ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

CS-411 : Digital Education & Learning Analytics

Chapter 1:

Introduction to digital education

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

A1

How do people learn ?

How we help them to learn ?

How do we design activities that make them learn ?

How can digital technologies enhance these activities ?

HOW PEOPLE LEARN

Connect with your EPFL account

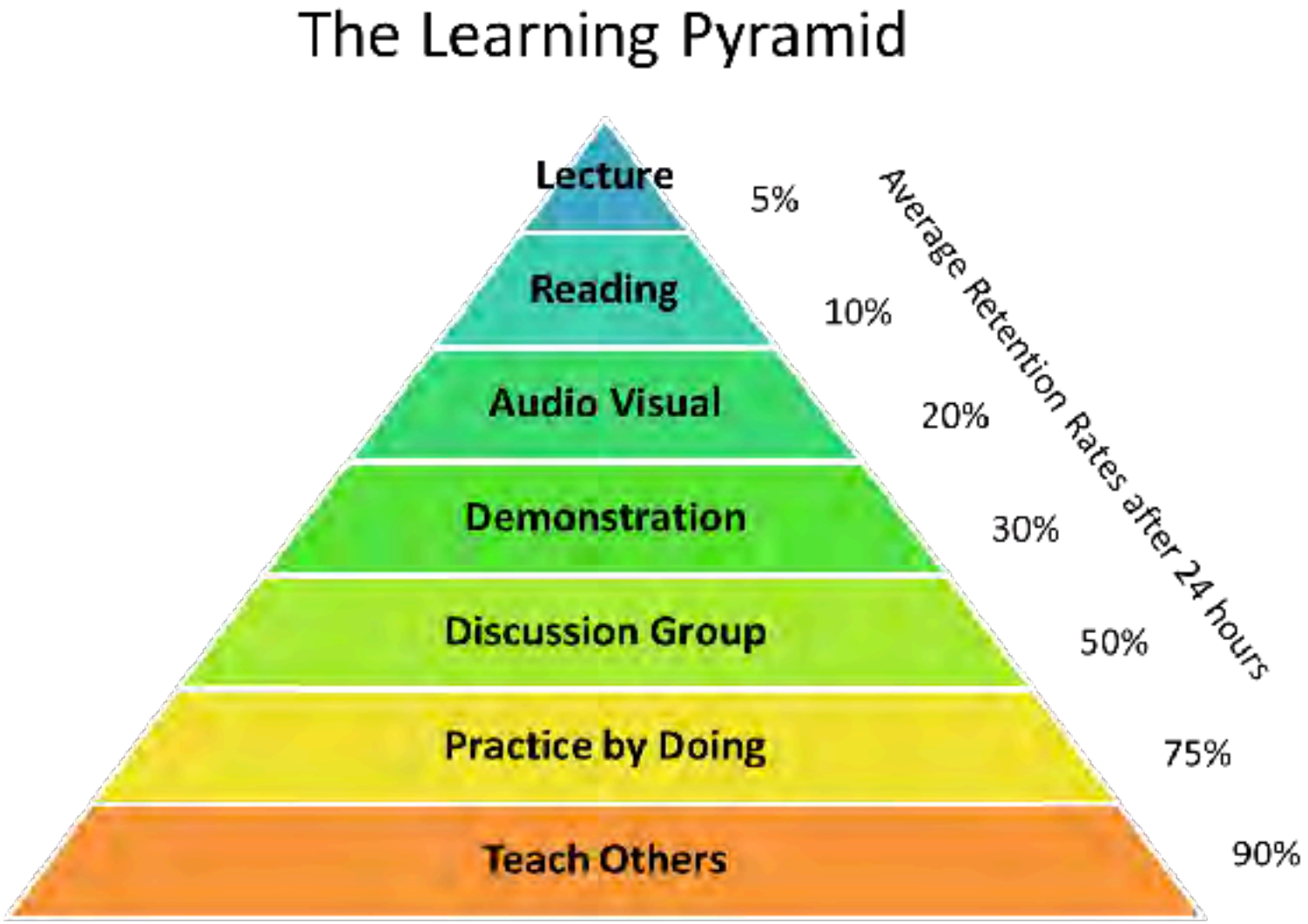
Go to Moodle CS-411

Select the first URL to FROG on week 1

How do you learn (before exams) ?

A3

HOW PEOPLE LEARN



Source: National Training Laboratories, Bethel Maine

HOW PEOPLE LEARN depends also upon WHAT PEOPLE LEARN

- 3 X 3 = 9
- 35’467+36’489
- 3/4 = 27/36
- $P(A|B) = \frac{P(B|A)\,P(A)}{P(B)}$

- Behaviorism (Skinner)
- Master Learning (Bloom)
- Constructivism (Piaget*)
- Socio-Cultural theory (Vygostky*)

A3

How do people learn ?

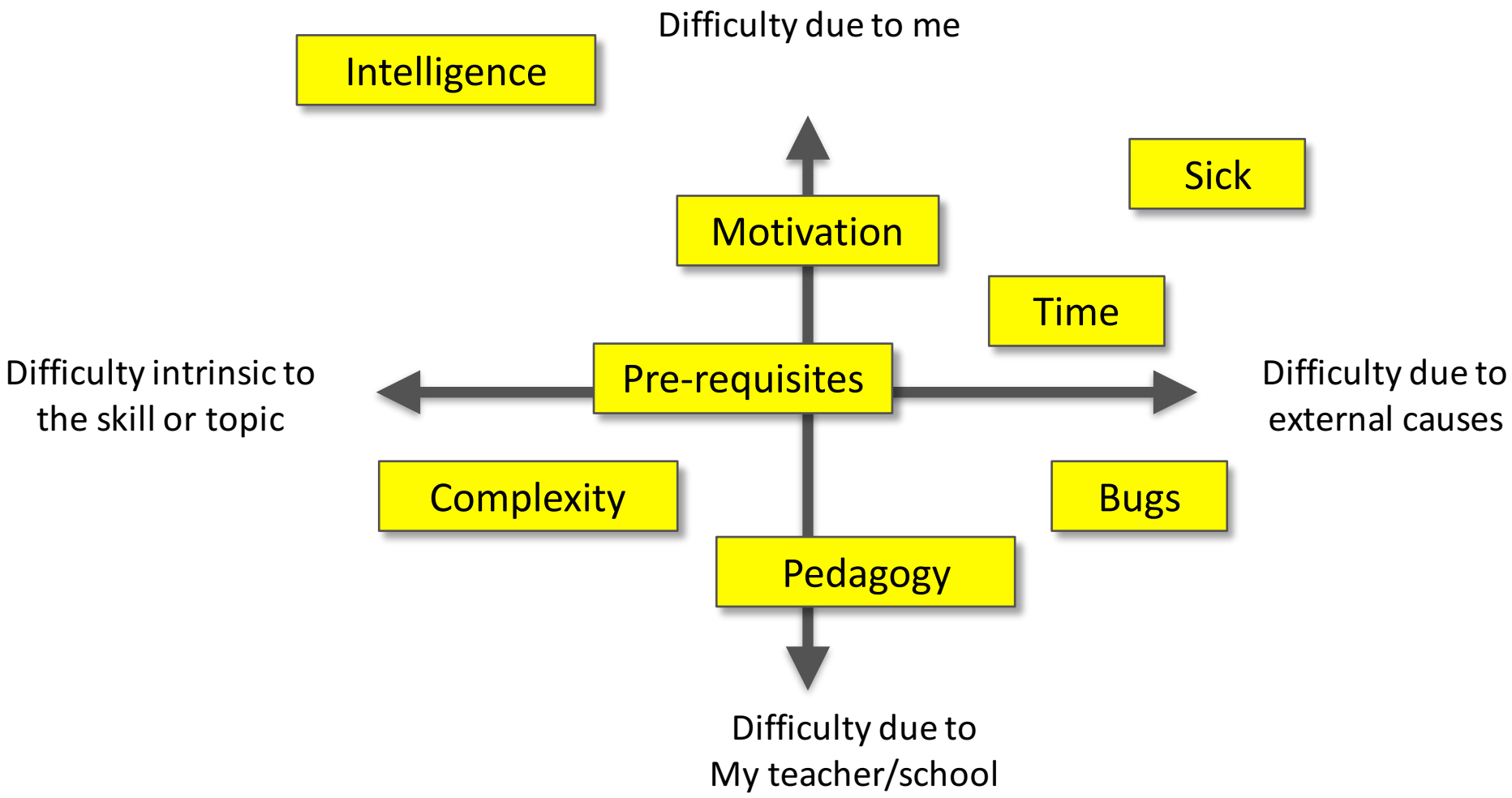
How we help them to learn ? Why helping ?

How do we design activities that make them learn ?

How can digital technologies enhance these activities ?

INSTRUCTIONS

Why do we need help to learn ?



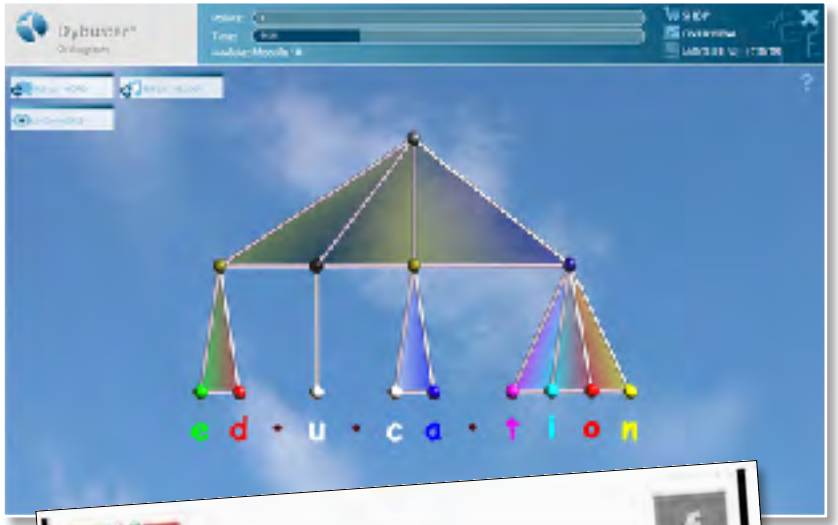
How do people learn ?

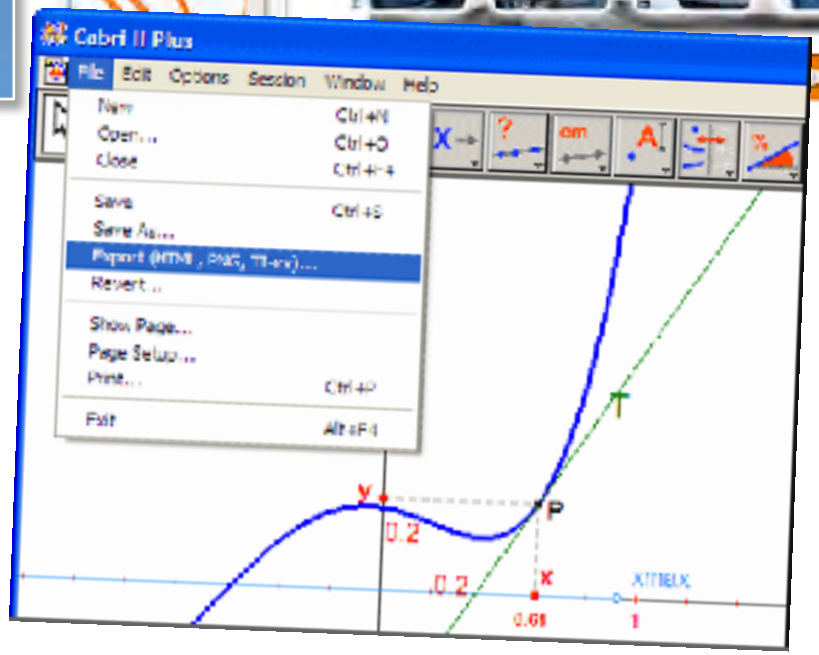
How we help them to learn ?

How do we design **activities** that make them learn ?

How digital **technologies** enhance these activities ?

Overview of Learning Technologies





"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)"

Thorndike, E.L. (1912, published 1923). *Education: A First Book*. New York: Macmillan Co.

