



PEDAGOGICAL CONTENT KNOWLEDGE: AN EMERGING ISSUE IN PREPARING TEACHERS

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Abstract

Teacher is one of the important components of education system. The quality and extent of learner achievement are determined primarily by teacher competence, sensitivity and teacher motivation (NCFTE, 2009). The achievement of the educational goals largely depends on the quality and standard of the teacher. Thus it is important to make them prepare for the future or upgrade their knowledge with new concepts to address the better quality and standard of them. Pedagogical content knowledge is one of such emerging concept which should be integrated in the curriculum of teacher education at all the level i.e. D.El.Ed, B.Ed or M.Ed. Pedagogical content knowledge (PCK) is a type of knowledge unique to teachers. PCK concerns the manner in which teachers relate their pedagogical knowledge to their subject matter knowledge in the school context for teaching students with specific level of understanding (Shulman, 1986). It is the integration of teacher pedagogical knowledge with their subject matter knowledge in the specific context so that definite needs of the group of students as well as individual students can be addressed and make the learning simple to understand. In a country like India where the teachers have to deal with different context and different level of understanding of the students PCK of the teacher is more important instead of the content knowledge or pedagogical knowledge singly. This paper will try to define and explore the concept PCK followed by explaining the need of implementing the concept PCK in Indian Teacher Education curriculum and thereby will try to identify the elements related to PCK that has been mentioned in the new NCTE regulation i.e. National Council for Teacher Education (Recognition Norms and Procedure) Regulations, 2014.

Keywords: *Teacher, Pedagogical content Knowledge, Indian Teacher Education curriculum, NCTE regulation (2014)*



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Introduction

Teacher is one of the important components of education system. Whatever is the education system is- say formal, non-formal or informal, one need teachers to run that system. In Indian system of education the place of teachers is always remain high still from the ancient time. This reflect in our *slokas*, like,

Gurur-Brahmaa Gurur-Visnnur-Gururdevo Maheshvarah

Gurureva Param Brahma Tasmai Shrii-Gurave Namah

We place our teacher in the position to the God. In that way our perception about the teachers in the society can be understood. At the same time the responsibility of the teachers to the society can also be well understood. Society gives the teachers the sacred responsibility of making the future generation a good citizen and a social human being.

On any educational level, the teacher is the mainspring of the school's activities. The case study revealed that teachers are largely responsible for the success of education system. It has been found that among various factors that affect or influence the efficiency of education, the 'teacher' factor alone contributes 68% whereas all other factors like infrastructure, finance, role of leaders, political backing etc. together contribute 32% only (Panda & Tiwary, 1997). Educational objectives are realized only when teacher as individual motivate learners to benefit from the educative process. Teacher has an important role in meeting the educational needs and interest of the young people i.e. the children in democracy.

The nation laid many objectives for education at different level. It is the teacher who at ground level works to meet those objectives. Therefore it is very much needed to make them skilled in different way and at different dimension to enhance their quality in order to meet the objectives. In this regard, it is worth to mention that, about teachers, the Education Commission (1964-1966) had observed, "of all the factors that influence the quality of education....the quality, competence and character of teachers are undoubtedly the most significant." The teacher education curriculum has included many things in order to increase the quality and skill of a teacher. It identified many characteristic that a teacher should have, like, good character, ethical, accountable, patience, non-biased etc. The content and pedagogical knowledge are such a two things which cannot be forgotten during mentioning the characteristic of teacher. That is a teacher should know "what to teach" (i.e. content knowledge) and "how to teach" (i.e.

pedagogical knowledge). But recent development clearly shown that only knowledge of content or pedagogy are not enough to address the quality of teacher, else it is better to have a integrated knowledge of content and pedagogy i.e. pedagogical content knowledge.

