

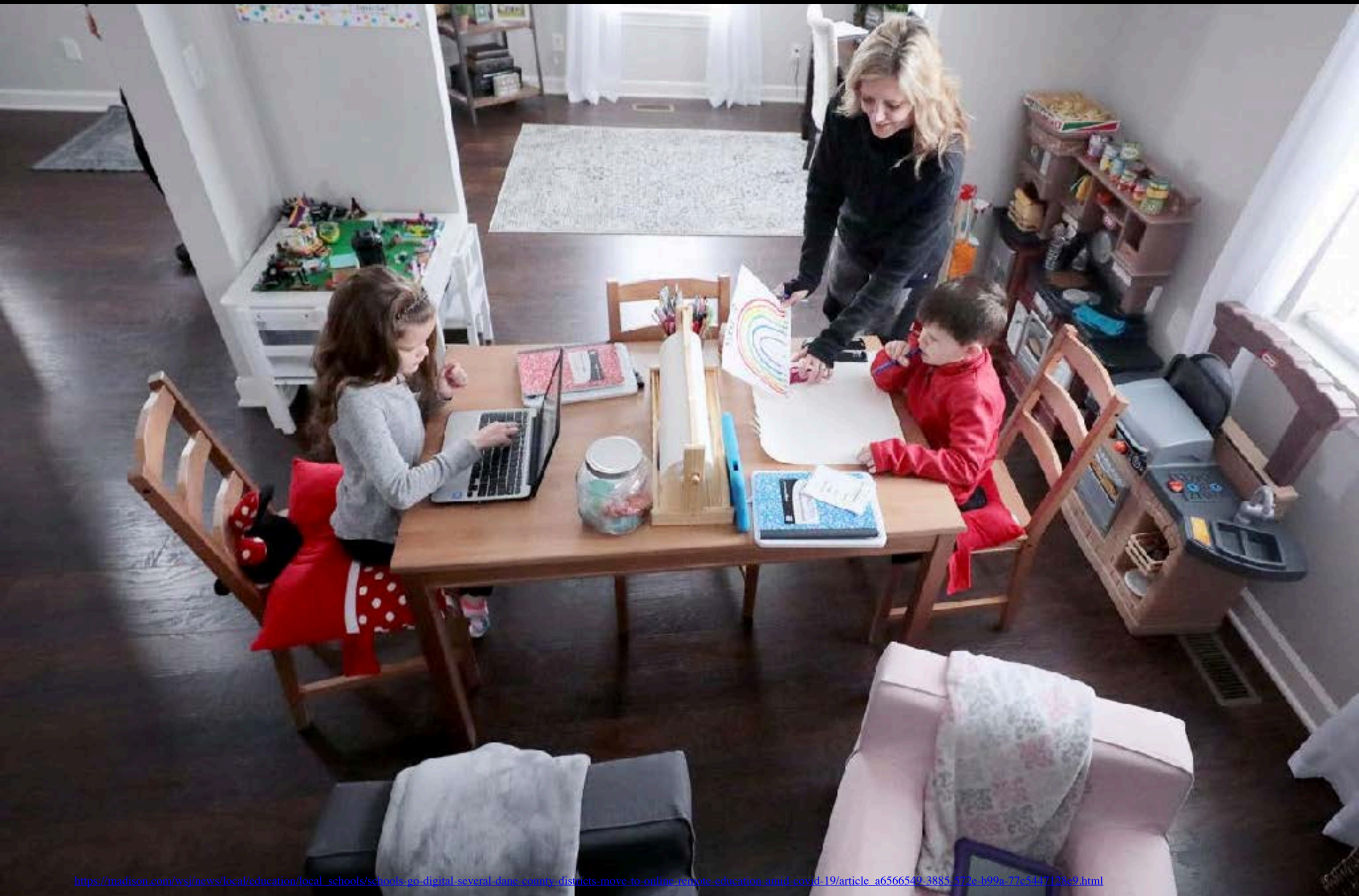


Classware





14:00 or 17:00 ?

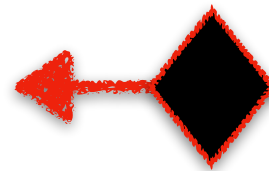


Weekly schedule

Name: _____

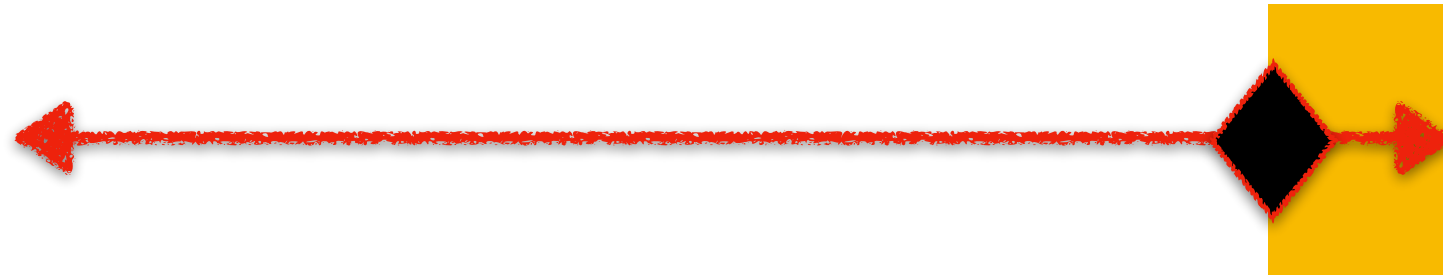
Time / period	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
08:00		School					Home School		
	Home School								
		School			School				
16:00				Home School			Home School		
		Home School			Home School				