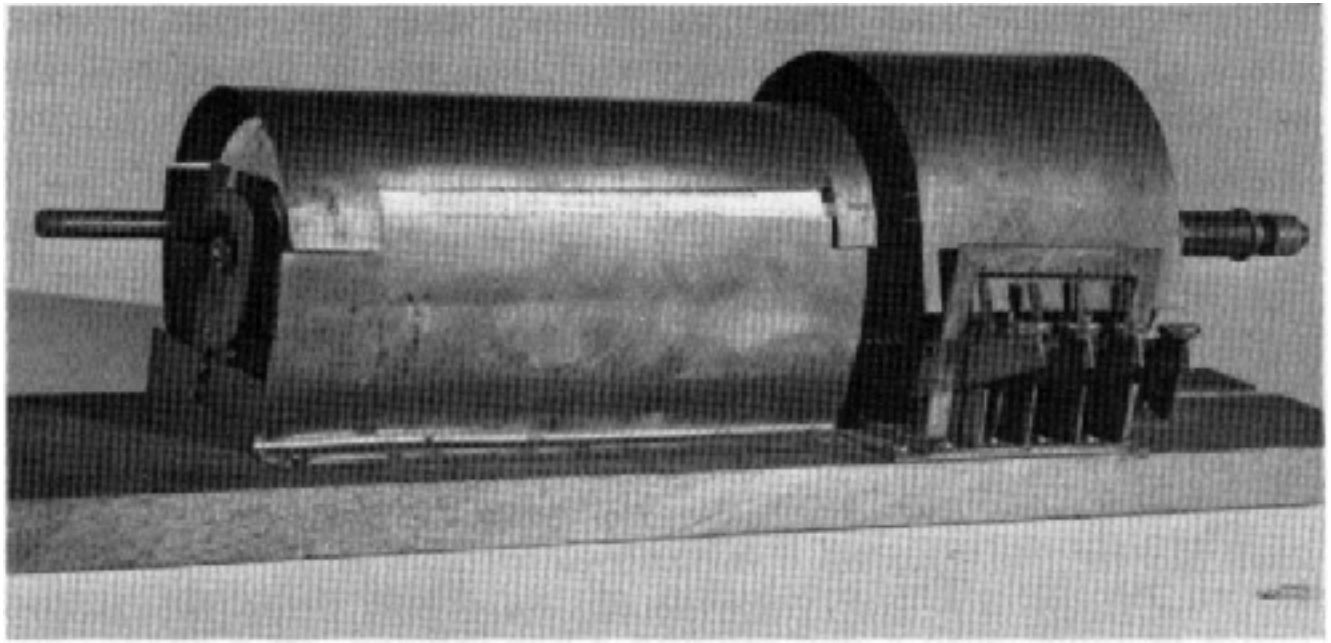


FIG. I. A multiple-choice device which omits items from further presentation once the student can consistently answer them correctly. 1927

First « teaching machine »

Sidney PRESSEY, 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

A5

Massive Open Online Courses (2008)
Technology-enhanced learning (2004)
Virtual Campus (2000)
Learning Management Systems (1999)
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)

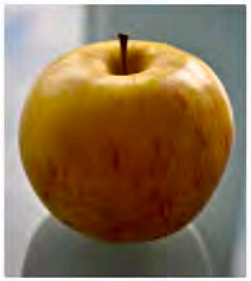
duolingo Accueil Mots Activité Discussion dillenbo 0 0

A5

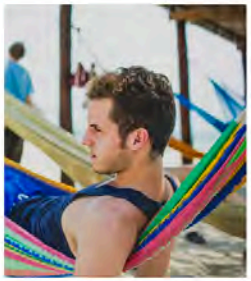
DRILL & PRACTICE

Quitter

Choisis la traduction de "homme"



