

Federation for Self-financing Tertiary Education (FSTE)

Project on Teacher Competency Framework

Module 3: Pedagogical Content Knowledge

Brief Notes and Suggested Reading

This brief note intends to give participants a big picture of the contents covered in the module. Suggested readings are listed to facilitate participants in accessing the sources and to obtain more detail information.

2. This module intends to provide answers to the following three key questions in the context of post-secondary education:

- I. What are the essential knowledge domains a competent teacher should have? *The big picture of Pedagogical Content Knowledge*
- II. How knowledge of content structure can facilitate student learning?
- III. How to utilize Pedagogical Content Knowledge in facilitating student learning?

I. What are the essential knowledge domains a competent teacher should have? *The big picture of Pedagogical Content Knowledge*

3. To answer the question, we probably have to critically think about:

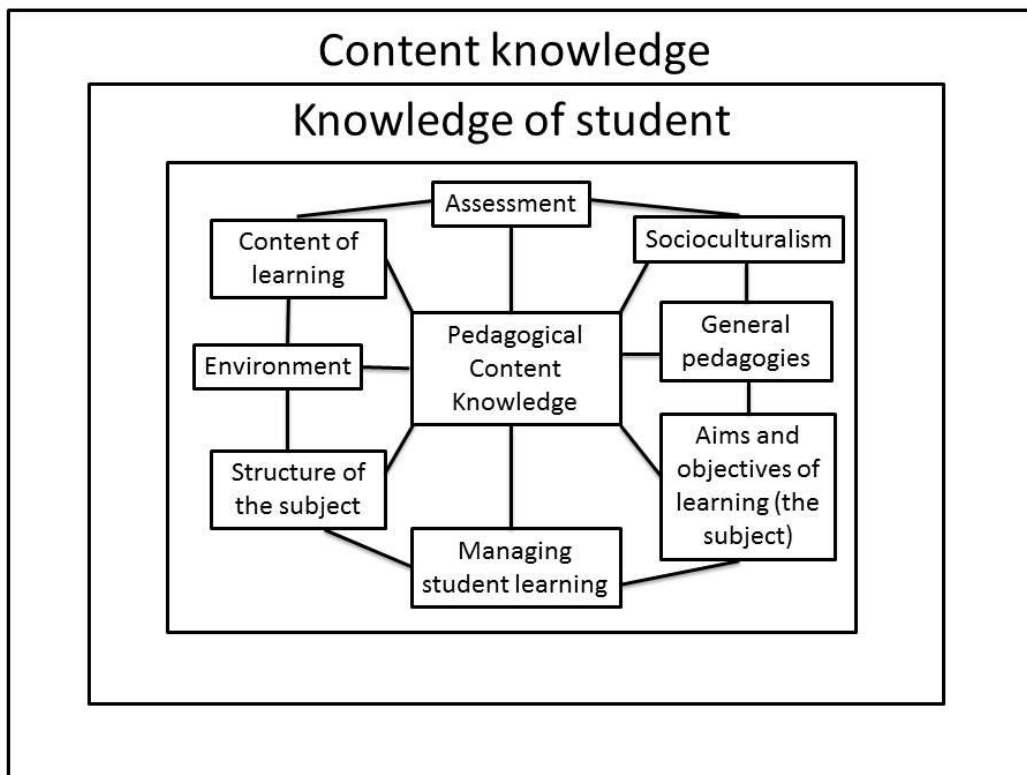
- a. What are the differences between an expert students and a novice teacher? And how can the novice become veteran?
- b. What are the domains and categories of knowledge in the mind of an experienced and competent teacher (veteran)?
- c. Is it sufficient that a teacher with rich content knowledge (of the subject he/she is teaching) and general pedagogical skills (such as lecturing, classroom management, assessment, etc) can transmit the content knowledge to students effectively?

4. Lee Shulman, a teacher education researcher of Stanford University who was interested in expanding and improving knowledge on teaching and teacher preparation, argued that developing general pedagogical skills was insufficient for preparing content teachers as was education that stressed only content knowledge. In his view, the key to distinguishing the knowledge base of teaching rested at the intersection of content and pedagogy. He defined pedagogical content knowledge as teachers' interpretations and transformations of subject-matter knowledge in the context of facilitating student learning.

