Professional Learning Communities (PLCs) for the Zimbabwean Design and Technology High School Contexts: Ensuring Quality Teaching through Effective Professional Development.

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ABSTRACT

This qualitative study analysed the implementation of Professional Learning Communities (PLCS) for quality teaching of Design Technology (DT) in the Zimbabwean high schools. The study was triggered by low uptake of the Design Technology curriculum since its inception in 2015 by public schools. The study included seven Design Technology secondary school teachers that were randomly selected from the secondary schools in the country's selected district cluster. Data was collected from the respondents through face to face interviews, critiquing, comparing and contrasting related literature. The social cognitive theory, Bandura's social learning theory and Vygotsky's social constructivism theory guides and informs the analysis of findings of this study. Findings shows that the Design Technology syllabus is comprehensive, teachers lack the relevant training to handle the comprehensive syllabus, low investment in staff development programs and low engagement in staff professional groups. The study recommends that regular staff development workshops be administered for Design Technology Schools, equip workshops with tools, teacher training in the comprehensive syllabus and engage in collaborative activities with other DT teachers in country and far wide to guarantee quality teaching of the learning area in the secondary schools.

Keywords: Professional learning communities, Design and Technology, Teaching, Professional development.

INTRODUCTION

Design Technology is a learning area taught across all levels in the Zimbabwean Education system either from grade 1 to university. This learning area is a combination of Building Technology (BT), Textile Technology Design (TTD), Technical Graphics (TG), Food Science Technology (FST), Wood Science Technology (WST), Metal Work (MT) technical learning areas among others to form one body of knowledge, (Hahlani, Bhukuvhani and Sithole, 2022).

In the teaching profession, educators are envisioned to be furnished with instruction competencies that ought to be elevated according to pressing pedagogical needs that mirror contemporary teaching techniques and refinements in the subject knowledge Laughlin, et al. (2011). The change-oriented edifice of the knowledge economy of the 21st century counts modern dimensions and components to the already intricate formulation and delivery of empirical teacher professional development (TPD), especially in implementing the Continuous Assessment Learning Activities (CALA) in the Competencebased Curriculum in Zimbabwean schools. One of the prerequisites for educators in the 21st century is being equipped to blend instructional Technology into teaching practices effectively. Despite the tremendous strides by the government toward

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technology investments in schools, teacher training and development around technology integration and pedagogical implementation still lag rearward. The present investigation exemplifies the characteristics and techniques set up to be rudimentary for implementing an effective TPD to support teachers' technology integration in the pedagogy and learning of Design and Technology. This papers, therefore, that instructor training and inservice professional are critical to effective teaching (MOE, 2005; Fraser, 2008). Carter et al. (2017) and Rodés et al. (2019) concur that sufficient professional development is intensive. It develops learning opportunities; determines your educational needs and of others; evaluates yourself, observational and peer-review skills; engages in introspection, professional dialogue, and feedback, and ultimately builds strong working connections among educators.

Statement of the problem

The professional learning communities in Zimbabwe continue to encounter challenges in integrating learning domains of the Design and Technology syllabus. In the teaching profession, educators are envisioned to be furnished with instruction competencies that ought to be elevated according to pressing pedagogical needs that mirror contemporary teaching techniques and refinements in the subject knowledge Laughlin, et al (2011). Mansour et al. (2014) assert that there is a gap between supposition and practice in connection to teacher professional growth as a means to elevate essentials in subject delivery. Day and Mansour et al. (2014) ascertained the essence of discoursing the harmony between theories and practices. To accomplish this, teachers' perspectives ought to be taken seriously. *"Wefind the syllabus too comprehensive and demanding now that it encompasses several learning areas into one. It, therefore, remains a challenge to be up to date, assuming the fast rate of technological advancement.*

Needless to say that most of the Design and Technology teachers are trained specialists in either Wood Technology and Design, Metal Technology and Design, Technical Graphics and Design, Textile Technology and Design or Building Technology and Design," one of the educators said in a statement. This is a profound situation in the professional learning community as the suppositions by the practising teachers of Design and Technology highlight that the andragogy of the educators seems not to be best preparing them to implement the Design and Technology syllabus in high schools. It is prudent to note that the financial constraints have registered as critical attributes of failure to develop the educator's capacity and breadth or scope of the syllabus at a local level (in-house training) or even district level. Suppose one has to look at the private and public schools. In that case, there is a general feeling in the existing subject delivery: the learners in private school setup appear to be handling the subject well, yielding favourable results. The same cannot be said for public school Design and Technology learners, who continue to attain below-average results. The allocation of teaching resources and technologies appears to be the centre of the disparities between the two. To address the differences, therefore, it is essential to consider staff development by resource persons, industrialists (interested parties), and professional groups to ensure the crosspollution of ideas, ultimately improving the subject delivery and uptake in high schools.

