Blended Learning and Professional Development of Student-teachers in the English-speaking Regions of Cameroon

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Abstract

Aim: This study examined blended learning and the professional development of student-teachers in the two English-speaking regions of Cameroon, within the context of the socio-political crisis and the COVID-19 pandemic.

Methods: The argument for this study anchored on Vygotsky’s Social Constructivism Theory, Tchombe’s Mediated Mutual Reciprocity Theory, Harasim’s Online Collaborative Learning Theory, Garrison’s Self-directed Learning Model, and Pavlov’s Classical Conditioning Theory. A cross-sectional survey research design, with a quantitative approach for data collection was used. A sample of 288 student-teachers, derived using two probability (proportionate stratified and simple random) sampling techniques and one non-probability (purposive) sampling technique, participated in this study. A 39-item self-designed structured blended learning questionnaire for student teachers was used to collect data. The data obtained were analyzed using both descriptive and inferential statistics. The Principal Component Analysis and Ordinary Least Squares Regression Model were used to test the specific null hypotheses.

Results: Findings showed that, teacher-directed learning has a positive but insignificant influence on student-teachers’ professional development (Coef. .0009534; P>t=0.988), distance learning has a negative but significant influence on student-teachers’ professional development (Coef. -.1169*; P>t=0.072), self-directed learning (Coef. .1985***; P>t=0.002 and flipped learning (Coef. .23711***; P>t=0.000) both have a positive and significant influence on student-teachers’ professional development.

Conclusion: The study conclude that blended learning has a significant influence on the professional development of student teachers in the English-speaking regions of Cameroon.

Recommendation: The study recommend that the blended learning strategy with relevant objectives and content be provided in the training of student-teachers, as well as the training of teacher-trainers on the didactics of the blended learning model integrating information and communication technologies.

Keywords: Blended learning, flipped learning, distance learning, self-directed learning, teacher-directed learning, professional development, student-teachers.
INTRODUCTION

Following the advancement in technology, the outbreak of the socio-political crisis in the English-speaking regions of Cameroon in 2016 and the corona virus disease in 2019 (COVID-19), technology-oriented blended learning took a centre stage in animating education in most countries including Cameroon (Béché, 2020; Hoti, Dragusha & Ndou, 2022; Singh, Steele & Singh, 2021). Blended learning, refers to the range of possibilities presented by combining internet and digital media with established classroom forms that require the physical co-presence of the teacher and students (Friesen, 2012). It is the integration of instructional learning strategies such as teacher-directed or face-to-face learning, distance learning, flipped learning and self-directed learning modes. Professional development refers to investments or improvements in human capital for the acquisition of knowledge, skills, and competences needed for work and life (Len, 2014). Nishimura (2014, p.21) citing Showers at al. (1987) contend that “the purpose of professional development is increasing the levels of knowledge to sustain and support new practice until it becomes embedded into the daily practice”. It refers to student teacher’s acquisition of pedagogical, technological, content-related knowledge, skills and attitudes towards teaching. These definitions suggest that the purpose of professional development is not limited to the acquisition of knowledge and skills by student teachers but extends to the effective implementation to foster learning in pupils after training.

Bahtia (2007) and Kaur (2013), as cited in Muxtorjonovna (2020), observe that the use of blended learning strategy in the training of student-teachers can ensure greater efficiencies with group sizes; support professional/work-based skills development; flexible study, anytime or anywhere, to meet learners’ needs wherever they want; provide wide access to digital resources, shared tools, and information systems; boosting up the effectiveness of education; increased access and convenience; greater cost-effectiveness; easy to access resources; enhance live feedback in the classroom; make lessons flexible, restrict the need for large buildings and enhance inclusive education. With advancements in technology and the upsurge of crises and pandemics, it was necessary to adopt innovative teaching strategies that will change the role of the teacher from a presenter or dispenser, to a facilitator of knowledge, who should be better prepared and sensitized to produce and use learning situations effectively and efficiently (Ariff et al., 2017).