in Class



Online

in Class



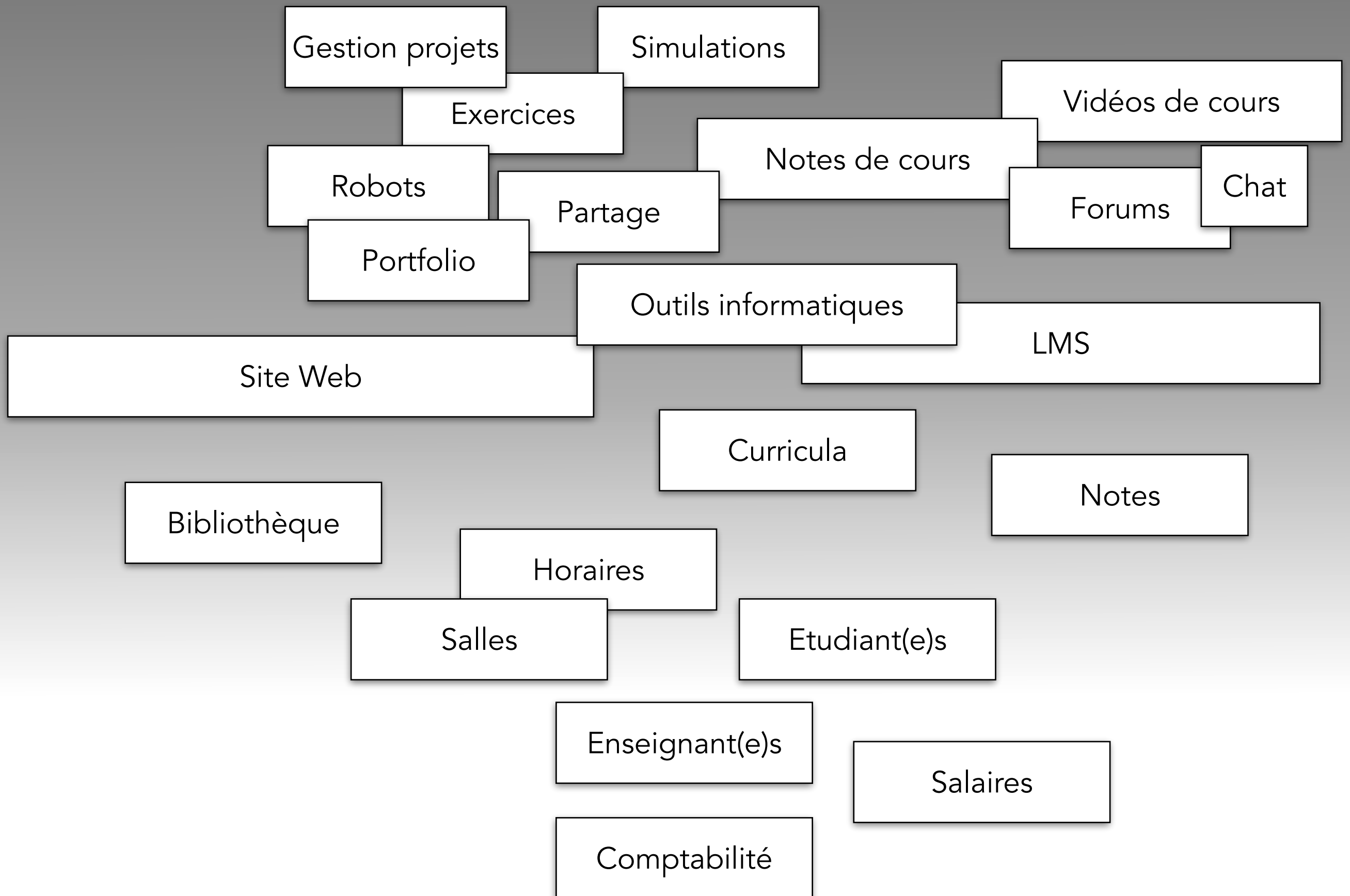
Online

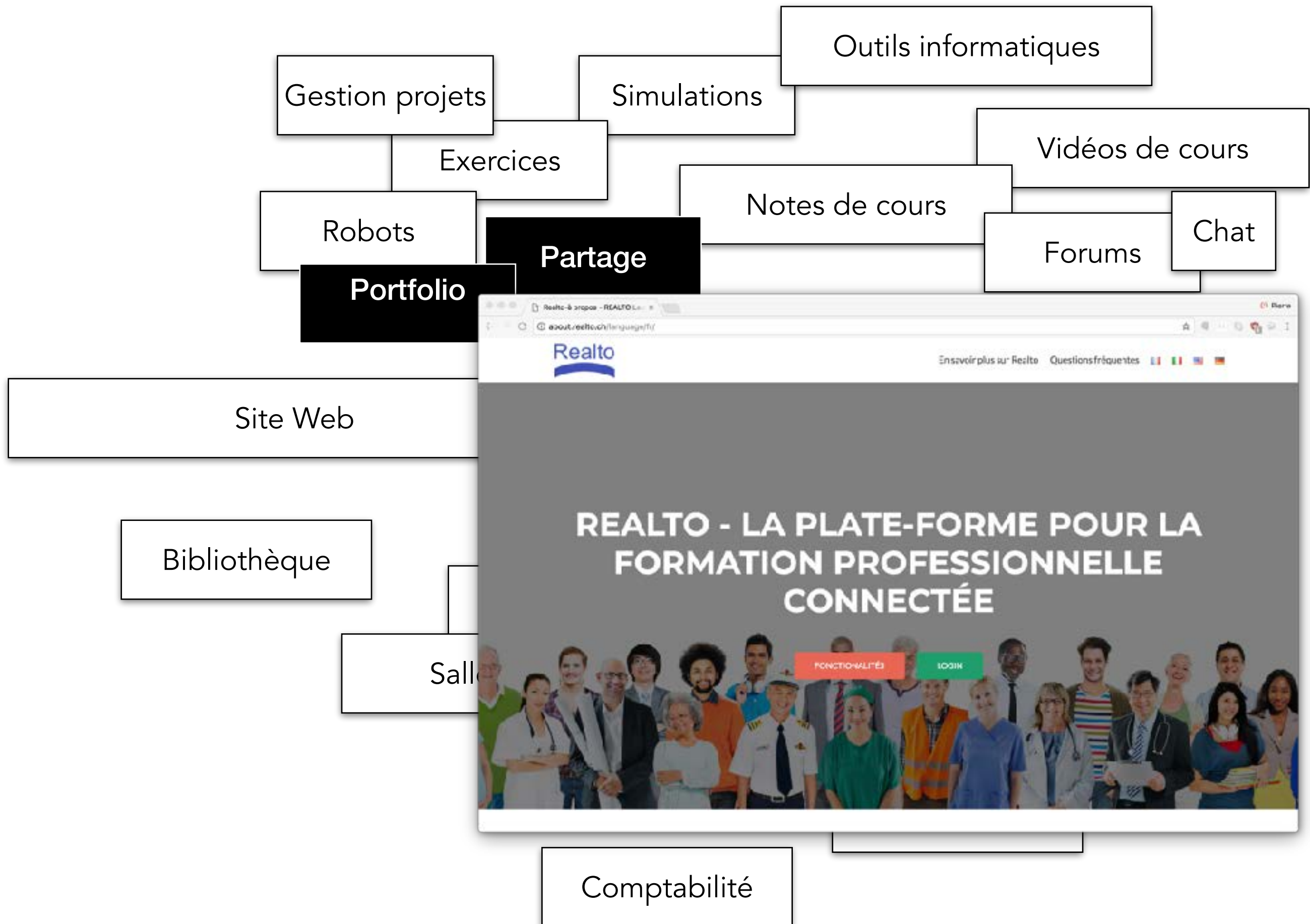


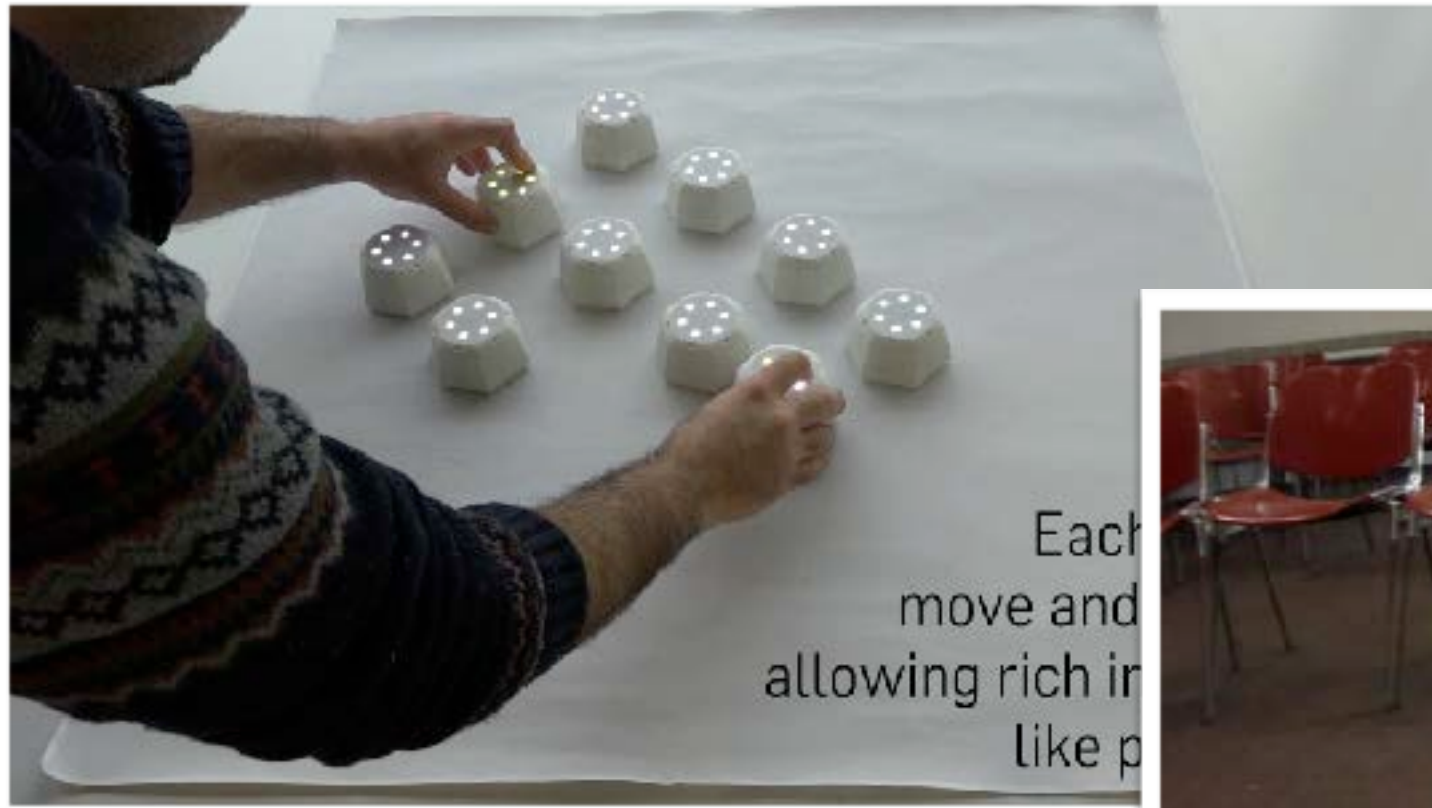
