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## PRE-SERVICE TEACHERS' CONCEPTIONS OF CONTINUING PROFESSIONAL DEVELOPMENT

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### ABSTRACT

Initial Teacher Education is designed to prepare pre-service teachers to teach and also establish a platform on which continuing professional development (CPD) can be erected. This qualitative study explored forty-six pre-service teachers' conceptualisation of teachers' CPD. The pre-service teachers, taking Mathematics as their major subject of specialisation, were in their final year of their four-year degree programme at a selected university in the central province of Zambia. Data for the study were collected using an open-ended questionnaire and follow-up interviews. By analysing the collected data using thematic analysis, this study found that pre-service teachers presented four diverse conceptualizations of CPD: CPD as lifelong learning, CPD as meetings, CPD as furthering one's studies and CPD as a programme mandate for teachers. The findings and their implications for mathematics teacher educators and initial teacher preparation programmes, with a role to prepare preservice teachers for CPD, are discussed.

**KEYWORDS:** Pre-service teachers, conceptualisation, continuing professional development.

### 1. INTRODUCTION

To become a school teacher, one has to complete an initial teacher education programme. The initial teacher education (ITE) programmes in Teacher Education and Training Institutions are programmes generally designed to help the pre-service teachers (PSTs) gain knowledge, skills and exposure and experience needed to enhance learning. They are directed toward preparing pre-service teachers to teach effectively and enhance learners' learning (Sandholtz, 2011). At the same time, they programme are meant to initiate, or introduce and develop the idea of continuing teacher learning and development with the aim of helping the student teachers become aware of the need for continuing growth and development as a critical component of their professional lives (Patterson, 2002). Thus, ITE provides a platform on which continuing professional development can be erected (Bubb & Earley, 2007).

ITE programmes in Zambia commonly offer student teachers compulsory education courses which relate to educational theory and practice. These courses may include: philosophy of education,

educational psychology, sociology of education and special education among others. Such courses are generally designed to provide general knowledge and skills for teaching and a foundation for professional growth and development (Banja & Mulenga, 2019). Student teachers also have to take courses that relate to their chosen teaching subjects of specialisation. It is expected that through these courses, they would further develop skills and knowledge relating to the content area of the teaching subject(s) they have chosen to specialise in. When in third year, the students are supposed to add on what is generally considered as methodology courses. These ‘...methodology courses are pedagogical in nature’ (Nalube, 2014, p.17). These are the courses which contribute to the development of pedagogical content knowledge which include techniques, strategies and procedures for teaching the content of the chosen subject of specialisation.

Several studies have done on CPD. These include: Muyunda, 2022; Sinzala, 2021; Likando, 2018; Kaliba, 2016; Mizinga, 2016; Mwelwa, Mwanza & M'sango, 2015; Hambula, 2015; Ngumbwe, 2014 which have been done on varied aspects of continuing professional development (CPD) for teachers of Mathematics the Zambian context in particular. However, the focus for these has been mainly on CPD with respect to in-service teachers of Mathematics. There is a general lack of specific consideration of CPD with respect to pre-service teachers (PSTs). Not paying attention to this can have negative consequences on PSTs’ ability to identify with and prioritise CPD when they start serving as teachers. This manuscript is an extract from a broader research study done as part of a Masters in Mathematics Education study programme and whose overall purpose was to find out the preparedness of secondary school Mathematics pre-service student teachers for continuing professional development. Three research questions, were posed to guide the whole study. This manuscript particularly addresses only one of the three research questions from this broader study. This one research question was: ‘What are mathematics pre-service student teachers’ conception of CPD?’

## **2. METHODS**

### **2.1 Research Design**

The broader research study from which this manuscript is drawn was a qualitative research employing a case study research design.