Statement of the Problem

Sustainable Development Goal 4 emphasises the provision of equitable, inclusive quality education and life-long learning opportunities for all (UNESCO, 2015), re-echoed on the Cameroon Growth and Employment Strategy Paper (Republic of Cameroon, 2009) and the Education and Training Sector Strategy Paper (Republic of Cameroon, 2013b). These were to be achieved through regular face-to-face or distance learning mode as previewed in article 23(2) and 25 of the 1998 Orientation Law of Education in Cameroon (Republic of Cameroon, 1998). However, the socio-political crisis that erupted in the North West and South West Regions in 2016 and the Corona Virus (COVID-19) pandemic in Cameroon introduced a challenge in the educational sector that experienced a disruption of studies at different intervals (Béché, 2020). The traditional on-site classroom learning strategy was disrupted, thereby reducing the effective theoretical classroom training periods for student-teachers in Teacher Training Colleges (TTCs). To ensure that effective training continued, the Ministries of Basic and Secondary Education in a
joint order requested an intensification of the use of the blended learning strategy (Akumbu, Teneng &Ngu, 2020; Béché, 2020). With interruptions in the traditional in-class learning, the low level of appropriation of digitalization by Cameroon teachers (Akumbu et al. citing Josue, 2007; Béché, 2013, 2017; Karsenti, 2009; Mbangwana, 2008; Ndongfack, 2015; Njebakal & Teneng, 2017), it became necessary to examine the extent to which the blend of the distance learning, self-directed learning, flipped, and teacher-directed learning modes influence student teacher’s acquisition of the required professional skills during the crisis period. The influence of the blended learning strategy on elementary student-teachers’ professional development during the crisis period was the gap in knowledge that this study sought to fill.

Main Research Hypothesis

Blended learning model has no significant influence on student-teachers’ professional development.

Specific Research Hypotheses

Ho1: Teacher-directed learning has no significant influence on student-teachers’ professional development.

Ho2: Distance learning has no significant influence on student-teachers’ professional development.

Ho3: Self-directed learning has no significant influence on student-teachers’ professional development.

Ho4: Flipped learning has no significant influence on student-teachers’ professional development.

REVIEW OF RELATED LITERATURE

Conceptual Review

Distance Learning

Distance learning (DL) refers to the use of internet facilities like Google search engines, WhatsApp and others to facilitate learning, where the learners and teacher are not regularly in a confined classroom. It is the teaching-learning process where students access either intranet-based or internet-based learning content, downloading topics or course materials and contacting tutors and each other over the Web (Naidu, 2003, as cited in Len, 2019). DL is easily adapted to learner’s needs, flexible and convenient for teacher trainers and students (Al-Arimi, 2014), promote interaction and critical thinking (Tchombe et al., 2008).

Flipped Learning

Flipped learning (FL), is also referred to as flipped curriculum approach, inverted classroom, inverted learning, reversed classroom (Badiah & Asma, 2020; Ghazizadeh et al., 2022) or the flip (Arnold-Garza, 2014). It is a pedagogical approach in which teachers invert conventional activities associated with lectures versus home assignments, whereby learners are provided with lecture content available on the internet or pre-conceived by the teachers, usually in the form of videos or audios to be watched or listened to at home and dealt with in advance before attending class where they participate in group activities or the teacher answers their questions (Yang,
2017; Aboraya & Elkot, 2020). The FL mode improves the level of achievement and maintains the impact of learning, allowing more time with the teacher in the classroom to seek help and solve problems. This leads to an effective and active learning environment. It also creates an environment for cooperative learning in the classroom, gives the possibility of repeating the lesson several times until the new concepts are understood. Furthermore, the FL mode considers the individual differences between students in the speed of their response to learning. It also ensures good use of class time, employs modern technologies to attract students to the learning process and enhances students' self-confidence. This makes it possible for learners to choose the appropriate time and place to learn (Zaid, 2020).

**Self-directed Learning**

Self-directed learning (SDL) or learner-directed learning (LDL), refers to a process in which individuals take the initiative, with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles in Brandt, 2020, as cited in Tieme, 2020). Limbu (2020) holds that SDL is a necessary skill for the development of life-long learning for those who want to develop their capacities to construct knowledge autonomously. Several benefits accrue for the use of the SDL mode in a blended learning context. It supports lifelong learning and prepares them to be skillful learners, gives freedom to students to design their learning practices thereby causing learners to bear responsibility and accountability (Nasri et al., 2020). According to these authors, SDL requires students to explore and decide their own learning objectives and strategies, and incorporate the various learning opportunities and resources throughout their learning process.