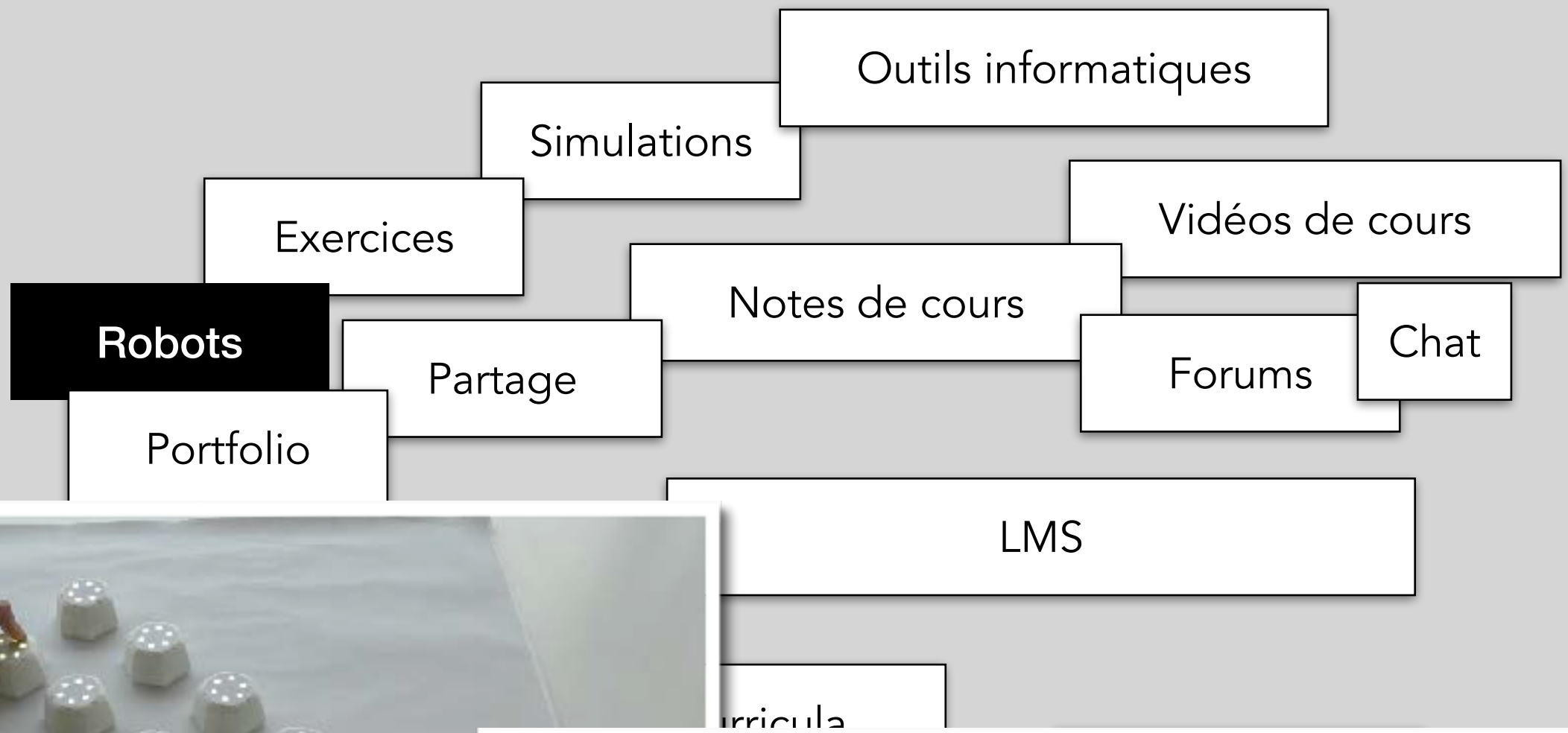
Quelle plateforme digitale pour mon école ?
Welche digitale Plattform für meine Schule?