### **2.2 Participants**

The 68 (57 male and 11 female) PSTs pursuing Bachelor of Science in Mathematics (and the course representing the minor subject) with Education in 2022/2023 academic year made the population for this study. They were Mathematics major students and were in their fourth and final year of their ITE programme. They were purposively chosen because they had: already done the courses generally designed to contribute to providing general knowledge and skills for teaching and a foundation for professional growth and development as already indicated above in the introduction section: done the practical aspects of their programme including peer teaching, and School Teaching Practice (STP) or practicum and: learnt or covered most, and all in some cases, of the course content for their courses

in their whole study ITE programme. At this stage of their programme, the PSTs had already covered all the content for their minor subject of specialisation (which included Physical Education Studies or Geography or History or Chemistry or Physics). They were taking only Mathematics-related content and methodology courses (as Mathematics was their major) and some fourth-year education-related elective courses. With the above presented, it was considered that they had been exposed to CPD both in the lectures on the same and practically such as during their STP. These selected fourth year students thus were highly likely to have learnt about and experienced forms of CPD than the third, second- or first-year pre-service teachers specialising in mathematics. They were considered well-positioned to offer richer and comprehensive insight in CPD related matters as needed in this study.

### 2.3 Data collection

The pre-service teacher participants participated in the study by first completing the questionnaire, after ethical clearance was granted and consent obtained, and thereafter by being interviewed. The questionnaire instrument with open ended-ended questions was distributed to all the 68 PSTs. Twenty-five (25) out of the 46 (37 male and 9 female) who completed the questionnaire indicated their willingness to participate in the one-to-one in-depth follow up interviews. This formed the basis of the decision to include them among those to be interviewed. The researcher was conscious of saturation point as explained in literature by scholars such as Guest, Namey and Chen (2020). With this, only 15 out of the 25 were interviewed. Only 2 out of the 4 Mathematics teacher educators were willing to be interviewed. Their willingness was also the basis for interviewing them as key informants. The data collected from the lecturers helped with crosschecking that from the PSTs.

Data collection methods for the bigger study from which this manuscript is drawn encompassed questionnaire, semi-structured interviews and document review. However, data for this manuscript in particular were drawn from the questionnaires and interview items and analysed using thematic analysis as elaborated by Joffe (2012). The questions that the PSTs and the lecturers were asked, from the questionnaire and/or interviews and whose responses were analysed and presented in this manuscript related to their knowledge OR understanding of CPD including its importance accompanied with probing and prompting when need arose during the follow up semi-structured interviews. The interviews were conducted at the convenience of the research participants. The length of the interviews with the 15 PSTs ranged from 9 to 22 minutes while with one lecturer it was 25 minutes and 33 minutes for the other. Trustworthiness was established through member checks as explained by Stahl and King (2020) and peer-briefing as elaborated by researchers such as Creswell and Miller (2000) and Laumann (2020).

### 3. Presentation and discussion of findings of the study

Analysis of mathematics PSTs responses on the questionnaire and to follow-up interviews led to the generation of the following themes and categorisation of the conceptualisation of CPD: CPD as lifelong learning, CPD as meetings, CPD as upgrading one's qualifications and CPD as a programme mandate for teachers. The PSTs' responses in relation to each one of these generated categories are

presented and discussed below. The discussion of each of the categories signifying conceptualisation of CPD by PSTs is first done individually (separately) and then collectively into a consolidated whole.  
CPD as Lifelong learning

In an attempt to share their conceptualisation of CPD majority of the PSTs in this study indicated that lifelong learning was what CPD was all about. For instance, PST15 stated that: *'lifelong learning is learning throughout the same thing as CPD. It is a process of getting knowledge as you are working picking up from the teacher training days...'*

In the same line, PST11 stated that:

*'It is a learning process, over a very long period of time, to develop or grow...that is why it is also called continuing development.'*

Yet PSTQ2 wrote: *'it is a process of continuous learning and acquiring knowledge and skills about specific difficult topics in mathematics'*. A point which in some way contradicted what lecturer LI1 stated concerning the focus of CPD as designed to be presented to students taking Mathematics: *'...of course we tell them that they can look at topics that are difficult to teach as part of CPD, but that is not all...there are other things that can be discussed including assessment in mathematics, problem solving among others...what is key for them to be able to identify what it is they need to focus their attention on...'* LI1.

**PSTI10** emphasised that *'you can't put a time on learning...it is like forever. That is why it is lifelong learning... and you have to hopefully keep getting better at teaching mathematics'* PSTI11 expressed that *'...it is the development of the professional self of a person by continually learning that is why it called continuing professional [with emphasis] development'*. The shared excerpts illustrate that PSTs had the ability to reflect and reason about their own learning and experiences and make connections that produced their conceptualisation of CPD. From the above comments it can be concluded that the PSTs were of the view that CPD is a learning process for the purpose of improvement.

