

**CONTINUING PROFESSIONAL DEVELOPMENT (CPD):
WHAT CAN WE LEARN FROM MATHEMATICS
TEACHERS' PERSPECTIVES?**

(Conference ID: CFP/462/2017)

Maureen K. Kanchebele-Sinyangwe
Mathematics and Science Education Department
Kwame Nkrumah University
Kabwe, Zambia
kabwema@yahoo.com

Abstract—

This article explores Mathematics teachers' perception of CPD and its value in their work context. A total of Ninety (90) secondary school Mathematics teachers in a selected district of the central province of Zambia participated in this case study research. The teachers' views on Continuing Professional Development (CPD) were ascertained by means of multiple data collection tools: questionnaire, face-to-face interviews, focus group discussions and review of documents. Among the key findings of the study is that teachers' responses show that they have a shallow understanding of the concept of CPD and its value. Their perception and experiences of CPD is limited and limiting at the same time. It is concluded that understanding how teachers perceive CPD and its value can help explain their participation in and commitment to CPD and also inform design and provision of CPD that can meet the perceived needs, expectations and aspirations of the target teachers.

Keywords— continuing professional development; perspectives; teachers

I. INTRODUCTION

Literature shows that there is increased attention on Continuing Professional Development (CPD) of teachers for the purpose of improving the quality of teachers' practices and improving pupils' learning experiences and achievement and overall quality of education [1, 2]. Zambia, like other developing countries in Africa, has recognised the importance of teachers' CPD. It has acknowledged that teachers, like other professionals, have a responsibility to themselves and their profession to deepen their knowledge, refine and extend their professional skills and update themselves on developments affecting their performance as educators [3, 4]. Even though there is no clearly stated definition of teachers' CPD, also referred to as on-going professional development, in Zambia, the role of CPD in contributing to quality of education delivery has been recognised in the national policy document on education, and the national development plans. This has facilitated the Zambian government, through the Ministry of General Education (MOGE), to invest in teachers' CPD. This investment is partly demonstrated in the institutionalisation of teachers' and teacher educators' CPD in primary and secondary schools and Colleges of Education respectively [4]. This means that CPD has been made a regular feature of school/college plans and programmes. Despite the importance attached to teachers' CPD and teachers themselves being central to and in the CPD process, there is a paucity of empirical studies on teachers' understanding, interpretation and perspectives on CPD itself and its value in their context.

II. LITERATURE REVIEW

A. *Continuing Professional Development (CPD)-A problem of definition*

The definition of the term CPD is rather complicated. In fact, there are a number of terms in literature such as: Professional Development (PD); Professional Learning; In-Service Education and Training or In-Service Training (INSET); Staff Development; Continuing Professional and Personal Development (CPPD); and Continuing Professional Development and Learning (CPDL) which are all related to CPD [5]. These alternative terms are defined differently, but the meanings are often related and overlapping, difficult to disentangle, and the terms often used interchangeably [6]. For instance, in trying to position the term CPD, [6] state that staff development is more encompassing than in-service education but CPD is viewed as the overarching term for all kinds of training. The term CPD is also interpreted differently in different professions and likely to be interpreted disparately by key players, such as teachers or teacher supervisors, within the education system. The differences in the interpretation of the term CPD can spell out different priority areas or focus of CPD [7]. It can be interpreted from the above that teachers' understanding of CPD can have an impact on their participation in CPD.

One example of a definition of CPD in literature is: 'CPD embraces the idea that individuals aim for continuous improvement in their professional skills and knowledge, beyond the basic training initially required to carry out the job'(p. 5)[1]. In this case, there is a clear focus on individual teacher responsibility and control in relation to CPD and silence

on the role of, for instance, national policy makers in the education system, the school system and other key and strategic stakeholders in teachers' PD. Teachers' long term PD is a collective responsibility involving teachers, schools, government and all relevant stakeholders [8, 9].

Another example of a definition of teacher PD is by [10] who states that it is '... a more systematised, initial and continuous, coherent and modular process of professional development of ...educators in accordance with professional competency standards and frameworks'(p. 5). This definition recognises that CPD is a continuous long-term process which is standardised involving module(s) as basis of its design, but seems to exclude non-systematised processes of PD such as any natural learning experiences or on the job learning. Reference [8]'s definition on the other hand covers this and extends it to several other aspects of PD when he states that:

Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute through these to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives(p. 4).