apple 1



man 2

woman 3

Solution correcte :
man

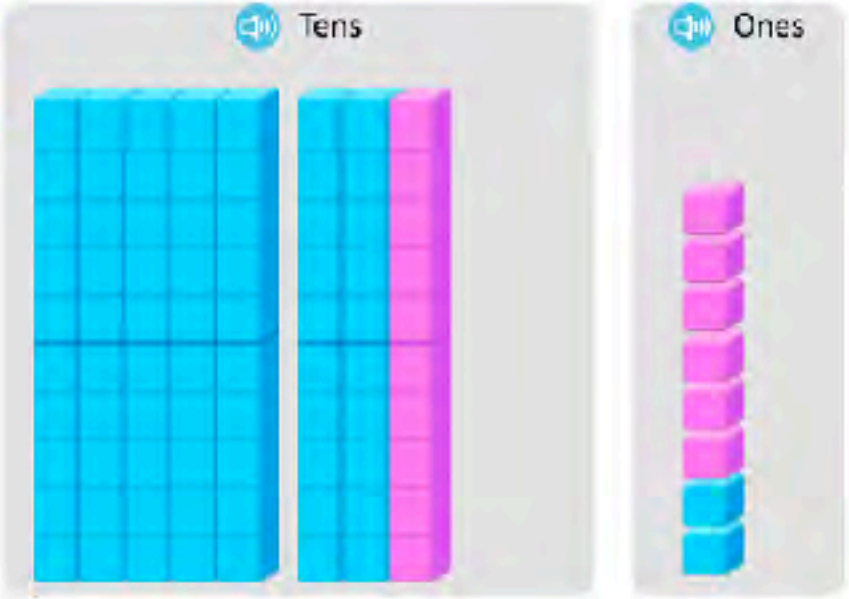
Signaler un problème

Continuer

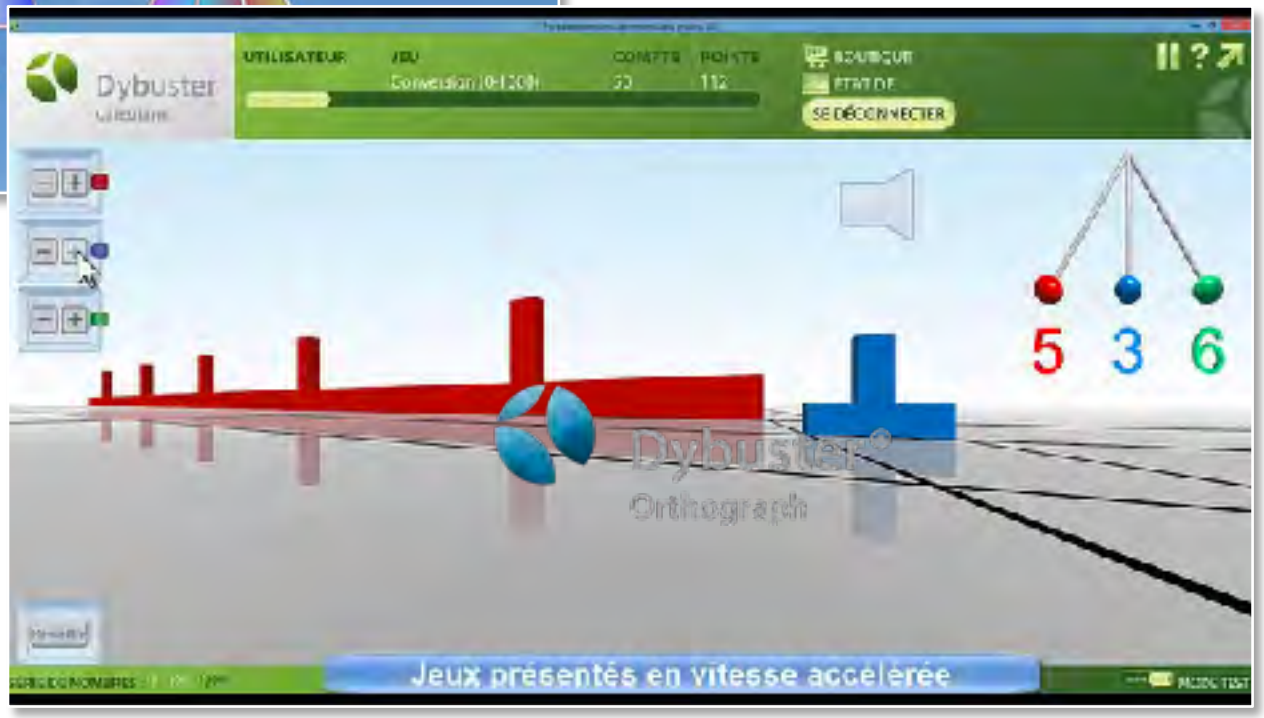
DRILL & PRACTICE

HappyNumbers.com

$72 + 16 = \square$



DRILL & PRACTICE

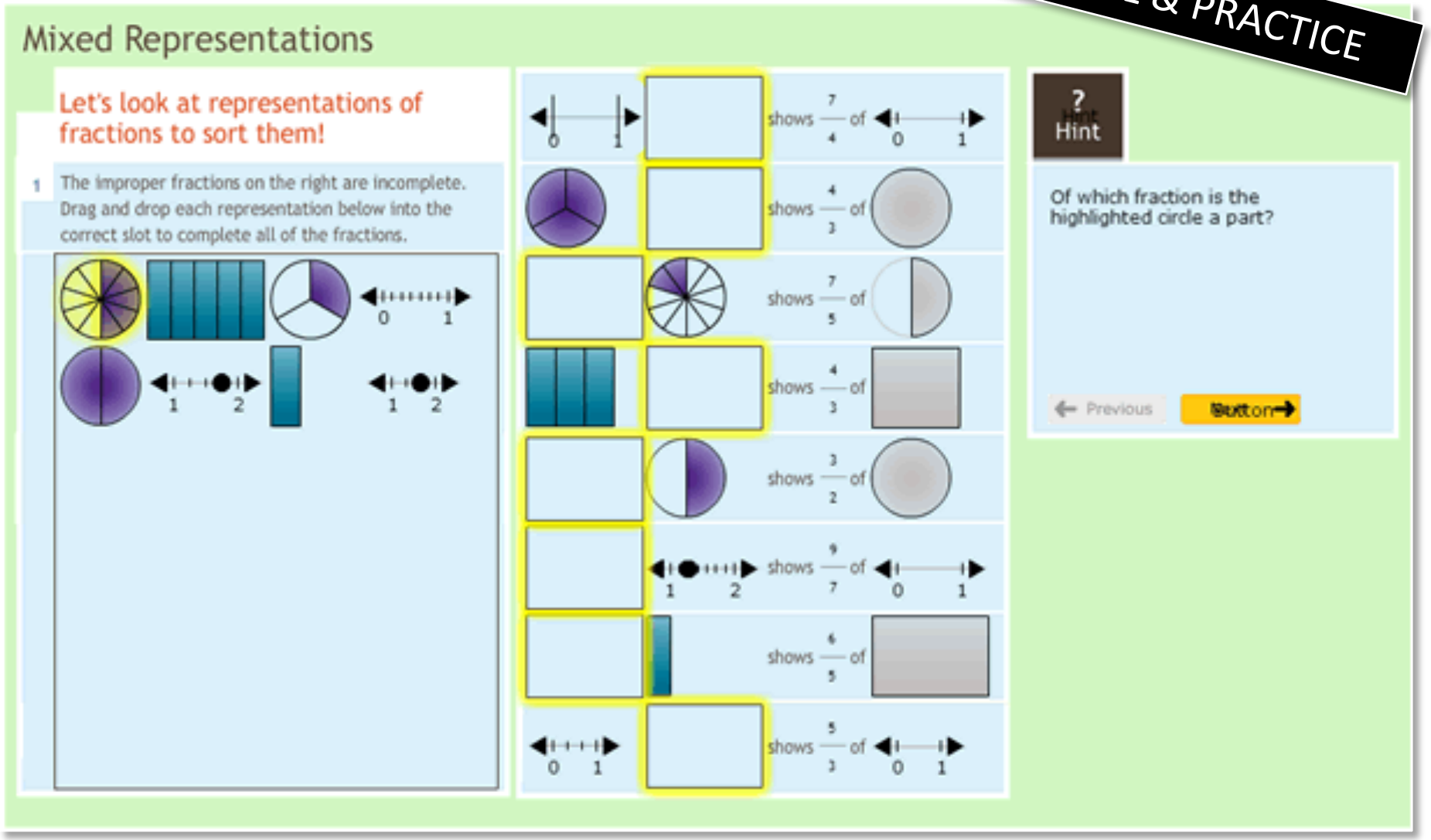


Dybuster®
Orthograph

https://vimeo.com/251725552

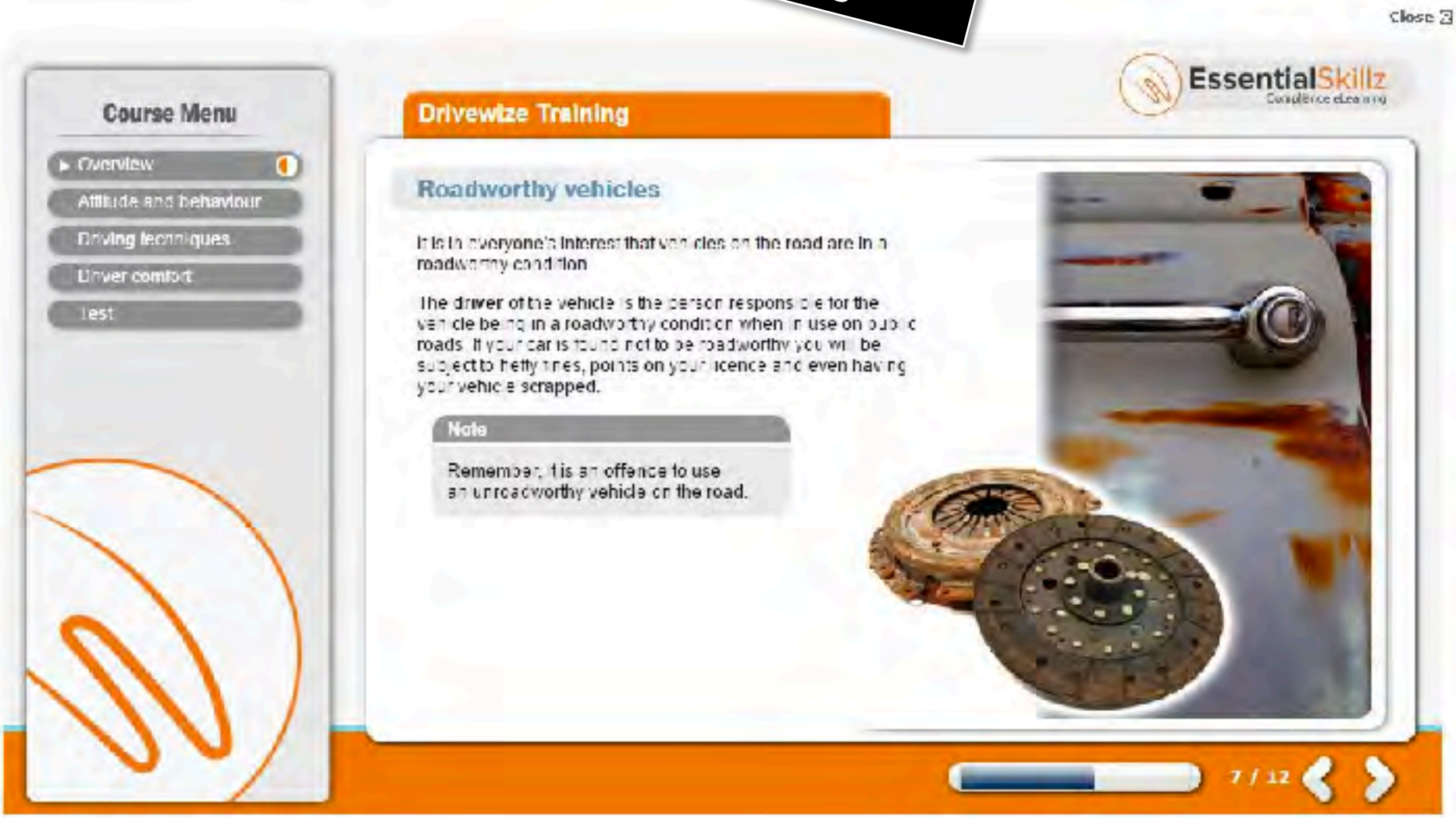
AI-enhanced math tutor

DRILL & PRACTICE



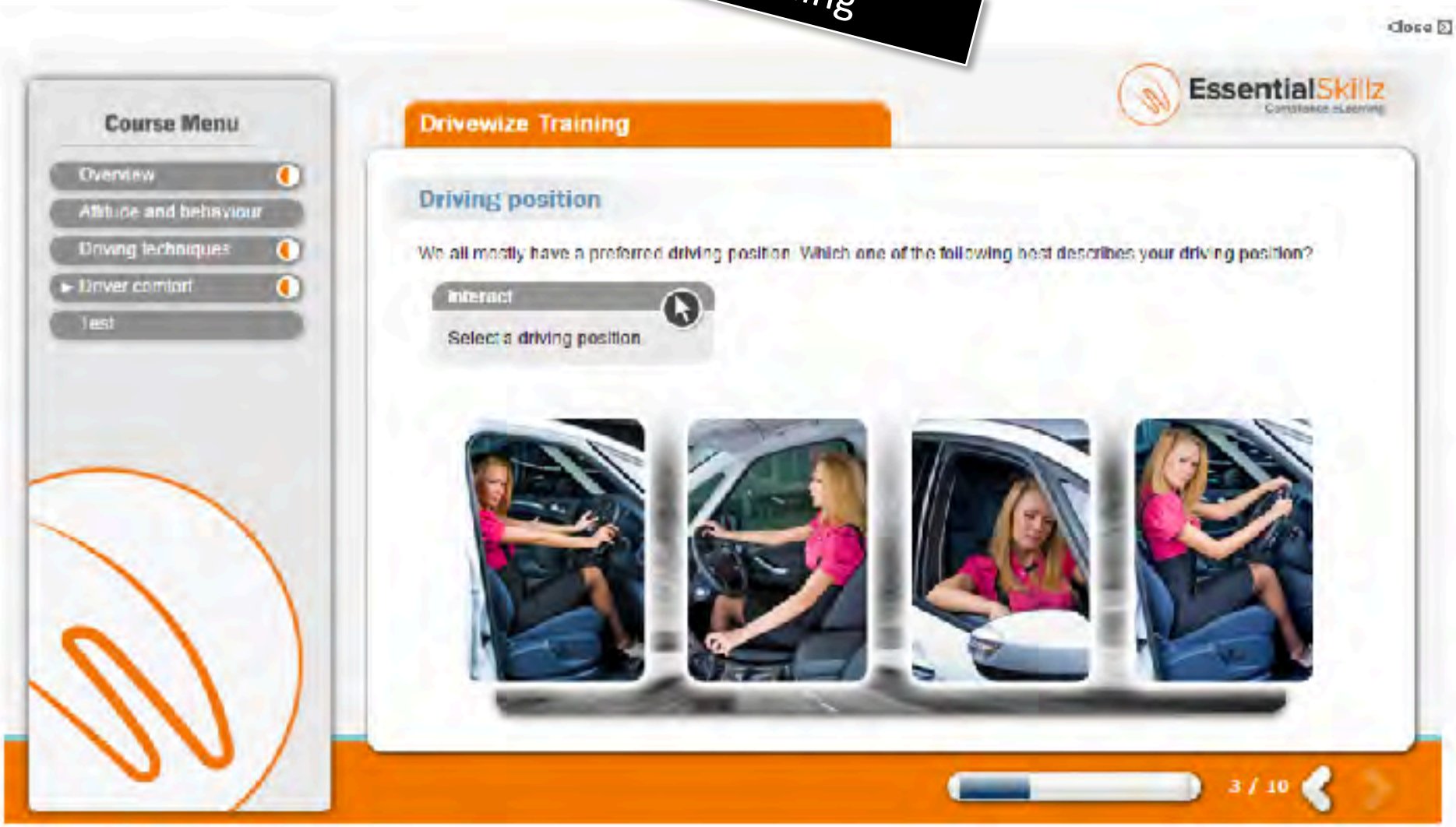
https://mathtutor.web.cmu.edu/alternate

e-Learning



https://www.essentialskillz.com/online-training/health-and-safety/driver-training-uk

e-Learning



https://www.essentialskillz.com/online-training/health-and-safety/driver-training-uk

e-Learning

https://blog.commlabindia.com/elearning-design/awareness-on-information-security

e-Learning

Je circule sur une route prioritaire :

OUI

NON

Je dois obligatoirement mettre le clignotant à droite :