Research questions

The study analysed how teacher Professional Learning Communities (PLCs) can enhance quality teaching of Design Technology in the secondary schools and is guided by the following research questions **(RQS):**

RQS1: Why are Design and Technology teachers challenged implementing the syllabus?

RQS2: How can professional development programs enhance teachers' capacity to deliver Design and Technology content?

RQS3: What is the role of Professional Development programs in effective teaching of Design Technology in Zimbabwean secondary schools?

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Theoretical Framework

The social cognitive learning theory, Bandura's social learning theory, and Vygotsky's social constructivism theory guide this paper. Social constructivism is the view that learning occurs through social interaction and the help of others, often in a group. Social constructivism posits that an individual's understanding is shaped through social interaction. The theory of social constructivism was developed by Soviet psychologist Lev Vygotsky (1896-1934). This theory's foundation is the belief that knowledge is not a copy of an objective reality but the result of the mind selecting and making sense of and recreating experiences. This means that knowledge results from interactions between subjective and environmental factors.

Knowledge is experience based

The knowledge that is imparted to the learners by the educators is too theoretical and conceptual; an individual undergoes numerous experiences in his life and acquires knowledge based on those experiences; when acquiring academic education, individuals, especially adult learners, are required to bring their experiences so that they can enrich their understanding and can interpret the significance of knowledge which they obtain in school as well as home.

Professional development creates a fertile ground for growth through exposure to new technologies and teaching methodologies related to Design and Technology. Design and Technology practitioners must be deliberate in learning and exploring new ways of delivering content by consulting resource persons and industrialists.

Learning is social

Languages, cultures and other social norms and values directly influence learning; social, interpersonal interaction, and communication with the community members also inculcate learning among the individuals. Bandura (1997) cited by Zonoubi et al. (2017) shares the same sentiments in his social learning theory on Self-Efficacy, "…beliefs in one's capacities to organise and execute the course of action required to produce given attainments." In the context of teaching, this construct refers to teachers' beliefs about their abilities to deliver instruction effectively. Within the construct of self-efficacy, two different categories of self-efficacy have been identified (Bandura, 1997). The first is self-efficacy expectancy, which refers to the belief in one's ability to complete a task. Within this study, this refers to a teacher's confidence to use a particular teaching practice.

All aspects of the person are connected

From the social constructivist point of view, a person's social interaction is essential for attaining knowledge, but besides social interaction, attitudes, emotions, values, and actions of the person are also relevant. In his social cognitive learning theory, Bandura posits that understanding follows the observation of social and environmental interactions. Social interactions and observations are critical in professional development for teachers as they help them choose the right pedagogical strategies for implementing content in Design and Technology classrooms. Similarly, in some cases, during these interactions in matters that may pertain to technological issues, conservative superiors may fear to divulge their questions publicly to their younger interns; however, they resort to observations.

Learning communities should be inclusive and equitable

The requirement of knowledge, information and awareness in the lives of the individuals and recognition of the social nature of learning indicates inclusiveness and equity in education. Therefore, it remains the teacher's responsibility to create a conducive environment for learners to recognise the differences of others.

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LITERATURE REVIEW

As referred to in the above-mentioned theoretical framework, this paper seeks to develop a Professional growth opportunity for teachers of Design and Technology. The comprehensive purpose of this study was to augment teacher efficacy with Technology and motivate them to effect modifications in their pedagogy with the new knowledge gained from experiences. Brown (2016) suggested school leaders can successfully execute their professional learning communities by utilising a system based on a theoretical framework. Twelve peerreviewed journal articles were reviewed correlating to educators' professional learning communities (PLC) in delivering the Design and Technology syllabus in Zimbabwean high schools to gain insight into professional development strategies for Design and Technology.

Professional learning communities were defined by (Hoaglund et al., 2014) as a group of instructors working closely in an ongoing process resulting in better student attainment. Schmoker (as mentioned in Hoaglund et al., 2014) asserted to develop and sustain a genuine PLC; teachers must come together regularly to improve already affirmed goals and to assess their progress using formative data. According to Wilson (2016), natural professional learning communities involve shared governance among members, ultimately resulting in school improvement. Ning et al. (2015) noted that Hord conceptualised teacher affiliation in PLCs into two main dimensions: collective learning and shared personal practice.