**Teacher-directed Learning**

Teacher-directed learning (TDL), also referred to as teacher-directed instruction (SAGE, 2017) or direct instruction (Ells, 2016), is a pedagogic situation in which the teacher decides the course goals and the content to be studied, presents course content to students in lessons, sets exercises and assignments for study, monitors completion and assesses accuracy of student’s work, as well as tests and grades student performance (Gibbons, 2002). According to Len (2019), it is an on-campus delivery mode in which students are in the classroom on seat with the teacher. Here, the teacher can bring internet sites of relevance and interest into the classroom, while students can also access topics or course materials using multimedia technologies, but which do not replace traditional teaching methodologies. Ells (2016) holds that TDL is the most efficient way to get information out to students. This is probably because the students face the teacher live while receiving instructions or knowledge. Feedback is, therefore, immediate and doubts are clarified.

**Contextual Review**

The upsurge of the Anglophone crisis in 2016 and the COVID-19 pandemic led to a disruption of regular face-to-face on-site learning in schools around Cameroon especially in the North West and South West Regions that had hitherto been hard hit by violence. With the need to meet up with inclusive quality training and life-long learning as stipulate in Goal 4 of the Sustainable Development Goal (SDG) (UNESCO, 2015), Cameroon Growth and Employment Strategy Paper-GESP (Republic of Cameroon, 2009) and the Education and Training Sector Strategy Paper-ETSSP (Republic of Cameroon, 2013b), the Ministries of Basic and Secondary Education
in Cameroon called for an intensification of blended learning approaches to ensure that learning continued (Béché, 2020). There was therefore a profound need to investigate the influence of blended learning approach on the professional development of elementary pre-service teachers in the affected English-speaking Regions of Cameroon.

**Theoretical Review**

**Social Constructivist Theory**

Social constructivism theory (SCT) was propounded by Lev Vygotsky (1978). The focus of social constructivism is to describe and explain teaching and learning as complex interactive social phenomena between teachers and students (Vygotsky, 1978, as cited in Picciano, 2017). The central idea in this theory is that knowledge is not fixed, but rather is constructed by the learner (Burns, 2011). Vygotsky posited that learning is problem-solving and that the social construction of solutions to problems is the basis of the learning process (Picciano, 2017). Learning is developed through personal relationships and participants in a shared learning experience (Burns, 2011). Children learn through imitation of rewarded behavior of peers or other adults that they have observed as models. The child picks up words, phrases and sentences directly by imitating what he/she hears. Through reinforcement and generalization, or by applying what he/she has learnt in new situations, the child learns when it is appropriate or inappropriate to use particular words or phrases. Vygotsky described the learning process as the establishment of a “Zone of Proximal Development” (ZPD) in which the teacher, the learner, and a problem to be solved exist. The ZPD is the area (or difference) between the child’s current development level as determined by independent problem solving and the level of development that the child could achieve through adult guidance or in collaboration with more compatible peers (Len & Lumadi, 2013). According to Jackson (2009), TDL follows the theoretical framework of Vygotsky’s ZPD. According to Vygotsky, teaching and learning are social activities that take place between social actors in socially constructed situations (Moore, 2000).

The teacher provides a social environment in which the learner can assemble or construct with others the knowledge necessary to solve the problem. In a social constructivist setting, learners bring unique, prior understandings to any learning situation; learning is an adaptive activity; learning is situated and contextual; learners may resist, accommodate or assimilate new learning; and learners interact with materials, resources, experiences, and other learners (Burns, 2011). During TDL, the teacher and peers serve as guides, providing hurdle help to scaffold student teachers as they interact with the subject matter to be learned during face-to-face encounter. Student-teachers come to the learning context with some prior knowledge which they build upon as they interact with the teacher, other students and the content for meaningful, long-lasting learning. They are scaffolded by the teacher and peers to overcome learning challenges and attainment of their ZPD. If the teacher is dominant in the teacher-directed learning environment, learning is inhibited. If he/she serves as a guide, learning will be effective.

**Mediated Mutual Reciprocity Theory**

Mediated Mutual Reciprocity (MMR) is a theoretical perspective of learning processes by Therese Mungah Shalo Tchombe (2019). Len and Tieme (2022) contend that unlike the social constructivist perspective of Vygotsky (1978) that emphasizes the role of the adult in leading a child through his/her ZPD, Tchombe’s MMR theory considers the child and adult as co-
constructors of knowledge, where the child has more responsibility in solving any problem. This theory sees learners as active transformers of ideas to create new knowledge (Tchombe, 2019). The student-teacher needs to feel actively involved in the learning process. Therefore, from the perspective of the MMR, learning is an unconditional give-and-take process with no hierarchy. In a BL context, be it in teacher-directed, self-directed, distance or flipped learning modes, student-teachers and teacher-trainers are co-constructors of knowledge. This encourages and motivates student teachers to become creative, develop a sense of initiative, thereby enhancing skill acquisition. This is because the MMR theory supports the view that learning in the African cultural context is through experimentation, participation, observation, modeling, imitation, hands-on, and collaboration.

