

Effectiveness of School-based Professional Development in Addressing Teachers' Learning Needs and Improving Learner-centred Pedagogical Practices

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Abstract

The study set out to investigate how school-based continuing professional development (SB-CPD) addresses teachers' learning needs and contributes to the improvement of learner-centred pedagogical practices in Tanzania secondary schools. The study employed questionnaire, interviews, classroom observation, and documentary review to collect data from a sample of 110 teachers and heads of schools participating in an SB-CPD programme called the Probono Teacher Training (PPT) Programme. The study revealed that, even though teachers' learning needs were not identified through a needs assessment, the teachers perceived the programme effective in addressing their learning needs related to the implementation of the competence-based (secondary education) curriculum. Moreover, the PPT Programme, to a large extent, was effective in improving learner-centred pedagogical practices, particularly in the aspect of applying learner-centred teaching (LCT) strategies in the course of teaching. Based on these findings, it can be concluded that an SB-CPD programme is effective in addressing teachers' learning needs and improving learner-centred pedagogical practices.

Keywords: Learning needs, learner-centred pedagogy, continuing professional development

Introduction

It is widely accepted that continuing teacher professional development (CPD) is important in improving teaching practices and student learning outcomes. It updates teachers' subject content knowledge and enables teachers and schools to develop and apply new strategies in implementing the school curriculum (Maciejowska, Čtrnáctová & Bernard, 2015). In Tanzania, as is the case elsewhere, TPD is considered an important factor in improving teacher performance. It is for that reason several CPD programme have been implemented in different schools in the country (Komba & Mwakabenge, 2019).

Professional development practices can be classified as traditional (off-site) or school-based (on-site) depending on the location where they are offered. Among the two, traditional CPD is widely practised. However, while any CPD programme could be limited by several factors such as teachers' readiness or availability of resources, traditional programmes are inherently costly, less accessible and occur irregularly (Lukanga, 2013). In addition, short time traditional programmes such as workshops that occur away from teachers' working place lack intensiveness (depth) and continuation (sustainability) to produce desired changes in the teaching practices (Gulamhussein, 2013; Kelley, 2021). They are usually lecture-based and not tailored to individual learning needs. They treat teachers as passive learners while providing little space for teachers to reflect on their practices (Rucker, 2018). It is similarly observed in Tanzania that although the major aim of traditional programmes is to improve teachers' pedagogical and content knowledge, in many cases teachers lack school-based support that would have had a significant impact on their performance while implementing concepts learned in these programmes (Anangisy, 2018).

2011; Dachi, 2018). It is due to this perceived weakness of traditional teacher programmes that other models of CPD have evolved, including school-based professional development.

Unlike the traditional model, SB-CPD involves learning activities that take place at a school level initiated by school leaders, and teachers or implemented by an external agency based on curriculum or teachers' learning needs (Rugambwa, 2022). The common SB-CPD activities include in-house training, professional dialogue, coaching, school visits, and peer observation (Fareo, 2013). The advocates of SB-CPD argue that, in addition to being more accessible and less costly (Republic of Zambia, 2009), it offers a continuous opportunity for teachers to improve their competencies based on their daily teaching experiences at the classroom level and through the sharing of ideas (Avalos, 2011). Consequently the teachers "benefit most by learning in the setting where they can immediately apply what they learn" (Mizell, 2012, p.8).

SB-CPD is practiced worldwide. In the US, for instance, Matsumura and Steinberg (2002) report an SB-CPD project in Los Angeles through which teachers engaged in self-reflection to improve their instructional practices and student learning with the help of coaches. Another example is that of an SB-CPD programme conducted in a special school in Shrewsbury, in the United Kingdom to address Mathematics, Science, and English curriculum issues through student engagement (Smith, Keating, and Turner, 2006). Similarly, in Australia, Owen (2003) reports a study on the leadership of school-based professional development in primary and secondary schools in Southern Australia. Literature also indicates that the SB-CPD model has been adopted in different countries in Africa. In Zambia, for instance, SB-CPD is considered "one of the effective ways of improving education as far as teaching is concerned as it targets self-development, group and eventually institutional development (Republic of Zambia, 2009, p.iii). In South Africa, the SB-CPD is said to respond to teachers' immediate needs, and provide opportunities for on-site practice and reflection (Boaduo, 2010). In Nigeria, SB-CPD is an alternative to the traditional 'workshop' model in which "pupils, teachers, supervisors, and facilitators are involved collaboratively in carrying out a series of classroom and school-based activities that will help the teacher to improve. The teacher gets professional support from facilitators and supervisors who serve as mentors (Fareo, 2013, p.65).

