Pedagogical Content Knowledge in the Teaching of Consumer Science: Effectiveness in the Classroom

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ABSTRACT

When thinking about teaching, we think Pedagogical Content Knowledge, which is the knowledge the teachers cannot ignore. I this study we argue that Pedagogical Content Knowledge are the determiner of teaching and learning activities in the classroom. The purpose of the paper was to examine sociocultural perspectives on the issues of Pedagogical Content Knowledge and the importance of development of PCK on the teachers teaching in the classroom. The data collection was done through use of a prepared questionnaire to survey the responses of the Secondary Schools Consumer Science teachers. The permission was obtained from both Department of Basic Education and school authorities under study to gather the research data using quantitative method. For the quantitative research method random sampling of the Consumer Science Secondary Schools teachers was sampled. The researcher used a random sampling technique since all the members of a population have an equal and independent chance of been selected and biased is reduced.

Key Words: Pedagogical Content Knowledge; Teaching and learning; Consumer science

INTRODUCTION

To teach learners according to today's standards, teachers' need to understand Pedagogical Content Knowledge deeply and flexibly so they can help students create useful cognitive maps, relate to see how ideas connect across disciplines and to everyday life. This kind of understanding provides a foundation for Pedagogical Content Knowledge that will enables teachers to make ideas accessible to others [17][17]. [16][18] introduced the phrase Pedagogical Content Knowledge the importance of this knowledge for effective teaching, how teachers' make sense of their profession world, the knowledge and beliefs they bring with them to the task, and how teachers' understand of teaching, learning and students, and the subject matter informs their everyday practice are important questions that necessitate an investigation of the cognitive and affective aspects of teachers' profession lives. [17][18] furthermore, alluded that the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students. In [17][18] theoretical framework, teachers need to master two types of knowledge (a) Content knowledge also known as deep knowledge of the subject itself and (b) knowledge of the curriculum development. Content knowledge encompasses what Shulman called the structure of knowledge: the theories, principles, and concepts of a particular discipline. [11] support Shulman in defining Pedagogical Content Knowledge as an over changing conceptions of what it means to teach a particular subject, knowledge of curricular, material and curriculum in a particular field, knowledge of student understanding and potential misunderstanding of subject area, and knowledge of instructional strategies and representations for teaching particular topics. And explanations, interpretation and illustrations used by teacher; in the process of PCK presentation in the classroom. [15] describe Pedagogical Content Knowledge as a set of attributes that helped someone transfer the knowledge of content to others it includes more useful forms of representation of these ideas, the most powerful analogies, illustrations, examples, explanations and demonstrations-in a word, the ways of representing and formulating the subject that make it comprehensible to others. Thus, the following elements and relationship are important in the framework we propose.

Effective Teaching of Pedagogical Content Knowledge

Pedagogical Knowledge: Pedagogical knowledge is deep theoretical knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims [1][13]. This is a generic form of knowledge that is involved in all issues of student learning, classroom management, and lesson plan development and implementation and student evaluation. It includes knowledge about techniques methods to be used in the classroom; the nature of the target audience; and strategies for evaluating student understanding [1][15] A teacher with deep theoretical Pedagogical Content Knowledge understands how students construct knowledge, acquire skills, such Pedagogical Content Knowledge requires an understanding of cognitive, social, and development theories of learning and how they apply to students in their classroom. Hence, Pedagogical Content Knowledge constitutes and represents the functional teaching experiences of teachers over the years of teaching career.

Content knowledge: Content knowledge is knowledge about the actual subject matter that is to be taught to learners [15]. The content to be covered in secondary school Consumer Science. Clearly, teachers must know and understand the subject matter that they teach, including knowledge of central facts, concepts, theories, and procedures within the given field [1][13].

Pedagogical Content Knowledge: According to [15] represents advanced thinking about teacher knowledge by introducing the idea of Pedagogical Content knowledge. He claimed that the emphasis on teachers' subject knowledge and pedagogy were being treated as mutually exclusive domains in research concerned with effective teaching domain [18]. The practical consequence of such exclusion was production of teacher education programmes in which a focus on either subject matter or pedagogy dominated. To address this contrast, he proposed to consider the necessary supportive relationship between the two by introducing the notion of Pedagogical Content knowledge [2]. This knowledge includes knowing what teaching approaches fit the content, and likewise, knowing how elements of the content can be arranged for better teaching. This knowledge is different from the knowledge of a discipline expert and from the general pedagogical Knowledge shared by teachers across disciplines [3].

Pedagogical Content Knowledge as articulated by Shulman is concerned with the representation and formulation of concepts pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of students' prior knowledge and theories of epistemology. The epistemologically concerns the thought, the intelligence, the knowledge, the consciousness, the imagination, the perceptions, the sensations. It raises questions about the scientific discourse from a historic and linguistic point [3]. It also involves didactics knowledge of teaching strategies or methods that incorporates appropriate conceptual representations, to address learner's difficulties and misconceptions and foster meaningful understanding. It also includes knowledge of what the students bring to the learning situation, knowledge that might be either facilitative or dysfunctional for the learning task at hand. Pedagogical Content Knowledge exists at the intersection of content and pedagogy. Thus, it does not refer to a simple consideration of content and pedagogy, together but in isolation, but rather to an amalgam of content and pedagogy [1]. Thus, enabling transformation of content into pedagogically powerful forms.