**Online Collaborative Learning (OCL) Theory**

Online collaborative learning (OCL) theory is developed by Linda Harasim (2012). This theory focuses on internet facilities to provide learning environments that foster collaboration and knowledge building. Online collaborative learning is a new theory of learning that focuses on collaborative learning, knowledge building, and internet use as a means to reshape formal, non-formal, and informal education for the knowledge age (Harasim, 2012). In this theory, Harasim sees the benefits of moving teaching and learning to the internet and large-scale networked education. Collaborative learning refers to the strategy in which students of different performance level work together in small groups towards a common goal with everyone responsible for their learning and that of others in the group. According to this theory, students are encouraged to collaboratively solve problems through discourse instead of memorizing correct answers, with the teacher or instructor playing a very essential role as moderator in this process. There are three phases of knowledge construction through group discourse in OCL theory: idea generating, idea organizing, and intellectual convergence.

**Idea generating:** This is the brainstorming phase, where divergent thoughts are gathered. Individual students engage in a group discussion of a specific topic. Each participant logs on to the discussion to present their initial perspective on the topic. They are able to express their own ideas and generate a range of divergent views through brainstorming. This phase is highly democratic and leads to the second phase, idea organizing.

**Idea organizing:** This is the phase where ideas are compared, analysed, and categorized through discussion and argument. Here, students really reflect on the various ideas presented and begin to interact with others. They can agree or disagree, clarify, critique, elaborate or reject the views of others. As they interact on the ideas of the teacher and mates, individual understanding grows into shared understanding. The discourses here advance to the third stage, intellectual convergence.

**Intellectual convergence:** This is the phase where intellectual synthesis and consensus occurs, including agreeing to disagree, usually through an assignment, essay, or other joint piece of work (Harasim, 2012). The group here actively engages in co-construction of knowledge based on shared understanding. Group members synthesize their ideas and explicit points of view for positions on the topic. The outcomes of this stage are then consolidated which can be presented through an assignment, essay, or a joint piece of work.
According to Bates (2015), OCL is grounded in and integrates cognitive development theories which centre around conversational learning, deep learning conditions, academic knowledge advancement and knowledge construction. To Harasim (2012), the teacher as a moderator of learning is critical in this process of knowledge construction, not only through facilitating the process and providing resources to the group of learners involved in collaborative learning, but also through ensuring that core concepts and practices of the subject matter are fully integrated. She contends that OCL is advantageous in that it promotes deep learning and encourages discussions at a level higher than discussions found in on-site teacher-directed classrooms. Also, OCL supports high level skills such as critical-thinking, analytical thinking, synthesis and evaluation.

Harasin’s OCL theory is relevant to this study in that, for BL to be effective, student-teachers and teacher trainers must be verse with and encounter internet and other electronic facilities in the process of teaching and learning. Irrespective of whether teaching and learning transaction is using the teacher-directed (face-to-face) mode, flipped mode, self-directed, or distance learning mode, learners and their facilitators must collaborate, interact, acquire and share ideas and content from or through these electronic facilities. During FL, DL, and SDL modes, student-teachers generate ideas, which they organize through reflective mental activities. These ideas are organized and then they come to a convergence after they engage in collaborative discourse with other mates and the teacher as a moderator. Such exposure and interaction enable student-teachers to master and demonstrate skills in lesson preparation, planning, presentation and evaluation.

Self-Directed Learning Model

Self-directed learning (SDL) model is postulated by Garrison. Garrison’s theoretical model, which is grounded in a collaborative constructivist perspective, integrates three overlapping dimensions: self-management, self-monitoring, and motivation (Garrison, 1997, as cited in Tieme, 2020, p. 22). Garrison postulates that although each of these dimensions is discussed separately, they are intimately connected in practice. According to Singh et al. (2021), this model of SDL also includes the perspectives of SDL as a personal attribute, as well as a learning process. Garrison’s collaborative perspective of SDL has the learner taking responsibility for constructing meaning (cognitive perspective) while including the participation of others in confirming worthwhile knowledge-social perspective (Sabry, 2010).

