



Teaching the Net Generation:
Curriculum, Pedagogy and the Challenge
of 21st Century Learning
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Teaching with ICTs: New technologies, new pedagogies?

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Presentation Outline

1. The question before us: Does teaching with new technologies change the way we teach?
2. Two examples: Same technology, different pedagogies
3. Accounting for the contrasts: Concepts from a theoretical framework about the relationship between teachers, technology and knowledge
4. Implications for teacher professional development in technology integration

The question

- *Does teaching with new technologies change the way we teach?*
- *Do we adopt new pedagogies every time we use new technologies?*
- *What is the relationship between new technologies and new pedagogies?*

- “New technologies” = digital technologies: computers, the Internet, digital TV and radio, digital cameras, mobile phones, PDAs,
- “Pedagogy” = “any conscious activity by one person [the teacher] designed to enhance learning in another [the learner]”
(Watkins and Mortimore (1999, p. 3); the way teachers teach, including how they assess learning

Two contrasting examples of technology integration

- Both examples use PowerPoint (*generic name: presentation software*).
- One example reflects a teacher-centered/transmissionist/instructionist pedagogy while the other example reflects a student-centered and constructivist pedagogy.
- ***Your task: Decide which is which.***

- Sample 1 (on multiple intelligences)
- Sample 2 (on task management in teaching)

Accounting for the contrasts

- The impact of a teacher's pedagogical orientation on how s/he uses technology
- The affordances and constraints of technology for teaching and learning
- The interaction between the teacher's pedagogical knowledge and her/his technological knowledge

Pedagogical orientations

- Beliefs about (the nature of) knowledge:

knowledge is acquired

knowledge is constructed

- Beliefs about learning:

behaviorism

cognitivism

(social)
constructivism

- Beliefs about teaching:

- Teaching is transmitting knowledge
- Teaching is providing the right stimuli and reinforcing correct responses
- Teaching is improving retention and transfer
- Teaching is coaching, guiding
- Teaching is designing appropriate learning environments
- *Teaching is ?*

Technology affordances and constraints

- Affordances: what technology allows you to do
- For example, you can:
 - Use multiple media
 - Communicate with experts in other geographic locations
 - Extend learning time through the use of online learning environments
 - Insert comments and track changes in word processing documents
 - Have students do collaborative activities such as making a wiki
 - Ask students to demonstrate what they know in different ways
 - *What else?*

Technology affordances and constraints

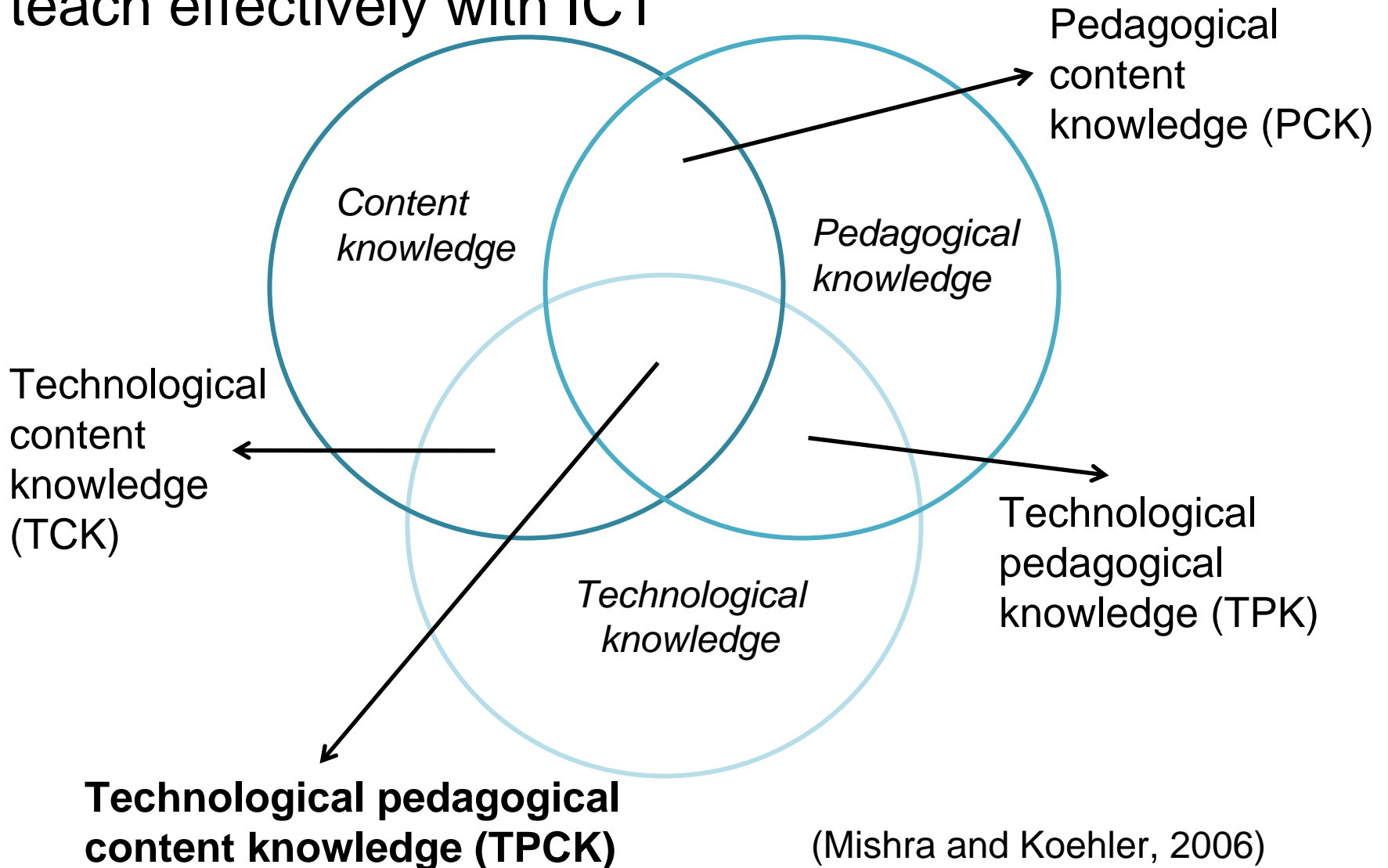
- Constraints
 - The limitations of technology (what you can't do with technology)
 - clinical skills, practicum, solving mathematical equations, *what else?*
 - Issues and challenges arising from use of technology
 - access, appropriateness, cost, inappropriate behavior (“flaming”, harassment, plagiarism), miscommunication, *what else?*

