

Workshop Exploring Technology in  
Mathematics and Science Education

J.V. Marc Corbeil

# Talking Technology

---

# aim

To develop awareness of opportunities and difficulties using technology to enhance teaching mathematics and science.

# topics

---

microworlds

technology and how we teach

technology and what we teach

cognitive obstacles

pitfalls

why use technology?



# microworld

A microworld is a **virtual** world in which teachers and students can actively explore concepts, relationships and alternatives.

Worksheet: Give three examples of a microworld you might use in your classroom.

# microworld

---

calculator

virtual calculator

virtual clock

fan cart physics gizmo

Find  $356 \div 17$

---

# tech changes HOW we teach.

virtual calculator

BT PAD/tablet and projection

Worksheet: In what way do you think technology might change how you teach?

# tech changes how we teach.

---

Worksheet answers:



http://ogspot.com

# tech changes **WHAT** we teach.

---

Worksheet:

In what way do you think  
technology might change what you  
teach?

# tech changes what we teach

---

Find the square root of 361 without using the root function.

# learning has Jumping Points

**Jean Piaget**

**epistemological (cognitive) challenges**

- **Assimilation: process by which a learner person takes material into their mind from outside -**

**making new knowledge fit**

# Cognitive (knowledge) obstacles

Bachelard 1938, Brousseau 1985,  
Tall 1989, Corbeil 1997

- **Piece** of knowledge of that the student has
- It satisfactory for solving certain problems
- Becomes anchored in the mind

But, when faced with new problems,

this piece of knowledge **blocks** assimilation.

# winding cable



# examples

---

$$3x + 1 = 7 \quad \text{and} \quad 3x + 1 = 6$$

# examples

---

exceptions to the rule:

thought

through

though

cough

bough

How does the computer environment change mathematical concepts, the development of students' conceptualizations and the related cognitive obstacles?

# technology changes

**how** you present the goal.

**what** you teach – the goal.

Always ask:

Am I teaching the goal or I am just  
playing with technology ?

# Have I prepared for problems?



# problems

- Worksheet:
- Describe some things that can go wrong.
- Suggest ways of either avoiding these problems or ways to deal with them.

# why use technology

---

Give some reasons that justify using technology as a teaching solution.

# scaffolding

Technology can help  
bridge the **gap** between  
where the learner is  
and where we want the  
learner to be.

NEVER  
GIVE UP!