Pedagogical Content Knowledge represents the blending of content and pedagogy into an understanding of how particular aspects of subject matter are organised, adapted, and represented for instruction. [16][17] argue that having knowledge of subject matter and general pedagogical strategies, though necessary, were not complex ways in which teachers' think about how particular content should be taught, he advocated for Pedagogical Content knowledge the content knowledge that deals with teaching process, including the ways of representing and formulating the subject that make it comprehensible to others [11][17][18]. How the teachers' Pedagogical Content Knowledge of Consumer Science, impacts on the teaching effectiveness of Consumer Science teachers' [10][9][8]

Emphasis on Teacher Pedagogy

[12] investigated the pedagogical guidance for Consumer Science in the South African context. The study reported on an investigation into the principles, approaches and preferred teaching-learning strategies used in

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internationally related subjects to Consumer Science in South Africa. The investigation aims to support pedagogical guidance for Consumer Science teachers in South Africa. According to [12], there is an urgent need to develop guidance for Consumer Science teachers in South Africa owing to the fact that the analysis of Consumer Science curriculum and Assessment Policy Statements (CAPS) is lacking in pedagogical guidance. The study responded to the report on the state of the South African National Curriculum where teachers pleaded for guidance and directions on '*how to teach'* their subjects. The study draws its theoretical framework from three perspectives; principles fundamental to teaching-learning in Consumer Science, the approach to how Consumer Science as subject is taught (or learned), and teaching-learning strategies to be used in Consumer Science. Two elements were employed as guiding principles in the teaching of Consumer Science in South Africa: useful, life-relevant learning; transferability of learning to other contexts and the intentional development of 21st century skills. The study suggested a holistic, practical and learner-centered approach that connects learning and content to real-life situations and the utilization of problem-solving and critical thinking in the teaching of the subject. It recommends that pedagogical principle such as life-relevant learning, which is transferable to novel contexts, be used in the teaching of Consumer Science in South Africa. The study suggested the principle of "*transferability of learning to other contexts"* as a gap found in the teaching of Consumer Science in South African context.

Classroom Environment in Relation to the PCK and Consumer Science

Helping students learn subject matter involves more than the delivery of facts and information. The goal of teaching is to assist students in developing intellectual resources to enable them to participate in, not merely to know about, the major domain of Human thought and inquiry [1]. [1] define Subject Matter Content knowledge that is still quoted by more recent researchers in this domain [1] they define it as including concepts, algorithmic operation, the connections among different algorithmic procedure, the subset of the number system being drawn upon, the understanding of classes of student errors, and curriculum presentation. [17][18] and [11] expanded this definition to include the syntactic and substantive structures as the different ways in which the fundamental principles and concepts of a discipline are organised. The syntactic structure relates to the set of rules that assist one in determining what is true or false, valid, or invalid within a discipline [17][18]. Syntactic structures also consist of the tools of inquiry within a discipline. [3] and [4] then also included an additional dimension into their view of Subject Matter Knowledge that relates to teachers' beliefs about and orientation towards the subject matter.

METHODOLOGY

The data collection was done through use of a prepared questionnaire to survey the responses of the Secondary Schools Consumer Science teachers. The permission was obtained from both Department of Basic Education and school authorities under study to gather the research data using quantitative method. For the quantitative research method random sampling of the Consumer Science Secondary Schools teachers was sampled randomly. The researcher used a random sampling technique since all the members of a population have an equal and independent chance of been selected and biased is reduced. In this study forty-five (45) Consumer Science teachers' respondents were supplied with questionnaires randomly, and out of forty-five (45), fourth-one (41) teachers completed the questionnaires fully and accurately. Descriptive statistics were employed to analyse the data collected from the questionnaire. Table below were used for descriptive analysis. Here descriptive statistics were applied to give a summary of frequency-based scores and to present values.

Table 1

Description	Agree	Somewhat Agree	Disagree	Mean	Rank	Frequency
I know how to organize and maintain classroom management skill and discipline.	73%	25%	2%	0.73	7	100

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I am familiar with common learner's learning problems and misconceptions.	75%	23%	2%	0.75	6	100
I can use a wide range of consumer science teaching methods in the classroom.	85%	15%	0%	0.85	2	100
I can assess learners learning in various ways.	85%	12.5%	2.5%	0.85	2	100
I can adapt and vary my teaching styles to meet different learner's needs and their learning.	78%	22%	0%	0.78	4	100
I can adapt my teaching based-upon what consumer science learners currently learning.	78%	18%	4%	0.78	4	100
I know how to assess consumer science earner's performance in a classroom situation.	88%	10%	2%	0.88	1	100

Teachers were given a list of statements about their teaching skills and teaching experience. They were asked to rate the statements on a scale of 1 to 3 where 1=disagree, 2=neither agree nor disagree and 3=agree. Overall, agreement levels were above (88%). There were (4%) educators who felt that they could not adapt their teaching based upon what Consumer Science learners currently understand or do not understand. One teacher (3%) who did not know how to assess Consumer Science learners' performance in a classroom situation and another one who did not know how to assess learners' learning in various ways. Three percent of teachers (3%) was not familiar with common learners' learning problems and misconceptions while another one (3%) did not know how to organize and maintain classroom management skill and discipline. However, most educators (85%+) could use a wide range of Consumer Science teaching methods in the classroom, could assess learners' learning in various ways and know how to assess learners' performance in a classroom situation.

