion stood out for the subject...they were knowledgeable they had experience in the field and it made you want to listen...”* and *“They’ve really been passionate, they’ve really been uhm interactive you know very uhm approachable...you can see the passion they have for the subject and that sort just rubs off on you. And that makes you just want to be like them in my own classroom”* and *“...they know their content...they make it simple for you to understand...they don’t judge you and make you feel like an amateur...I know they have heaps of years of experience and they way that they carry over the experience and make you understand is so enriching...they have made the course worthwhile...all of them have passion...how they carry over how they facilitate uhm that just makes them unique”* and *“Their understanding of maths and making it simple and and giving it back to us. That was phenomenal in terms of my development.”*
- However, there were some facilitators who were either ill prepared and/or never bothered to engage constructively with the course participants and/or their level of professionalism was questionable: *“There were also some facilitators that their approach to teaching treated us as kids...some of them were speaking down to us and not as professionals...for myself I found that I would tune out immediately...”* and *“uhm there were some facilitators that felt like they didn’t even wanna answer questions because we would just be trying to get through.”*

11.5.1 Analysis and discussion

Despite some challenges with the facilitators and their facilitation skills, some appreciated the passion and high levels of pedagogical content knowledge displayed by the facilitators. The way in which the facilitators allowed for socially mediated and shared learning to take place amongst peers during the contact training sessions, proved invaluable to the respondents. It was during the contact sessions, facilitated by the facilitator, that many felt that ideas were shared and developed on how to transpose the new theory learnt into their current context and thus critically reflect on the changes to their teaching practices.

11.6 Confidence/comfortable in delivering the curriculum

- Experience has made teachers more comfortable about applying new strategies and the new content knowledge: *“...so I am very comfortable uhm because the knowledge and the different methods and strategies”* and *“Experience has improved my teaching, created improved levels of enthusiasm and passion back into the classroom.”*
- Experience took some teachers from a point of uncertainty about the content to a point where they understood the content and developed higher levels of self-esteem: *“...the things that stand out for me about the ADE in terms of my experience is that it took me from a certain point of where I was a bit unsure sometimes to become a more uhm teacher with more uhm that self esteem and I can stand in front of my class now putting my head high because I know what I’m talking about so that was the main thing that came from it.”*
- Strengthening of content knowledge led to increased confidence to deliver the curriculum: *“...the only goal or the only outcome at the very beginning was that I would strengthen my content knowledge that I would gain more confidence in teaching the subject. That I would uhm I would become more comfortable teaching the subject. Uhm, which has definitely happened, I have grown as a teacher since being on this course...”*

- Exposed to new pedagogies and ability and confidence to try out the new strategies: *“...some of the teaching models that we tackled under ADE uh were completely new. I got introduced to guided reinvention...And I have since taken that back to my class and I find that its working very well, something that I want to follow”...I had the confidence because I had the knowledge and I have the skills and I have everything to just stand up and say my side. And this is what this course did to me it really boost my confidence...and I can be this confidence because I have more knowledge now...I know how to approach a thing...”*
- More confident and more positive outlook to teaching and try different approaches because of increased understanding of the content and make teaching more interesting for the learners: *“...I think it also make me to be more confident than I was. To try...some of the stuff. To look at different angles to see what I see” and “ I have gained more confidence in it. I have gained more...And there is so many of us that feel like wow our minds have been blown like there’s something completely new that we can totally take to our classroom...when you go back to your classroom the kids appreciate the fact that you are also learning uhm and that you are also trying to come up with new things and interesting things to make it more fun and appealing to them...” and “Definitely. Definitely, definitely. Like I said earlier I only use the module on the topic of integers I could see even in my exams they would do ok...but last year I was so surprised I was so surprised...they did very well in...Yes, definitely I can see that this course material this knowledge I gained here definitely had a big impact on my school” and “A lot of the content I’m more confident in uhm teaching my learners. I have a better understanding of the different approaches that I can use that I’ve learned in the course. Uhm I am just more positive...” and “I felt more confident in terms of the knowledge because I really feel like I gained knowledge here. So, I’ve been teaching with confidence because I knew we discussed something we discussed it in class here. You know when I go back to my class and I know what we are talking about is correct.”*