Given this global trend on SB-CPD, it is not surprising that Tanzania has also adopted it in addition to traditional CPD. SB-CPD is expected not only to increase teachers' access to professional development but also to improve teachers' practices and hence learning outcomes (MEST, 2017). In-service teachers' SB-CPD in Tanzania can be traced back to the late 1990s and early 2000s during which projects such as Oxfam-EQUIP (Education Quality Improvement through Pedagogy) were implemented to improve instructional practices and student learning outcomes (Kitta, 2004; Sedere, Mengele & Kajela, 2008). Moreover, the adoption of the school-based model of teacher development in Tanzania is evidenced by the existence of several policy documents such as the Secondary Education Development Programme (Ministry of Education and Vocational Training [MOEVT], 2010), Teacher Education Management and Development Strategy (MOEVT, 2008), and National Framework for Continuing

Professional Development for Practicing Teachers (Ministry of Education, Science, and Technology [MEST], 2017). All these 'policies' require school authorities and management to supervise the implementation of SB-CPD activities for teachers' professional growth. Specifically, the National Framework for Continuing Professional Development promotes SB-CPD with the argument that "teacher learning which is embedded in the context of schools tends to address the relevant needs of teachers, students, and schools" (MEST, 2017, p.5). It is due to these policies or from own initiatives several secondary schools in some regions such as Kilimanjaro and Dar es Salaam are engaging in SB-CPD programmes. However, mere implementation of SB-CPD programmes may not be sufficient. What is more important is the question of how effective they are in addressing teachers' professional needs and improving their teaching practices (Gullamhussein, 2013; MEST, 2017). It was based on that reasoning that this study was found significant. Specifically, the objectives of the study were:

- a) To examine the extent to which SB-CPD programmes identify and address teachers' professional development needs.
- b) To establish the extent to which and how SB-CPD programmes contribute to improved learner-centred pedagogical practices in secondary schools.

Literature Review

Several studies have associated effective SB-CPD with teachers' learning needs and improvement of learner-centred pedagogical practices. Moreover, there is a need of understanding the concept of learner-centred pedagogy (LCP) in the Tanzanian context and the theoretical basis of the study.

SB-PCD in addressing teachers' learning needs

Literature indicates that professional development programmes are perceived effective if they address teachers' learning needs as well as the needs of the school. Teachers express high levels of dissatisfaction with professional development programmes that fail to cater for their learning needs or live up to their expectations (Garet et al., 2005). Moreover, Whitehouse (2011) while reviewing studies that assessed the effectiveness of CPD programmes, observed that any model of professional development must be driven by the learning needs of teachers "that have been identified beforehand". Identifying teachers' needs before implementing the programme helps to set the criteria against which the programme can be evaluated. In a nutshell, these observations by Goodall (2005) and Whitehouse (2011), and those of others such as Hunzicker (2010) and Gaible and Burns (2005) suggest that CPD programmes (including SB-CPD) are considered effective if they meet their objectives set based on the identified learning needs of the teachers. Although these studies were not conducted in Tanzania, they still hint at what teachers expect from a CPD programme.

The contribution of SB-CPD to pedagogical practices

The available literature is not conclusive on whether SB-CPD improves classroom practices. The study by Svendsen and van Marion (2015) indicates that SB-CPD has a direct effect on the mode of teaching and a long-term effect on the ways teachers think about teaching. These findings are supported by the study conducted in Tanzania by Hardman (2015). The study revealed that the teachers who participated in a certain pilot SB-CPD programme showed significant improvement in their teaching practices including changing classroom layout, engaging students actively through group or pairs works, and creating a positive learning environment. Other studies, however, indicate either the failure or partial success of SB-CPD programmes in improving teacher practices. Wondem (2015), for instance, reports that although SB-CPD has been implemented in Ethiopia since 2004, it has not been able to achieve its major objectives of improving teachers' classroom practices and consequently student achievement. Wondem (2015) argues that SB-CPD is not effective because teachers lack professional support and follow-up from professional development facilitators. Moreover, a study on a certain teacher programme in Tanzania by Mllinga (2014) suggests that an SB-CPD programme can have a mixed impact on teachers' classroom practices. The study found that while the programme was effective in organizing the classroom to facilitate learning and encouraging pupils to ask questions, it failed to promote the use of instructional materials and a variety of teaching and learning activities. This disagreement in the literature regarding the effectiveness of SB-CPD makes studies like this worthy of pursuit.