Pedagogical Content Knowledge

The term “pedagogical content knowledge” was coined by Professor Lee S. Shulman in 1986. Shulman claimed that the emphases on teachers' subject knowledge and pedagogy were being treated as mutually exclusive. He believed that teacher education programs should combine the two knowledge fields. To address this dichotomy, he introduced the notion of pedagogical content knowledge (PCK) that includes pedagogical knowledge and content knowledge. His initial description of teacher knowledge included curriculum knowledge, and knowledge of educational contexts.

In Shulman’s view, pedagogical content knowledge is a form of practical knowledge that is used by teachers to guide their actions in highly contextualized classroom settings. This form of practical knowledge entails, among other things, (a) Knowledge of how to structure and represent academic content for direct teaching to students; (b) Knowledge of the common conceptions, misconceptions, and difficulties that students encounter when learning particular content; and (c) Knowledge of the specific teaching strategies that can be used to address students’ learning needs in particular classroom circumstances (Rowan et al., 2001).

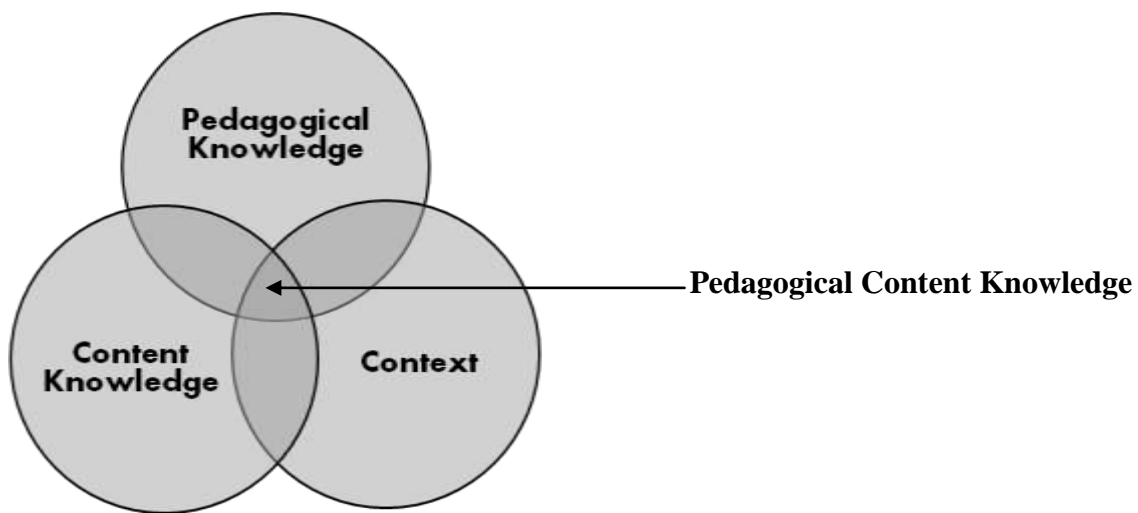


Figure 1: Schulman’s (1986) domains of PCK (Hurrell, 2013)

PCK is not about only merging two terms into one. It has a very deep sense. PCK is concerned with the representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, and knowledge of students' prior knowledge. PCK is concern about how to teach the content to whom and to when. Thus it is super blending of teacher's content and pedagogical knowledge according to the context. PCK is a significant determinant for effective teaching. It is not only knowledge of subject or pedagogy of teaching but is an integration of content, pedagogy and learner. It is something specific to subject and level of learner. E.g. the context of an urban and a rural school is different. The students from those schools are from different environment. So their way of thinking and perception may vary. The teacher has to blend his/her teaching according to that context. This is the main theme of pedagogical content knowledge. A teacher may has a vast knowledge of the subject but still s/he would not be a good teacher on other hand the reverse may be true. That is a teacher with less content knowledge may be a good teacher. It all depends on the potential or skill of the teacher to blend his\her subject knowledge with pedagogical knowledge according to the context i.e. level of learners understanding, their previous knowledge and their culture etc. These are the all things a teacher has to keep in mind and integrate during teaching. In other way it can be said that PCK is the process to transform the subject matter into the learning eligible material according to the level of understanding of the student and other context.