11.6.1 Analysis and discussion

The data provides evidence of the respondents' pedagogical content knowledge being strengthened. This provided them with the confidence and self-esteem to teach certain content areas with confidence, improve their confidence levels in the classroom and speak with a certain level of authority and understanding about the mathematics they were teaching. One indicated that her confidence levels had improved so much that she now holds workshops for the rest of the mathematics teachers at her school. This increase in self-confidence also led them to attempt taking calculated risks within their teaching practices and gave them the ability to confidently and critically reflect on their own teaching practices, thus having the ability to put their thoughts into action and, on an iterative and cyclical manner, change their teaching practices.

11.7 Course material supported course learning and professional learning

- Appreciates the way the material challenges them: *"...because we are doing Post Grad studies some of the activities should have been a bit more challenging just to challenge us as individuals on an intellectual level."*
- Appreciate that the booklets have been structured to encourage active involvement in the training: *"I love the booklets because I like to be actively involved. I like to be working out I like to be doing things myself...I like the way the booklets have been structured."*
- Appreciate the amount of activities in the booklets and how it progresses from easy to more difficult and how the activities could be used in the classroom to attend to the varying cognitive needs of the learners and also look at the progression of content in a phase: *"Fantastic...there is lots of activities to do...its starts with easier and it gets difficult...and that is exactly how it should be done...I take it to my class and I take out of the activities especially for my learners that works a little bit faster...activities that is on their level but a little more challenging so I can use that in my class for the faster learners and they say Mrs can I have more can we have more can we have more...so that is fantastic" and "...I need to organize that this year to say how can go use that in class...it's not ambiguous uhm it's a lot of things."*

A lot of examples, there is a variety of examples but that's good. As you can you know you can test the same skill but with different exercises" and "...but sometimes it's the work in the booklets are more for high school on the other hand...I find that beneficial because I teach grade 7's...so instead of just sticking to what they are supposed to know in grade 7 I can teach them a little more and prepare them better for grade 8" and "...but I think in terms of uhm being current in terms of being able, so ...on a grade 10/11 level. Which is fine because we need to equip ourselves for that uhm teaching at a higher level."

- For some teachers, they do not use the course material in their classrooms because the activities *"doesn't make sense" or "it wasn't helpful, it's not" or "is baie lig daar is nie krag nie (it is very easy and not challenging)"* and *"I could not use some of the content in the package in the booklets because my learners are not on that level"* and *"I think they need to be uhm revisited and moderated so as to eliminate all those errors that were picked up in those handouts. Because it looks to me maybe they didn't have enough time to look at those handouts hence they came with errors."*

11.7.1 Analysis and discussion

Many found the course material useful in the development of their own pedagogical content knowledge, however, some had challenges with the material not being grade specific, although the resources focussed on phased based content, highlighting the progression of the content across the phase. There were also challenges with errors within the material and the activities either being too easy or difficult for the learners. SUNCEP has taken heed of these challenges and will be addressing them before the next cohort of students are enrolled. However, many took these resources back to their classrooms, adapted them to address various cognitive levels of the learners and utilised them in novel ways. Indications point to teachers who, being aware of their own teaching contexts, adapting the activities in the course material to address their own teaching contexts. It also indicates that the course material could be transposed into teaching and learning resources within their own classroom contexts, thus guiding their teaching practice.