Learner-centred pedagogy in Tanzania context

Since one of the objectives of this study was to establish how SB-CPD influences learner-centred pedagogical (LCP) practices, it is important to understand how the term learner-centred pedagogy is perceived in the Tanzanian context. Vavrus, Thomas, and Bartlett (2011) hint that the perception of LCP in Tanzania can be linked to the adoption of Education for All as a global educational goal in 1990 in which efforts were made to discourage teacher-centred approaches and adopt the so-called learner-centred approaches. These efforts in Tanzania eventually resulted to Tanzania curriculum reforms that witnessed the shift from a content-based curriculum to a competency-based curriculum (CBC) that incorporates LCP. According to Vavrus et al. (2011), LCP in Tanzania can be defined as a teaching philosophy that embraces participatory teaching, critical thinking, and inquiry-based learning. It is all about putting learners at the centre of a teaching process by focusing on their learning needs and active engagement in the learning process. Similarly, according to Keith, Rugambwa, Vavrus, and Maganga (2016), LCP in Tanzania is perceived as "an instructional approach in which students influence the content, activities, materials, and pace of learning. This approach places a learner in the centre of the learning process" (Keith et al., 2016, p.3 citing Collins & O'Brien, 2003).

Moreover, in an attempt of creating the framework for assessing LCP, Vavrus (2013) provides a list of basic activities expected from a teacher who applies LCP in a Tanzanian classroom. The list includes: beginning a lesson

with a starter (warm-up) to attract students' attention; using a variety of teaching strategies to promote active learning and conceptual understanding; praising and rewarding students, and tailoring the lesson to multiple intelligences (p.35). Another indicator of LCP is the teachers' ability to make use of the teaching resources found in the school or improvised from local materials (Vavrus & Salema, 2013).

The Conceptual Framework

The study followed the "Common Attributes" model (Rugambwa, 2022) in identifying the features of an effective SB-CPD programme. The model is based on the review of the literature that provides several lists of the common features of an effective teacher development programme regardless of its type (Garet et al., 2001). These lists are obtained from surveys of a large number of teachers or the reviews of several studies conducted over years (Garet et al., 2001; Avalos, 2011). Although each of these lists consists of some features which are not found in other lists, six overlapping features can be extracted from them. These are sustainability and intensiveness; identifying and addressing teachers' learning needs; being job-embedded; being instruction-focused; and focusing on student achievement (Bubb, 2010; Hunzicker, 2010; Avalos, 2011). When these six features are present in an SB-CPD programme, it is expected to provide teachers with opportunities for practising and applying new teaching methods in the classroom and hence leading to permanent improvement in teachers' instructional practices (Whitehouse, 2011). In this study, two of these common features were used as indicators of an effective SB-CPD programme, namely addressing teachers' learning needs and instruction focused (i.e. aiming to improve teacher practices). It is from these two indicators that the objectives of this study were drawn.

Methodology

The study employed a mixed-method approach in the process of complementing research methods and triangulating research data for the credibility of the study and an in-depth understanding of the research problem (Ary, et al., 2002). The case study design was used to study an SB-CPD programme called Probono Teacher Training (PTT) Programme. Since SB-CPD practices are rarely practised in many schools (despite the policy), studying a case of selected schools implementing a well-organized and monitored SB-CPD with the shared objective of improving LCP practices, was found more informative than studying a set of schools with no or poorly established SB-CPD practices. The study took place in Kilimanjaro and Dar es Salaam regions where PTT intervention took place. It involved a sample of six secondary schools, hereafter known as PTT schools. These schools are (using pseudonyms) Maono, Faraja, and Kilevi secondary schools which are located in Dar es Salaam and Aisha, Mlogi, and Kilombili secondary schools located in Kilimanjaro Region.