This definition is comparatively a very broad view of CPD. There are several aspects of PD presented by Day's definition above. However, only five have been identified and expanded upon here with reference to other literature, in this and the next paragraphs. Firstly, by stating that PD consists of all natural learning experiences and those conscious and planned activities, [9] suggests that PD includes the kind of learning and the support activities that go with it which not only take place in work-based settings but also externally. It includes both informal learning experiences as well as formal opportunities for teachers' development that can take place inside or outside a classroom setting, within or beyond the school context. Whilst SBCPD has its own advantages and serves particular purposes, CPD may not only be limited to it. Even if it (SBCPD) is beneficial and crucial for enhancing teachers' professional growth, it is not sufficient in itself and on its own [11].

Secondly, there is reference to the point that teachers' CPD is not entirely on an individual basis in developing acceptable professional practices and level of 'expertise' as may be required in the educational system, but constitutes cooperating and collaborating with others too for the same purpose. The idea is that even though there are cases and opportunities for individual isolated work, CPD also involves elements of collaboration between teachers and pupils, teachers and teachers and teachers and other relevant stakeholders [12, 13].

The third point is that [8]'s definition suggests an inclusion of professional, personal and social development dimension of teachers' PD. This is based on his reference to the

development of not only knowledge and skills, but also of emotional intelligence needed throughout teachers' teaching lives in the definition of PD.

Fourthly, it is inferred from [8]'s definition above that CPD is perceived as a long-term continuous process that lasts through a teacher's life. PD is thus a long-term engagement in the learning process. It is a learning process and not necessarily an activity or an event [8, 14]. This process begins with initial teacher training and through all the stages of teaching life [13]. The learning process itself however, cannot necessarily be considered a linear and less complex process. There is a need for forms of sustained support, feedback and follow-up activities during teachers' learning process.

Lastly, the other implication of [8]'s definition is that CPD is directed at teachers' learning, enhancing and using appropriate skills and knowledge and adopting values not only for the direct or indirect benefit of the teachers themselves, but also the learners, as well as the school and education system as a whole.

Based on literature viewed, there is no one single agreed definition of CPD. Reference [8]'s definition of CPD embraces various dimensions of CPD as illustrated above and is considered holistic and useful including in the context of this study.

B. The value of CPD

Among the several reasons that indicate the importance of teachers' CPD are the ones discussed below. The first point is that CPD can be a means through which teachers keep abreast with knowledge and pedagogy in their subject areas and in the field of education in general. It can contribute to updating and extending their professional knowledge, values and skills on new developments and new areas of practice to ensure continuing competence in their teaching job [9].

Even though the relationship between teacher teaching and pupil learning and attainment is difficult to establish [15], there is evidence from literature [16] to the effect that CPD can lead to increased teacher knowledge, positive changes in teaching strategies which all can contribute to improved pupil attainment. Therefore, implying that CPD is linked to improvement in learners' learning experiences and attainment.

Further, central to the core purpose of school(s) and students' learning is the view that those responsible for pupils' learning should be learners themselves. Teaching is a learning profession and every teacher should also be a learner [4]. CPD is one of the avenues through which teachers can continue learning.

Furthermore, several literature [8, 9] indicate that CPD is also related to school improvement and effectiveness. Hence suggesting that investing in teachers' PD is equally investing in school improvement.

III. METHODOLOGY

This study was part of a PhD study on ‘secondary school Mathematics teachers’ perspectives of CPD in Zambia: the case of a selected district in Central Zambia’. It used a case study research approach with data collected using questionnaire, which comprised both closed and open-ended questions, face-to-face in-depth interviews, focus group discussions including document review. Constructivism, Adult Learning theory and socio-cultural frameworks guided the study. Ninety (90) secondary school Mathematics teachers in the selected district of Central Zambia participated in the study. Data was collected in the period of April-August 2015.

IV. FINDINGS AND DISCUSSION

Although most teachers were not able to state correctly what the letters in the acronym CPD represented, they appeared to be familiar with the acronym and were able to share what they understood by CPD. An analysis of their responses led to the following emerging themes and categorisation of the understanding of the nature and value of CPD: CPD as an event; CPD as a collective activity; CPD as learning; CPD as a government directive; and CPD as a ladder to promotion. The teachers’ responses pertaining to each one of these categories are presented below.