11.8 Mentoring supported professional learning but was a challenge for some

- Some were disappointed in their mentors: *“I’ve got mixed feelings because on the fact that in my case the mentor that I was given I feel that couldn’t support me...Uhm so that was a bit of concern, the mentor really didn’t give us much support as I think the role states...”* and *“In our case, in my region, no. The mentorship did not do much...”* and *“I am not a big fan of my mentor. Uhm Sorely because if I ask a question, I never get an answer...So, it was a bit frustrating having to explain to the mentor what I need. I kinda feel if you’re a mentor you’re supposed to anticipate my needs...”* and *“I remember I sent in uhm a mentor a message once uh asking about uh an assignment ug and he never uhm replied so I just let it go uhm. yah I think overall it was only in a cluster meeting uh that we really to engage uh the mentor or when I got to interact with him”* and *“actually wanted another mentor. I just feel that the mentor didn’t do anything for me. The mentor sessions I actually learn more from my colleagues than what I’ve learned from my mentor...There was no extra uhm enrichment for me from my mentor. So, anything that I didn’t understand I would go to one of my colleagues. And one of my colleagues who is also doing the course and I would get more support there as what as what I would get from a mentor”* and *“But I don’t know (laughs) the I just feel the mentor maybe is uh there’s a lot more that could have done in assisting us. Maybe he just didn’t come to the party. I don’t know why because uhm to me it felt like he was more of a middleman to take information from from from uh the lecturers to us. And then when we when had questions about whatever information was being conveyed through him to us and then he didn’t have answers and he would say ok I must then go back and get those answers and then come back and give them. Which means maybe he he wasn’t so well informed about the courses that we were doing himself. “*
- Others felt there was value in having a mentor, despite certain flaws: *“If I didn’t have hadn’t had a mentor I wouldn’t be sitting here. Honestly because that was my support system. That was my support system...so the mentor with the mentor session was one of my biggest support systems.”*

- Some had a change in mentors and indicated that there was a change for the better: *“didn't know why she was here but when I asked the questions via WhatsApp uhm it always seemed like she didn't know uhm what to say or how to respond or how to reply she always ask for... but now now last yeah since I think September we got a new Mentor and she's really good because she always questioning us always pushing us always uhm throwing in that why are you doing that and. she so she's very yah. I think that helped me a lot especially with thinking uhm especially when it comes to assignments and uhm reflecting on what we did on this past years”* and *“ Ok 111 in this course I had I was fortunate to have 2 mentors. No problem at all I attended the teaching sessions he was good he was clear on what he wants us to do and everything its its been really pushed us in mentoring sessions to become more and do more than we usually do. Then my second year...Different person uhm more specific. He's a guy that actually when he marks your stuff, he gives you criticised your work. in a good way. But he also tells you when you need to improve. So, for me the 2 mentors I've got they different in the in the personality and what they portray but in terms of my development they support and that structure.”* and *“He was available for contact and that was really nice. He was very he was really very very uhm how do you say uhm sympathetic...But there was a switch...And that was a bit rocky coz I felt like uhm our new mentor was also supposed not supposed just be our new mentor, was a bit uhm I lost. Which I can understand because he came in the second year. You know, he wasn't with us now in the first year uhm but also very responsive very available uhm help where we can, but I think he's still finding his way around all of this still. That's the feeling I get.”*

11.8.1 Analysis and discussion

This was, for the most part, one element that was the most challenging for the respondents. Many felt that their mentors were not qualified and equipped with the proper skills to mentor them and there was also an indication that the mentors were not fulfilling the supportive role which was crucial to the teachers developing their teaching practices. However, others felt that their mentor fulfilled this supportive role and was instrumental in developing their critical reflective skills in order to change their teaching practices. There is evidence that within their cluster mentoring sessions the gap between their theoretical knowledge and their practice was minimised, that is, putting their new knowledge into practice within their classroom context. As this is a crucial element in the SUNCEP practice-based approach to teacher professional learning, where the gap between theory and practice could be minimised, it will also be an area that SUNCEP needs to strengthen.

11.9 Programme was delivered with integrity and that the academic quality was not compromised.

Many agreed that the way the course was administered (logistics, communications, etc.) was good to excellent, although communication could be strengthened: “...*the administration was very well from the get-go*” and “*WhatsApp, email, that was on time*” and “...*in general the course was a bit frustrating at times...miscommunication with all that. But the second year was way better because I think everyone learnt a lot in the first year...it went smoother than the first year*” and “*I would say they should keep on having that optimistic attitude or that optimistic aura of theirs.*”

11.9.1 Analysis and discussion

Despite initial teething problems at the start of the programme, many felt that the administration and logistics around the course was constantly improving. They appreciated that the course managers and administrators listened to their needs and these were addressed immediately. Experiencing these administrative and logistical challenges made SUNCEP cognizant of the different contexts in which the ADE programme is delivered and is in constant communication with the relevant stakeholders to ensure that the adaptations required to address the contextual challenges are met for the successful delivery of the programme.