OUI

NON

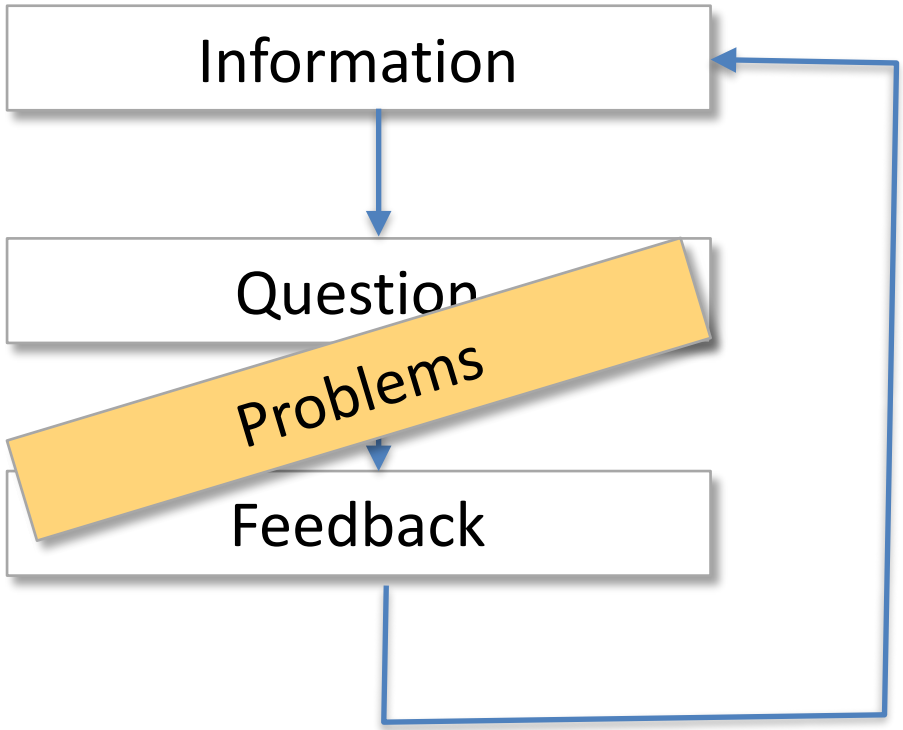
A

B

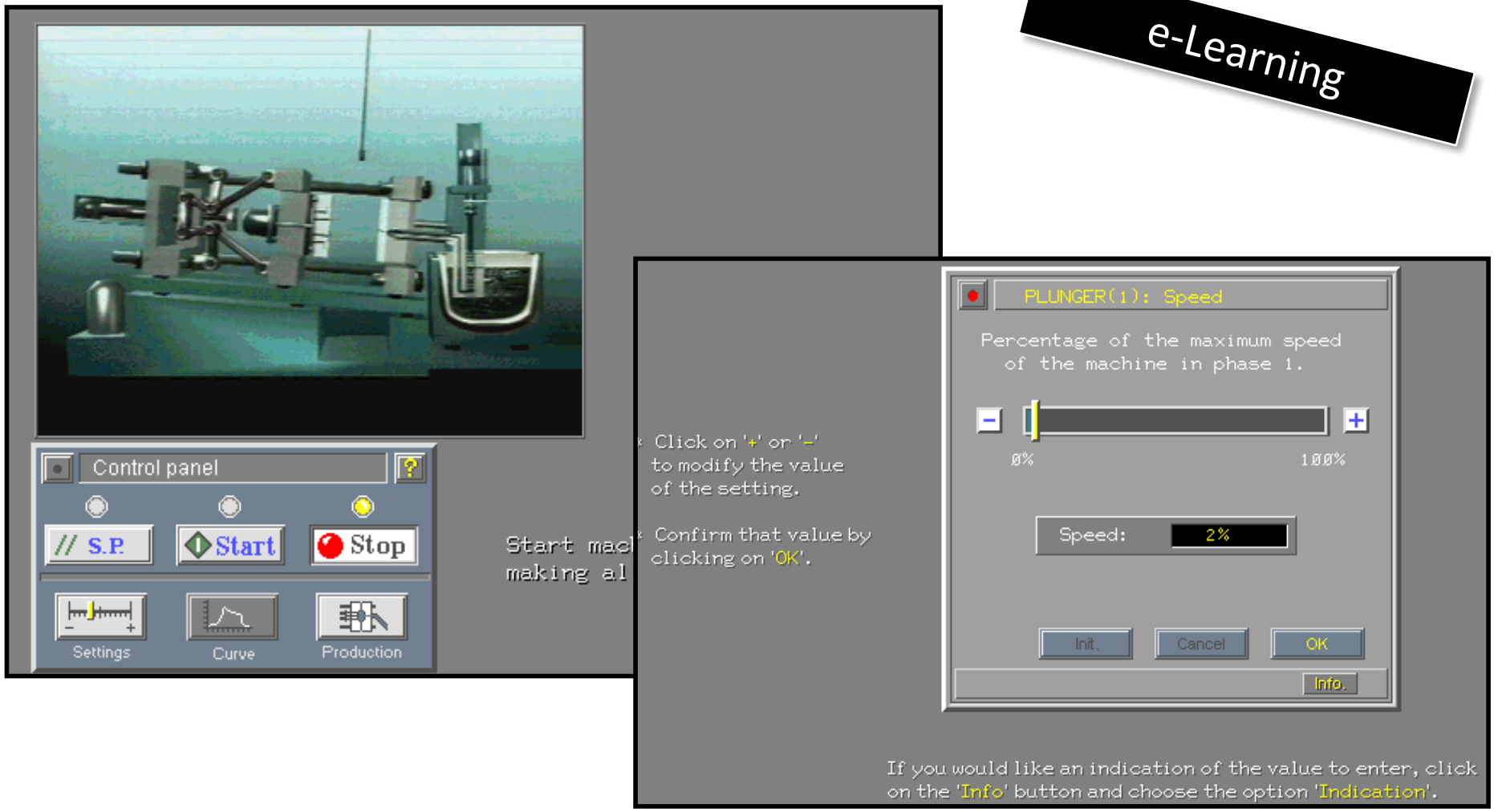
C

D

e-Learning



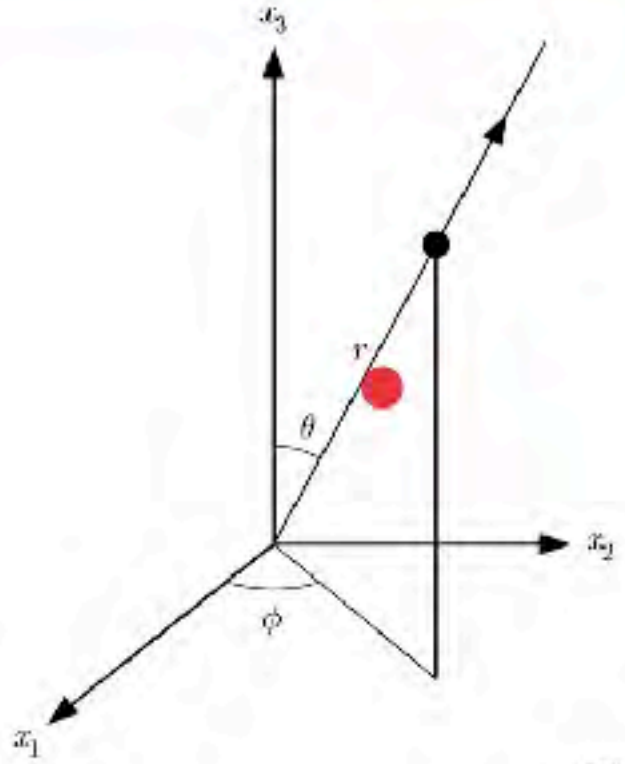
e-Learning



Le Zinc, UTE- UMH, Belgium, C. Depover

MOOCs

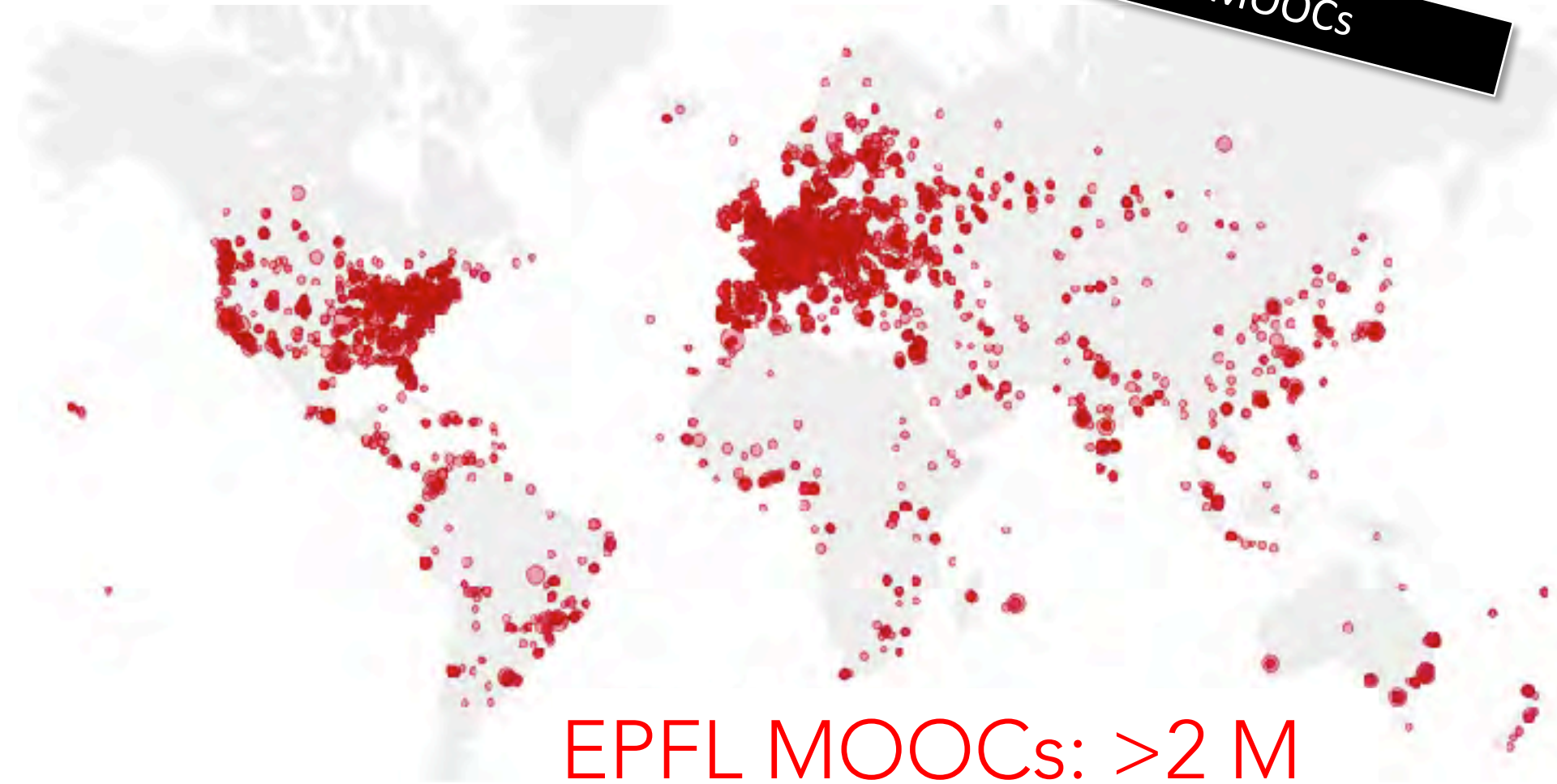
Définition : lignes de coordonnées (c. sphériq



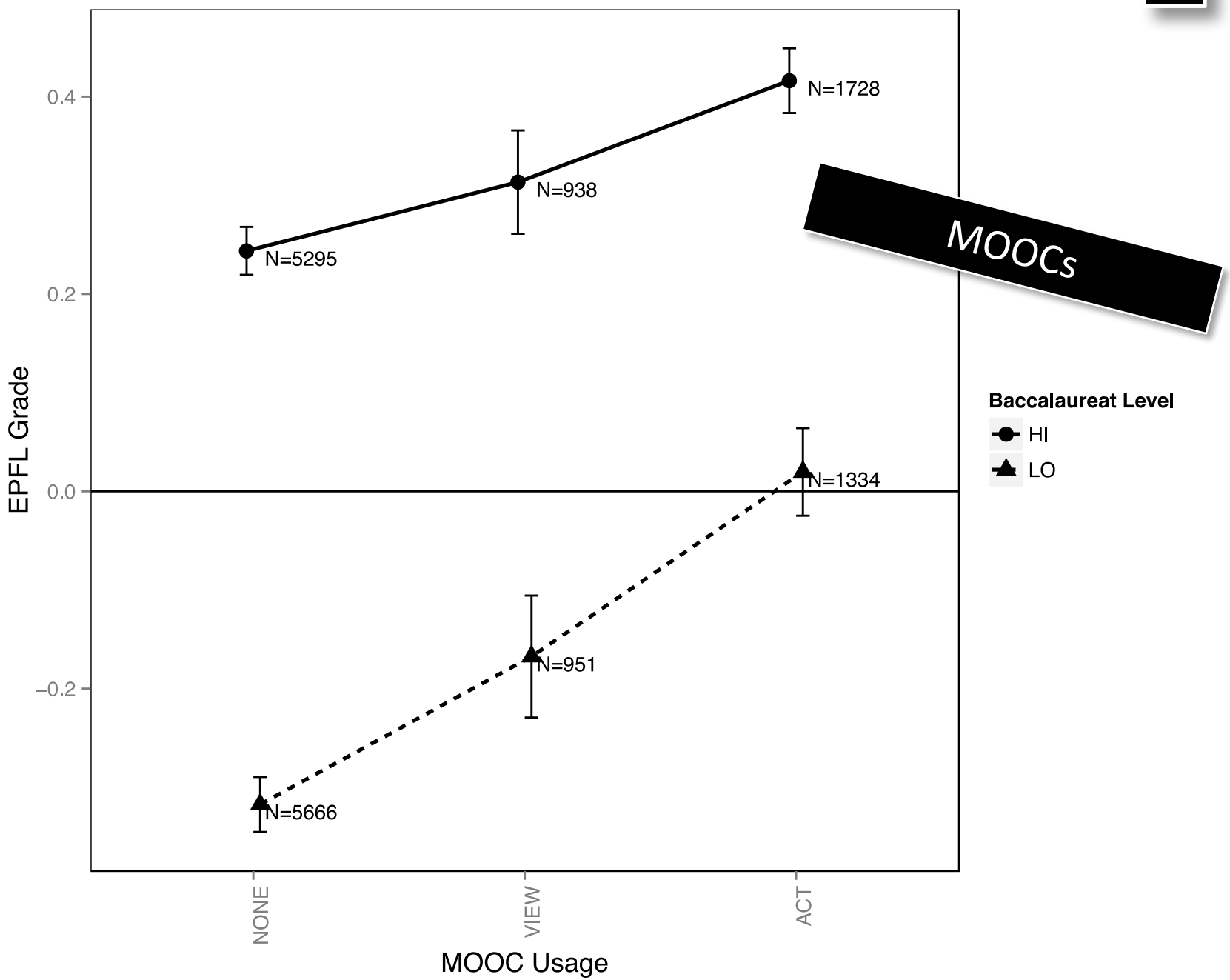
MOOCs

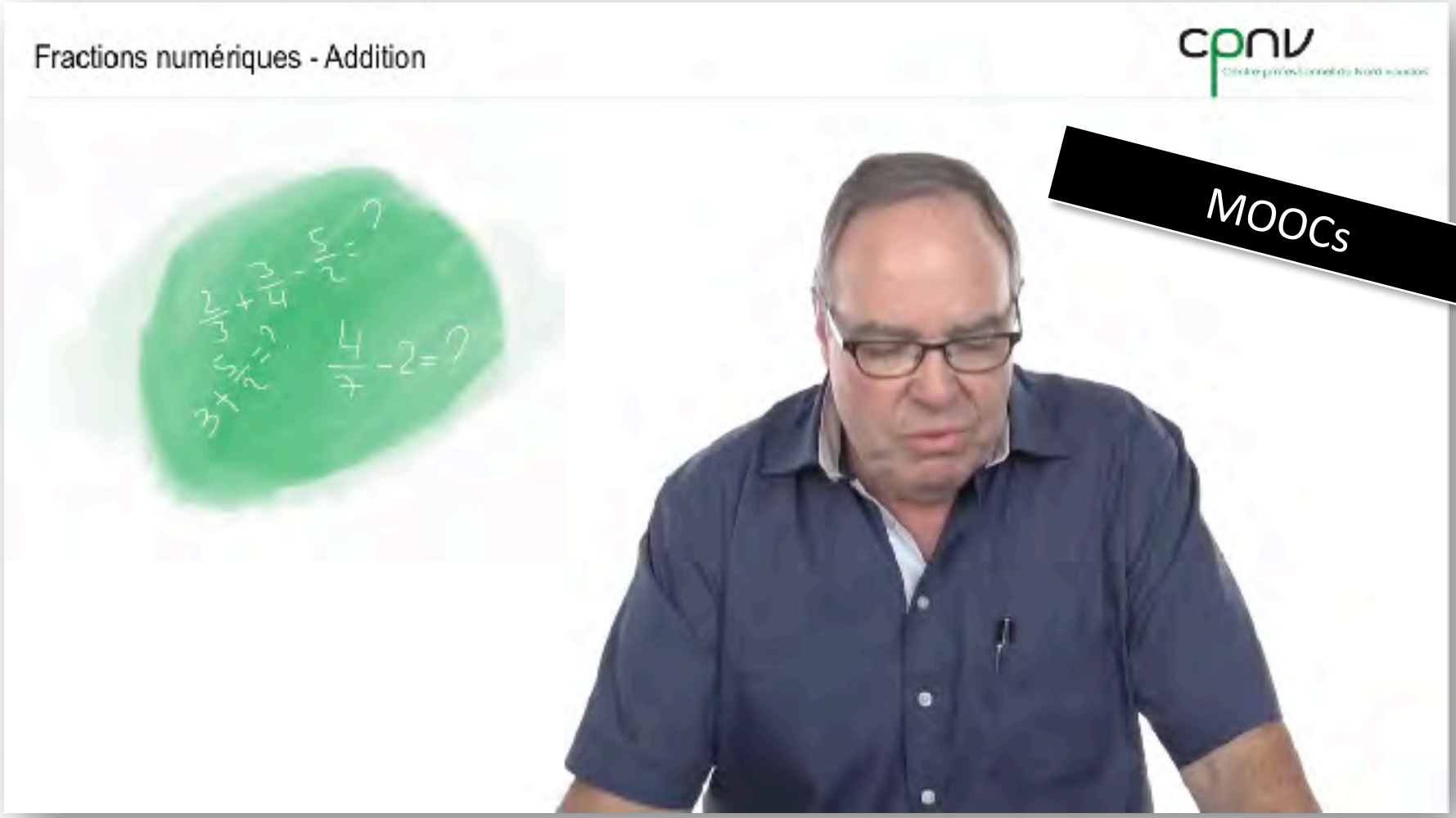
A5

MOOCs



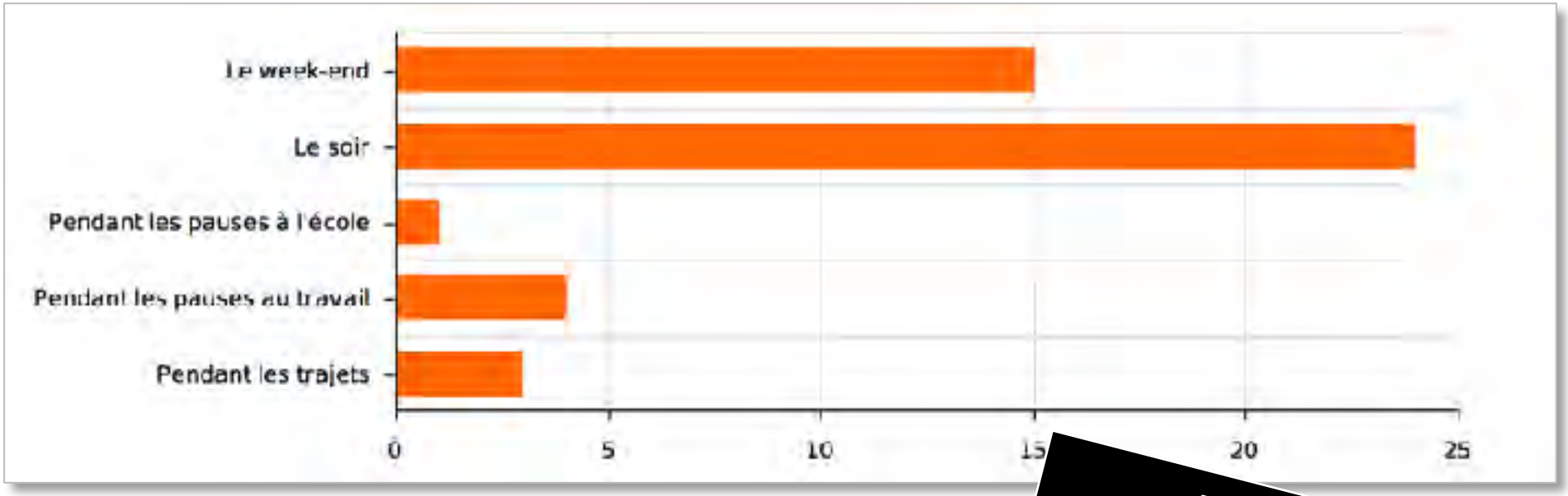
EPFL MOOCs: >2 M


MOOCs
EPFL Grade
0.4
0.2
0.0
−0.2
N=1728
N=938
N=5295
N=1334
N=951
N=5666
NONE
VIEW
ACT
MOOC Usage
Baccalaureat Level
HI
LO



