

# Socio-cultural Theory and Technology-Enhanced Learning

BASIC CONCEPTS

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Are you familiar with any theory about learning and cognition?

What do you know about learning theories?

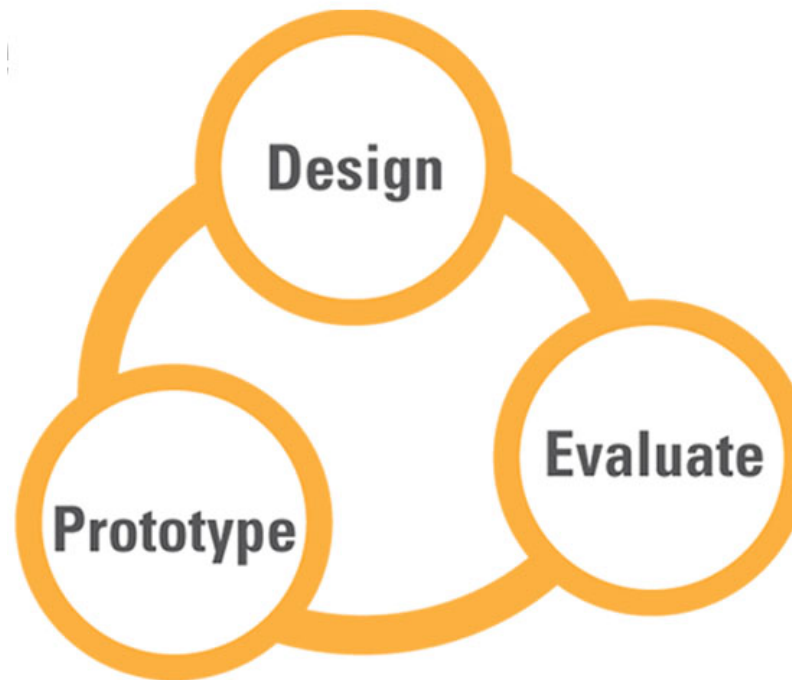
Tell us your experience!

# 1. Learning Theory and TEL

- TEL is an interdisciplinary field:
  - Educators, designers, engineers...
  - Schools, museums, other private initiatives (e.g. aviation) ...
  - Both supporting Instruction and Learning.
- TEL implies both a practical and an analytical component
  - Design-Based Research.

# 1. Learning Theory and TEL

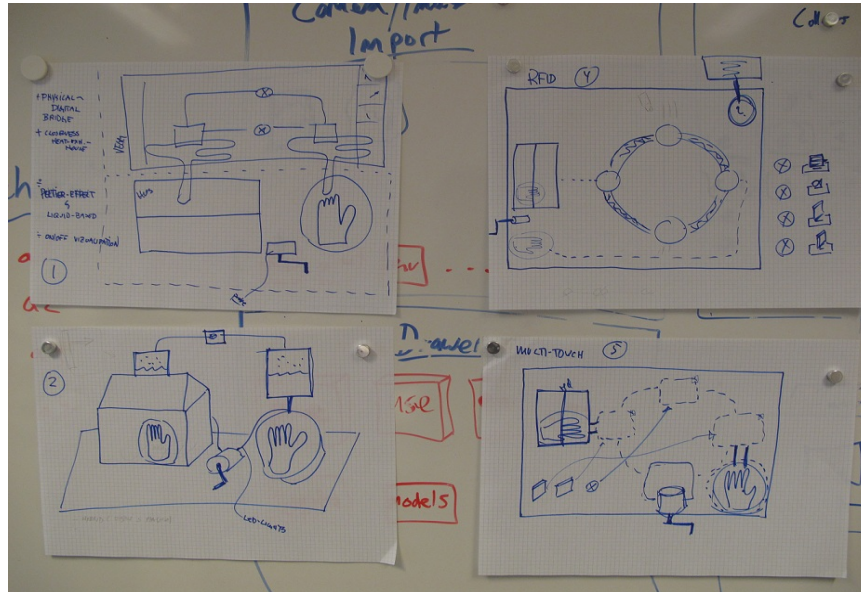
So, in what sense are learning theories important to TEL?



We need learning models to approach the design iteration at each step:

- While designing and prototyping we need to have some arguments for taking decisions.
- In evaluating, we need some assumptions of what it means in to learn to approach “users’ learning”.

# An example from MIRACLE



# 1. Learning Theory and TEL

## 3 Main Models of Learning:

- The Behaviorist model (Skinner, 1938).
- The Cognitivist model (Atkinson and Shiffrin, 1968).
- The Socio-cultural model (Vygotsky, Wertsch...)

These different theories imply different ways to looking at the relation between people and the objects they interact with (e.g. technology).

# 1. Learning Theory and TEL

- Behaviorism:
  - Stimulus – Response.  
Learning is the result of contingencies between stimulus and reinforcements or punishments.
- Cognitivism:
  - Stimulus – (information processing) – Response
- Socio-cultural:
  - Stimulus – (social mediation) – Internalization of social relations.

Depending on the theoretical lenses, questions of design and evaluation may be radically different. During design and prototyping, our expectations will vary. During evaluation, our units of analysis will be completely different.