12. CONCLUSION

This report addresses but two aspects of the longitudinal research study namely, the teachers' or in this case the respondents' perceptions of the programme and their professional learning whilst on the programme. From the evidence provided by the data there is evidence that their professional learning was content intensive, socially mediated and shared, that they took ownership of their learning (embodied) and addressed their contextual needs (context sensitive). The evidence from the data indicates that it had all the elements of a practice-based teacher professional learning approach.

Many of the respondents also indicated that by learning new content and pedagogies within an environment that was socially mediated and allowed for sharing of teaching practices within a safe collegial and collaborative environment, allowed them to put their theory into practice, taking into account their contextual challenges. This, for most of the respondents, was the most crucial element of the ADE programme, as it was the one element where their theoretical knowledge was transformed into practical knowledge, within their various teaching contexts.

If this report were to thus make a recommendation, it would be that teacher trainers should consider creating and facilitating safe collegial and collaborative spaces for teachers to socially and professionally interact and share their teaching practices with peers and experts, without the officiousness and bureaucratic influences from educational officials. This should occur after attending any content intensive training session.

The next part of this longitudinal research study will be focussing on level 3 and 4 of this research study. It will not only investigate how the respondents applied their new knowledge and skills learnt on the ADE programme in their classrooms, but also focus on the institutional challenges in doing so. Evidence via interviews will be gathered once they have implemented their new knowledge and skills, and a research report developed which will be the final part of this longitudinal research study.

13. WITH APPRECIATION

- The Western Cape Education Department for granting the researchers permission to conduct this research.
- The mathematics teachers on the ADE programme who consented to be research participants.
- To the Fund for Innovation and Research in Learning and Teaching (FIRLT) at Stellenbosch University Centre for Teaching and Learning for providing the funding for this research study
- To the research assistant who diligently collected and assisted in transcribing and analysing the data.

14. APPENDIX A



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

ADE Interview script

Open interview by going through purpose of interview and the right as an interviewee.

1. How has the ADE experience been for you so far?
2. What was your expectations at the start of the course?
3. Did you have any content or pedagogical needs that you wanted the course to address?
4. Has this course met any of your content and/or pedagogical needs?
 - If not, why?
 - If yes, how?
5. How did the course material help support your course learning and development?
 - Any considerations that should be taken when putting together course packages & materials in the future?
6. What influence has the course had on your content knowledge (what you already knew before starting the course)?
7. What influence has the course made on your pedagogy (teaching skills)?
8. What role has the mentor had on your professional learning throughout the course?
 - Are there any recommendations that you would like to make with regards to mentoring in future courses of this nature?
9. What role did the facilitator make in your professional learning throughout the course
 - Are there any recommendations that you would like to make with regards to facilitation/facilitators in future courses of this nature?
10. Please share your opinion on:
 - The course administration.
 - How this course has been delivered (format, communication, contact sessions, etc.)

11. Please share any suggestions you might have to improve the delivery of this ADE course.

Close interview by asking if interviewee requires any clarification or has questions about the research.

