PCK
Pedagogical Content Knowledge

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Teaching – A Highly Complex Activity

• Teaching any subject is a highly complex cognitive activity in which the teacher must apply knowledge from multiple domains (Resnick, 1987; Leinhardt & Greeno, 1986; Wilson, Shulman, & Richert, 1988).

• Teachers with differentiated and integrated knowledge will have greater ability than those whose knowledge is limited and fragmented. (Magnusson, S. J., Borko, H., & Krajcik, J. S. 1999)
Teacher Knowledge – Starting Point

PK
Pedagogical Knowledge

CK
Content Knowledge

Generic knowledge about pedagogy, how students learn, teaching approaches, methods of assessment and knowledge of different theories about learning, etc.

Knowledge of the subject matter without consideration about teaching the subject matter. (e.g. Mathematics, Physics, etc.)
PCK = Pedagogical Content Knowledge

PCK represents the blending of content and pedagogy into an understanding of how particular aspects of subject matter are organized, adapted, and represented for instruction.

PCK: originally proposed by Lee Shulman (1986; 1987)
Shulman – the Father of PCK

- Pedagogical content knowledge (PCK) is an “amalgam” of content and pedagogical knowledge.
- PCK includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons.  (Shulman 1986, 9)
Shulman’s Acknowledgement

• “…pedagogical content knowledge is of special interest because it identifies the distinctive bodies of knowledge for teaching.

• It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. (Shulman 1987, 8)
Shulman’s Claim

- “Pedagogical content knowledge is the category most likely to distinguish the understanding of the content specialist from that of the pedagogue.” (Shulman 1987, 8)
PCK by Shulman (1986)

- “the most regularly taught topics in one’s subject area”,
- “the most useful forms of representation of those 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.”  (Shulman 1986, 9)
Characterization of PCK (1/2)

• Pedagogical content knowledge is a teacher’s understanding of how to help students understand specific subject matter.
• It includes knowledge of how particular subject matter topics, problems, and issues can be organized, represented, and adapted to the diverse interests and abilities of learners, and then presented for instruction.

(Magnusson, Borko, & Krajcik 1999)
Characterization of PCK  (2/2)

• PCK exists at the intersection of content and pedagogy - it goes beyond a simple consideration of content and pedagogy in isolation from one another.

• At the heart of PCK is the manner in which subject matter is transformed for teaching. This occurs when the teacher interprets the subject matter and finds different ways to represent it and make it accessible to learners.  
  
  (Mishra & Koehler 2006, 1021)
The PCK model of Magnusson et.al. (1999) components model for science teaching from an integrative view:

1. Orientation to teaching science,
2. Knowledge of science curriculum,
3. Knowledge of students’ understanding of science,
4. Knowledge of instructional strategy, and
5. Knowledge of assessment of scientific literacy. (Magnusson, Borko, & Krajcik 1999)
PCK is Widely Used Notion

- Since its introduction in 1987, PCK has become a widely useful and used notion.
- For instance, in the area of science education, scholars such as Anderson and Mitchner (1994); Hewson and Hewson (1988); Cochran, King, and DeRuiter (1993); and professional organizations such as the National Science Teachers Association (NSTA, 1999) and National Council for the Accreditation of Teacher Education (NCATE, 1997) have all emphasized the value of PCK for teacher preparation and teacher professional development.

(Mishra & Koehler 2006, 1022)
PCK is an Epistemological concept

• An analysis of Teacher Educator’s Handbook (Murray, 1996) shows Shulman as the fourth most cited author of the close to 1,500 authors in the book’s author index, with an overwhelming majority of those references made to this concept of PCK (Segall, 2004).

• The notion of PCK since its introduction in 1986 has permeated the scholarship that deals with teacher education and the subject matter of education (see, for example, Ball, 1996; Cochran, King, & De-Ruiter, 1993; Grossman, 1990; Ma, 1999; Shulman, 1987; Wilson, Shulman, & Richert, 1987).

• It is valued as an epistemological concept that usefully blends the traditionally separated knowledge bases of content and pedagogy. (Mishra & Koehler 2006, 1022)