Self-management in this model, according to Song and Hill (2007), involves students taking control of the learning context to reach their learning objectives. This form of control implies working with other people within the context and not necessarily independent learning (Garrison, 1997). This includes collaborations between educator and student in managing the learning situation. Garrison (1997) believes that students should be given the freedom to choose how they would like to execute the learning process. Self-management focuses on goal setting, the use of resources, collaboration with peers and the teacher and external support for learning. With interruptions and restrictions on regular face-to-face learning, teacher trainers and peers serve as support systems to student-teachers who engage in SDL. This is mostly done through WhatsApp chat groups, during Zoom lessons on the internet or through radio and television broadcast lessons where learners could call or send text messages for guidance. Student-teachers also
experienced such coaching during the brief on-site interactions they had with teachers and peers in school and with cooperating teachers during teaching practice sessions.

Self-monitoring refers to the ability of students to monitor both their cognitive and metacognitive processes (Garrison, 1997). He emphasizes the importance of integrating knowledge structures meaningfully to ensure that learning goals are being met. In order to do so, the ‘self-monitoring’ student should show responsibility in creating meaning through reflection and collaborative confirmation. This is bound to promote students’ self-monitoring as they integrate external feedback with their own reflection. The students should plan and adapt their thinking after which they should engage in critical reflection, while assimilating new knowledge with existing knowledge. Garrison stresses the importance of distinguishing between responsibility and control. Responsibility refers to self-monitoring, while control refers to self-management. Educators need to understand the difficulty students face in taking responsibility for learning if they do not experience control over the learning situation. Sharing control choice and collaboration promotes students assuming responsibility for their learning.

The last dimension of Garrison’s SDL model is motivation. According to him, effort towards learning is only possible if students are motivated. This means that their perceived value and anticipated success of learning goals is initiated. Motivation stands between control and responsibility during the learning process. It is crucial that conditions are created to motivate students. This can be done by creating interest and aspiration to create personal meaning and common understanding. This theory is relevant in that when students exercise autonomy over their learning, they become motivated to take learning initiatives thereby promoting effective learning in a blended learning context.

Classical Conditioning Theory

Classical conditioning theory, proposed by Ivan Pavlov (1903), is a behavioural learning theory (Tchombe in Nsamenang & Tchombe, 2011). Behaviourism or behavioural psychology is a theory of learning which states that all behaviours are learned through interactions with the environment in a process called conditioning (Zama & Endeley, 2023). Behaviourists considered all human behavior to be a series of events in which a stimulus (an environmental event) produces a response (an observable muscular movement or physiological reaction) (Tambo, 2012). Zama and Endeley (2023) add that the “essential characteristics of behavioural approach to learning is that events in the environment are understood to predict a person’s behavior not the thoughts, feelings or other events that take place inside the person.” Learners will pick up and recall responses that result in pleasant side effects. They contend that classical conditioning focuses on association between a stimulus and a response. Repetition of an association results in learning. If the student is ready for the association, learning is enhanced. If not, learning is inhibited. Pavlov, the Russian Psychologist in his experiment presented meat powder which caused the dog to salivate. He then successively paired the meat powder with ringing of a bell. He later rang the bell without the meat powder, causing the dog to salivate at the sound of the bell. Conditioning is a behavioural process in which, as a result of reinforcement, a reaction becomes more common or predictable in a given context, with reinforcement often being a stimulus or reward for a desired response. Classical conditioning therefore is learning acquired from experience. Learning occurs when a stimulus that was incapable of previously eliciting a specific response is repeatedly paired with another stimulus that does. The experiment
demonstrated how an external stimulus (sound of the bell) can be used to condition (modify) a reflex (salivation) which is a normal physical response.

Just like the experimenter plays a significant role in ushering learners into the learning process and guiding them through the teacher in the teacher-directed learning mode selects the objectives, presents content, materials and learning experiences just like the classical conditioner. On the other hand, a school subject is a neutral stimulus that should not elicit specific response from the students (Tambo, 2012). However, if the subject is associated with favourable environmental conditions (conditioned stimulus) like a collaborative friendly teacher, appropriate teaching approaches, methods and instructional materials, students will respond positively (Tambo, 2012). It is from this viewpoint that Zama and Endeley (2023) postulate that conditioning is ideal for training programs especially in skill acquisition. If the teacher dominates the teaching-learning context with content, methods, strategies and materials not interesting to the learners, learning is inhibited.