Digital School Ecosystem







Gestion projets

Simulations

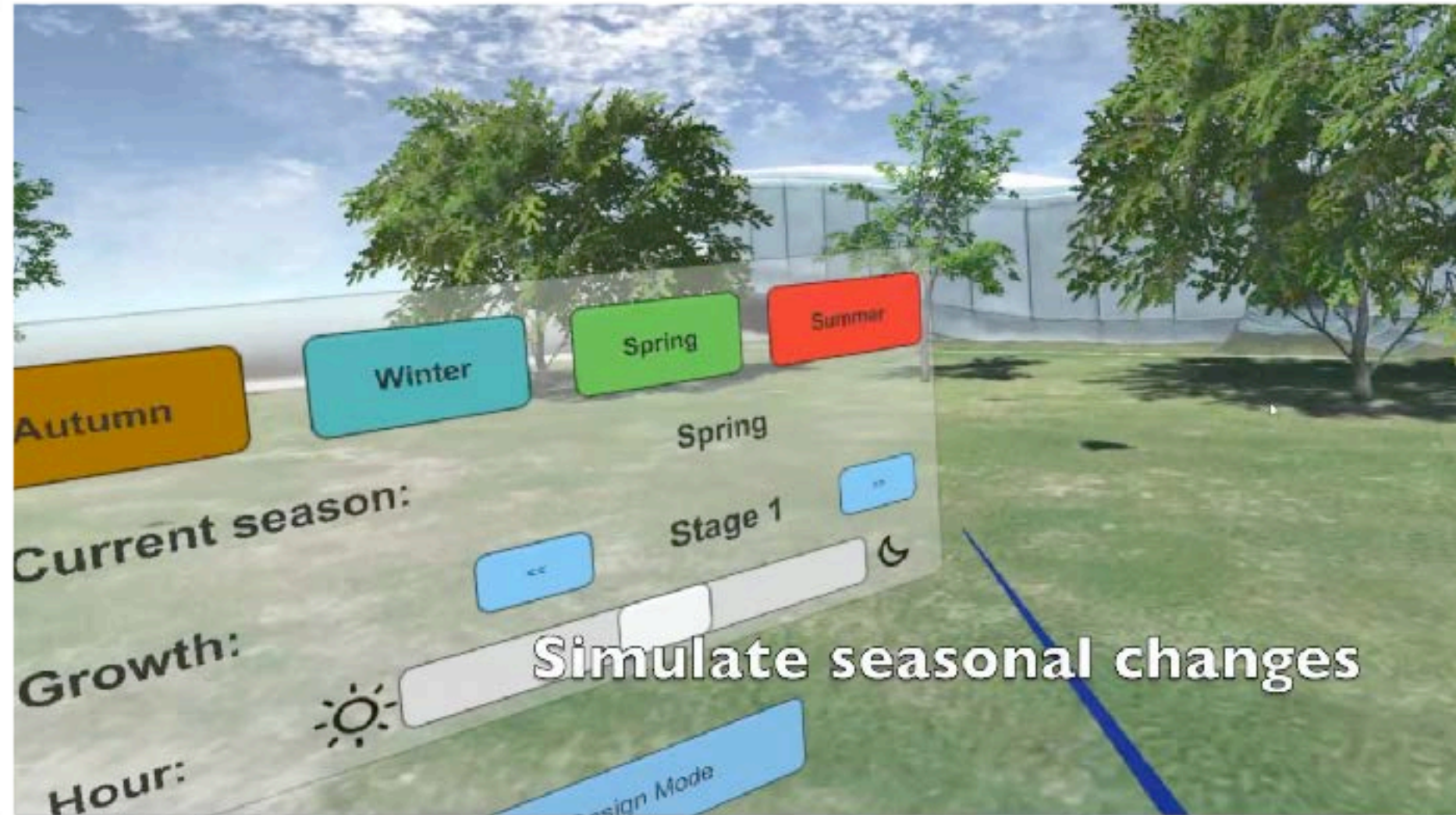
Outils informatiques

Exercices

Vidéos de cours

Forums

Chat



Notes

Enseignant(e)s

Salaires

Comptabilité

Outils informatiques

Gestion projets

Simulations

Vidéos de cours

Exercices

Notes de cours

Robots

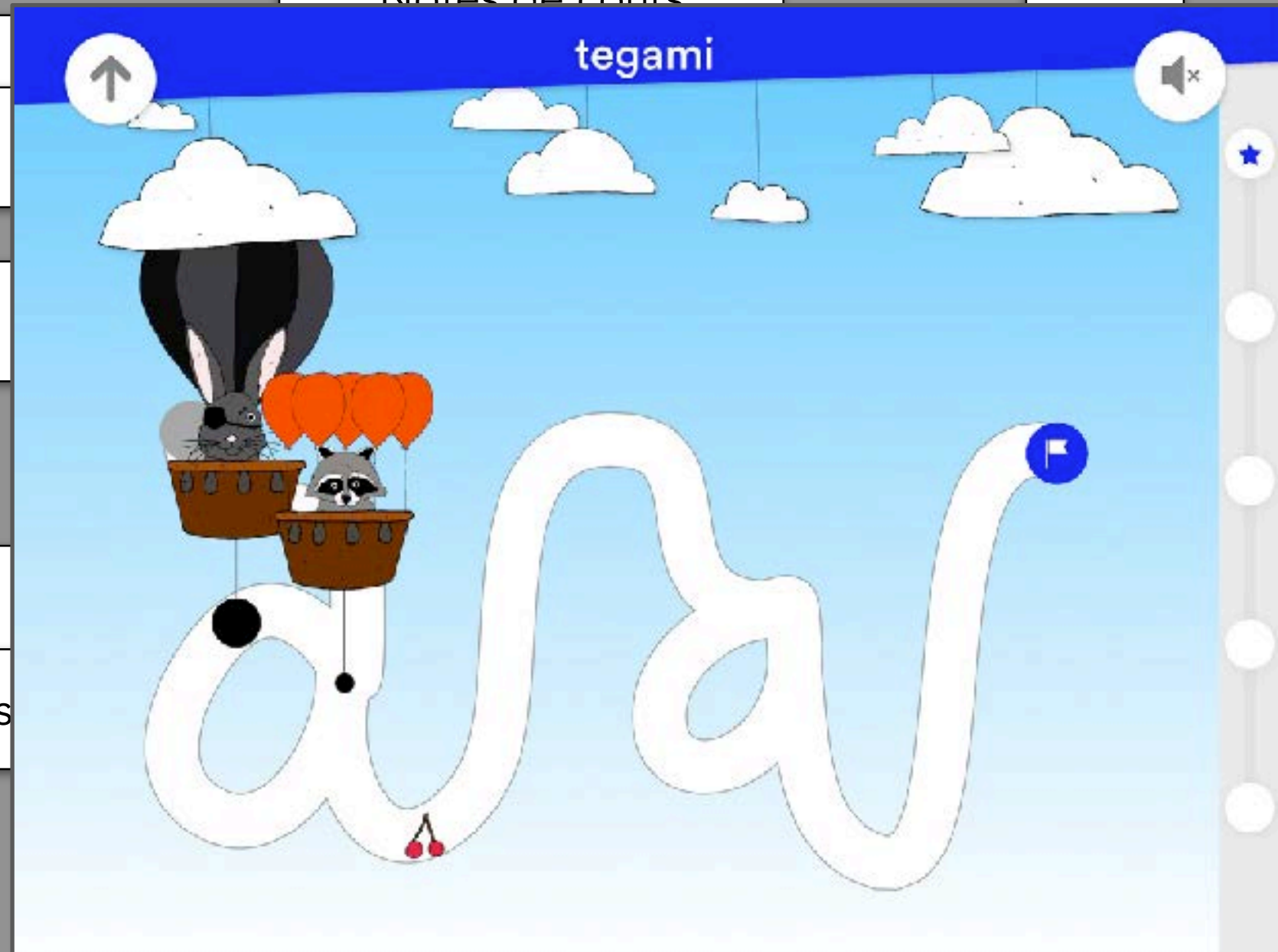
Portfolio

Site Web

Bibliothèque

Salles

Comptabilité

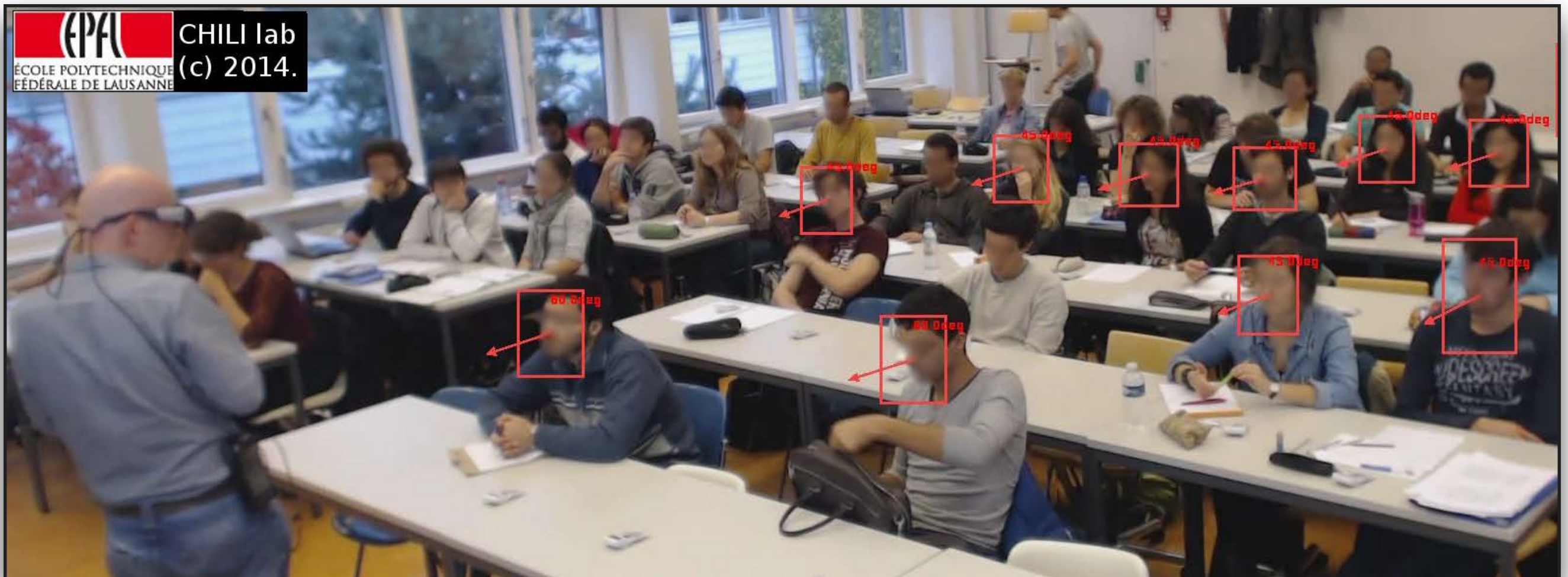




You passed below 5% attention



Classroom Analytics



Raca, M., & Dillenbourg, P. (2013). System for assessing classroom attention. In *Proceedings of 3rd International Learning Analytics & Knowledge Conference*

1. Are you **crazy** ?

2. Lecturing better or lecturing less ?



1896