DuFour & Reeves (2016) observed that schools purportedly had created professional learning communities but did not fully implement the strategies natural professional learning communities put into practice. First, DuFour & Reeves (2016) argue that educators work together as teams, not in isolation, and take responsibility as a group for student learning. Second, they work jointly to affirm a curriculum that meet the necessities of learners step by step, considering the mindsets, skills, and proficiency the learners bring to the subject (DuFour & Reeves, 2016). Third, educators formulate relevant assessments created as a group based on a practical curriculum (DuFour & Reeves, 2016). Fourth, they use the results of a formative joint evaluation to recognise learners who require more time and additional help for learning, to identify students who benefit from enhanced or expanded education, to single-out areas of individual solidity and deficiency in teaching based on the confirmation of student learning, and to address areas where educators are not competent to help learners (DuFour & Reeves, 2016). Fifth, they create a system where learners who need additional support can receive it without losing class time (DuFour & Reeves, 2016). Elucidating further, DuFour & Reeves (2016) hinted that teachers must consider four questions to function as a true professional learning society. First, in what areas do learners require to be knowledgeable? Second, how will we comprehend what they have learned? Third, what do we do about what they have not learned? Fourth, what can we do for learners who have mastered the necessary content? By asking and answering these types of questions, teachers can create a genuine professional learning community (DuFour & Reeves, 2016). DuFour & Reeves (2016) thus established conducting relevant assessments and knowing how to use the resulting data are vital tenets for creating authentic PLCs. They noted that intervention also plays a significant role in guiding students toward their learning goals. The most effective interventions eliminate the type of teaching repeatedly implemented without success, replacing it with methodical, intense, precise, and swift individual or small-group instruction. They pointed out that intervention is a much better option than retention, leading to increased student promotion (DuFour & Reeves, 2016). Sacks (2017) cited in Brown et al. (2018) posits that to ensure everyone is heard, everyone is given a voice and an opportunity to participate; this bonds well with DuFour & Reeves (2016) learning and assessment stages.

METHODOLOGY FINDINGS

This paper adopted qualitative research, critiquing, comparing and contrasting related literature and face-to-face interview of randomly sampled seven Design and Technology high school teachers to establish the

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extent to which PLCs can influence the effective delivery of Design and Technology content in Zimbabwean high schools.

The examined literature shows that teachers need continuous upgrading of their skills, especially in the fast-growing global technological village. Learners are constantly changing their approaches to learning, in some cases exposed to a whole lot of information which must be handled and processed with care. Through effective PLCs, teachers of Design and Technology can improve their perception in the uptake of the subject and get to channel learners in the right direction. It was also noted that the DT teachers must adopt a common formative assessment to recognise learners needing more time and help to learn. Similarly, to identify learners who benefit from enhanced or expanded knowledge, pinpointing areas of individual strength and weakness in teaching based on the proof of student learning, and addressing areas where teachers cannot help learners (DuFour & Reeves, 2016).

FINDINGS

Professional challenges Design and Technology teachers face in implementing the Learning area in Secondary schools.

The first question registered the following responses; Teacher 'T' shared the following view, *"lack of required skills to deliver the Design and Technology syllabus. I find it difficult to cover all the content since I am a trained wood specialist in Wood Technology and Design."* Similarly,

Teacher 'U' posits, *"I feel there is a need to invest in in-house staff development to ensure cross-pollination of ideas in managing the ever-changing technological trend*." Teacher 'Z' said, *"There is a need to organise district-wide workshops to equip Design and Technology teachers with the right ammunition to deliver Design and Technology content. We also lack the ideal demands by the industry; hence it continues to perpetuate gaps in knowledge."* The general feel of the sampled group indicates that the lack of staff development programs continues to affect the effective delivery of Design and Technology content in high school. Needless to say, content specialist continues to be trapped in their area of specialisation.

Professional development programs that can enhance teachers' capacity to deliver Design and Technology content in the secondary schools.

