Chapter 0: Course Presentation

Pierre Dillenbourg, Patrick Jermann, Stian Haklev, Jennifer Olsen, Louis Faucon
EPFL MOOCs

EPFL MOOCs: 1’815’471 , 97’510
Massive Open Online Courses (2008)
Virtual Campus (2000)
Virtual University (1999)
Open Learning (1995)
e-Learning (1993)
Online Education (1993)
Computer-Mediated Learning (1990)
Educational telematics (1988)
Computer-Assisted Learning (1985)
Computer-Based Learning (1980)
Computer-Assisted Instruction (1960)
Learning theory ➔ Learning Technology

*How people learn* ➔ *How technology supports learning*

1. Behaviorism ➔ Adaptive Instruction

2. Constructivism ➔ simulations, microworlds

3. Social cognition ➔ groupware, communication
“If, by a miracle of mechanical ingenuity, a book could be so arranged that only to him who had done what was directed on page one would page two become visible, and so on, much that now requires personal instruction could be managed by print. (page 165)"

First « teaching machine »

Sidney PRESSEY, Professeur de psychologie de l’éducation, Ohio State University

- In some window appears 1 question and 4 answers
- The machine has 4 buttons, one per answer
- The machine records the answer and updates a counter
- Questions correctly answered are not re-proposed

http://www.coe.uh.edu/courses/cuin6373/idhistory/pressey.html
Massive Open Online Courses (2008)
Virtual Campus (2000)
Virtual University (1999)
Open Learning (1995)
e-Learning (1993)
Online Education (1993)
Computer-Mediated Learning (1990)
Educational telematics (1988)
Computer-Assisted Learning (1985)
Computer-Based Learning (1980)
Computer-Assisted Instruction (1960)
Choisis la traduction de "homme"

Solution correcte :
man

https://www.duolingo.com/skill/en/Basics-1/1

38 millions users
App of the year 2013 Apple
Top of the top App Android 2013
Learning theory  ➔  Learning Technology

How people learn  ➔  How technology supports learning

1. Behaviorism  ➔  Adaptive Instruction

2. Constructivism  ➔  simulations, microworlds

3. Social cognition  ➔  groupware, communication
Jean Piaget

Stages of development

Sensori-motor (0-2 years)
- Schema created by child reinforcing that objects are permanent
- Understanding of world developed through sensory and physical experimentation

Pre-operational (2-7 years)
- Beginnings of language through understanding of symbols
- Egocentric
- Difficulty understanding conversation or more than one aspect of a situation

Concrete Operational (7-11 years)
- Ordering and classifying based on appearance
- Ability to sequence numbers
- Developing ability to empathise
- Simplistic understanding of maths, geometry and physics

Formal Operations (11+ years)
- Ability to draw conclusions based on hypotheses rather than objects
- Adolescent egocentrism
- Logical

Permanence of object
Conservation Task
PryamidTask
7. Draw Spirals

To change the procedure called POLY so as to draw spirals we make a very small addition to line 3. We also change the name -- but that is of course unnecessary.

```plaintext
TO POLY :STEP :ANGLE
1 FORWARD :STEP
2 LEFT :ANGLE
3 POLY :STEP :ANGLE
END

TO POLYSPI :STEP :ANGLE
1 FORWARD :STEP
2 LEFT :ANGLE
3 POLYSPI :STEP+5 :ANGLE
END

POLYSPI 5 90

POLYSPI 5 120

POLYSPI 40 60

POLYSPI 5 121

POLYSPI 5 125
```
Cabri Géomètre
Simulations

Acquire Skills

Discover underlying model
Learning theory ➔ Learning Technology

How people learn ➔ How technology supports learning

1. Behaviorism ➔ Adaptive Instruction
2. Constructivism ➔ simulations, microworlds
3. Social cognition ➔ groupware, communication
SocioCultural Theories

Social Speech

Private Speech (Vygotsky)
Egocentric Speech (Piaget)

Inner Speech

Thinking as a dialogue with oneself

Internalisation:
One of the theories that was stated in the dialogue was that the HIV virus really **DOES NOT cause AIDS**.

In the article, it states that the HIV virus violates 3 postulates of Knoch and Henle.

**The other theory stated was that the HIV virus really **DOES cause AIDS**.**

Data: HIV cannot be isolated from 20–50% of AIDS cases.

Data: After introduction of the HIV antibody screening test in the US, the transmission of HIV in the blood supply in the US was reduced from 1/1000 to 1/40000.