Two stages were followed in sampling PTT schools. First, the study used purposive sampling in identifying project schools that implemented the programme for at least three years and were committed (based on the views of programme organizers) to conducting school-based workshops. The purpose was to have participants who were

well-informed about the programme. In the second stage, six schools that met the criteria in the first stage were selected through random stratified sampling. Three schools from Kilimanjaro (rural) and three schools from Dar es Salaam (urban) were selected to ensure equal representation of schools experiencing both rural and urban contexts (Hardman et al., 2015.). Moreover, the study employed a key informant sampling technique to select six heads of schools (HOS), and six school-level programme facilitators called guardian teachers (one from each school) due to their direct involvement and being well-informed about the intervention. The HoS and guardian teachers participated in in-depth interviews. Moreover, a purposive sampling technique was used to select other 98 teachers who were trained under the PTT programme from all the six sampled schools. All full-time teachers without prior professional development experience, who had attended at least 75% of PTT sessions during the four years of implementing the programme, were sampled for the study. Out of these 98 teachers, 12 (two from each school) were interviewed, the other 12 were engaged in classroom observations and the remaining 74 filled out the questionnaires. The items in the questionnaires were close-ended for objectivity and for gathering data from a large sample of respondents. In total, 110 participants qualified for the study. The documentary review was another data collection method used in the study. The method was used to review and analyze PTT Programme documents to get useful information related to the study. This includes the objectives of the programme, the number of schools involved in the programme, their geographical locations, and the number of PTT trainees in each school. The researcher obtained the required documents from the coordinator of the PTT Programme.

The type of mixed-method approach used in the study was convergent mixed methods. Therefore, the analysis of quantitative and qualitative data for each research question was made separately and then compared before the interpretation was made to have a complete picture of the contribution of SB-CPD to teaching and learning (Creswell, 2014). The analysis of qualitative data (interviews and document analysis) was an ongoing process and thematic. Collected data were organized into electronic files according to research themes (research questions) and coded. Then the coded data were described narratively with the help of direct quotes. Meanwhile, the analysis of quantitative data employed simple descriptive statistics. At the basic stage, all the responses to each item of the questionnaire (or ratings in the observation schedule) were organized in tables and presented in form of numbers (frequencies) and/or percentages.

Findings

Effectiveness of SB-CPD in identifying and addressing teachers' learning needs

The first objective of the study was to examine the extent to which an SB-CPD programme a) identifies teachers' learning needs, and b) addresses (satisfies) these learning (professional development) needs.

The extent to which PTT Programme identified teachers' PD needs

In assessing the effectiveness of the PTT Programme in identifying teachers' learning needs, 18 interviewees (12 teachers and 6 HoS from PTT schools) were asked if they believed their learning needs were considered when designing the PTT Programme. Table 1 summarizes their responses.

Table 1: *The extent to which PTT Programme Identified Teachers' PD needs*

	Total	Heads of Schools	Teacher
Base	18	6	12
Yes	6	1	5
%	33%	17%	42%
No	12	5	7
%	67%	83%	58%

Source: Field Data

According to the findings, 6 participants (1 HoS and 5 teachers) said: "Yes" (33%), while the rest (5 HoS and 7 teachers) said, "No" (67%). Moreover, it is evident even at the group level that the views of the participants didn't differ very much. The majority of interviewed HoS (5 out of the 6 interviewed HoS) and the majority of the interviewed teachers (7 out of 12) believed the PTT Programme didn't consider their learning needs when it was being designed. The observed difference in the figures (percentages) between the two groups, based on the chi-square test, is statistically insignificant ($p - value \approx 0.28 > 0.05$).

In a probing question, those who responded with a "No" were asked to explain "why". They provided answers indicating that no one asked them about their professional development needs. That is, there was no study (needs assessment) conducted to assess teachers' learning needs. Those who responded with a "Yes" were asked a follow-up question regarding the extent to which the PTT curriculum was designed based on their professional development needs. They provided different responses to the question. For example, "the PTT Programme was conducted by looking at the need of the syllabus as well as the use of learner-centred teaching" (Male teacher at Faraja Secondary School). This perception that the programme was necessitated by curriculum need was supported by other interviewees. A female teacher at Aisha Secondary School, for instance, observed that "the curriculum was not implemented in an accurate and successful manner". The "teachers were in need of knowing teaching and learning methods and techniques so as to improve the learning process" (Male teacher at Maono Secondary School). Moreover, the responses from other interviewees revealed that PTT Programme was necessitated by poor teaching quality in PTT schools. For example, a female teacher at Kilombilii Secondary School claimed that "The initiators had researched and found out that there was a problem in the teaching in schools". Moreover,

Most of the teachers were able to conduct teaching and learning processes but not efficiently. Before PTT [they] were just doing as usual and sometimes [they] encountered difficulties in topics... Teachers

were not able to teach well in class. They used non-interactive teaching methods. This need [of teaching well] influenced PTT Programme. (The HoS at Mlogi Secondary School)

Therefore, it is safe to conclude based on the findings that the PTT Programme was not effective in identifying teachers' learning needs. The programme was designed based on the assumed curriculum needs and the observation that teaching quality in target schools was poor.