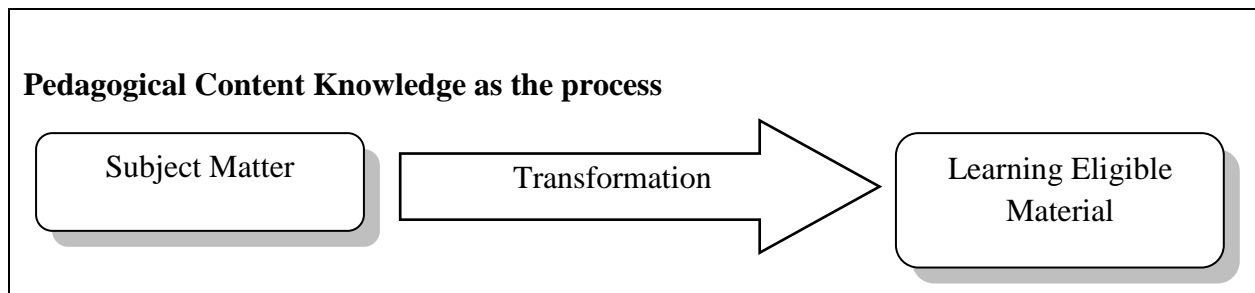


Figure 2: PCK as the process

It can be said that in order to address the need of the students and pre-laid objectives of the society we need quality teacher and quality of the teacher can be enhanced if s/he has the knowledge of PCK. There is the importance of implementing PCK in Teacher Education program.

Need of implementing PCK in Indian Teacher Education Curriculum:

Pedagogical content knowledge is that form of knowledge that makes teachers teachers rather than subject area experts (Gudmundsdottir, 1987a, b). Teachers differ from biologists, historians, writers, or educational researchers, not necessarily in the quality or quantity of their subject matter knowledge, but in how that knowledge is organized and used. For example, an experienced science teacher's knowledge of science is structured from a teaching perspective and is used as a basis for helping students to understand specific concepts, whereas a scientist's knowledge is structured from a research perspective and is used as a basis for the construction of new knowledge in the field (Cochran, King & DeRuiter, 1991).

What is unique about the teaching process is that it requires teachers to "transform" their subject matter knowledge for the purpose of teaching (Shulman, 1986). This transformation occurs as the teacher critically reflects on and interprets the subject matter; finds multiple ways to represent the information as analogies, metaphors, examples, problems, demonstrations, and classroom activities; adapts the material to students' abilities, gender, prior knowledge, and misconceptions; and finally tailors the material to those specific students to whom the information will be taught (Cochran, King & DeRuiter, 1991). Buchmann (1984) discusses the notion that good teachers must maintain a fluid control or "flexible understanding" (p. 21) of their subject knowledge, i.e. be able to see a specific set of concepts from a variety of viewpoints and at a variety of levels, depending on the needs and abilities of the students. It is important to note that a teacher's transformation of subject matter knowledge occurs in the context of two other important components of teacher knowledge that contribute to pedagogical content knowledge and differentiate teachers from subject matter experts. One is a teacher's knowledge of students, including their abilities and learning strategies, ages and developmental levels, attitudes, motivations, and their prior knowledge of the concepts to be taught and another one is teacher knowledge is teachers' understanding of the social, political, cultural and physical environments in which students are asked to learn.

Several studies have shown that inexperienced teachers have incomplete and superficial levels of pedagogical content knowledge (Carpenter, Fennema, Petersen, & Carey, 1988; Feiman-Nemser & Parker, 1990; Gudmundsdottir & Shulman, 1987; Shulman, 1987, Van Driel et al., 1998). Such as, novice teachers tend to make broad pedagogical decisions without assessing students' prior knowledge, ability levels, or learning strategies (Carpenter, et al., 1988).