Thierry Hugonnet, CPNV

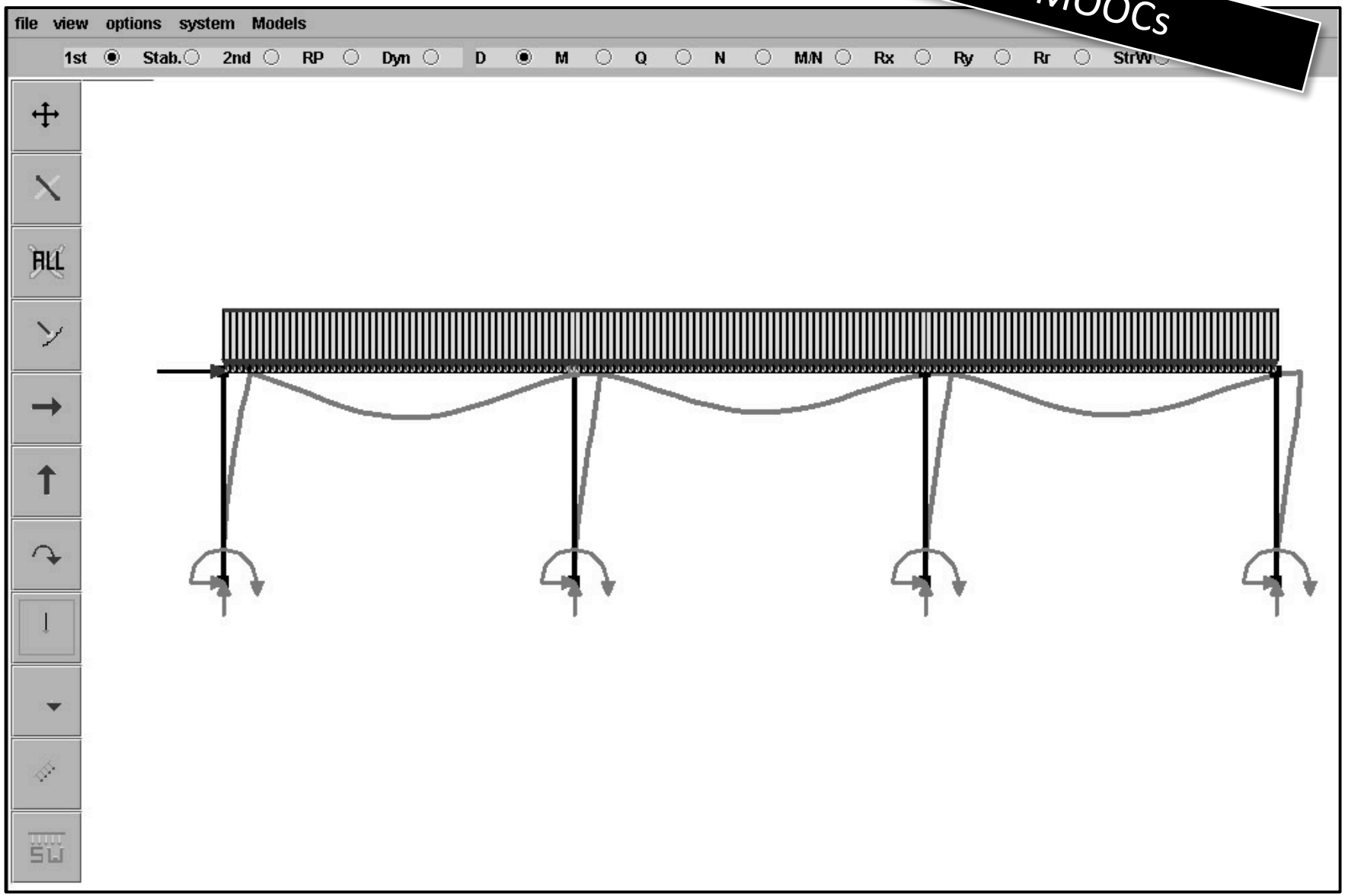
When did you look at your math videos ?



MOOCs

Statics (Muttoni & Burdet)

MOOCs

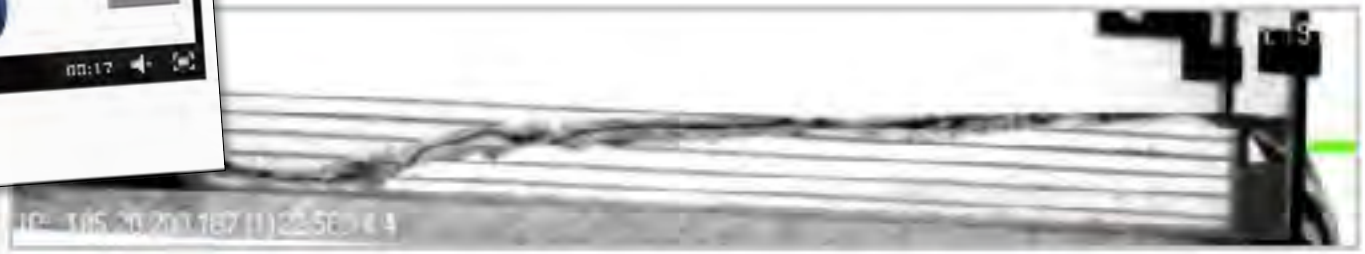


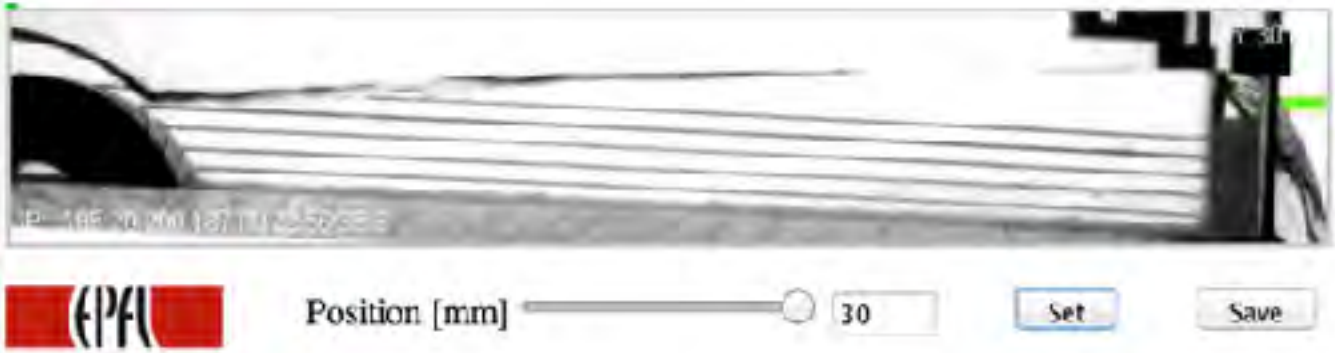
MOOCs


00:42
00:17
Teaser MOOC de Mécanique des Fluides
C. Arcoy, F. Gallaire et M. Farnoldi