**RESEARCH METHODOLOGY**

The study made use of a cross-sectional survey research design with a quantitative approach. The area of study was the North West and South West Regions of Cameroon. The target population comprised of 1,037 level three student-teachers of the 15 GTTCs in the North West and South West Regions of Cameroon, while the accessible population, from which the sample was drawn, consisted of 1,027 level three student-teachers from 12 GTTCs in the North West and South West Regions. The sample consisted of 288 level 3 student-teachers selected using purposive, proportionate stratified, and simple random sampling techniques. A 39-items self-designed structured Blended Learning Questionnaire (BLQ) was used to obtain data. The instrument was validated through a pilot study involving 10 student-teachers of G.T.T.C. Ndop, Akwa-Bakassi, and G.T.T.C Fontem who were not part of the sample, with a reliability index which stood at 0.78 using Cronbach’s alpha. Out of the 288 questionnaires administered, 234 were returned giving 81.75% return rate. Data was analyzed using both descriptive and inferential statistics. For descriptive statistics, frequency distributions, percentage tables, and measures of variation were used, while for inferential statistics, the principal component analysis and Ordinary Least Square (OLS) regression model were employed using SPSS 20.0 and STATA 14 software package.
PRESENTATION OF FINDINGS

Verification of research hypothesis One (Ho1): Teacher-directed learning has no significant influence on student-teachers’ professional development.

Table 1: Influence of teacher-directed learning on student teacher’s professional development

<table>
<thead>
<tr>
<th>Professional development</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>T</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-directed learning</td>
<td>.0009534</td>
<td>.0620006</td>
<td>0.02</td>
<td>0.988</td>
<td>-.1212112 -.1231179</td>
</tr>
<tr>
<td>_cons</td>
<td>2.91e-10</td>
<td>.061599</td>
<td>0.00</td>
<td>1.000</td>
<td>-.1213732 .1213733</td>
</tr>
</tbody>
</table>

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Number of obs=234
Ho: Constant variance F(4, 229)=8.35
Variables: fitted values of PD Prob > F=0.0000
chi2(1) = 4.09 R-squared=0.1273
Prob > chi2 = 0.1431 Adj R-squared=0.1121
Mean VIF=1.06

Source: Researcher field work (2022) Note: *** p<0.01, ** p<0.05, * p<0.1

Findings on Table 1 showed that teacher-directed learning has a positive but insignificant influence on student-teachers’ PD in North West and South West Regions of Cameroon (Coef. .0009534; P>t=0.988). Since teacher-directed learning has a positive but insignificant influence on PD, the authors retained the null hypotheses which states that, teacher-directed learning has no significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon.

Verification of research hypothesis two (Ho2): Distance learning has no significant influence on student-teachers’ professional development.

Table 2: Influence of distance learning on student teachers’ professional development

<table>
<thead>
<tr>
<th>Professional development</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>T</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance learning</td>
<td>-.1169537*</td>
<td>.0648197</td>
<td>-1.80</td>
<td>0.072</td>
<td>-.2446729 .0107655</td>
</tr>
<tr>
<td>_cons</td>
<td>2.91e-10</td>
<td>.061599</td>
<td>0.00</td>
<td>1.000</td>
<td>-.1213732 .1213733</td>
</tr>
</tbody>
</table>

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Number of obs=234
Ho: Constant variance F(4, 229)=8.35
Variables: fitted values of PD Prob > F=0.0000
chi2(1) = 4.09 R-squared=0.1273
Prob > chi2 = 0.1431 Adj R-squared=0.1121
Mean VIF=1.06

Source: Researcher Field Work (2022) Note: *** p<0.01, ** p<0.05, * p<0.1

From the analysis on Table 2, distance learning has a negative but significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon (Coef. -
Quantitatively, a marginal increase in distance learning will lead to a decrease in student-teachers’ PD holding other factors constant. The authors rejected the null hypotheses and retained the alternate hypothesis which stated that, distance learning has a significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon.

Verification of research hypothesis three (Ho3): Self-directed learning has no significant influence on student-teachers’ professional development.

Table 3: Influence of self-directed learning on student-teachers’ professional development

<table>
<thead>
<tr>
<th>Professional development</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>T</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-directed learning</td>
<td>0.1985806***</td>
<td>0.0623444</td>
<td>3.19</td>
<td>0.002</td>
<td>0.0757387 – 0.3214226</td>
</tr>
<tr>
<td>_cons</td>
<td>2.91e-10</td>
<td>0.061599</td>
<td>0.00</td>
<td>1.000</td>
<td>-1.213732 – 1.213733</td>
</tr>
</tbody>
</table>

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Number of obs=234

F(4, 229)=8.35

R-squared=0.1273

Prob > chi2 = 0.1431

Adj R-squared=0.1121

Mean VIF=1.06

Root MSE=.94228

Source: Researcher field work (2022)  Note: *** p<0.01, ** p<0.05, * p<0.1

Findings on Table 3 shows that, self-directed learning has a positively and significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon (Coef. 0.1985806***; P>t=0.002). Everything being equal, a marginal increase in self-directed learning leads to a 0.1985806 increase in PD. The authors rejected the null hypotheses and retained the alternate hypothesis which stated that, self-directed learning has a positive and significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon.