*'Continuing professional development (CPD) is a substantial...component of lifelong learning...'* Friedman (2023, p. 588). It involves lifelong learning which encompasses continually (re)considering knowledge and skills necessary at each and every stage of one life (Friedman, 2023; Sockalingam et al., 2022). From the responses given by the PSTs in this study it can be concluded that they were of the view that CPD is a learning process and one for the purpose of improvement even though specific reference to different stages of one's (career) life was not explicitly stated. Teachers are expected to continue learning, after their initial education, throughout their career years, so as to improve their practice and be able to adapt to the changing (learning) needs of their society and learners (Day & Sachs, 2004; de Vries, Jansen, & van de Grift, 2013).

It can also be deduced from the views shared by the PSTs that the focus of CPD is basically ~~limited~~ linked to gaining knowledge and developing skills for the teaching of the topics in Mathematics that are deemed to be difficult to teach. Even though they considered CPD as learning, their focus was mainly learning as related to acquiring technical mathematics knowledge and teaching skills associated with the difficult topics identified by others and little or no focus on considering knowledge and skills pertaining to personal development. A point similar to the one raised with reference to already serving teachers as presented in Sinyangwe (2017). With reference to the argument that Mathematics is generally a difficult subject to teach and that learner performance in national examinations in the subject in Zambia has been extremely low (Examinations Council of Zambia-ECZ, 2012, 2015, 2016, 2018, 2022; Mukuka et al., 2019) it may be justified that focus of CPD be on gaining knowledge and skills for teaching difficult topics in mathematics to contribute to improved learner performance. This specific focus however appears to ignore other aspects of Mathematics teaching or learning and appears to detach the development of a personal component of a professional. As argued by Young (undated webpage) there may be need of bringing in the word 'personal' in CPD to have Continuing Personal and Professional development (CPPD) or of approaching CPD as CPPD (without necessarily having two Ps) where there is among other things the reflection of personal responsibility for one's professional growth and or where focus of CPD initiatives one engages in can be on personal matters which may be directly or indirectly related to one's profession. CPD should aim to develop the individual specialist and their profession (Cole, 2000) too.

#### CPD as meetings

PSTs' conceptualisation of CPD was linked to meetings or meeting attendance. Representative of this view are the following comments from the PSTs: PSTI9 stated that '*... CPD is when you have meetings...meetings like departmental meeting...*'. This was more like building on the argument written on questionnaire by PSTQ44 that '*...this is the meeting which is conducted by the department to present work...*'.

In the same line, PSTI3 stated that: '*you know you are learning when you attend meetings such as the Lesson Study meetings...because there you learn how to prepare and teach the difficult Maths topics...*'

As evidenced above, some PSTs' conceptualisation of CPD was linked and limited to a specific kind of event- a meeting. While there is evidence that attendance of meetings such as stated by the PSTs can support PD (Mamba, 2022), CPD goes beyond meetings or meeting attendance. Works such as Day (1999) do align with this point when he indicates that CPD goes beyond attendance of a CPD activity. It is not necessarily an event itself, but a process. This view is also advanced by Singh, Rind & Sabur (2021) who state that CPD is a process that supports teachers and their development. Therefore, suggesting that attendance of meetings such as Mathematics Department meetings or Lesson Study meetings, as cited by the PSTs, provide opportunities or are avenues through which

teachers can continue to learn and hence develop. They are ways that can facilitate teachers' personal and professional learning and development (Mahmoudi & Özkan, 2015; Mansour et al., 2014).

The PSTs' views of CPD are probably based on their context and experiences such as experience of School Teaching Practice (STP). However, if focus is on CPD being meetings or attendance of meetings only, then it shifts attention from what is considered as holistic picture of PD such as presented by Day (1999).

#### CPD as upgrading one's qualifications

Some PSTs who participated in this study indicated that CPD was about upgrading or furthering one's academic studies and hence qualifications. Excerpts from the questionnaire and interviews include the following:

*'It is about continuing learning for one to get the highest qualification there is ...for instance from degree to masters' level...'* expressed PSTI6.