A. CPD as an event.

In an attempt to share their understanding of CPD and its value most Mathematics teachers referred to events such as peer observing a lesson or attending a meeting pertaining to Lesson Study (LS) as being CPD. An example of teachers’ responses is: ‘*CPD is when you have Lesson Study cycle*’. (Questionnaire)

In the same line, one teacher stated that: ‘*It is not practical for me to have Lesson Study [referring to CPD] when it is just one person in the department. Because CPD is when you have Lesson Study meeting...*’ (Interview 20)

Another said ‘*CPD is attending workshops, but people like me have not had a chance to attend any workshop in a long time so no CPD...*’ (Interview 4)

It can be concluded that some teachers’ understanding of CPD is linked and limited to a specific kind of (CPD) event. However, literature such as [8] indicate that CPD goes beyond attendance of a CPD activity. It is not necessarily an event itself, but a process. CPD activities such as LS and workshops provide opportunities and are avenue intended to facilitate teachers’ professional, personal and social development and improve teachers’ practice [17, 18].

If focus is on an activity or event such as lesson planning then it shifts attention from other formal CPD activities and less formal ones such as personal study or on-the job learning, which are equally important avenues for PD. It shifts attention from holistic picture of PD,

which covers ‘...all natural learning experiences and those conscious and planned activities...’(p. 4)[8].

B. CPD as a collective activity

Mathematics teachers’ responses during interviews, discussions and questionnaire referred to the point that CPD was about coming together as a group to share ideas and resources for teaching for the purpose of improving their teaching practices. An excerpt representative of this view is:

CPD is when you arrange to and meet with others and have a chance to share ideas concerning teaching with colleagues. (Questionnaire)

Such arguments could have their roots in the fact that LS, which is a major form of teachers’ CPD in Zambia, is largely based on collaborative approach to teacher learning. Even though the collaboration in the CPD context has its own challenges, collaboration in general and in the specific areas as attached to LS has a crucial role to play in teachers’ PD [5].

Individualised and collaborative CPD can both facilitate teachers’ PD [5]. The two are not conflicting. Collaborative learning is not meant to replace or compete with individual learning, but rather to complement it [19].

C. CPD as learning and developing

Mathematics teachers’ understanding of CPD was linked to learning. Representative of this view is the comment:

CPD is about learning, it is about learning and growing in what I know about teaching mathematics and how to teach it...(Questionnaire)

Several Mathematics teachers were of the view that CPD was essential. They supported the idea of CPD being about learning, unlearning and relearning. While several teachers were of the view that CPD was an essential part of their work, some teachers expressed reservations with the idea especially with how it is presented in practice. For example, teachers had this to say:

...it is nothing about what I would like to learn, but about what the people at the top want me to learn (Interview 2).

...the idea of ‘continuing’ in CPD to me means that I am aware of where I am in terms of the knowledge and the skills on which I have to keep building, unfortunately this is not considered... (Interview 1)

The above is an indication that while CPD is indeed about learning there is one aspect that has not been paid attention to: teachers being aware of the point where they are in terms of knowledge and skills and also be able to design a path for their development by identifying possible ways to meet the identified needs. Reference [8] holds concerns similar to the

teachers' by stating that 'without a clear conception of what this 'growth' might look like it is difficult to determine a path for professional development' (p. 40) [8].

Majority of teachers' responses such as:

...the whole idea of CPD is about increasing teachers' mathematical knowledge ...(Questionnaire)

show that even though teachers considered CPD as learning and developing, their focus was mainly learning as related to acquiring technical knowledge and skills. This shows that many teachers' perspective of CPD for them as learners is limited. This is because CPD should contribute to the development of both hard and soft knowledge and skills [20] and positive change in attitudes and behaviour.