The extent to which PTT Programme addressed teacher's learning needs

To answer the second part of the first research question, this study sought to know the extent to which teachers' learning needs were addressed by PTT Programme. The respondents, through questionnaires, were asked to rate the PTT Programme with respect to how effective it was in addressing their (assumed) learning needs related to the training areas covered by the programme. Their responses are summarized in Table 2 based on a rating scale with high internal consistency (Cronbach's alpha, $\alpha = 0.95$). The findings indicate that most of the respondent teachers were satisfied with the programme in addressing their learning needs associated with each of the rated training areas. 97% of the responses on all items considered the programme either effective or very effective in addressing their learning needs while only 3% of the responses indicated the programme "not effective" or "undecided". Therefore, it is logical to argue that, to the large extent, PTT Programme was effective in addressing teachers' learning needs, regardless of the fact that the needs were not identified by the teachers themselves.

Table 2: *The Effectiveness of the PTT Programme in Addressing Teachers' Learning Needs*

S/N	PD Area	n	Not Effective	Undecided	Effective	Very Effective
1	Content knowledge in teaching subject	74	0	0	20	54
2	Student assessment skills	74	0	0	30	44
3	Class management	74	0	0	33	41
4	Learner-centred teaching skills	74	0	4	10	60
5	ICT skills for teaching	74	0	0	47	27
6	Student discipline management	74	0	0	37	37
7	School management and administration	74	0	0	44	30
8	Laboratory Management	74	7	4	37	26
9	Improvisation of teaching aids	74	0	4	24	46
Total		666	7	12	282	365
Percent		100%	1%	2%	42%	55%

Despite this general outlook, the findings suggest as well that the degree of teachers' satisfaction differed from one training area to another. Teachers were more satisfied with the programme in some training aspects than others. For example, on one hand, PTT Programme obtained a good number of "very effective" ratings in improving LCT skills (60 out of 74 = 81%); subject content knowledge (73%), and improvisation of teaching aids (66%). On the

other hand, some training areas such as school management (41%), ICT skills (36%), and laboratory management (36%) obtained the lowest percentages of “very effective” ratings. Specifically, ‘laboratory management’ was the only PTT training area that was rated “Not effective” by 7 respondents (9%) with the other 4 respondents (5%) declaring “undecided”. This might have been caused by some weaknesses in its facilitation as observed by one interviewee with respect to ICT training “E-learning was not well planned and organized. Some topics were not well discussed because of time not [being] enough. CD's/, DVDs, flashes which contain simulations were not provided”. Nevertheless, even with the relatively lower ratings on the aspect of ‘laboratory management’, the PTT Programme was generally perceived as effective in addressing teachers’ learning needs.

As is the case with questionnaires, the interviewed teachers indicated the same level of satisfaction with how the PTT Programme addressed their learning needs. For instance, two interviewees had this to say:

PTT Programme has been particularly relevant as it has changed my attitude towards learners and has made me change learners’ attitude towards learning giving back their confidence and self-esteem... PTT is relevant to my professional development. For example, I was not aware of many varieties of learner-centred techniques before but now I am well equipped. (Teachers at Maono Secondary School)

Table 3 lists some examples of the learning needs that were addressed by the PTT Programme as given by the interviewees. It is evident from the findings that the PTT Programme was perceived as effective in addressing teachers’ learning needs, particularly those related to LCT, classroom management, the use of e-learning/ICT in teaching, and the use of low-cost and locally available resources in teaching.