*'This is where teachers of mathematics continue to further their studies to gain more knowledge for the benefit of the learners they teach'* indicated PSTQ11.

Other PSTs expressed their concerns by stating that they are not ready for CPD because of this. For instance, PSTI2's argument was that *'I cannot do CPD... I don't see myself going for further studies after completing this degree programme...that is why I am saying CPD is not my thing...'* Such concerns appear to have been echoed by one of the lecturers LI2 who explicitly stated that *'...masters or PhD programmes are something our students generally do not aspire to pursue...meaning that learning for them ends with this first-degree programme...'*

A conception that CPD was about upgrading or furthering one's academic studies and hence qualifications as held by some PSTs not only leaves out other forms of CPD activities that are considered formal, but also informal CPD activities and which that can also contribute to professional development to one's disadvantage. Both formal and informal CPD activities can contribute to professional development. Srinivasacharlu (2019) further argues that CPD involves divergent formal and informal activities which *'...aim at developing the teacher's... intellectual abilities (cognitive domain), self-confidence, attitude, values, and interest (affective domain) and skills and competencies (psychomotor domain) for improving personality and to carry out the responsibilities of the teaching profession properly...'* (p.29). Similar ideas also expounded by Hayes (2016). This further stretches the argument of the focus of CPD as well and contributes to supporting the ideas of embracing divergent informal and formal activities that support teachers' development.

### CPD as a programme mandate for teachers

PSTs responses during interviews and as shared through the completed questionnaire referred to the point that CPD was a government programme that teachers were mandated to fulfil. They viewed CPD as a directive from government, through the Teaching Council of Zambia (TCZ) and teachers needed to comply if they were to keep their teaching jobs. Excerpts representative of this view are presented below.

**PSTQ9** indicated *'It is a government programme for teachers, in the mathematics department, which has the objective of uplifting and expanding knowledge among teachers...for particular topics which are challenging.'*

**PSTI13** said *'... it is what the Teaching Council of Zambia expects from teachers...a programme for teachers so that they make points... that the Teaching Council counts and considers when looking at the future of a teacher and his or her teaching work...'*

The PSTs construction of knowledge of CPD as being a government programme that teachers were mandated to fulfil is somehow in line with TCZ and hence government expectation for teachers. PSTs' point is somehow in line with what is existing in their context through TCZ expectations. TCZ has indicated an award of CPD credit points to teachers as one way of encouraging them to direct their attention to and draw on the benefits of CPD. The rationale and value for CPD has been presented above under literature review where it is highlighted that CPD can be a way through which governments direct teachers to national priorities including those in education related. Indeed, changes and innovations in the education sector can be successfully implemented, if teachers are prepared for them-something that could be achieved through targeted CPD initiatives. CPD can also be a means of equipping teachers to be well-informed critics of national education policy reforms or initiatives (Bolam & McMahan, 2004)- a point that needs to be considered during initial teacher education and training too. However, this does not mean that CPD should only be viewed as a directive or mandatory programme by government (through TCZ in this case). Personal motivation for achievement and growth (McMillan, McConnell & O'Sullivan, 2016) should apply to it too. The general argument being that motivation factors for CPD as expressed by teachers themselves and for themselves need to be considered as well.

### **3.1 Consolidated Discussion of Key Findings**

The PSTs in this qualitative study conceptualised CPD as 'lifelong learning', 'meetings/meeting attendance', 'upgrading one's qualifications' and 'a programme mandate for teachers. This could be because of their construction of knowledge of it and interpretations of it when/during/after learning about it, their experiences of it or observations made in relation to it among other factors. Some student teachers pointed out what would be considered as a conceptualisation of CPD falling under only one of the identified themes while others presented views that were in more than one or a

combination of the categorisations or themes. Others still presented their conceptualisation of CPD by stating the rationale for it and its value which is also evident in some literature. On one hand, despite there being variations in PSTs' conception of CPD, their responses show that they have some acceptable and useful ideas about the concept of CPD, its focus and value.