Jean vs TED



TEDTalks

EPFL Exercises Session

assistant

works

waits





“While Waiting Productivity” LOSS : 62% → 6%

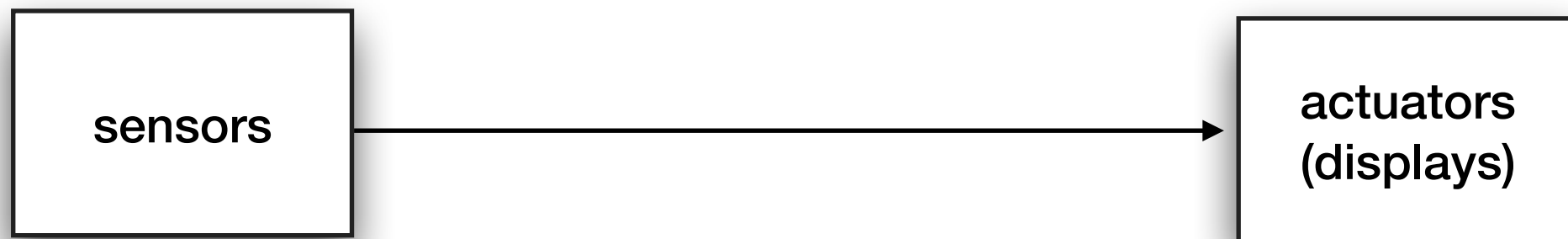


Classware: the classroom is a digital system



« Classware »

My (physical) classroom is a digital environment

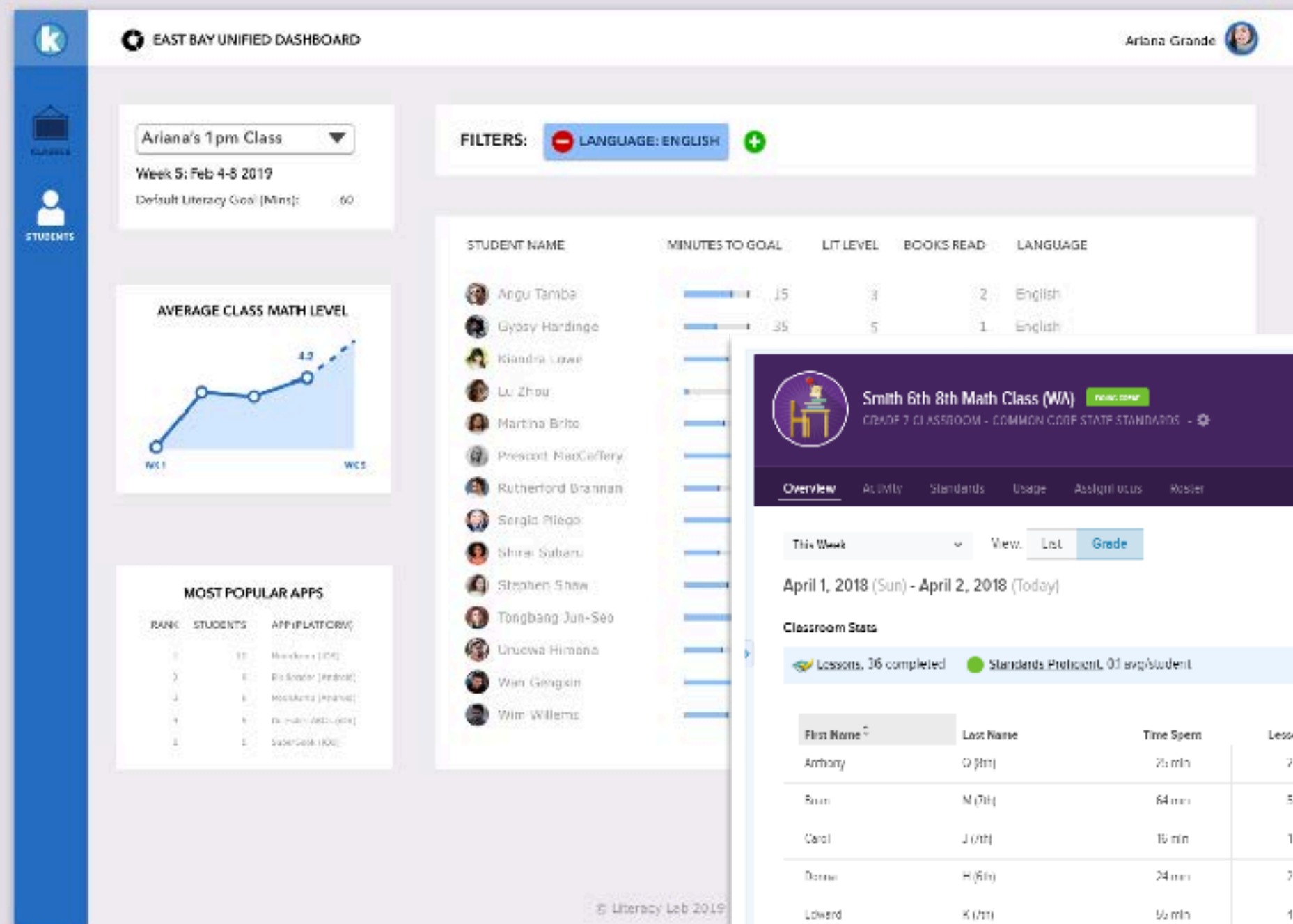


- **Accelerometer** that measures acceleration forces
- **Magnetometer** that measures magnetization/magnetic fields
- **Light sensor** that measures the strength of light
- **Gyroscope** that measures orientation
- **Hygrometer** that measures moisture in the atmosphere
- **Thermometer** that measures ambient temperature
- **Barometer** that measures atmospheric pressure
- **Proximeter** that detects when something is close