D. CPD as a directive from government.

Majority of the Mathematics teachers in this study viewed CPD as a directive from government and they needed to comply. One teacher had this to say:

CPD is about doing what government wants us to do: do lesson planning together, observe one of you teach, discuss the lesson afterwards- and we go through the motions just like that ...so that we satisfy our employers (FDG 2)

...most of us have been attending Lesson Study as a formality -to fulfil government expectation for teachers... (FDG1)

Such views of CPD solely as a directive from government suggest that CPD can only be CPD when it is formal and structured and thus detaching teachers' self-directed learning and informal CPD as an aspect of CPD. CPD activities encompass formal and structured CPD and informal CPD activities too [19]. While there is to be an element of complying with professional standards set by government, there should also be an element of and recognition of a degree of teacher autonomy regarding their PD. This appears not to be recognised.

Another teacher's comment worth noting here is:

I see CPD as a way of experimenting with the foreign ideas that government borrows from other countries it considers as cooperating partners to strengthen their relationship... (Interview 26)

Related findings emerge from other studies in Central Zambia such as that by [21] which confirm that LS is the main form of CPD and that teachers considered quite alien. It is not surprising that teachers expressed uncertainty about the positive effects of ways of working that are 'borrowed' from other countries and being adopted in their work context. Neither is it surprising that they expressed negative feelings toward imposed top-down directives. With such views, it is highly likely that some teachers ignore the directives and carry on with their work as before. Reference [22] refers to sentiments and ways of working as expressed above. However, it is important to note that most reforms in the education system come from external sources and appear as 'borrowed ideas'. What should equally be noted is that literature has also shown that there are ways of reducing resistance to implementation of

reforms from external sources such as: informing teachers of change, giving teachers some degree of control or say and input in the planning for and actual implementation process of the changes [23]. This can contribute towards teachers starting to view change and embrace the new and innovative ideas as their own even though coming from an external source. When teachers are working in an autonomy supportive environment it is relatively easier for them to embrace change as their own [24].

E. CPD as a ladder to promotion

The Mathematics teachers regarded CPD as a means for increasing chances of being given additional recognizable responsibilities and positions within the school, of being promoted to a higher position in the MOGE and or enabling them to change their careers.

CPD for me is a way of preparing me to get to the top as an administrator... I don't see myself remaining a teacher for the rest of my life. (Interview 6)

When those in higher positions see your commitment to CPD they are likely to give you some extra duties from which you can make some extra cash or they can promote you... (FDG 2)

There were a few however who made contradicting comments to the effect that there was no obvious relationship between commitment to CPD and being promoted. An example of their responses to this effect is:

Mathematics teachers are in most cases not promoted because if they were, then they would create further shortages at the school level. So those who think they are going to be promoted are simply dreaming... (FDG 2)

The findings of this study are consistent with findings from studies such as by [25] and [26] in which some teachers stated that CPD is a ladder for their promotion while others also argued that it had little or no impact on their promotion outlooks.

Majority of the Mathematics teachers in this study appeared to have a career path or prospect in mind. Table 1 below with questionnaire data shows that the biggest group of teachers in the study that is, 39 (47%) want to be lecturers at college/university level followed by 16 (19%) who want to be HOD and only 7(8%) who want to remain Mathematics teacher.

Working on assumption that the thirty-nine teachers actually become lecturers it would be justifiable to plan on increasing the supply of secondary school mathematics teachers. It would also mean that CPD should be designed in such a way that it contributes toward retaining, generating and maintaining teachers' (dying) enthusiasm for classroom teaching especially with respect to those who indicated that they wanted to remain class teachers. This is in line with the observation made by [27] that a focus on addressing the shortage of teachers should go hand in hand with focus on addressing the needs of the teachers who are actually serving and supporting them in the process of lifelong learning. An argument which [28] underscores: '...to improve retention in the profession, there is a need to revive and sustain the enthusiasm of existing qualified teachers of mathematics, as well as a need to support and develop them throughout their teaching careers...' (p. 109).

Table 1 Mathematics teachers' long-term career plan

	N ^o of Teachers	Ranking
Lecturer at a college or University Class teacher	39(47%)	1
HOD	16(19%)	2
Head teacher	8(10%)	3
Mathematics (Class) teacher	7(8%)	4
Deputy Head teacher	4(5%)	5
Become an administrator (at District, Provincial or National level)	4(5%)	5
Stop teaching and look for another job	3(4%)	6
Retire	2(2%)	7
TOTAL	83(100%)	

Indeed, in the face of critical shortages of secondary school Mathematics teachers in Zambia, it matters a lot that leaders at local and national level join and heighten efforts directed at retaining the few Mathematics teachers that are currently serving. A suggestion by [29] of creating, within the realm of teaching, positions of responsibility or salary scales that would allow individual teachers to receive salary increases and still continue teaching is worth considering.