Table 3: *PD Needs Addressed by PTT Programme*

S/N	Area of PD	PD Needs addressed
1	Classroom Instructional Skills	New learner-centred techniques for teaching (8) Class management (8) Laboratory and experimental Skills (3) The competence in content area (1) Use of low cost and local resources in teaching (7)
2	IT (information technology) skills	Use of e-learning (8) Use of computers in teaching and lesson preparation (2) Teaching using instructional media (2)
3	Lesson Preparation	Preparation of lesson plan (3) Preparation of lesson notes (1)
4	Student Assessment	Assessment and Evaluation (2)

The extent to which and how the PTT Programme improved LCP practices

In the attempt of achieving its second objective, this study using the case of the PTT Programme attempted to establish the extent to which an SB-CPD programme contributes to the improvement of LCP practices. The respondents were asked to rate PTT Programme in terms of how it improved their LCP practices. The questionnaire, as explained later, was adapted from the 'observation guide' developed by Vavrus (2013).

Table 4: *Perceived effectiveness of the PTT Programme in Improving LCP Practices*

S/N	Aspect of Learner-centred Teaching	n	SD	DS	NS	AG	SA
1	I can now improvise and use locally available teaching materials	74	0	0	0	47	27
2	My laboratory management skills have improved significantly	74	7	0	3	44	20
3	I am now able to arouse students' interests and participation through a variety of LCT strategies	74	0	3	0	17	54
4	My lessons address multiple intelligences	74	0	3	0	54	17
5	My lessons promote conceptual understanding (not just factual)	74	0	0	4	40	30
6	I start my lesson with a hook to attract students' attention	74	0	0	0	34	40
7	I respond positively to questions asked by students	74	0	0	4	30	40
8	I motivate students by rewarding or praising them during lessons	74	0	0	0	27	47
9	I promote critical thinking by asking open-ended questions	74	0	0	0	34	40
10	I am able to devise a variety of procedures to evaluate a lesson	74	0	0	0	37	37

Key: SD -Strongly disagree; DS - Disagree; NS - Not sure; AG - Agree; SA - Strongly agree

The findings of the study (summarized by Table 4) indicate that nearly all the respondents believed that the PTT Programme was effective in improving their LCP practices. At least 64 out of the 74 (86%) respondents who filled out the questionnaires either "agreed" or "strongly agreed" that the PTT Programme improved every rated aspect of LCP. Notably, all 74 respondents (100%) perceived the PTT Programme as effective ("agreed" or "strongly agree") in improving: the use of locally available resources in teaching (improvisation), starting their lessons with the hook; motivating students by rewarding or praising them; promoting critical thinking through open-ended questions and evaluating the lesson through a variety of procedures. The PTT programme was also highly rated for improving teachers' skills in addressing multiple intelligences (96%); arousing students' interest through the use of different LCT strategies (96%); promoting conceptual understanding (95%); and responding positively to students' questions (95%). It is also evident that, as was the case with learning needs (Table 2), a considerable number of the respondents (10 out of 74 - equal to 14%) rated the PTT Programme as not effective ("strongly disagreed" or "not sure") in improving their laboratory management practices. Although this percentage (14%) is not significant compared to the 86% of the respondents who rated high the aspect of laboratory management, the findings suggest that the programme was more effective in improving some aspects of teachers' LCT practices than others.

The study also used classroom observations to triangulate data from questionnaires and interviews. The study adopted the ‘classroom observation guide developed by Vavrus (2031 based on the list of “Principles of LCP” (Vavrus, Salema, and Bartlett, 2013, p.18) used to assess the extent to which teachers applied LCT in classrooms in Tanzania after attending a CPD programme. The internal consistency of the observation tool was 0.9 based on Cronbach’s alpha. Table 5 summarizes the findings from classroom observations.

Table 5: *Ratings of Teachers’ LCP Practices in the Observed Lessons*

S/N	Observed Learner-centred components	n	Mean	Ratings				
				1	2	3	4	5
1	Lesson began with a hook to get students’ attention.	12	3.7	1	2	2	2	5
2	Lesson addressed multiple intelligences.	12	3.5	0	2	3	6	1
3	The lesson promoted conceptual understanding	12	4.1	0	0	1	9	2
4	The lesson was relevant, drawing connections to real world	12	4.1	0	0	2	7	3
5	The teacher responded positively to questions asked by students.	12	3.7	0	1	5	3	3
6	The teacher rewarded or praised students during lesson.	12	4.3	0	0	1	7	4
7	The teacher asked open-ended questions (e.g. Why..., How..., etc.)	12	3.6	1	2	1	5	3
8	The teacher was able to arouse students’ interests and participation through a variety of learner-centred strategies.	12	4.2	0	0	1	8	3
9	The teacher was able to devise and use a variety of procedures to evaluate the lesson.	12	3.9	0	2	1	5	4
10	The teacher used teaching aid(s) such as model, poster to facilitate learning.	12	3.5	2	1	1	5	3
Key: 1 – Not observed;		2 – Rarely observed/wrongly applied;		3- less frequent/poorly applied				
4 – Frequent/well applied;		5 – Frequent/very well applied						