The other educators (15%) who declared their shortcomings related to:

1. Inability to evaluate the performance of Consumer Science learners.
2. Not being familiar with evaluation of learners' learning problems.
3. Inability to organise, execute classroom management skills and discipline.
4. Unable to adapt their teaching styles in relation to learners' needs and understanding.

The above stated short coming of the educator reflect inadequate training standards during their preservice teachers' preparation, with special reference to both general didactics and subject specific didactics. Furthermore, their creative problem-solving skills leave much to be desired.

DISCUSSION AND CONCLUSION

The responses of the 41 educator's respondents on the: teaching styles versus experience, indicate a (88%+)

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agreement level, based on the rating of a three-point scale analysis: statements were rated from 1 = disagree, 2 = somewhat agree and 3 = agree. Further analysis of teaching styles versus experienced, showed that two Consumer Science teachers, could not adapt their teaching styles owing to current understanding or lack of understanding of learners in the Consumer Science class. Viewed as a whole (85%+) of the educators in Consumer Science classes are highly competent and are higher performers as a group. Furthermore, based on classroom live observations, they were found to possess dynamic personalities, good motivators, and with a strong sense of self-efficacy. They also exuded high levels of enthusiasm, competence for teaching Consumer Science. Additional positive qualities reported in the study's findings:

1. Assumes relentless responsibility and ownership for the classroom and learners' success.
2. Uses or draw from personal experiences as examples in the process of classroom teaching.
3. Displays high sense of empathy towards his/her learners.
4. Communicates clearly and ensures good rapport with learners.
5. Admits to mistakes and corrects same immediately.
6. Thinks most of the time about teaching and reflects on teaching practices.
7. Provides healthy social support to learners with learning problems.
8. Displays high sense of humour.

Effective teaching is also based on good lesson plans, organizing skills, leadership skills and exemplary behaviour of the teacher. Furthermore, effective teachers encourage learners to work together outside class or within a discussion in the classroom but retain a structure where individuals are responsible for their own work, and have enthusiasm, rapport, and expressiveness. Thus, honest, and frequent feedback is essential to learning, but even very negative feedback can be offered in a constructive, non-threatening way. In particular, [3] described four useful learning styles as follows: (a) Reflective observation-learning through watching others or through thinking about one's own experiences or those of others; (b) Abstract conceptualisation- learning by creating concepts and theories to describe and explain one's observations; (c) Active experimentation learning by using the theories and concepts that one has derived to solve problems and make decisions. Depending on these preferences, four learning styles are advocated and suggested namely:

1. Convergers – rely most on abstract thinking and active experimentation. Learners search for specific, concrete answers, and a single solution to a problem. Furthermore, prefer dealing with things rather than people. In this way, they are probably protected from stress since their interaction is with things, ideas, and concepts and not with other learners.

2. Assilators- mostly rely on abstract thinking and reflective observation. They focus more on theoretical concerns rather than practical applications. Alternatively, they prefer to engage in research activities, and planning, tasks that require them to integrate material aspects of learning.

3. Divergers- engage more on concrete experience and reflective observation. They generally prefer to work with people and generate numerous ideas. They enjoy class discussions and working in groups.

4. Accommodators- focus more on concrete experiences and active experimentation. They are risk takers, are action-oriented, flexible and like new experiences. This class of learners seek novelty, new challenges. Seemingly, they are proactive, creative innovative and adventure-seekers. They enjoy a hands-on approach in dealing with learning-challenges.

In addition to above stated learning styles, researcher point out that it is also useful to focus on the way sensory inputs influences learning. The teacher needs to identify learners who learn better through processing information by hearing (auditory), seeing (visual), touching (tactile), or positioning (kinaesthetic). Thus, diverse

learning styles call for a variety of teaching strategies or methods. More focus should be devoted on learning styles and multiple intelligences. In particular, teachers will present their Subject Matter effectively if they apply Bloom's Taxonomy of Educational Objectives namely: (1) Remember, (2) Understand, (3) Apply, (4) Analyse, (5) Evaluate, and (6) Create.

The introduction of pedagogical content knowledge in association with effective teaching in the classroom has been shown to have a positive impact on teaching and student performance in teaching. Also, it has become apparent that introducing teachers to these components of PCK generally is beginning to lead to enhanced teaching, learning and assessment in other aspects of the curriculum areas [13].

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