In addition, low levels of PCK have been found to be related to frequent use of factual and simple recall questions (Carlsen, 1987), which are easy for a novice teacher to quickly evaluate and require less "on the spot" analysis of the learning setting. Studies also indicate that novice teachers struggle with how to transform and represent the concepts and ideas in ways that make sense to the specific students they are teaching (Feiman-Nemser & Parker, 1990; Wilson, Shulman & Richert, 1987). In a study (1989) Grossman focused on six teachers in their first year of teaching English, three of them having substantial subject matter background but no formal teacher training. The other three had completed a teacher education program with a strong subject matter component. In Grossman's study, the teachers without formal teacher education planned and taught English as a formal discipline focusing on the literary analysis aspects of the texts to be read. On the other hand the teachers with professional teacher education were more focused on the need to relate the readings to the students' experiences, and to use the texts as a basis for learning skills of communication and self-expression. These differences in the two groups of teachers were also evident in their choices of readings, the professionally prepared teachers choosing texts more relevant to students' interests, and organized their courses around writing instead of literature. The two groups of teachers also differed in their expectations and knowledge of students, with the professionally prepared teachers being much less surprised by students' misconceptions and lack of understanding. What these results indicate is that the professionally prepared teachers had a frame work for dealing with student needs constructed during their professional program and adjusted more effectively to the diverse needs of the students in their classrooms. In another example, Hashweh (1987) conducted an extensive study of three physics teachers' and three biology teachers' knowledge of science and the impact of that knowledge on their teaching. All six teachers were asked about their subject matter knowledge in both biology and physics, and they were asked to evaluate a textbook chapter and to plan an instructional unit on the basis of that material. Given a concept like photosynthesis for example, the biology teachers knew those specific misconceptions that students were likely to bring to the classroom (such as the idea that plants get their food from the soil) or which chemistry concepts the students would need to review before learning photosynthesis .The biology teachers also understood which ideas were likely to be rather difficult (e.g. the dark phase of photosynthesis) and how best to deal with those difficult concepts using a variety of analogies, examples,

demonstrations and models. The biology teachers could describe multiple instructional "tools" for these situations; but although they were experienced teachers, they had only very general ideas about how to teach difficult physics concepts. The physics teachers, on the other hand, could list many methods and ideas for teaching difficult physics concepts, but had few specific ideas for teaching difficult biology concepts. Predictably, when the teachers in Hashweh's study were asked about their subject matter knowledge outside their fields, they showed more misconceptions and a less organized understanding of the information which directly carried over into their plans for teaching the content. Within their own fields, the teachers were more sensitive to subtle themes presented in textbooks, and could and did modify the text material based on their teaching experiences. Moreover, they were more likely to discover and instructionally deal with student misconceptions. The teachers in both fields used about the same number of examples and analogies when planning instruction, but those analogies and examples were more accurate and more relevant in the teachers' field of expertise. Bharati and Mohalik (2014) had conducted a descriptive research on PCK of science teacher at secondary level. The study was done by using questionnaire. The data collected analyzed through using inferential and descriptive statistics. The study found that, those teachers having higher qualification i.e. M.Sc B.Ed had greater degree of PCK than those had B.Sc B.Ed. Further the study found that PCK among science teacher was greater who had greater experience.

Although the case study approaches used in many of these studies do not necessarily allow broad generalizations about teacher knowledge, the combination of these results and others show that pedagogical content knowledge is highly specific to the concepts being taught, is much more than just subject matter knowledge alone, and develops over time as a result of experience in many class room settings with many students (Cochran, King & DeRuiter, 1991). Teacher education program has the potential to inculcate the skill and the quality in the future teacher and above studies suggest that integration of the concept PCK in the teacher education curriculum can make the process better.