Interaction between technological knowledge and pedagogical knowledge

- Also known as technological pedagogical knowledge (TPK)
- Understanding of **technology as a teaching tool**: knowledge of how technology can support pedagogical goals (Zhao, 2002)
- “...and conversely, knowing how teaching might change as a result of using particular technologies” (Mishra and Koehler, 2006, p. 1028)

- TPK includes —
 - “An understanding that a range of tools exists for a particular task
 - “Ability to choose a tool based on its fitness
 - Using “strategies for using the tool’s affordances
 - “Knowledge of pedagogical strategies
 - “Ability to apply those [pedagogical] strategies for use of technologies “(Mishra and Koehler, 2006, p. 1028)

What teachers need to know to be able to teach effectively with ICT



Pedagogical content knowledge (PCK)

- Knowledge of “ways of representing and formulating the subject that make it comprehensible to others” (Shulman 1986, p. 9)
 - “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”
- **Subject pedagogies:** the particular ways of teaching and learning — including learning activities, tools and resources — that underpin subjects (John, 2005)

Technological content knowledge (TCK)

- Knowledge of how “the subject matter can be changed by the application of technology” (Koehler and Mishra, 2006, p. 1028)
 - Constraints on representation of subject matter caused by technology used
 - Affordances of new technology: “newer and more varied representations and greater flexibility in navigating across these representations”

Technological pedagogical content knowledge (TPCK)

- Integrated knowledge of technology, pedagogy and content
- “Teacher knowledge about technology [is] important, but not separate and unrelated from contexts of teaching – i.e., it is not only about what technology can do, but also, and perhaps more importantly, what technology can do for them as teachers” (Koehler and Mishra 2005, p. 132)
- “TPCK is the basis of good teaching with technology.” (Mishra and Koehler, 2006, p. 1029)


How is TPCK developed?

Teacher learning
as process


Dimensions of
teacher learning

Stages of learning how to teach with technology (Sandholtz et al. 1997)

1) **ENTRY**: Teachers are learning how to operate the technology and are not yet able to think of how these can be used for instruction.



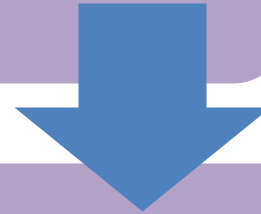
2) **ADOPTION**: Teachers begin to use the technology in support of common instructional practices.



3) **ADAPTATION**: The new technology has become “thoroughly integrated in traditional classroom practice” and productivity is a major theme.

Stages of learning how to teach with technology (Sandholtz et al. 1997)

4) **APPROPRIATION:** There is effortless use of technology and formation of new beliefs about technology.



5) **INVENTION:** Teachers experiment with different technology-supported instructional practices, including new ways of relating to students and colleagues, and they begin “to reflect on teaching, to question old patterns”.

Dimensions of teacher learning (1)

Readiness to teach
with ICT

Comes from institutional or organizational vision of technology integration, and a personal vision of technology-enhanced classrooms

Willingness and
motivation to teach
with ICT

Comes from frequent use of computers and formal training in using and teaching with computers

Ability to teach
with ICT

- **Knowing what to teach and how to teach, what technology to use and how to use it in teaching (TPCK)**
- **Comes from training and practice**

Dimensions of teacher learning (2)

Ability to learn from teaching experiences
(critical reflection)

- **Using a knowledge-based perspective for examining personal experience**
- **Enables teachers to respond proactively to the complex challenges of teaching**

Participation in a professional community
(community of practice)

Key elements: a coherent and responsive policy, communication networks, formal staff development opportunities, technical support, school leadership that models and encourages exemplary use of computers

(After Shulman & Shulman, 2004)

Implications for TPD in technology integration (1)

Focus on technologies as pedagogical tools

Privilege subject matter and pedagogical content connections

Integrate ICTs across the curriculum

Foster critical reflection on practice

Consider the pedagogical, social and ethical aspects of ICT use

Engage with research and theory about teaching, learning and technology

Implications for TPD in technology integration (2)

Foster
dialogue
and
collaboration

Create
discourse
communities

Establish
school-university
partnerships

Provide
classroom-focused,
just-in-time and
continuing TPD

Learning
by design

In-school
pedagogical
support