While it is true that CPD supports career aspirations and progression [19] of the teachers, thus benefiting the teachers themselves, it is meant to benefit others too. It is meant to be of benefit to pupils, fellow teachers, the school system to mention but a few. References [8] and [19] support this argument with [8] particularly stating that CPD is ‘...intended to be of direct or indirect benefit to the individual, group or school and which contribute through these to the quality of education...’ Therefore, the need for CPD participants to look beyond the benefits to themselves and embrace the broader picture of CPD that looks to benefiting others too. Based on literature reviewed so far it is deduced that CPD is vital for individual teacher development and essential for development of effective teaching practice whether this results into promotion or not.

V. SUMMARY OF KEY FINDINGS, CONCLUSIONS AND IMPLICATIONS

What can we learn from Mathematics teachers' perspectives of CPD? The findings of this study show Mathematics teachers' conceptualisation of the notion of CPD differed from teacher to teacher and so was the value they attached to CPD. Specifically, CPD was perceived to be: 'an event', 'a collective activity', 'about learning and developing', 'a directive from government' and 'a ladder to promotion'. How committed Mathematics teachers are to CPD, to an extent depends on their conception of CPD. Considering the different and limited notions of CPD, it can be construed that there is a need to provide a comprehensive view of CPD, which advances the differing notions, and purposes of teachers' CPD. By implication, the differing, and seemingly, conflicting perspectives of CPD can be brought together for a broad and all-inclusive shared understanding of CPD which would not only be essential for teachers, but also for all the providers of CPD. Having a shared understanding of what CPD could pave way for meaningful cooperation between and among relevant stakeholders in CPD provision and more opportunities for widening the content of CPD sessions so as to meet teachers' various and diverse CPD needs.

At the heart of teachers' CPD is self-improvement not only for its own sake, but with a view to ensure improvement in the quality of the teaching and learning process so that pupils and other beneficiaries are provided with the best service possible [9]. The findings of the study show that even though professional, personal and social development aspects are intertwined and crucial for having 'whole' teacher development, Mathematics teachers' CPD focus was mainly for technical knowledge and skills and little on considering knowledge, skills, competencies and values pertaining to their social and personal development. It is concluded that Mathematics teachers' perceptions demonstrate that they have a shallow, limited and limiting view of what constitutes their CPD. The need for a broad view of CPD that encompasses professional, personal and social development applies.

Mathematics teachers in this study mainly engaged in formal structured SBCPD through LS chiefly for the purpose of complying with government demand and less out of their ability to exercise autonomy with regard to their CPD. By deduction, there is a need to embrace the kind of CPD that comprises and accommodates many different activities: formal or informal in nature, school-based as well as non-school-based, that allow for teacher learning and professional growth. The whole picture of teachers' continuing PD is to cover the point that teacher development or growth can take place in multiple contexts taking into consideration the individual teacher as a learner [19].

Based on Mathematics teachers' conceptualisation of CPD, their engagement in and experiences of CPD, there is little evidence and scope of integrating greater teacher autonomy which is a crucial element in the CPD context. While it is true that government, through the MOGE, has a role to play in teachers' CPD, teachers have a role to play too. Teachers need to have a sense that CPD is something that can be within their control. Enabling a 'teacher autonomy supportive environment' would contribute toward increasing teacher autonomy not

only in identifying their CPD needs, but also in deciding the CPD activities that have potential to meet perceived needs.

In conclusion, what we can learn from Mathematics teachers' perspectives of CPD is that understanding how teachers perceive CPD and its value can help explain their participation in and commitment to CPD. Having an understanding of the meaning that teachers attach to CPD and its value can also inform design and provision of CPD that can meet the perceived needs, expectations and aspirations of the target teachers.

Acknowledgment

I am most grateful to the Commonwealth Scholarship Commission and the Faculty for the Future for supporting the PhD research study from which this work has been drawn.

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