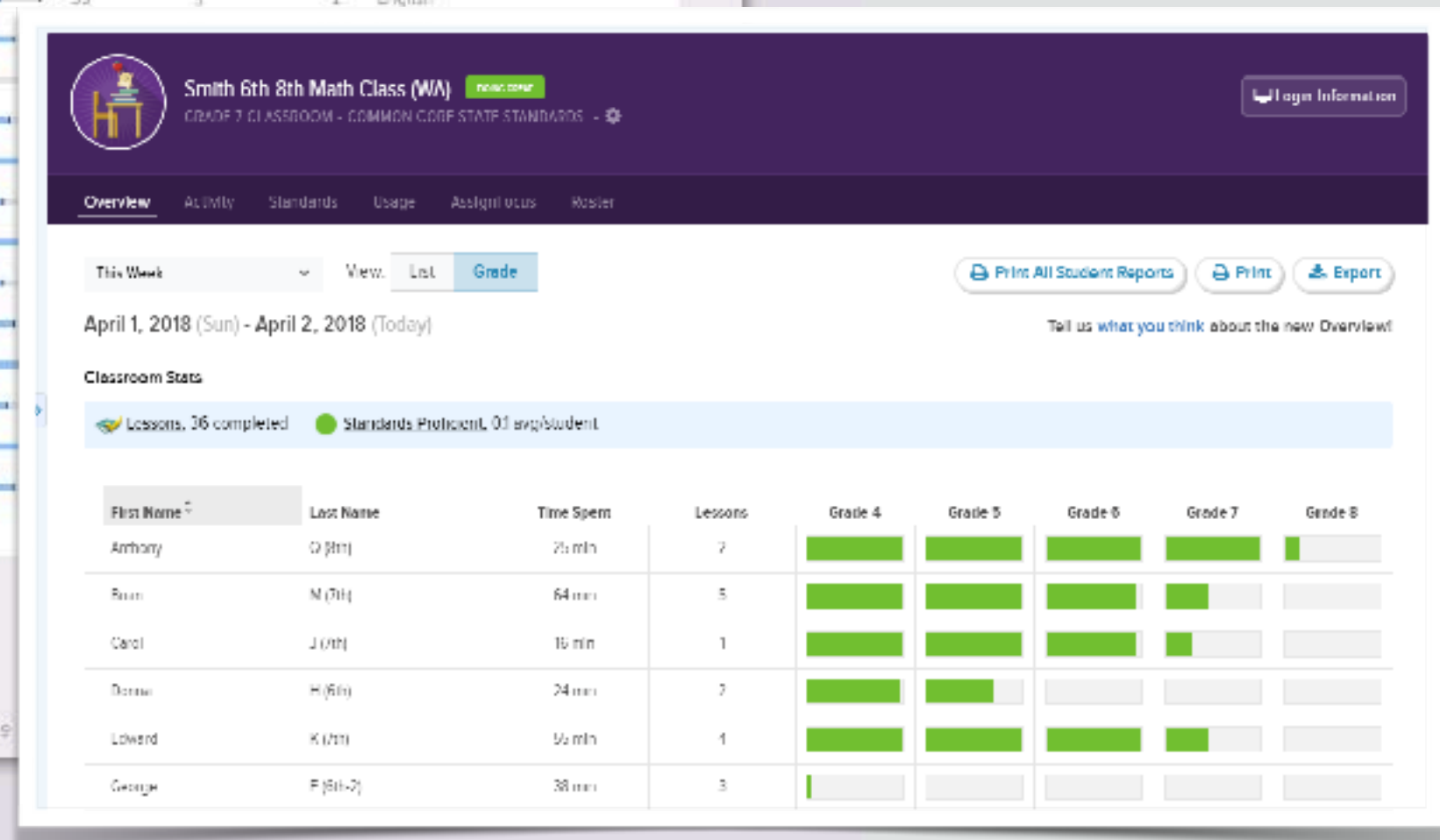
sensors

- **Precision Gas Sensor** - Test air quality, carbon monoxide levels
- **Reducing Gas Sensor** - Sense methane, propane, and natural gas leaks
- **Oxidizing Gas Sensor** - Ozone sensing and chlorine leaks
- **Non-Contact Thermometer** - Check food temperature, engine diagnostics, ...
- **Humidity Sensor** - Check heat index, food storage conditions
- **Temperature Sensor** - Measure ambient temperature
- **Light Sensor** - For checking light intensity, sunlight monitoring,....
- **Color Sensors** - Use as a color meter, color matcher/analyzer, even pattern recognition
- **Pressure Sensor** - Blood pressure monitor
- **Proximity Sensor** - Use it as a stud finder or liquid level monitor
- **Expansion Connector** - Connecting other sensors like EKGs, Thermal Printers, and more



Kidapolis

Dreambox



Dashboard

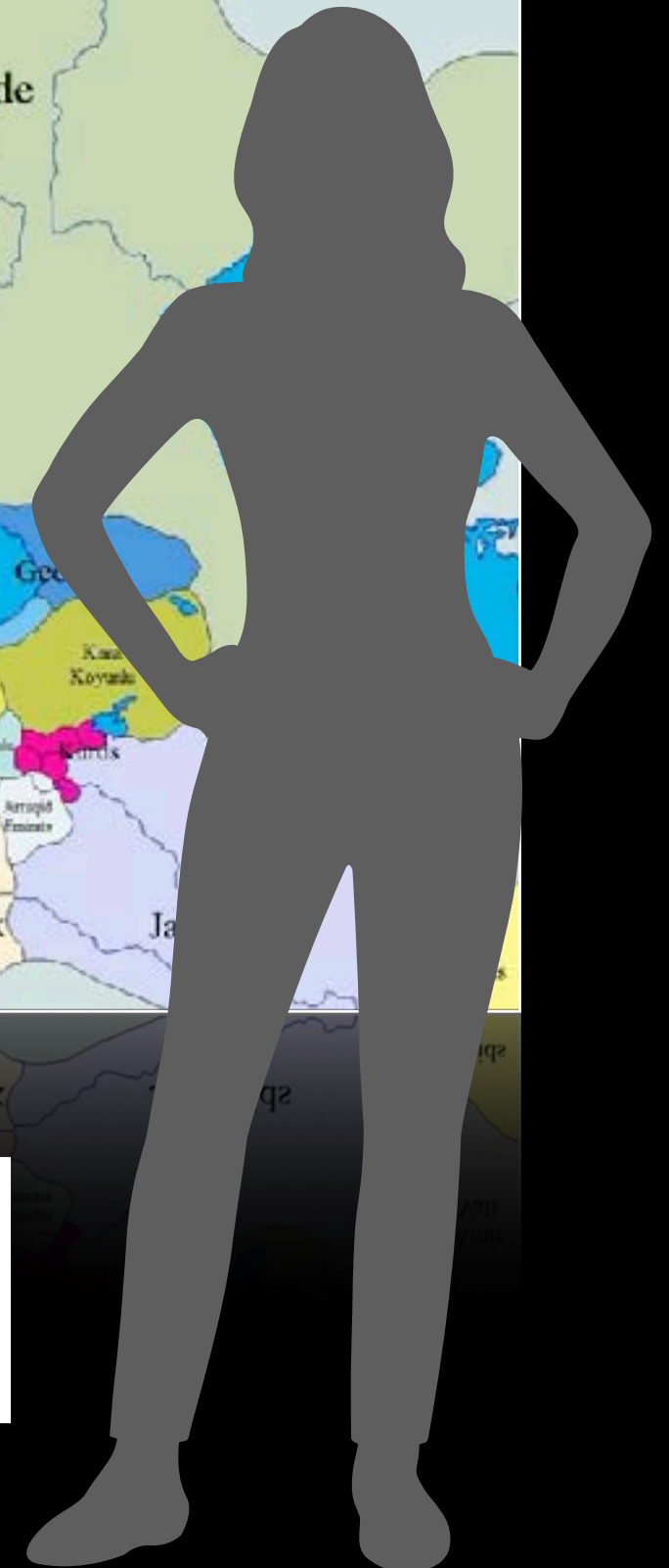
sensors

actuators
(displays)