edX

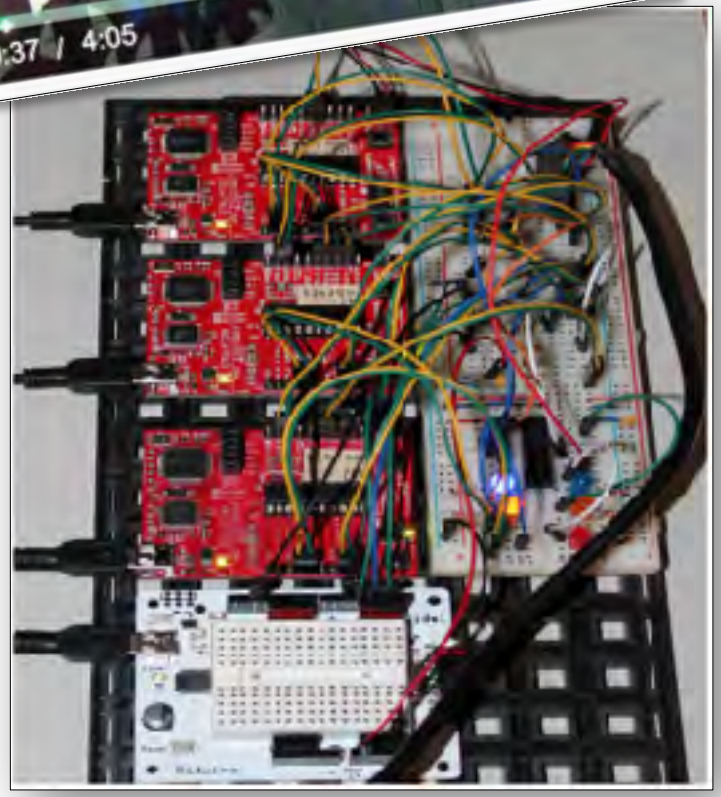

Position [mm]
13
Set
Save

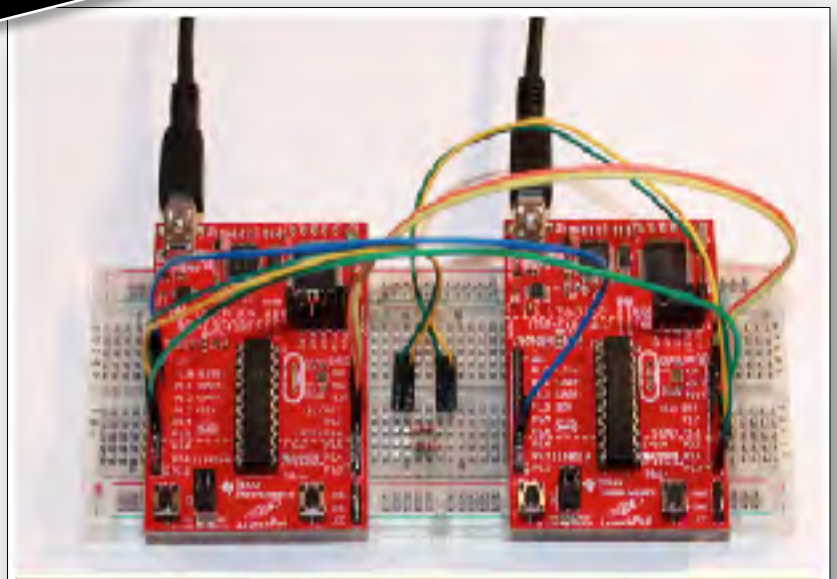

Position [mm]
19
Set
Save

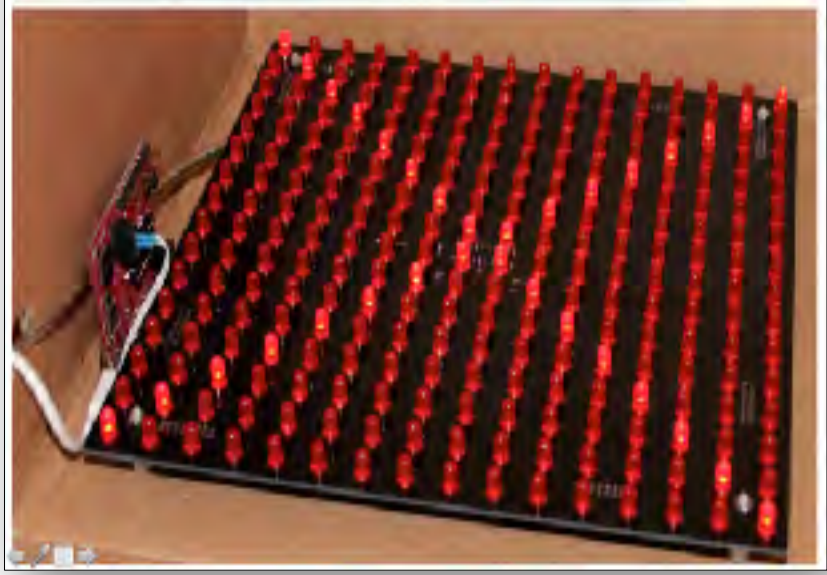

Position [mm]
30
Set
Save

A5

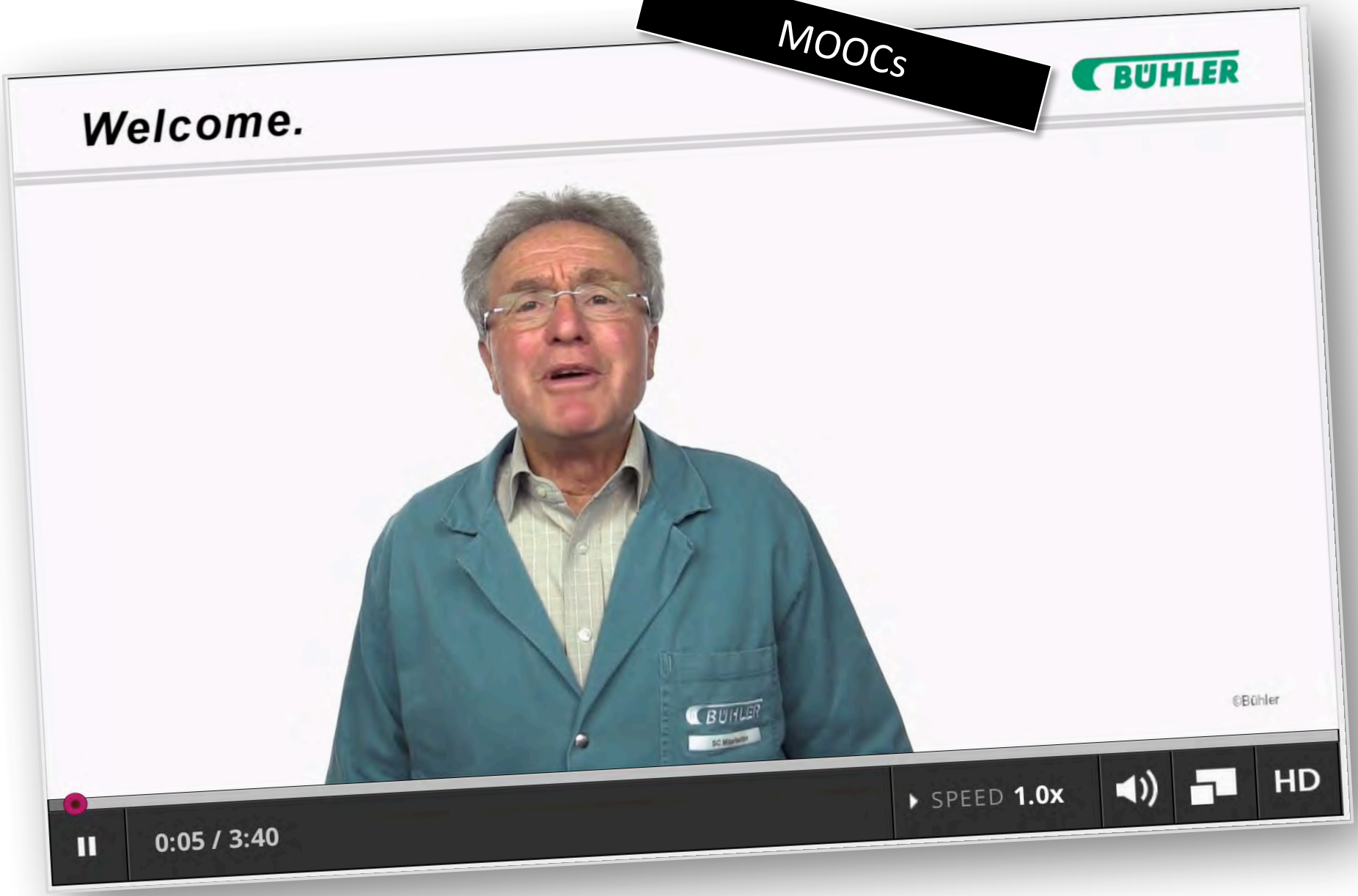
MOOCs



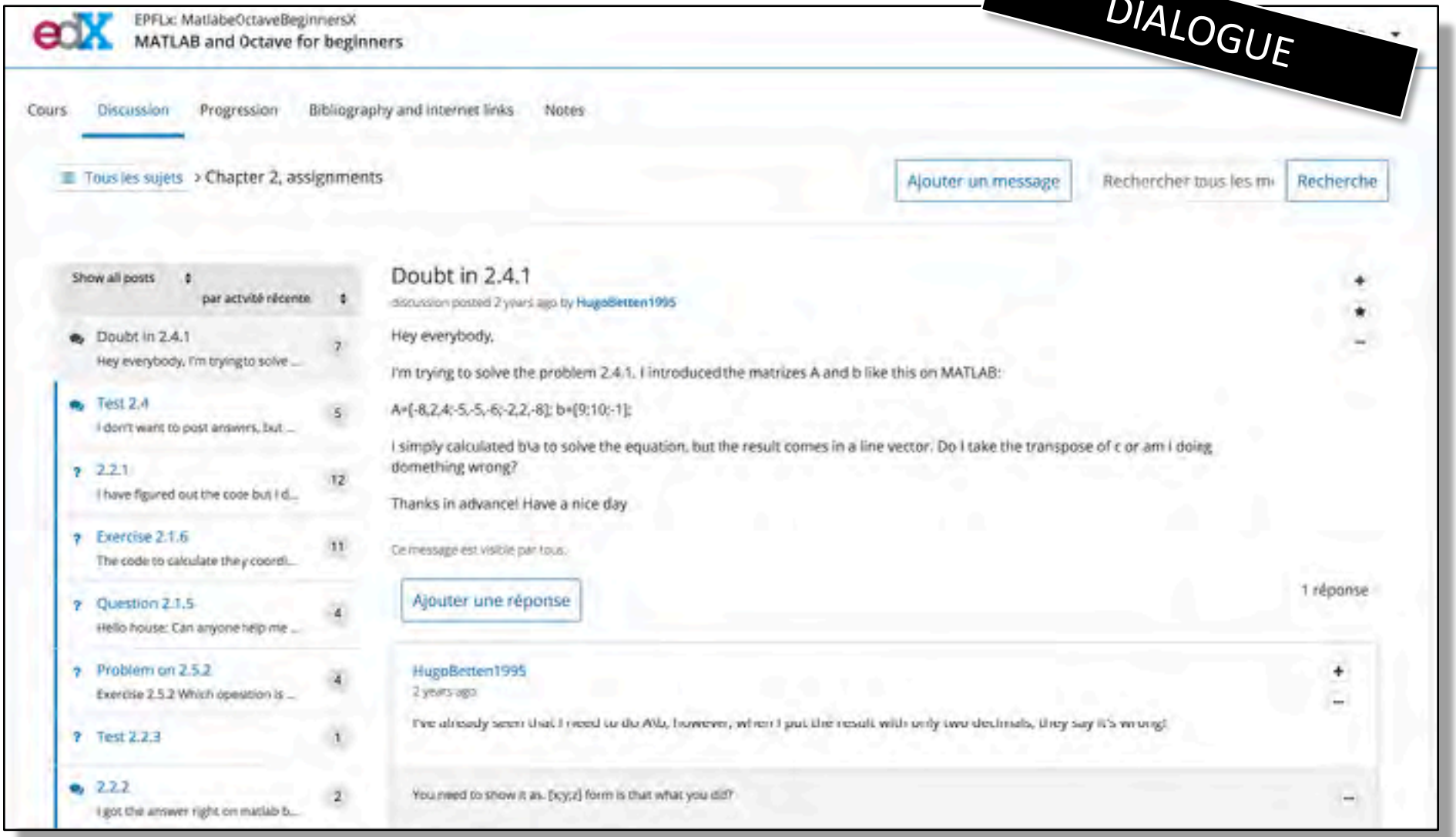




MOOCs



DIALOGUE



EPFLx: MatlabeOctaveBeginnersX
MATLAB and Octave for beginners

Cours | Discussion | Progression | Bibliography and internet links | Notes

Tous les sujets > Chapter 2, assignments

Ajouter un message | Rechercher tous les m | Recherche

Show all posts | par activité récente

- Doubt in 2.4.1 — Hey everybody, I'm trying to solve ... — 7
- Test 2.4 — I don't want to post answers, but ... — 5
- 2.2.1 — I have figured out the code but I d... — 12
- Exercise 2.1.6 — The code to calculate the y coordi... — 11
- Question 2.1.5 — Hello house: Can anyone help me ... — 4
- Problem on 2.5.2 — Exercise 2.5.2 Which operation is ... — 4
- Test 2.2.3 — 1
- 2.2.2 — I got the answer right on matlab b... — 2

Doubt in 2.4.1

discussion posted 2 years ago by HugoBetten1995

Hey everybody,

I'm trying to solve the problem 2.4.1. I introducedthe matrizes A and b like this on MATLAB:

A=[-8,2,4;-5,-5,-6;-2,2,-8]; b=[9;10;-1];

I simply calculated b\a to solve the equation, but the result comes in a line vector. Do I take the transpose of c or am I doieg domething wrong?

Thanks in advance! Have a nice day

Ce message est visible par tous.

Ajouter une réponse

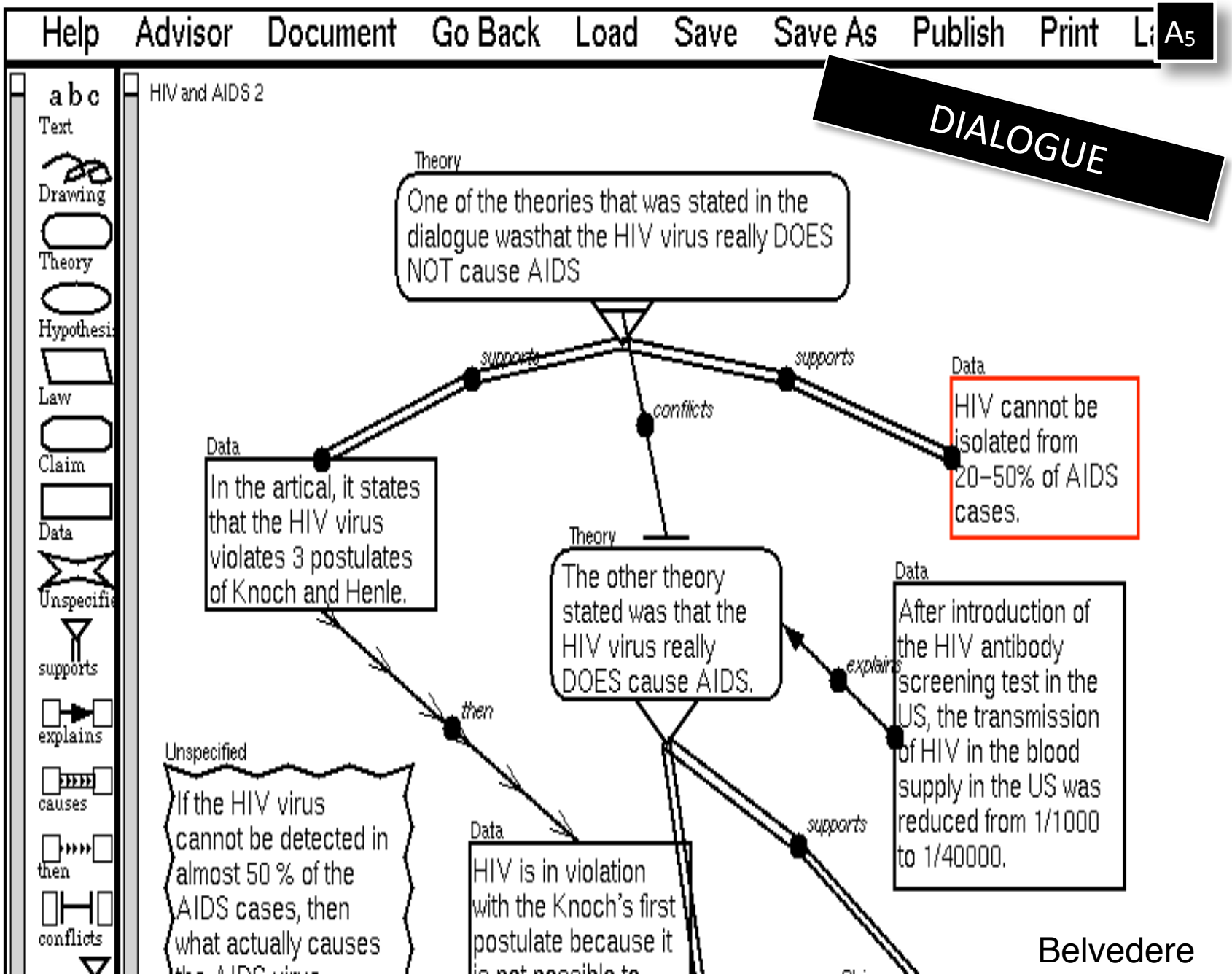
1 réponse

HugoBetten1995
2 years ago

I've already seen that I need to do A\b, however, when I put the result with only two decimals, they say it's wrong!

You need to show it as. [x;y;z] form is that what you did?

DIALOGUE



Belvedere


DIALOGUE
M. Nussbaum, UC Chile

A5

MICROWORLD

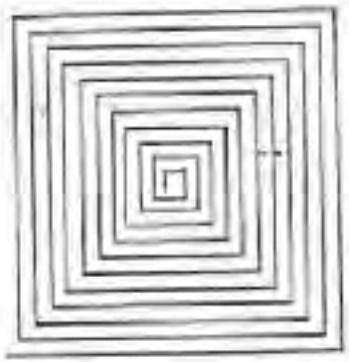
7. Draw Spirals

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.

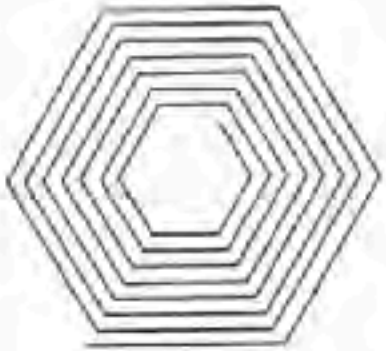
```
TO POLY :STEP :ANGLE
1  FORWARD :STEP
2  LEFT :ANGLE
3  POLY :STEP :ANGLE
END
```