Based on the observation data (Table 5), the mean score on a scale of 1 to 5, for each observed LCP practice was approximately 4 (ranging from 3.5 to 4.3). This rating implies that on average all the observed teachers “applied well and frequently” every observed aspect of LCP (items 1-10 in Table 5). Despite this generally positive picture, some LCP practices were more frequently observed than others. These are rewarding or praising students (mean rating ≈4.3), arousing students’ interest through a variety of learner-centred strategies (4.2), connecting the lesson with real-world phenomena (4.1), and promoting conceptual understanding (4.1). LCP practices that were relatively less frequent include using teaching aids to facilitate learning (3.5), addressing multiple intelligences (3.5), and asking open-ended questions (3.6). In other related scenarios, the teachers applied the observed LCP practices either less frequently or in the wrong way. For example, for item 7 one teacher didn’t ask open-ended questions (rated 1); two teachers asked very few open-ended questions (rated 2), and one did better (rated 3). Similarly, in the case of starting the lesson with the hook (item 1), one teacher didn’t start the lessons with a hook (hence rated 1), and two teachers applied the hooks in the wrong way (rated 2) and the hooks of the other two teachers were unconvincing by using warm-up activities that were not linked to the lesson concepts (hence rated 3). The reason why some teachers struggled with certain LCP practices was not clear, since the study did not have the component of feedback sessions after classroom observations.

Despite observed differences in the application of LCP among teachers, it is evident from the quantitative (questionnaire and structured classroom) data that PTT Programme to large extent improved teachers' LCP practices. Through interviews, research participants provided a detailed narrative on how PTT Programme improved their LCP practices. One teacher, for instance, stated that,

PTT equipped me with many techniques which are applicable to learner-centred strategies ... Up to now; I have a lot of teaching and learning strategies that I can use according to my needs considering the terms and conditions leading to the selection of teaching and learning strategies and techniques. (Female teacher at Kilevi Secondary School)

It was also the opinion of the HoS at Mlogi Secondary School that the “PTT Programme has helped teachers in learning different teaching methods. Teachers liked sessions on learner-centred teaching techniques and stress management”. A female HoS at Aisha Secondary School also argued that “at least half of the teachers [were] applying LCT in their classrooms. The popularly applied strategies were: group discussions, interactive posters, and experiments – we encouraged science teachers to do experiments”. Moreover, based on the responses of other interviewees, new LCT strategies learned through PTT Programme include loop the loop; simulation; think-pair-share; role-play; hot seat; group discussions and presentations; and interactive lectures.

In general, the study revealed that to a large extent, the PTT programme was perceived as effective in improving LCP practices. The programme mostly helped the teachers to apply LCP in their classroom by (among others) making students interested and actively engaged in learning through a variety of ‘new’ learner-centred teaching strategies, praises and rewards, and enhancing students’ critical thinking and conceptual understanding by connecting the lesson with the real world phenomena.

Discussion

The findings of this study largely confirm what is already known through different studies. As discussed in the literature review, an effective SB-CPD programme addresses teachers’ learning needs (Darling-Hammond et al., 2017). Addressing teachers’ learning needs, however, begins with identifying them. This study revealed that PTT Programme was implemented without identifying formally teachers’ learning needs. The teachers were not asked what they wanted to be trained in. These findings contradict the literature that recommends designing a CPD programme based on the learning needs identified by teachers themselves through a needs survey (Guskey, 2002). Moreover, one of the best practices of a community of practice (in this study – teachers learning together in a school context) is teachers identifying their own learning needs (O’Sullivan, 2008). Therefore, since the teachers were not involved in identifying their learning needs, it is safe to argue that the PTT Programme was not effective in identifying these needs. Nevertheless, there was a perceived notion among a section of the research participants that the PTT Programme was necessitated by poor teaching quality and the needs related to the secondary education (competency-based) curriculum. This notion was evidenced by one of the objectives of the PTT Programme which

was to improve the quality of lessons. Moreover, PTT promoted LCT which is at the centre of the competency-based curriculum (URT, 2007, p.20). Linking PTT Programme with the curriculum needs concurs with the literature. For instance, Klentschy (2005) argues that the focus of CPD “should be curriculum-based so that it helps teachers to help their students attain higher levels of” academic performance (p.1). Therefore, although the PTT programme did not identify teachers’ learning needs through a needs survey, it identified them through the needs of the secondary education curriculum.