On the other hand, the PSTs conceptualisation of CPD as shown in the themes presented above also suggest some element of ambiguity attached to the term CPD itself. This aligns with points by researchers such as Friedman and Phillips (2004, p.361) who state that there '...is confusion regarding its definition and purpose in both academic and professional literature which extends to professionals themselves...' and argue that CPD is an ambiguous concept. Their suggestion in conclusion is that 'clarifying the definition(s) and purposes of CPD and linking it more closely with the ideals of professionalism' (Friedman & Phillips, 2004, p.361) with the '...underlying conceptions of professionalism... made explicit' (Kennedy, 2007, p.95) is a must. While Friedman and Phillips (2004) were not referring to student teachers' conceptualization of CPD as this study is, their suggestion may need to be critically considered with respect to preparation of Mathematics PSTs, in this context, for CPD

In addition to there being some element of ambiguity attached to the term CPD itself, the PSTs' responses also show that their conceptualization of CPD is narrow. Their perception and description of CPD presents to be limited and limiting at the same time. For instance, to start with, even though there is some acknowledgement of CPD being about continuing learning, the PSTs' conceptualisation of the focus/content of CPD appears to be limited to gaining knowledge and developing skills for the teaching of the topics in Mathematics that are deemed difficult to teach as presented by an expert such as the HOD and or an in-service teacher. Even though they considered CPD as learning, their focus was mainly learning as related to acquiring technical mathematics knowledge and teaching skills for the said difficult topics to teach and not extended to other areas. Discussing the difficult-to-teach topics in Mathematics is particularly important, but the focus of CPD can be extended. For instance, it could include knowledge and skills for supporting mathematics learners' sustained motivation and engagement, a focus on knowledge and skills pertaining to one's own personal development among others such as suggested by Srinivasacharlu (2019) and CDC (2013).

Further, even though there is some acknowledgement of CPD being about continuing learning, the PSTs' conceptualisation of the avenue for learning was limited. It was largely linked to Lesson Study, the most common school based CPD (SBCPD) in Zambia, and university learning were one's academic qualifications could be upgraded. While these ~~are avenues~~ are certainly means through which one can continue to learn and develop, there are others worth considering too. There are several other ways and means: collaborative and non-collaborative, school-based or non-school based, formal or informal, planned or incidental means through which teachers of mathematics can continue to learn.



### 3.2 Limitations of the study

This study only analyzed the conceptualisation of mathematics PSTs with the consideration that they all had mathematics as their major subject of specialisation. It did not consider the factors such as the PSTs' gender or age or what their minor subject area of specialisation was in the analysis of data. The researchers recognise that such factors COULD have a bearing on the PSTs conceptualisation of CPD and therefore suggest that future research in the area put them into perspective. It can form a basis for future research. Despite this limitation, the PSTs in this study had an opportunity to express their conceptualisation of CPD in their context and thus providing valuable insight into possible conceptualisations of CPD by pre-service teachers of Mathematics which could inform teacher educators knowledge and practices for preparing PSTs for CPD.

### 4. CONCLUSION AND IMPLICATIONS

This study found that the pre-service teachers of mathematics presented four diverse conceptualizations of CPD: CPD as lifelong learning, CPD as meetings, CPD as upgrading one's qualifications and CPD as a programme mandate for teachers. While these conceptions were specific to the pre-service teachers with Mathematics as the major subject of specialisation at the selected university, they offer Mathematics teacher educators and other key relevant stakeholders insight into pre-service teachers' conceptualisations of CPD which is a crucial aspect of the PSTs' future teaching lives. they also inform the focus of instructional practises targeted at preparing preservice teachers for CPD.

Not only that, it is maintained that having an understanding of how PSTs conceptualise CPD can have implications on Mathematics teacher education and preparation for CPD. For instance, it can help in assessing what and how much the PSTs know about CPD during their ITE period. Having an understanding of the conceptualisation of CPD held by PSTs can provoke creation of opportunities for the PSTs self-reflection and interrogation of their knowledge of CPD. It can also inform mathematics teacher educators' review of the PSTs curriculum content and implementation strategies as a way to facilitate correcting CPD misconceptions or misinformation, where evident, and adequately preparing the PSTs to prioritise and commit to CPD in future.

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