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

POLYSPI 5 90



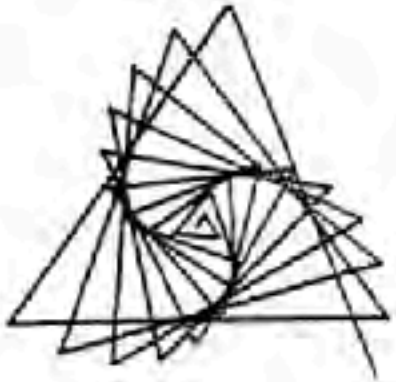
POLYSPI 40 60



POLYSPI 6 120

POLYSPI 5 121

POLYSPI 6 125



Papert, S. & Solomon, C. (1971, Twenty with a computer, AI Memo 248, MIT

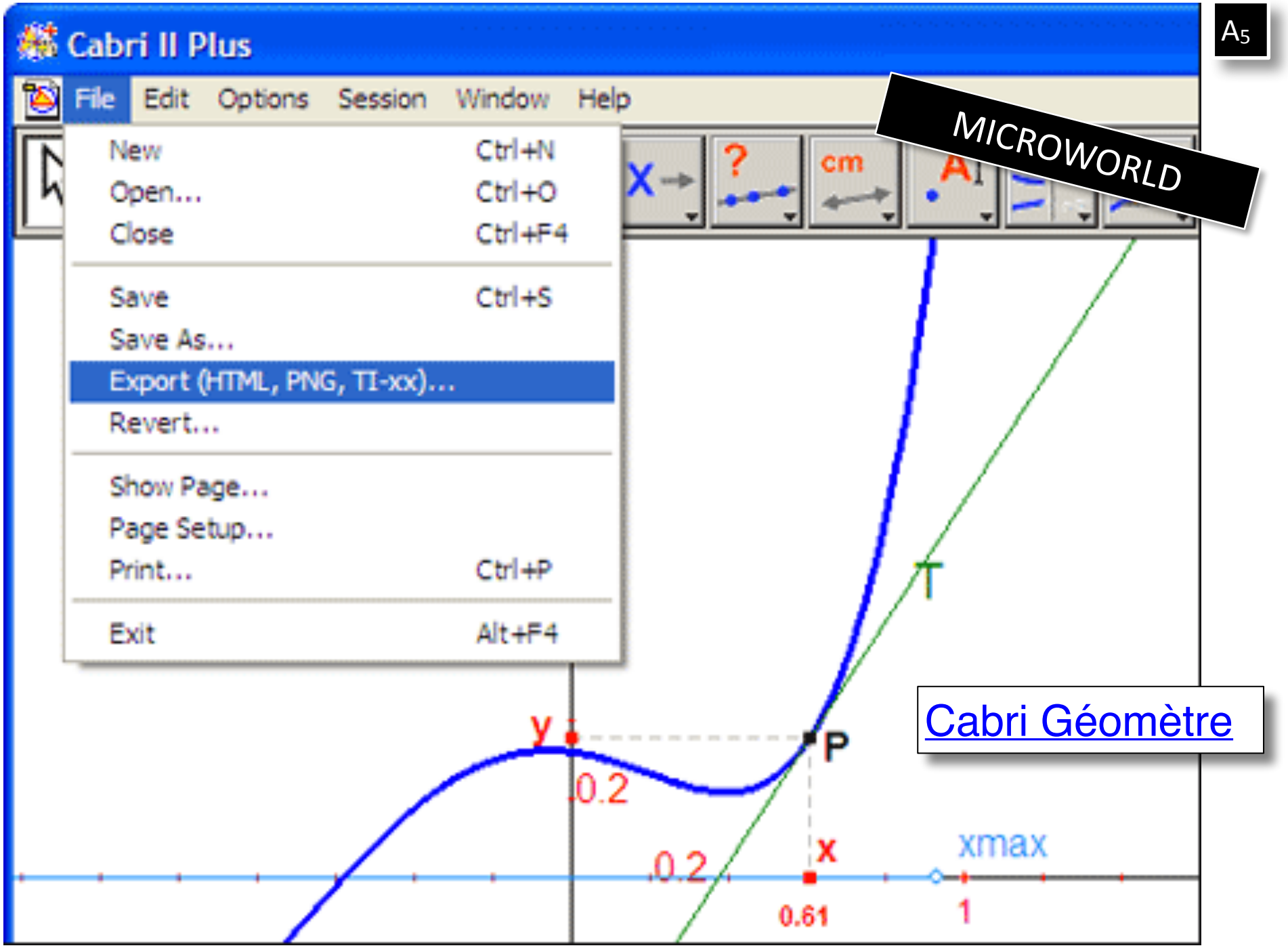
thymio

MICROWORLD

A5

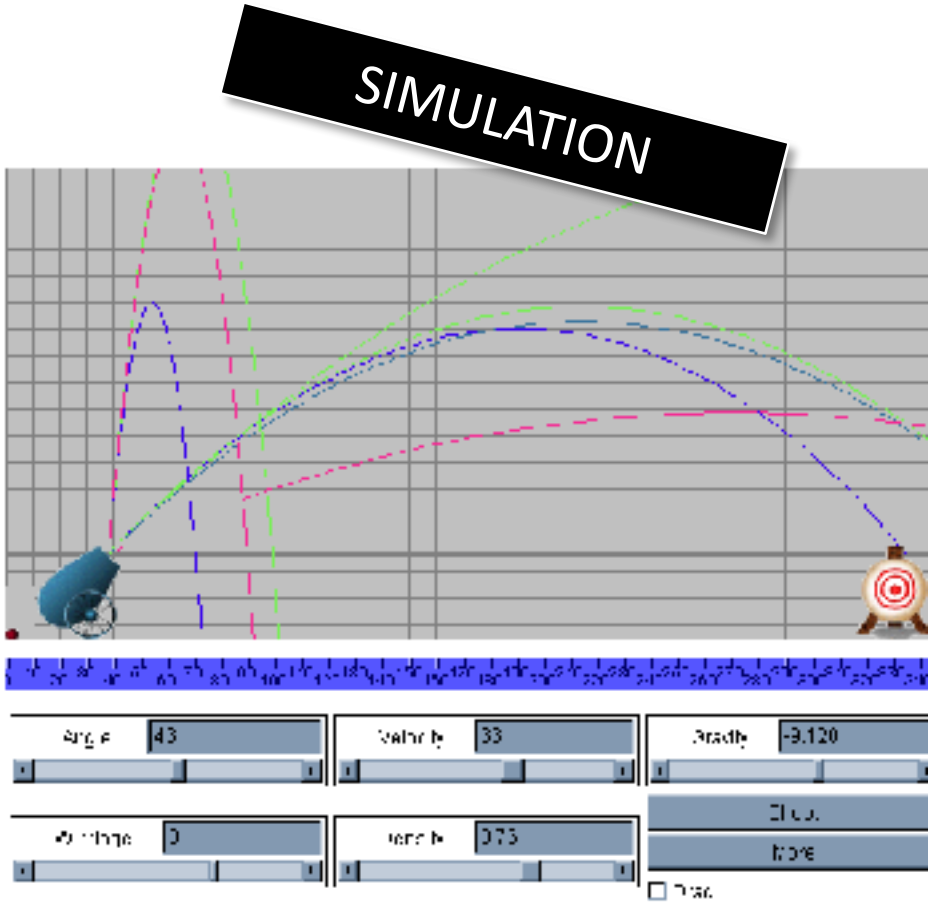
MICROWORLD

MINECRAFT



[Cabri Géomètre]