Data

Visualisation



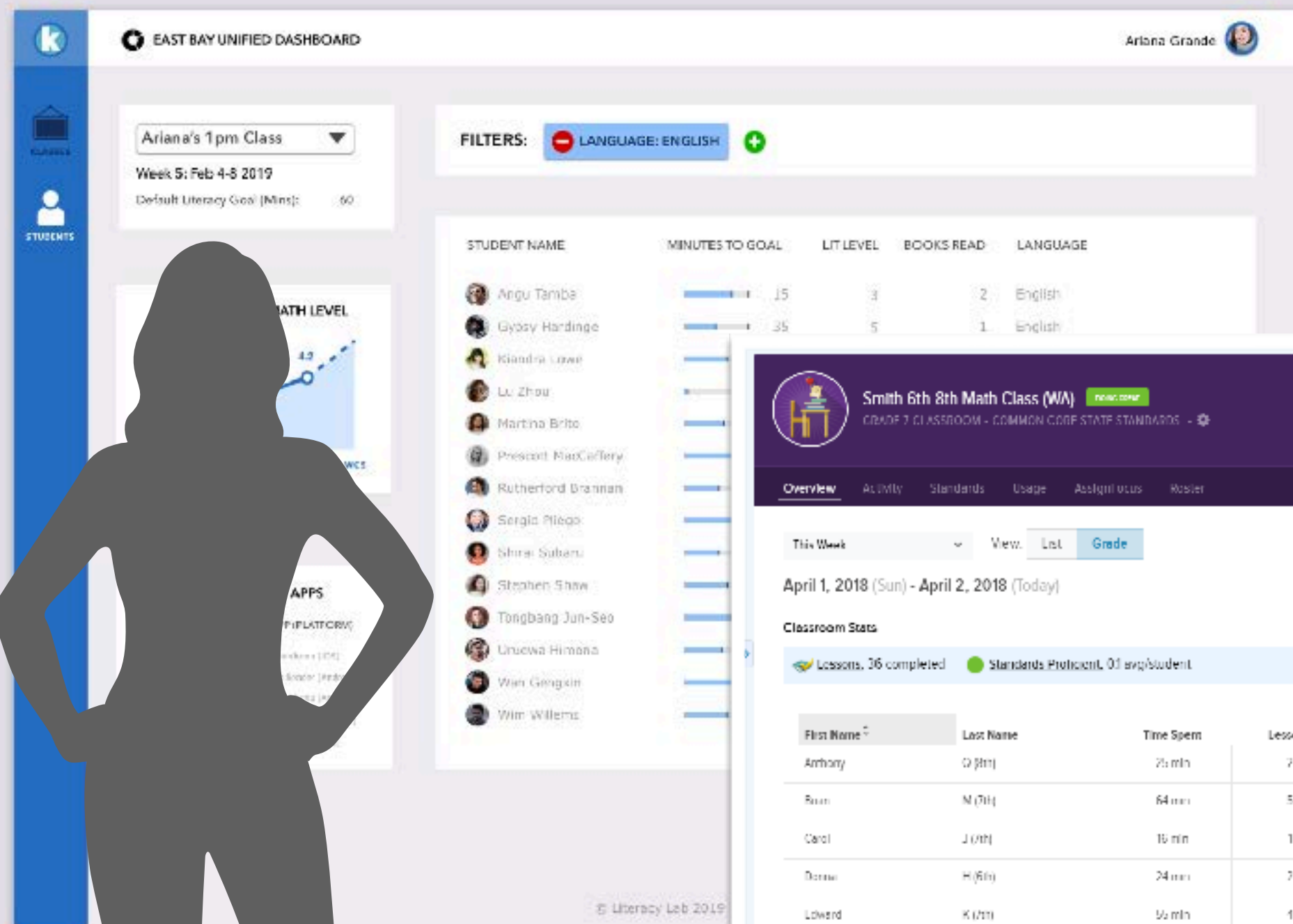
00:00 - 09:00



Data

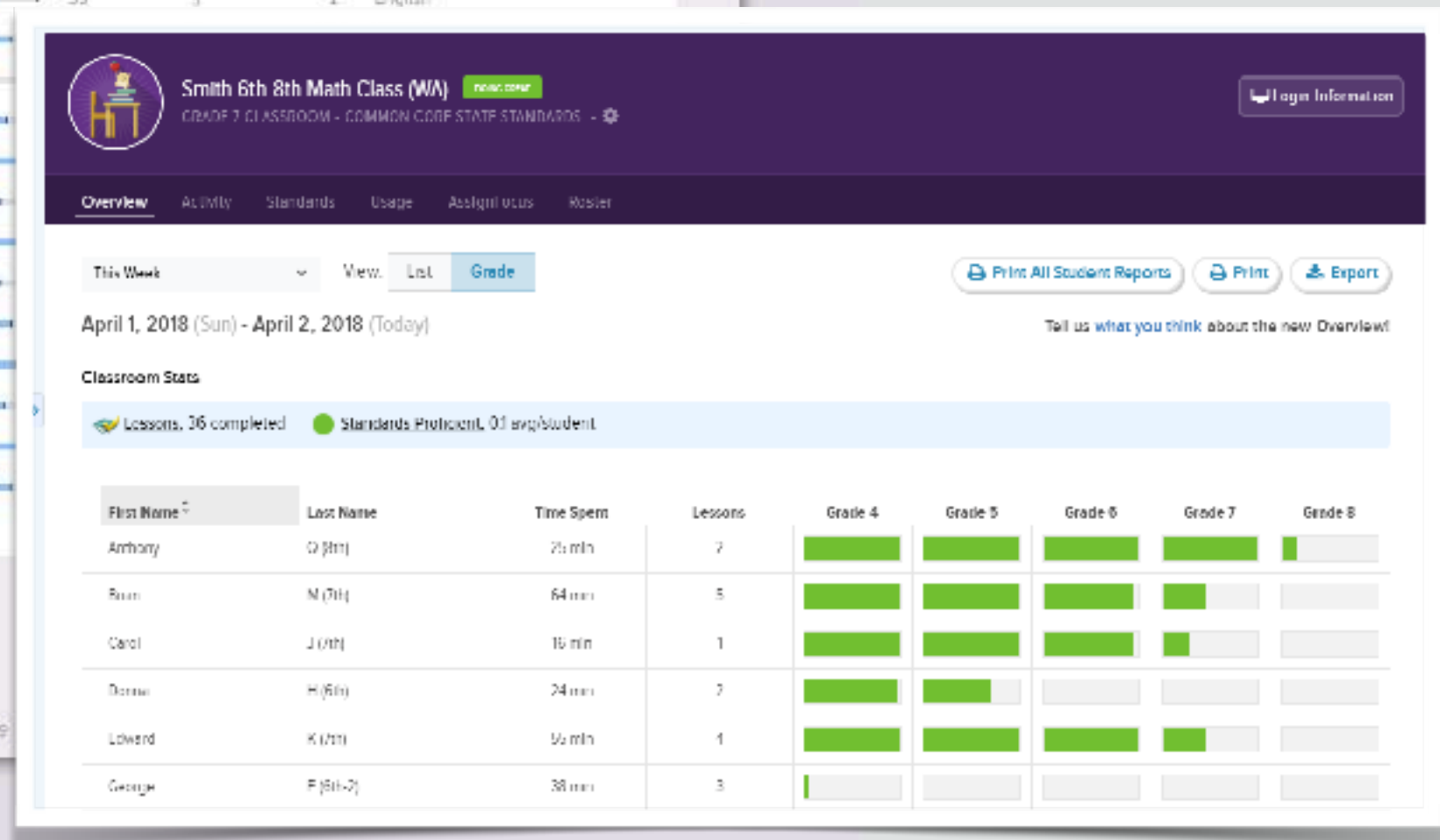


Visualisation



Kidapolis

Dreambox

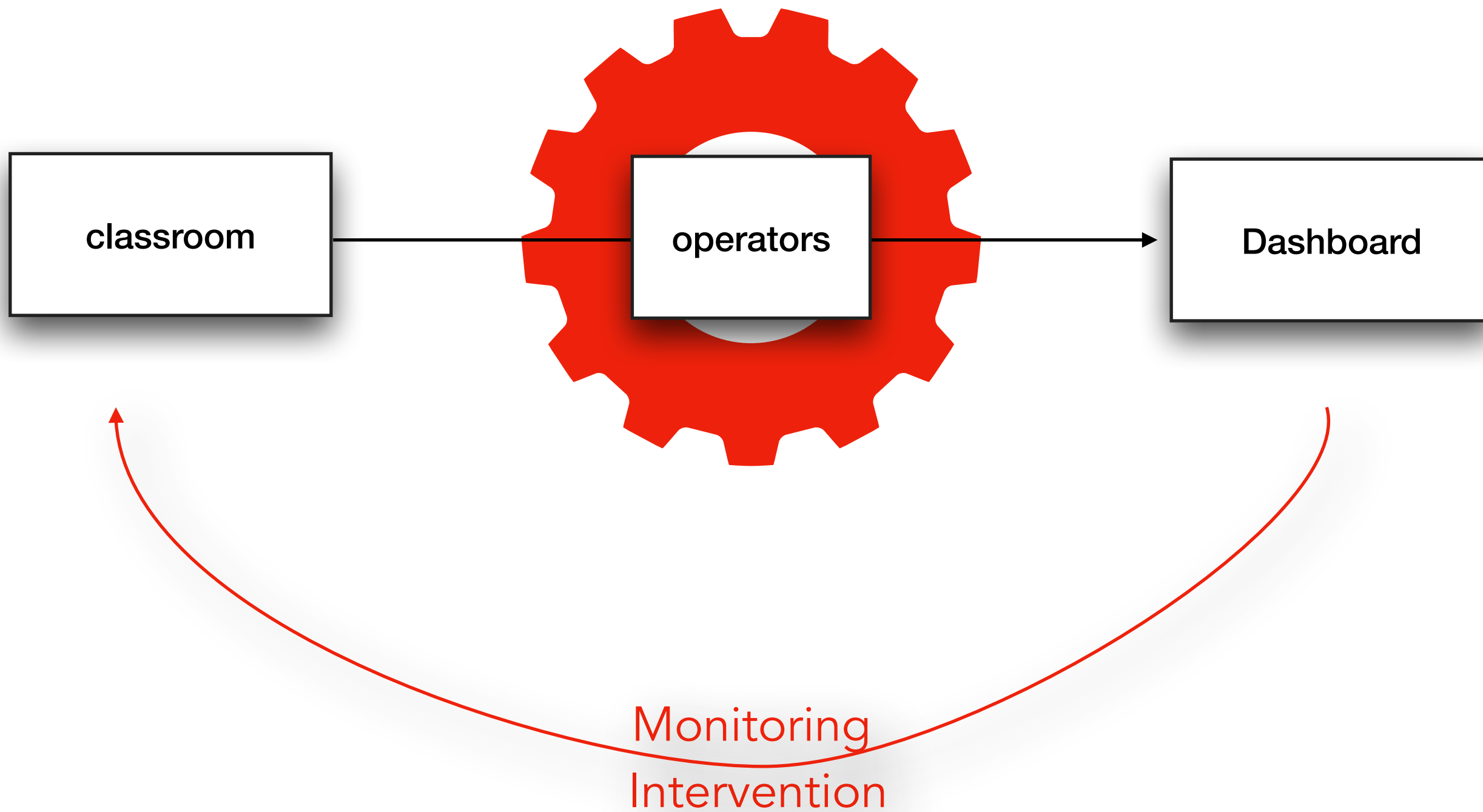