Verification of research hypothesis four (Ho4): Flipped learning has no significant influence on student-teachers’ professional development.

Table 4: Influence of flipped learning on student-teachers’ professional development

<table>
<thead>
<tr>
<th>Professional development</th>
<th>Coef.</th>
<th>Std. Err.</th>
<th>T</th>
<th>P&gt;t</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flipped learning</td>
<td>0.2371135***</td>
<td>0.0645477</td>
<td>3.67</td>
<td>0.000</td>
<td>0.1099302 – 0.3642968</td>
</tr>
<tr>
<td>_cons</td>
<td>2.91e-10</td>
<td>0.061599</td>
<td>0.00</td>
<td>1.000</td>
<td>-1.213732 – 1.213733</td>
</tr>
</tbody>
</table>

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Number of obs=234

F(4, 229)=8.35

R-squared=0.1273

Prob > chi2 = 0.1431

Adj R-squared=0.1121

Mean VIF=1.06

Root MSE=.94228

Source: Researcher Field Work (2022)  Note: *** p<0.01, ** p<0.05, * p<0.1
Finally, findings on Table 4 shows that, flipped learning has a positive and significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon holding other factors constant (Coef. .2371135***; P>t=0.000). A marginal increase in flipped learning will lead to a 0.2371135 increase in student-teachers’ PD. The authors rejected the null hypotheses and retained the alternate hypothesis which stated that, flipped learning has a positive and significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon.

Table 5: Summary of findings

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Coefficient of determination</th>
<th>P-Value</th>
<th>Decision</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ho1: Teacher-directed learning has no significant influence on student-teachers’ professional development.</td>
<td>.0009534</td>
<td>P&gt;t=0.988</td>
<td>Null hypothesis retained and alternate hypothesis rejected.</td>
<td>Ho1: Teacher-directed learning has no significant influence on student-teachers’ professional development.</td>
</tr>
<tr>
<td>Ho2: Distance learning has no significant influence on student-teachers’ professional development.</td>
<td>-.1169537*</td>
<td>P&gt;t=0.072</td>
<td>Null hypothesis rejected and alternate hypothesis retained.</td>
<td>Ha2: Distance learning has a significant influence on student-teachers’ professional development.</td>
</tr>
<tr>
<td>Ho3: Self-directed learning has no significant influence on student-teachers’ professional development.</td>
<td>.1985806***</td>
<td>P&gt;t=0.002</td>
<td>Null hypothesis rejected and alternate hypothesis retained.</td>
<td>Ha3: Self-directed learning has a significant influence on student-teachers’ professional development.</td>
</tr>
<tr>
<td>Ho4: Flipped learning has no significant influence on student-teachers’ professional development.</td>
<td>.2371135***</td>
<td>P&gt;t=0.000</td>
<td>Null hypothesis rejected and alternate hypothesis retained.</td>
<td>Ha4: Flipped learning has a significant influence on student-teachers’ professional development.</td>
</tr>
</tbody>
</table>

DISCUSSION

Teacher-Directed Learning and Student-Teachers’ Professional Development

Statistically, findings showed that teacher-directed learning mode had a positive but insignificant influence on student-teachers’ PD in GTTCs in the North West and South West Regions of Cameroon. The insignificant influence of teacher directed learning mode on student-teachers’ PD
is as a result of the fact that student teachers do not feel motivated enough when provided with learning goals, content, learning experiences and materials which may not tie with their interest. The findings are contrary to that of Namyssova et al. (2019) and Jackson (2009), who held that teacher-directed learning enables both parties to get immediate feedback that is in turn favourable for the teaching-learning process, enhancing contact and communication with the instructor. The findings are also in contrast to Vygotsky’s (1978) social constructivism theory and Pavlov’s classical conditioning theory. Vygotsky’s theory holds that teaching and learning are social activities that take place between social actors in socially constructed situations (Moore, 2000). He explains that children learn effectively in a social environment, and create meaning using engagement with others. A child is able to perform and solve more complicated tasks with direction, support, and collaboration. Pavlov’s theory argues that, successive presentation of content by the teacher and repetition by the student-teachers is expected to enable learners acquire required skill and thus professional development (Tchombe in Nsamenang & Tchombe, 2011).