In India presence of diversity in the society is natural phenomena. Unity that exists among the multiculturalism is the pride of us. One can find such kind of multiculturalism even in the classroom. The nature, attitudes, needs etc of the children also change if someone move from one place to another even within in a state. Thus to address such kind of situation a teacher must

know how to transform his/her subject knowledge according to the need of the context. This transformation can be done in the best way if the teacher has the knowledge of the concept PCK. Thus it is the demand of the present to integrate PCK in the teacher education curriculum in India.

With keeping this in mind the authors have tried to analyze the new regulation and suggest curriculum given by National Council for Teacher Education (NCTE) with delimited themselves to the B.Ed curriculum only.

Analysis of National Council for Teacher Education (Recognition Norms and Procedure) Regulations, 2014 regarding PCK:

On analysis B.Ed Curriculum it was found that new regulation did not use the term PCK directly but there are certain things which are related to PCK. Like, it has suggested to design the B.Ed Curriculum to integrate the study of subject knowledge, human development, pedagogical knowledge and communication skills. We know that PCK is all about a successful integration of subject and pedagogical knowledge.

The success of PCK will remain unaddressed if it is not according to the context. It has found that new regulation emphasized on using variety of approaches i.e. how to teach, such as, case studies, observations of children, and interaction with the community in multiple socio-cultural environments in order to contextualization of education. Further it has emphasized on including of inclusive education as integral part of B.Ed Program. We know that, inclusive education means to include all the children irrespective of cast, race, tribe, gender, and socio-economic status and also the mental and physically disabled children under one roof for learning. Teaching students in inclusive classroom is not an easy task. For that a teacher has to blend his teaching in such a way to reach to each child in a single classroom. The knowledge PCK can help him/her in this regard. The new regulation also suggested to include study of child, child development and adolescence, school curriculum, teaching and learning, gender in the context of school and society. The knowledge of such things will help a future teacher to understand the context and to blend his/her teaching according to the needs. E.g. the needs and the way of thinking of adolescent students are different from that of the students of age nine or ten. So would be teacher of secondary level should have the knowledge of child development and adolescent.

The new regulation proposed hands-on experience to the student-teacher of engaging with diverse communities, children and schools and asked for developing understanding about issues of diversity, inequality and marginalization in Indian society and the implication for education. These kinds of engagement and understanding will help the student-teacher to blend his teaching strategy according to the circumstances. The new regulation also gave the direction of what to do during teaching, such as, providing the student the understanding of school curriculum, linking school knowledge with community life and including variety of investigative projects in order to transform the subject knowledge in to communicable meaningful learning material.

On studying the B.Ed curriculum suggested by new regulation, NCTE (2014) it can be said that the reflection of PCK can be felt at each line although the term PCK is not mentioned directly there. The main theme of PCK which was discussed earlier in this article can be extracted out in a well manner from the B.Ed curriculum suggested.

Conclusion

In any kind of educational system teacher is an important factor. Further the quality of a teacher can create a great difference in educational system. A teacher with lots of knowledge of subject matter does not imply that s/he is a good teacher rather a teacher who knows how to teach those contents according to the context is a good quality teacher. PCK is all about that i.e. blending the content through pedagogic process in according to the needs and perspectives of the learners. Teaching is profession and teacher education is a professional course for preparing teachers (NCFTE, 2009). Therefore for producing the good quality professional teachers it is very much needed to include the concept of PCK in Teacher Education program. There is lots of research report which indicate the need of the knowledge of PCK to the teacher (both in- and pre-service) and hence increase the demand of inclusion the concept PCK in the teacher education curriculum. On analysis of the B.Ed curriculum proposed by new regulation i.e. National Council for Teacher Education (Recognition Norms and Procedure) Regulations, 2014 it was found that although it does not mention the term PCK directly but the main theme of it is reflected from the whole proposed curriculum. The authors are suggesting to include the concept PCK in the teacher education curriculum directly so that the student-teacher will come to know

the term. It will further help them to identify the pedagogic process to transform the subject matter in to communicable meaningful learning material with a more clear vision.

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