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Learning and teaching science in an online world:  
An exploration of pedagogical and curriculum  
innovations afforded by the 1 to 1 lap top program  
in lower secondary science classrooms

Julie Boston

# Learning and teaching science in an online world

**An exploration of pedagogical and  
curriculum innovations afforded by the  
1 to 1 lap top program in lower  
secondary science classrooms.**

**Julie Boston  
MEd Candidate**

**Supervisors: Professor Mark Hackling  
Associate Professor Karen Murcia**

# WHAT GOT ME THINKING

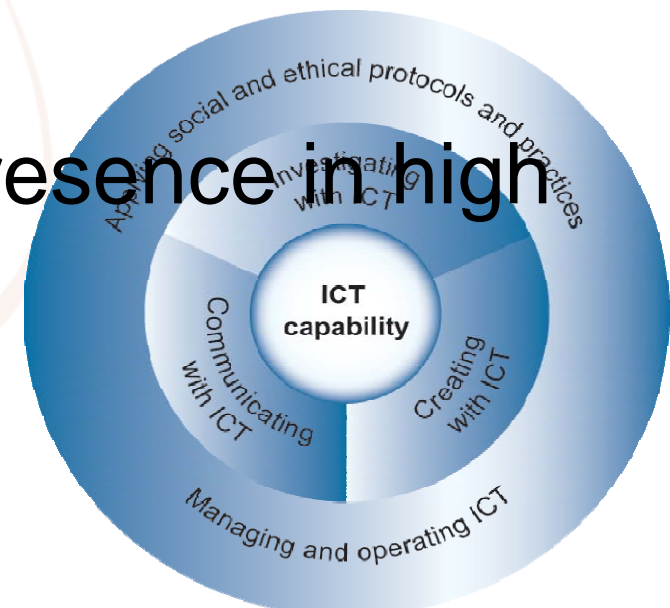
collaboration  
integration  
assessment  
access  
simulations  
wireless  
IWB's  
multi-modal  
inclusivity  
virtual-worlds  
ubiquitous  
TPACK  
media-literacy  
communities-of-interest  
anywhere-anytime  
literacy  
communication  
social-networking  
learning communities  
problem-solving  
lap-tops  
games  
teaching  
research  
PCK  
science

## BACKGROUND

- ❑ Digital Education Revolution (*DER*) has resulted in \$1.2 billion Federal investment in the technology infrastructure of Australian schools.
- ❑ *The National Secondary School Computer Fund* (NSSCF) has resulted in approximately one million students in Years 9 to 12 across the country with access to their own personal lap top computer.

# BACKGROUND

- ❑ *Australian Institute for Teaching and School Leadership (AITSL) National Professional Standards for Teachers* explicitly documents the required use of digital technologies for teaching and learning .
- ❑ ICT now has a ubiquitous presence in high schools



This diagram shows the organisational elements of ICT competencies as outlined in ACARA

# PROBLEM

- ❑ Teachers are being constantly challenged to integrate technology into their classroom
- ❑ However, technology integration is a complex task requiring technological knowledge, time, resources and motivation.
- ❑ There is now an urgent need for science teachers with technological pedagogical content knowledge (TPACK).

# PURPOSE

- ❑ This case study will investigate how teachers (identified as having TPACK) are exploiting the affordances of the lap top so that their students can:
  - access science ideas;
  - create;
  - problem solve;
  - communicate;
  - and work collaboratively with others

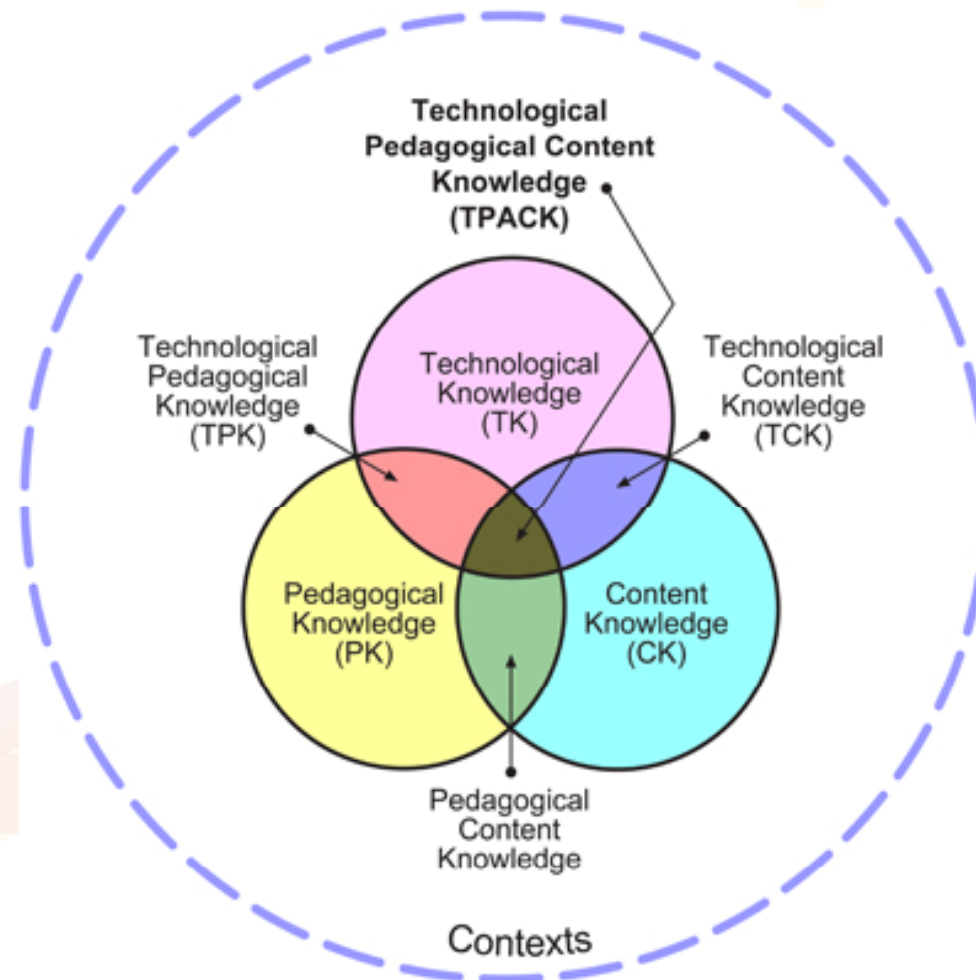
# CONCEPTUAL FRAMEWORK

## □ **Technological Pedagogical Content Knowledge (TPACK) Framework by Matthew Koehler & Punya Mishra (2006)**

- The TPACK model has been strongly influenced by the theoretical learning model of social constructivism
- The authors of this model argue that there has been an over emphasis on the use of ICT rather than focussing teacher professional development around how to use ICT effectively with students for learning



# CONCEPTUAL FRAMEWORK



# RESEARCH DESIGN

- Qualitative research methodology
  - Case study of 3-5 metropolitan high school science teachers
  - Pre and post lesson teacher interviews
  - Classroom observation
  - Video capture practice and analysis

# WHERE TO FROM HERE?