If the HIV virus cannot be detected in almost 50% of the AIDS cases, then what actually causes the AIDS virus?
What is the role of computers in learning?

Enabling activities → Modelling Learning

- Access
- Simulating
- Computing
- Repeating
- Distance interaction
- Synthesis
- Analyis
If learner’s score in activity A > 60%, then select activity B1 else select activity B2
Self-improving system

If learner’s score in activity A > X%,
then select activity B1
else select activity B2
SYSTÈMES TRIPHASÉS SYMÉTRIQUES

Tension Simple: \( U_{RN}, U_{SN}, U_{TN} \)

Tension Composée: \( U_{RS}, U_{ST}, U_{TR} \)

\[
\begin{align*}
M_{RS} &= M_{RN} - U_{SN} \\
M_{ST} &= U_{SN} - U_{TN} \\
M_{TR} &= M_{TN} - U_{RN}
\end{align*}
\]

\[
\begin{align*}
U_{RN} &= M e^{j\alpha} \\
U_{SN} &= M e^{j\alpha/3} \\
U_{TR} &= M e^{j\alpha - \frac{2\pi}{3}}
\end{align*}
\]

Kshitij Sharma, Patrick Jermann, Pierre Dillenbourg
EPFL Center for Digital Education
Eye tracking experiment on MOOC Video

Following teacher’s references

Gaze of students’ watching Scala course by Prof. Martin Odersky (EPFL, Switzerland)

K. Sharma, P. Jermann, P. Dillenbourg
@ CHILI – http://chili.epfl.ch
Supported by the Swiss National Science Foundation (Grants CR1211_132996 and PZ00P2_126611)
Time [msec] to visit the referred sites, first time

First Fixation Duration [msec] the referred site

« withmeness »
Analysis:
Learning Analytics
Campus analytics
Multimodal Learning Analytics
Synthesis: Orchestrination Graph
<table>
<thead>
<tr>
<th>Date</th>
<th>Course Overview</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/09</td>
<td>Course overview</td>
<td>Form teams of 3. Select a topic.</td>
</tr>
<tr>
<td></td>
<td>CH1. Intro. Learning Sciences</td>
<td></td>
</tr>
<tr>
<td>26/09</td>
<td>CH2: Mastery Learning</td>
<td>Task Analysis</td>
</tr>
<tr>
<td>03/10</td>
<td>CH3: Discovery Learning</td>
<td>Designing Activities</td>
</tr>
<tr>
<td>19/10</td>
<td>CH4: Social Learning</td>
<td>Designing Activities</td>
</tr>
<tr>
<td>17/10</td>
<td>CH5: Orchestration</td>
<td>Graph Design</td>
</tr>
<tr>
<td>24/10</td>
<td>CH6: FROG Platform S. Haklev</td>
<td>Implementation S. Haklev</td>
</tr>
<tr>
<td>31/10</td>
<td>CH6: FROG Platform S. Haklev</td>
<td>Implementation S. Haklev</td>
</tr>
<tr>
<td>07/11</td>
<td>CH7: Open Education P. Jermann</td>
<td>MOOC studio P. Jermann</td>
</tr>
<tr>
<td>14/11</td>
<td>CH8: Measuring learning</td>
<td>Pre-testing</td>
</tr>
<tr>
<td>21/11</td>
<td>CH9: Learning Analytics P. Jermann</td>
<td>Introduction to R P. Jermann</td>
</tr>
<tr>
<td>28/11</td>
<td>CH9: Learning Analytics P. Jermann</td>
<td>Introduction to R P. Jermann</td>
</tr>
<tr>
<td>05/12</td>
<td>CH10: Market trends Pierre Dubuc, Open Classrooms J.-M. Tasseto, CoorpAcademy</td>
<td>Running experiment</td>
</tr>
<tr>
<td>12/12</td>
<td>CH10: Bayesian Knowledge Tracing J. Olsen &amp; L. Faucon</td>
<td>Running experiment</td>
</tr>
<tr>
<td>19/12</td>
<td>Synthesis Presentation of graphs</td>
<td>Report writing</td>
</tr>
</tbody>
</table>
Do your own MOOC!

https://youtu.be/DVoMxgUhHb4
Project (50%)

Form teams of 3
No the same team as ever
One team member knows javascript
Choose a topic in which one of you is expert

Exam (50%)

Oral: 15 min prep + 15 defense (with notes)
Applied questions