# Socio-cultura Theory

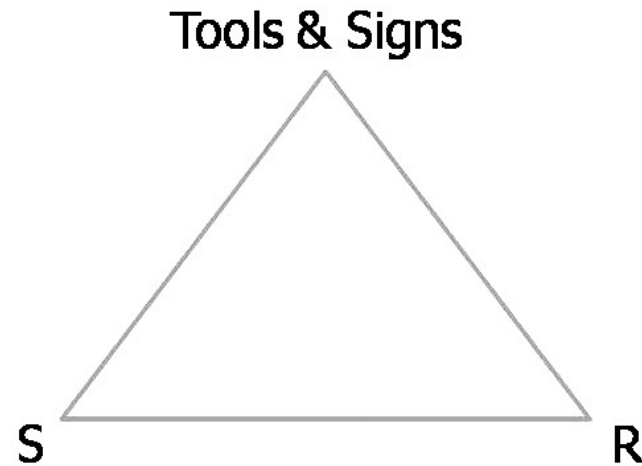
Basic Concepts

## 2. Socio-cultural Theory

- Vygotsky (1896 – 1934)
- A critique to mainstream psychology of his time:
  - Against the empiricism that reflexology and behaviorist approaches (e.g. Thorndike) had assumed, which ignored the central “problem of consciousness”
  - Against the more rationalist approach that Piaget was developing, which “claim(ed) that the external reality plays no substantial role in the development of a child’s thought” (Vygotsky, 1934/1986).

## 2. Socio-cultural Theory

- MEDIATION:



Mediation (Vygotsky, 1978/1933)

Vygotsky turned attention to the role that **signs** and **tools** (and therefore culture) had in transforming the nature of the relation between human and nature.

The anecdote of the child's pointing gesture in Vygotsky's 1978 *Mind in Society* is very illustrative.

## 2. Socio-cultural Theory

“In response to the unsuccessful grasping movement of the Child, there arises a reaction not on the part of the object, but on the part of another person. In this way, others carry out the initial idea of the unsuccessful grasping movement” (Vygotsky, 1931/1981).

## 2. Socio-cultural Theory

The General Genetic Law:

“every function in the cultural development of the child appears on the stage twice, in two planes, first, the social, then the psychological, first between people as an intermental category, then within the child as a intramental category” (Vygotsky 1931, 1981).

Cultural forms become, therefore, ***internalized***.

## 2. Socio-cultural Theory

- Tool vs. Sign:
  - Both are mediational means: means by which the relation between subject and object is transformed.
  - However, both differ in their orientation:
    - Tools affect objects (externally oriented).
    - Signs affect subjects (internally oriented).

Language (sign system) becomes the main means by which thought and action are organized. But!  
There is a gap between thought and language!  
(Vygotsky, 1934/1986)

- How does language genres, ways of practice, influence the way we organize thought?

Think of this lecture, the ppt and the “lecturing” genre, and how this influences the way we relate to each other ABOUT the “contents” this lecture is about. How does the ppt structure OUR interaction (lecturer-students)? How does this affect the way you come to learn about socio-cultural theory?

## 2. Socio-cultural Theory

- Zone of Proximal Development (ZPD)

An implication of the general genetic law is that the individual, in its developmental aspect, cannot be seen in isolation of her/his cultural environment.

ZPD as opposed to “actual developmental level” (see def. in Vygotsky, 1978, p. 86).



# 3. Implications

- Analytical Implications:
  - Minimal unit of analysis = Mediated Action (Wertsch, 1998)
  - Focus on the process of appropriation of forms of “speaking”, of cultural forms of inter-relation.
  - Focus on the process of development, and not on the final products of learning.
  - Focus is NOT on the individual, but on the individual in its social niche.
  - ZPD calls attention to the role of tools and others in learning environments.

# 3. Implications

- Practical Implications:
  - Make groups of 2 and discuss different solutions to the MIRACLE's dilemma.
  - Discuss how these different solutions may be grounded in one or other learning theory, and on some of the basic notions of the socio-cultural approach.
  - Share with us your ideas.

# PRACTICAL IMPLICATIONS

- Aims of the MIRACLE game:
  - We want the students to make sense of the game.
  - The last screen is meant to provide with a resource for making sense of the game activity in the context of the conceptual domain of heat pumps.
  - It is aimed to be a means to raise conceptual discussion among the students. How we do that?

- SHOW THE CLIP!!



Prøv å holde temperaturen mer stabilt for å forbedre resultatet!

I løpet av året brukte du 3974 KW timer for å drive varmepumpa. For å holde temperaturen i huset gikk det med 11925 KW timer.



- Energi brukt for å drive varmepumpa
- Samlet energioverføring mellom ute og inne



JANUAR FEBRUAR MARS APRIL MAI JUNI JULI AUGUST SEPTEMBER OKTOBER NOVEMBER DESEMBER

# Questions we had during design...

- How long should the screen stay?
- How the graph should look like?
- What should be included in the text?
- How should this be connected to further activities in the pedagogical trajectory?

Discuss possible solutions and try to ground them on some aspects of learning theory.