5. The key factors contribute to the development of pedagogical content knowledge include:

- a. knowledge of representations of subject matter (content knowledge);
- b. understanding of students' conceptions of the subject and the learning teaching implications that were associated with the specific subject matter;
- c. general pedagogical knowledge (or teaching strategies);
- d. curriculum knowledge;
- e. knowledge of educational contexts; and
- f. knowledge of the purposes of education, in particular the learning of the said subject.

The relationship can be depicted in the following diagram:



II. How knowledge of content structure can facilitate student learning?

6. The understanding of each contributing factors to effective teaching and their interactions is complex. In the context of this module, we take content knowledge in teaching as a head start.

7. Content knowledge in teaching is the amount and organization of content knowledge per se in the mind of the teacher. It grows in the mind of a teacher with experience and can be broadly summarized in 3 categories:

- a. Subject matter content knowledge: it is beyond knowledge of facts or concepts of a domain; it is about the structures of the subject matter, which include both the substantive and syntactic structures.
 - ✧ Substantive structures are the variety of ways in which the basic concepts and principles of the discipline are organized to incorporate its facts.
 - ✧ Syntactic structure is the set of ways in which truth or falsehood, validity or invalidity are established.
- b. Pedagogical content knowledge: which goes beyond knowledge of subject matter per se to the dimension of subject matter for teaching – the ways of representing and formulating the subject that make it comprehensible to others; it also includes an understanding of what makes the learning of a specific topics easy or difficult: the conception and preconceptions that students of different ages and backgrounds bring to the learning.
- c. Curriculum knowledge: the full range of programme designed for the teaching of particular subjects and topics at a given level, the variety of instructional materials available in relation to those programs, and the set of characteristics that serve as both the indications and contraindications for the use of particular curriculum materials in particular circumstances
 - ✧ Lateral curriculum knowledge: curriculum materials under study by students in other subjects they are studying at the same time. With such knowledge, the teachers would be able to relate the content of a given course to topics or issues being discussed simultaneously in other classes.

- ✧ Vertical curriculum knowledge: topics and issues they have been and will be taught in the same subject area

II. How to utilize Pedagogical Content Knowledge in facilitate student learning?

8. There is no panacea in teaching. What we can map out is a process, not an event, of utilization. The process will include two steps:

Step 1: Identify the knowledge and information which are essential underpinnings for the design of learning activities of the content, such as:

- a. How can I break down the content I am going to teach into learning elements?
- b. What are the relationships between these learning elements?
- c. What are the backgrounds of my students?
 - Age group
 - Socioculturalism
 - Prior learning
 - Etc
- d. What resources are available for the learning of this content?
 - Venues and the setting
 - Special equipments
 - Learning materials
 - Etc
- e. What are the context and environment of learning?
 - Context of learning for this group of students
 - The previous and next learning content of students in this subject: vertical curriculum knowledge
 - Students' concurrent learning in other subjects: lateral curriculum knowledge

Step 2: Design the learning activities to answer the questions of where to go, how to go and have I arrived:

- f. What types of knowledge and skills I expect my students to learn and develop in this activity? *Where to go or learning outcomes*

- g. How can I know that my students have learned what I expect them to learn?
Have I arrived or the assessment

- h. How can I plan the learning activities for my students to achieve the expected learning outcomes?
How to go or the learning tasks

Useful websites

Pedagogical Content Knowledge

http://www.fisica.uniud.it/URDF/masterDidSciUD/materiali/pdf/Shulman_1986.pdf

[http://gse.buffalo.edu/fas/yerrick/ubscience/UB Science Education Goes to School/21C Literature files/shulman,%201987.pdf](http://gse.buffalo.edu/fas/yerrick/ubscience/UB_Science_Education_Goes_to_School/21C_Literature_files/shulman,%201987.pdf)

[http://www.idra.org/IDRA Newsletter/August 2009 Actionable Knowledge/Pedagogical Content Knowledge/](http://www.idra.org/IDRA_Newsletter/August_2009_Actionable_Knowledge/Pedagogical_Content_Knowledge/)

Content knowledge for teaching

<http://www.math.ksu.edu/~bennett/onlinehw/qcenter/ballmkt.pdf>

Concept map

<http://www.ijonte.org/FileUpload/ks63207/File/14b.kilic.pdf>

UbD

<http://www.grantwiggins.org/documents/UbDQuikvue1005.pdf>

FSTE August 2014