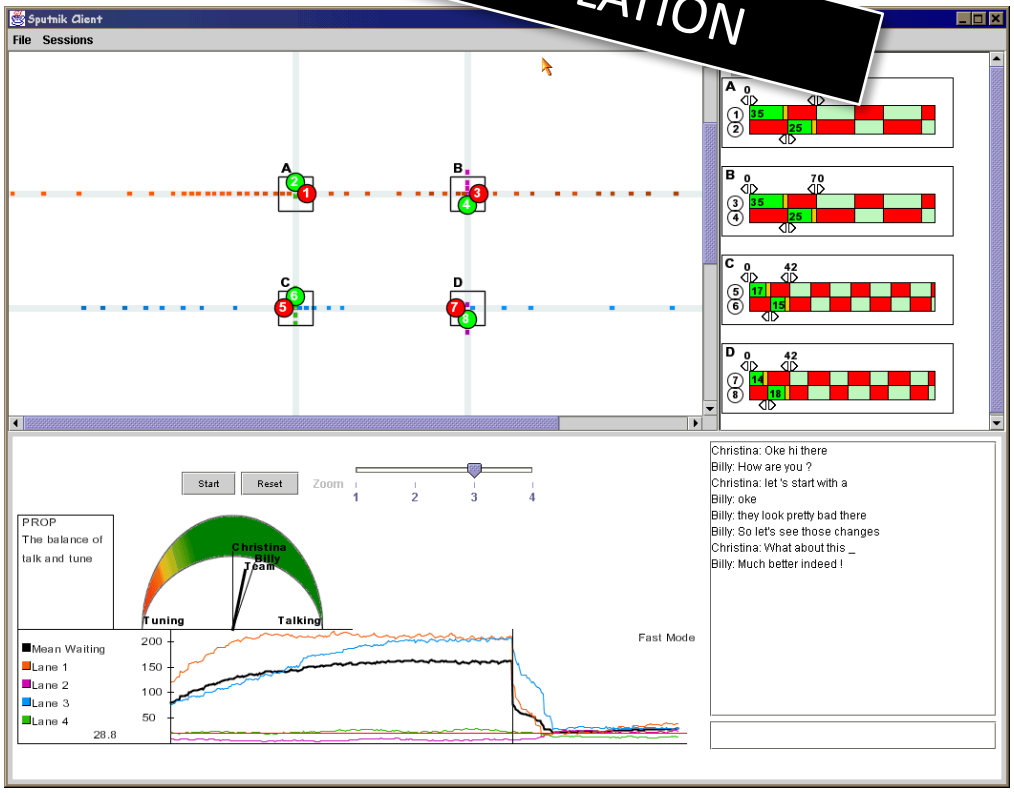
Acquire Skills



Discover underlying model

SIMULATION

Acquire Skills



Discover underlying model

AR/VR

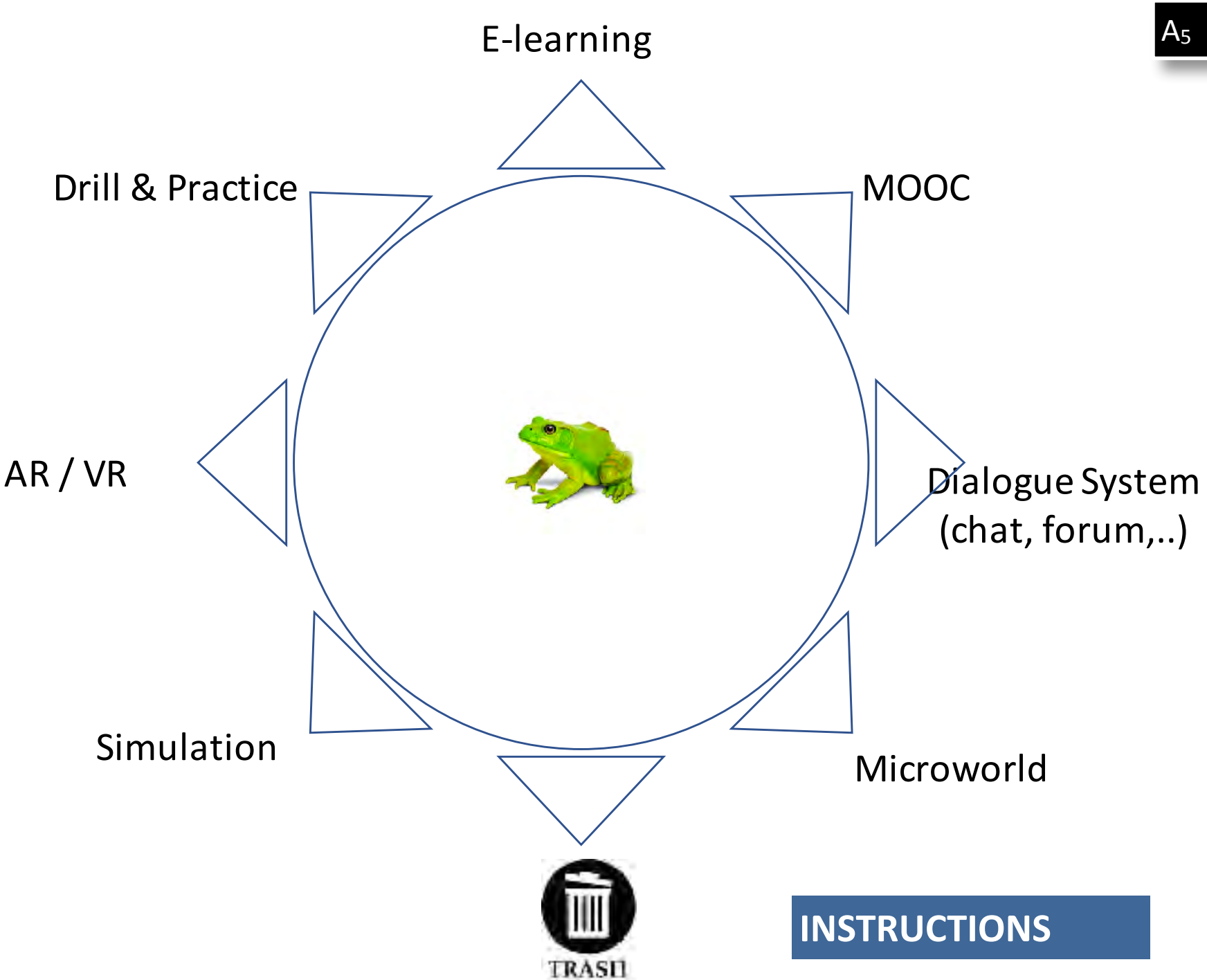
Simpliquity

AR/VR

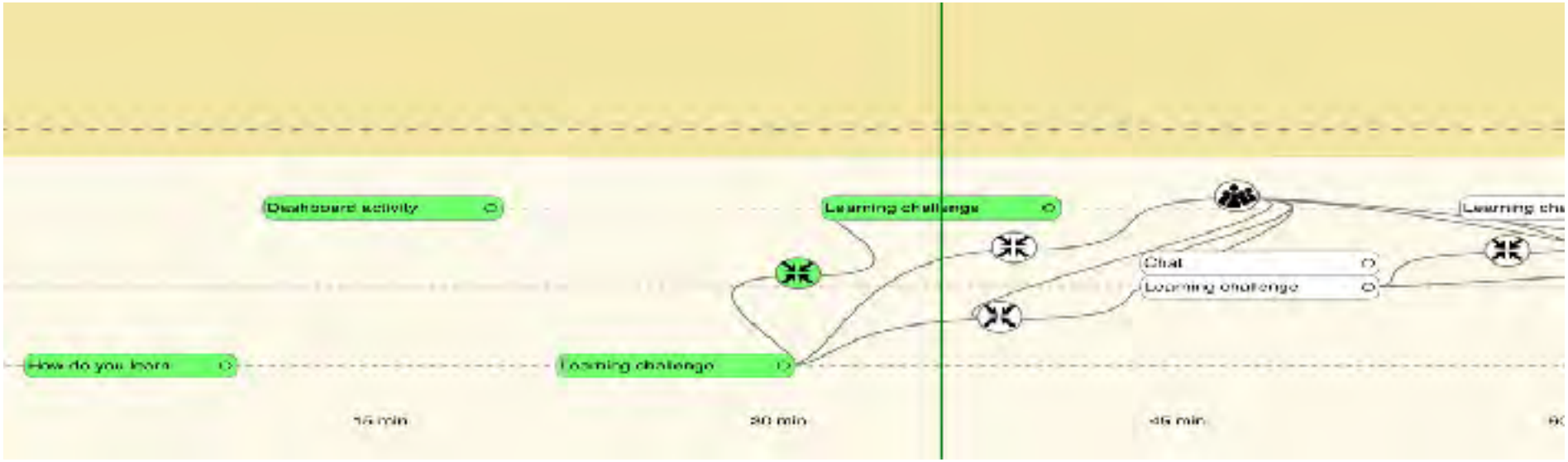
A5

AR/VR

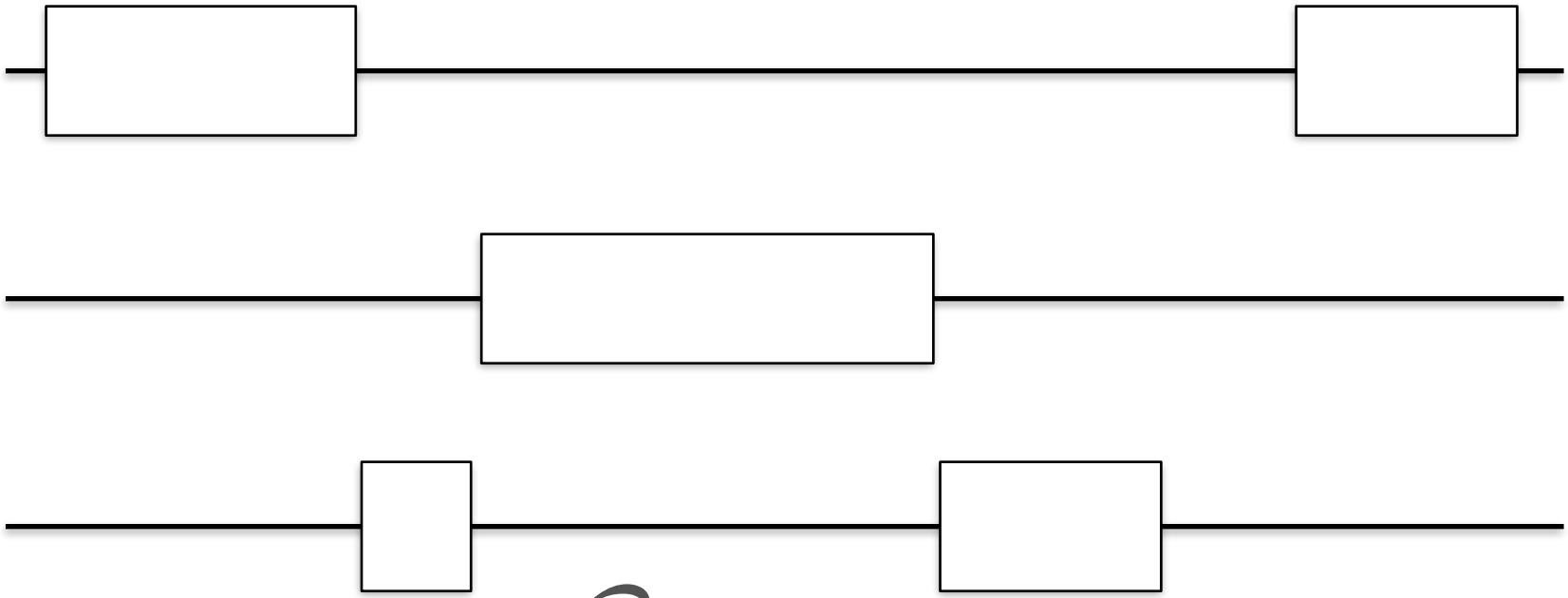
A5



INSTRUCTIONS


Dashboard activity
Learning challenge
Chat
Learning challenge
How do you learn
Learning challenge
15 min
30 min
45 min

TODAY



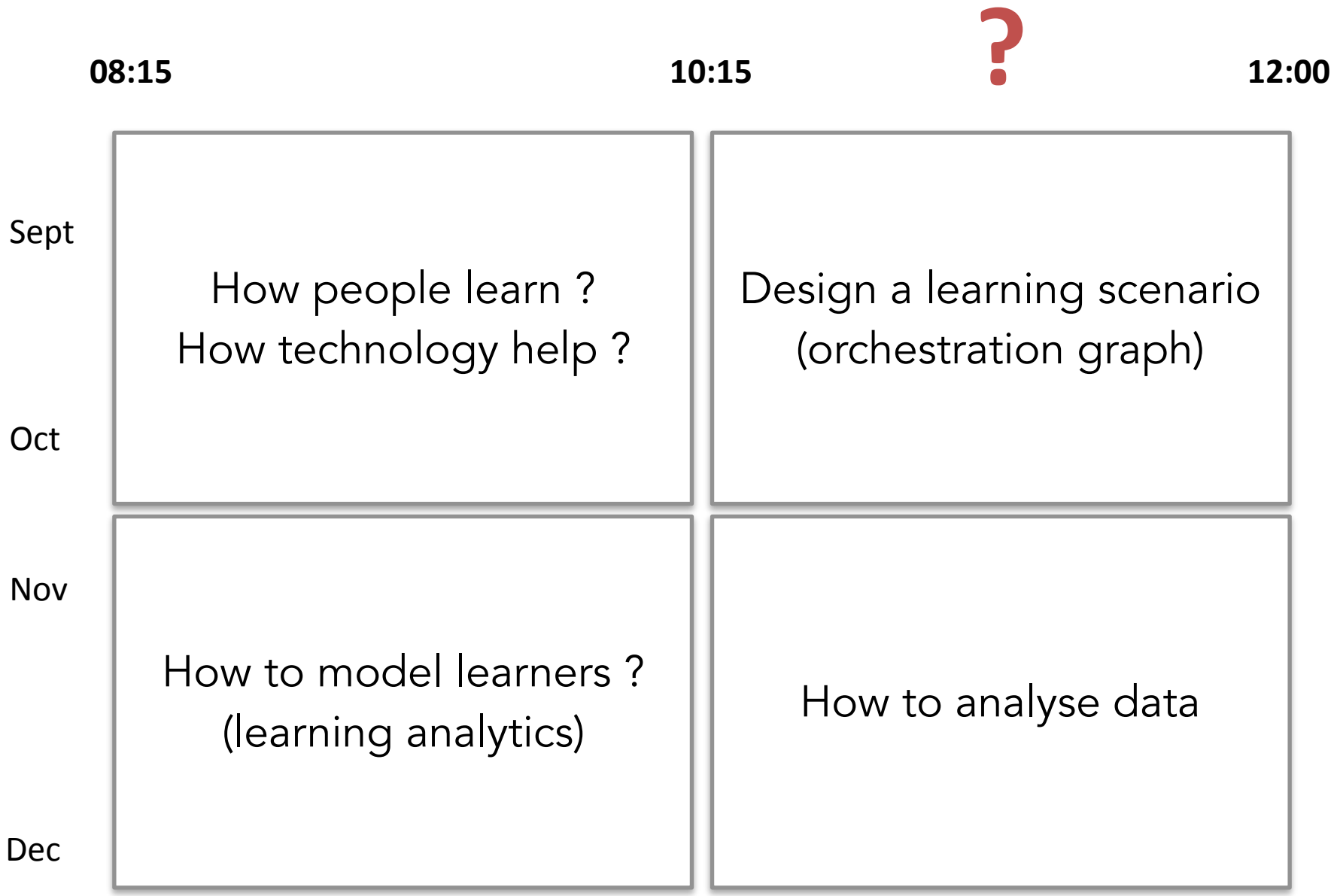
Orchestration Graphs

CS 411 Project

1. Make team of 3
2. Pick to topic
3. Decompose it
4. Design an orchestration graph
5. Implement it on FROG
6. Run experiments
7. Analyse data
8. Write a report

Last Year Projects

1. Sorting algorithms
2. Supervised VS Unsupervised learning
3. Shape of letters
4. Modular origami
5. Reading a music partition
6. Chess Moves
7. First Aid
8. Morse Code


08:15
10:15
?
12:00
Sept
Oct
Nov
Dec
How people learn ?
How technology help ?
Design a learning scenario
(orchestration graph)
How to model learners ?
(learning analytics)
How to analyse data

	08:15 ➔ 10:00 Course	10:15 ➔ 12:00 Project
18/09	CH 1. Introduction to CS-411 (OG-11) CH 2. Introduction to Learning Sciences	Introduction to FROG, S. Haklev Implement Graph-01. ➔ 21.09 **Form project teams ➔ 24.09**
25/09	CH 3: Mastery Learning (OG13 and 14)	Feedback on Graph-01 S. Haklev, J. Olsen Implement Graph-02. ➔ 28.09 **Select project topic ➔ 01.10**
02/10	CH 4: Task Analysis	Feedback on Graph-02, S. Haklev, J. Olsen Task analysis
09/10	CH 5: Social Learning (OG15)	Project . S. Haklev, J. Olsen & L. Faucon 11:00 Visit of the MOOC studio (1/2 class)
16/10	CH 6: Discovery Learning (OG16)	Project. S. Haklev, J. Olsen & L. Faucon 11:00 Visit of the MOOC studio (1/2 class)
23/10	CH 7: Graph Edges CH 8: Graph Operators	Project. S. Haklev, J. Olsen & L. Faucon ***Milestone1: Project Design ➔ 26.10***
30/10	CH 8: Designing experiments	Project . S. Haklev, J. Olsen & L. Faucon
06/11	CH 9: Learning Modelling *Running Experiments*	Introduction to statistics (R & Jupiter Notebook) *P. Jermann, L. Faucon*
13/11	CH 10: Bayesian Knowledge Tracing J. Olsen *Running Experiments*	Introduction to statistics (R & Jupiter Notebook) *P. Jermann, L. Faucon*
20/11	CH 11: Advances in learning Analytics J. Olsen & P. Dillenbourg *Running Experiments*	Introduction to statistics (R & Jupiter Notebook) *P. Jermann, L. Faucon*
27/11	CH 12: Campus Analytics, *P. Jermann* *Running Experiments*	Data Analysis *P. Jermann, L. Faucon*
04/12	CH13: Corporate Learning *08:15 P. Dubuc, OpenClassrooms* *09:00 J.-M. Tasseto, CoorpAcademy.*	Data Analysis *P. Jermann, L. Faucon*
11/12	*Open Slot*	Data Analysis *P. Jermann, L. Faucon*
18/12	Project presentation by each team	Finalising report

Confusion

Ed'Tech
Methods & Tools

1

2

Digital **Skills**
Goals

Data Sciences
of educational

3

for the governance
systems

EPFL
Innovation Park

digitalswitzerland

SWISS

swisscom

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

CVCI
CHAMBRE VAUDOISE DU COMMERCE ET DE L'INDUSTRIE

EdTech Collider

A7

FONDATION HENRIMOSER

JACOBS FOUNDATION
Our Promise to Youth

TOTALYMAGE

we are play lab

coorpacademy

Dybuster

Klewel
the webcasting company

GOODWALL

NEOCOSMO

PocketCampus

Calerga

LANTERA solutions

LEARNING SEVEN

MATHRIX

mobsya

better study

EKSTRA REALITY

LANTERA solutions

GalliLearn

MOBILETIC.COM

headswap

tthf media

UbiSim

taskbase

EPFL EXTENSION SCHOOL

bulbee
Swipe to learn.

GRAASP

IDEAO

Happy Numbers

Rosie

LABSTER

lillup
lead your life

Simpliquity

SpeakUP

SLX
Swiss Learning Exchange

InnovaKids

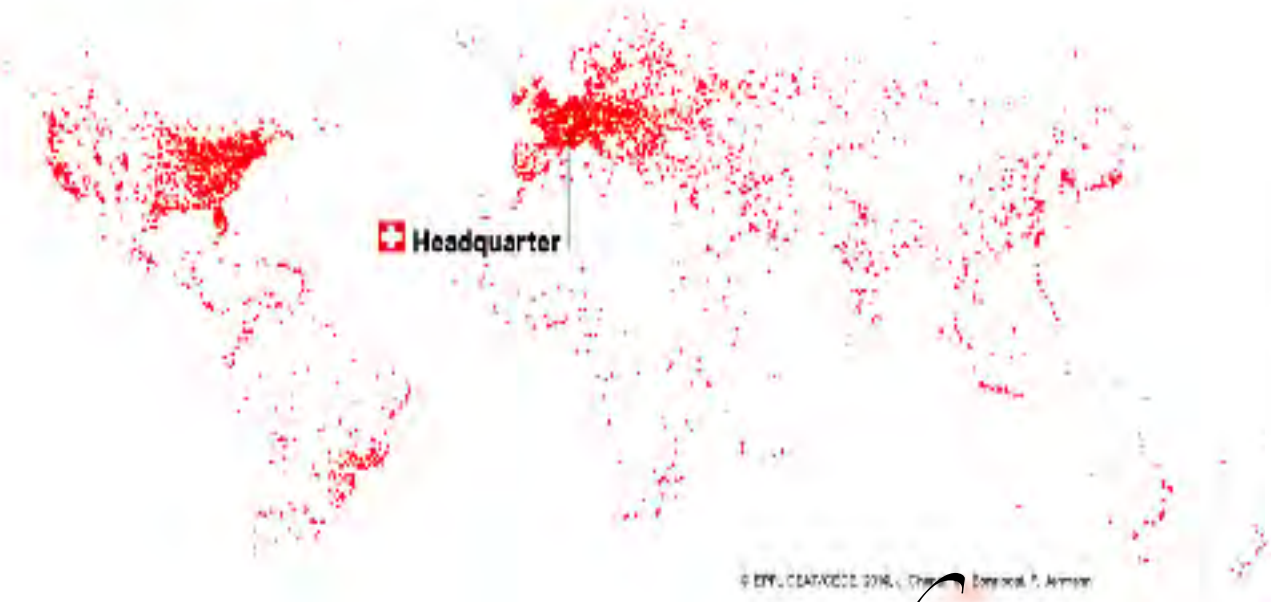
educabay

Test We.

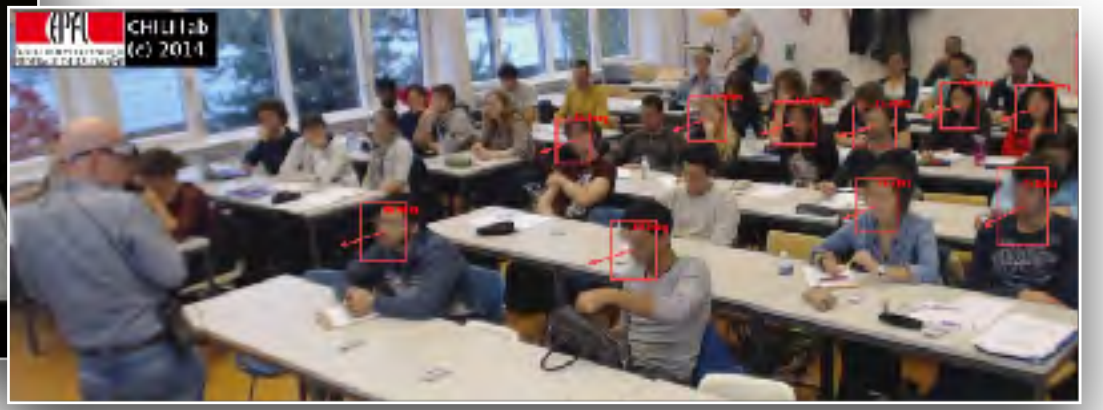
ayaru

Little Vista

LEDsafari



EPFL Center for Learning Sciences



Who has taken a ML class ?

Who is taking a ML class ?

CS 411

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