Participants of the study registered the following responses; Teacher 'W' opined, *"Resource permitting, I feel engaging professional groups to help us manage the ever changing classroom dynamics will go a long way in improving effective delivery in Design and Technology content in high schools*." Teacher 'Y' said, *"I have attended Cambridge refresher courses on Assessment and Evaluation of learners' work. This has been a beneficial experience since you learn what the examiners demand, what to teach and emphasise in the classroom.*" Teacher 'V' hinted, *"As a school, we occasionally engage in in-house training. We find this helpful as it exposes the teacher to new technologies; for example, during the Covid 19 pandemic era, we migrated to Digi-school on short notice. The in-house training helped us with the transition into the unfamiliar space."* From these submissions, it follows that staff development programs are pretty crucial in the PLCs. They form the basis for growth and help the transition in any complex environment.

Impact of component subject specialists in teaching and learning Design and Technology.

Teacher 'X' said, *"I have been teaching Technical Graphics for the past eighteen years, hence becoming a specialist in this area.*

The current Design and Technology syllabus requires all resistant materials and processes to be covered and I find it difficult since I have been concentrating on Graphic products. This has impacted my previous examination class.",

Similarly, teacher 'W' shared the same view: "*As a Metal Technology specialist, I find it difficult to supervise and monitor coursework projects that are wood-based, fabric-based, plastic-based and architectural designs."* From the above findings, it is clear that component specialists require remediation and andragogy to help them manage the Design and Technology syllabus implementation in high schools.

Relevance of Design and Technology andragogy to content delivery in high school classrooms.

Teacher 'Y' had this to say, *"Workshops are relevant because you get to cross-pollinate ideas on matters of Design and Technology."* Similarly, Teacher 'U' opined, "*Industrial specialists may bring information that will help bridge high schools and industry."* Design and

Technology andragogy to deliver content in high school classrooms is critical to effective delivery. It is from the exposure to the world of work, field trips and industrial visits that teachers can dispel or teach complex industrial processes.

Migratory strategies towards the Design and Technology professional community.

Teacher 'X' said, *"Regular workshops per term will help improve teachers' capacity to deliver content in DT classrooms."* Teacher 'Z' said, *"There is a need to equip workshops with necessary tools. This will boost the teachers' confidence in delivery by demonstrating abstract processes to the learners."* Teacher 'Y' had this to say, *"District-wide rotation of resource persons can go a long way in improving the quality of teaching in Design and Technology."* Therefore, one can safely recommend the abovementioned aspects when addressing PLCs in Design and Technology high schools.

DISCUSSION OF FINDINGS

From the above findings, the research questions were addressed in a manner the researcher was astonished. It is important to note that teachers as professionals may decide ways in which they can be taught through models. Generally, the PLCs of Design and Technology require a more deliberate proactive approach since the subject is a composite learning area. This confirms the need to seriously consider the professional staff development of Design and Technology teachers so that they remain on top of the situation. The moral fabric of teachers can be shaped more by regular training, which seeks to address their immediate needs. When immediate personal needs are not addressed, people are bound to take shortcuts and sometimes be unproductive. This kind of selective disinclination to duty is perpetuated by poor remuneration. The theories supporting PLCs do not entirely dismiss the needs of the teachers but emphases on the societal obligations within the self-efficacy beliefs. Effective PD can drive the agenda for grassroots industrialisation and education 5.0 mantra only if the teachers' major motivational components are met. The calibre of learners needs exceptional guidance, which calls upon the teacher to go that extra mile to address this. While it is prudent to mention the significance of resource persons in facilitating PD in communities, financial constraints continue to be a stumbling block in our contemporary societies.

CONCLUSION

The reflection from this research has highlighted the need for professional communities in Design and Technology as a pillar for the cross-pollination of ideas. The observation is clear from the research that there is a need for proper funding to raise awareness and bridge high schools and industry. Design and Technology as a subject equips learners with various skills; hence, it is a path for specialisation. It is, therefore, mandatory for public schools to follow the private trends in as much as the subject is concerned to arrest all drawbacks hindering the subject's success. In this call, the first point to visit is equipping the teacher who plays a pivotal role in facilitating the subject. Andragogy should always be at play to improve pedagogical ways within Design and Technology.

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RECOMMENDATIONS

The following recommendations are made as a result of this research.

- Workshops should be done regularly to keep track of the vast technological trends of the subject.
- Resource persons should rotate within the district to areas that cover a different specialisation component.
- Workshops should be fully equipped such that abstract information can be supported.
- Design and Technology should be given more space on the timetable to conscertise learners on the importance of practicality and specialisation.
- Teachers should be further trained
- Field trips and industrial visits should be regularly conducted to bridge the gap between industry and school.

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