15. References

- Akiba, M., & Liang, G. (2016). Effects of teacher professional learning activities on student achievement growth. *Journal of Educational Research, 109*(1), 99–110.
<https://doi.org/10.1080/00220671.2014.924470>
- Avidov-Ungar, O. (2016). A model of professional development: teachers' perceptions of their professional development. *Teachers and Teaching: Theory and Practice, 22*(6), 653–669. <https://doi.org/10.1080/13540602.2016.1158955>
- Badri, M., Alnuaimi, A., Mohaidat, J., Yang, G., & Al Rashedi, A. (2016). Perception of Teachers' Professional Development Needs, Impacts, and Barriers: The Abu Dhabi Case. *SAGE Open, 6*(3), 1–15. <https://doi.org/10.1177/2158244016662901>
- Ball, D., & Bass, H. (2000). Interweaving content and pedagogy in teaching and learning to teach: knowing and using mathematics. *Multiple Perspectives on the Teaching and Learning of Mathematics, 83–104.*
- Ball, D. L., & Cohen, D. K. (1999). Developing practice, developing practitioners: Toward a practice-based theory of professional education. *Teaching as the Learning Profession: Handbook of Policy and Practice, 1*(3), 3–22.
- Boud, D., & Middleton, H. (2003). Learning from others at work: communities of practice and informal learning. *Journal of Workplace Learning, 15*(5), 194–202.
<https://doi.org/10.1108/13665620310483895>
- Boud, D., & Rooney, D. (2011). *A practice approach to studying professional learning: "can't get no satisfaction."* 1–9.
- Bruce, C. D., Esmonde, I., Ross, J., Dookie, L., & Beatty, R. (2010). The effects of sustained classroom-embedded teacher professional learning on teacher efficacy and related student achievement. *Teaching and Teacher Education, 26*(8), 1598–1608.
<https://doi.org/10.1016/j.tate.2010.06.011>
- Guskey, T. R. (2002). Does it make a difference? Evaluating Professional Development. *Educational Leadership, 59*(6), 45–51. Retrieved from https://uknowledge.uky.edu/edp_facpubhttps://uknowledge.uky.edu/edp_facpub/7
- Ha, A. S. C., Lee, J. C. K., Chan, D. W. K., & Sum, R. K. W. (2004). Teachers' perceptions of in-service teacher training to support curriculum change in physical education: The Hong Kong experience. *Sport, Education and Society, 9*(3), 421–438.

<https://doi.org/10.1080/13573320412331302467>

- Hustler, D., McNamara, O., Jarvis, J., Londra, M., & Campbell, A. (2003). Teachers' Perceptions of Continuing Professional Development. In *Australian Journal of Political Science* (Vol. 429). <https://doi.org/10.1080/00323269308402229>
- Jeram, R. (2018). *On bridging the gap between theory and practice: A conceptual analysis of practice in relation to a teacher professional learning programme at Stellenbosch University*. Stellenbosch University.
- Jeram, R., & Davids, N. (2020). In support of practice-based teacher professional learning. *South African Journal of Higher Education, In press*.
- Keay, J. K., Carse, N., & Jess, M. (2019). Understanding teachers as complex professional learners. *Professional Development in Education, 45*(1), 125–137. <https://doi.org/10.1080/19415257.2018.1449004>
- Mccormack, A., Gore, J., & Thomas, K. (2006). Early Career Teacher Professional Learning. *Asia-Pacific Journal of Teacher Education, 34*(1), 95–113. <https://doi.org/10.1080/13598660500480282>
- McMillan, D. J., McConnell, B., & O'Sullivan, H. (2016). Continuing professional development – why bother? Perceptions and motivations of teachers in Ireland. *Professional Development in Education, 42*(1), 150–167. <https://doi.org/10.1080/19415257.2014.952044>
- McMillan, J. H., & Schumacher, S. (2006). *Research in Education: Evidence-Based Enquiry* (Sixth). Pearson.
- NEEDU. (2012). *National Education Evaluation and Development Unit 2012 Report*. Retrieved from <http://www.sqa.org.za/docs/papers/2013/needu.pdf>
- Opfer, V. D., & Pedder, D. (2011). Conceptualizing Teacher Professional Learning. *Review of Educational Research, 81*(3), 376–407. <https://doi.org/10.3102/0034654311413609>
- Raelin, J. a. (2007). Toward an epistemology of practice. *Academy of Management Learning and Education, 6*(4), 495–519. <https://doi.org/10.5465/AMLE.2007.27694950>
- Timperley, H. (2008). *Teacher professional learning and development (EDUCATIONAL PRACTICES SERIES – 18)*. Retrieved from http://edu.aru.ac.th/childeddu/images/PDF/benjamaporn/EdPractices_18.pdf

Van der Berg, S., Spaul, N., Wills, G., Gustafsson, M., & Kotze, J. (2016). *Identifying Binding Constraints in Education*. Retrieved from http://resep.sun.ac.za/wp-content/uploads/2016/06/PSPPD_BICiE-email-01062016.pdf

Webster-Wright, A. (2009). Reframing Professional Development Through Understanding Authentic Professional Learning. *Review of Educational Research*, 79(2), 702–739. <https://doi.org/10.3102/0034654308330970>