**Distance Learning and Student-Teachers’ Professional Development**

Statistically, findings showed that distance learning had a negative but significant influence on student-teachers’ PD in the North West and South West regions of Cameroon. The findings are in congruence with that of Etomes (2022) who opines that, for Cameroon to guarantee educational normality in the event of other similar crises, she must integrate distance-learning technologies and improve the access to essential socio-educational services such as electricity, television and internet. The findings contradict that of Hashmi et al. (2020) who found out that, distance learning program has profound positive influence on teacher PD. The findings are also contrary to those of Liu & Yen (2014) and Sharpe et al. (2006) who stated that, the distance learning mode had positive effect on the learning effectiveness of students. In addition, findings were also in contrast with that of Baradyana (2013) who asserted that, setting goals for distance learning was relevant to students and that teacher’s interest on distance learning as a model for teacher PD is preferable as a means to develop teacher’s skills and competences.

**Self-Directed Learning and Student-Teachers Professional Development**

Statistically, findings showed that self-directed learning has a positive and significant influence on student-teachers’ PD in the North West and South West Regions of Cameroon. The findings are in congruence with those of Len and Tieme (2022), and Tieme and Chongwain (2022) who both concluded that, self-directed learning has significant positive effects on the development of competencies among students. Citing Locke’s (1968) Goal Theory, Len and Tieme assert that individuals who set specific challenging goals perform better than those who set general or vague, unchallenging goals. The findings are also in line with Rowe et al. (2017) who contend that, when students are given the opportunity to set individual goals, they demonstrate higher academic achievement and engagement in learning. Additionally, the findings corroborate the self-management, self-monitoring, and motivation dimensions of Garrison’s (1997) Self-Directed Learning model, which are intimately connected in practice, seeing the learner taking responsibility in constructing meaning in learning. As such, when student-teachers engage in self-directed learning, they develop competences in lesson planning, lesson presentation and evaluation. This gives them self-confidence and develops in them a positive attitude towards teaching.
Flipped Learning and Student-Teachers Professional Development

Statistically, findings showed that flipped learning has a positive and significant influence on student-teachers’s PD in North and South West Regions of Cameroon. The findings are in line with those of Al-Naabi et al. (2022), Sevillano-Monje et al. (2022), Aidoo et al. (2022), and Millard (2012) who contend that flipped learning increases student engagement in learning, strengthens team-based skills, offers personalized student guidance, focuses classroom discussion thus enhancing learner creativity especially during the COVID-19 context. The findings also support Tchombe’s (2019) Mediated Mutual Reciprocity theory, in which she contends that the learner and teacher are co-constructors of knowledge with the learner having more responsibility in solving a problem. To her, learning in the African context is through experimentation, participation, observation, modelling, hands-on learning and collaboration which are all evident in a flipped learning context. This enhances creativity and motivates learning. Additionally, the findings corroborate that of Badiah and Asma (2020) who asserted that amongst the several efforts needed to meet the new learning and high equality teaching standards today, flipped learning pedagogy has emerged as an alternative model that will promote the characteristics requisite for students to be successful lifelong learners.

CONCLUSION AND RECOMMENDATIONS

The findings showed that teacher-directed learning had a positive but an insignificant influence on student-teachers’ PD, distance learning has a negative but a significant influence on student-teachers’ PD, while self-directed and flipped learning have a positive and significant influence on student-teachers’ PD. Based on these findings and given that blended learning is an innovative strategy especially in times of crises and pandemics, the study recommends;

1) Teacher-trainers should ensure lesson objectives, content, learning strategies and methods are appropriate, interesting and captivating to student-teachers.
2) Student-teachers should be encouraged to develop a positive attitude towards distance learning activities by ensuring that exercises to be completed are attainable and content available.
3) Teacher-trainers should be trained on the didactics of the blended learning model for integrating technologies.
4) Teacher-trainers, within the self-directed learning mode, should encourage student-teachers to set challenging individual learning goals and objectives for themselves and select learning strategies that suit their needs. This must, however, remain within the realms of the prescribed curricula.
5) Teacher-trainers, within the flipped learning mode, should ensure that student-teachers acquire preliminary knowledge by exposing them to important aspects of the subject matter before they come to class.

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Conflict of Interest

The authors declare dennisno conflict of interest.
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