The reviewed literature has also indicated that an effective SB-CPD programme not only identifies teacher needs but also addresses them. According to Hunzicker, (2010) and Meissel, Parr, and Timperley (2016), one of the characteristics of effective TPD is its ability to address the learning needs of teachers. Hunzicker (2010) argues that an effective CPD programme is supportive, as it integrates the learning needs of schools and teachers. Moreover, Goodall et al. (2005) link the effectiveness of a CPD programme with the satisfaction of teachers which occurs when their learning needs are addressed. Similarly, this study has revealed that the PTT Programme addressed teachers’ learning needs and hence was perceived as effective even though these needs were not identified beforehand. Nevertheless, as noted in the findings, this positive image was marred by the perception of a few participants that some of the learning needs such as laboratory management and IT skills were not well addressed. The reason for this observation was associated with the weaknesses in the facilitation of PTT sessions in some schools. On this issue of poor facilitation, Burns and Lawrie (2016) recommend that teacher programmes must invest in high-quality teacher trainers. They also suggest that teacher educators who facilitate professional development must also possess essential knowledge and skills as those of competent teachers including deep content knowledge, different models of instructional strategies, and the ability to support teachers through coaching, observations, and workshops. Therefore, SB-CPD programmes may be more effective if the teacher trainers (fellow teachers or hired experts) are well-equipped with the teaching skills needed for their trainees.

The findings of this study have also suggested that SB-CPD contributes to the improvement of LCP practices particularly in the aspects of the application of learner-centered strategies by promoting conceptual understanding and critical thinking as well as improving student participation in the learning process. These findings coincide with the findings of other studies conducted in Tanzania. For instance, a study by Anney (2013) revealed that in a certain SB-CPD programme, teacher practices improved as evidenced by the use of LCT methods in preparing, teaching, and engaging students actively in the lesson. Moreover, as noted elsewhere, the findings by Hardman et al. (2015) also indicated that the teachers who participated in a pilot SB-CPD programme showed significant improvement in creating a positive classroom climate, using group work, and changing the classroom layout to facilitate learning. However, as noted in the literature review, not all studies are conclusive on whether SB-CPD contributes to the improvement of instructional practices. For instance, Rawle et al. (2019) observe, with respect to EQUIP’s programme, that while teachers demonstrated improved classroom practices such as inclusion and interaction with students, these practices declined with time. They ended up concluding that it was not clear if the

programme contributed to the improvement of teaching quality in the targeted schools. Therefore, it is evident that there exists a lack of consensus on whether SB-CPD contributes to improved instructional practices. This disagreement calls for further studies to probe the problem.

Conclusions and Recommendations

It can be concluded from the study that an SB-CPD programme may be designed based on assumed teacher needs and not identifying them through a needs survey. Nevertheless, it is also the conclusion of the study that even when teachers' learning needs are not identified through a survey, the teachers may still perceive an SB-CPD programme effective in addressing their assumed needs. Moreover, it can be concluded from the study that to a large extent an SB-CPD programme is effective in improving LCP practices, particularly in applying 'new' LCT strategies.

Given these conclusions, it is recommended, that before implementing an SB-CPD programme, there is a need of identifying teachers' learning needs through a needs assessment. Although in the case of the PTT Programme the teachers were fine with implementing the programme based on their assumed professional development needs, it may not be the case always. An SB-CPD programme based on identified teachers' learning needs will surely attract teachers' interest and commitment and hence be sustained. Moreover, following the findings of the study that SB-CPD contributes to improved LCP practices, there is a great need for the government of Tanzania (MEST) assisted by local governments and school leaders to ensure that SB-CPD programmes are established and sustained in all secondary schools for improving teaching practices. As of now SB-CPD practices in Tanzania are neither mandatory nor institutionalized despite the existing policy that guides their implementation.

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