Dashboard

Classroom
Data

Visualisation

Aggregation, comparison, visualisation,....



Distributed



Data



Visualisation

Centralized

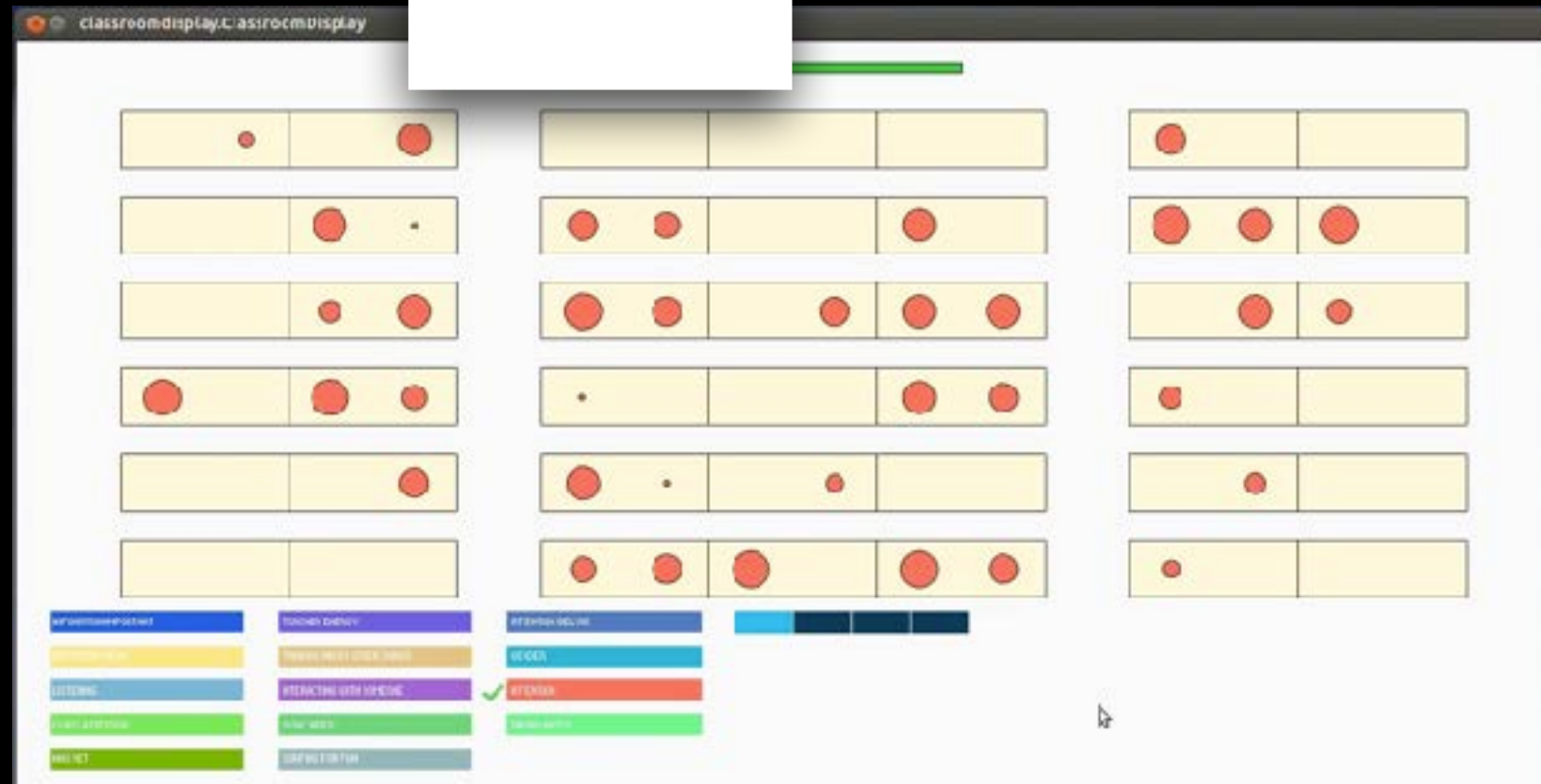
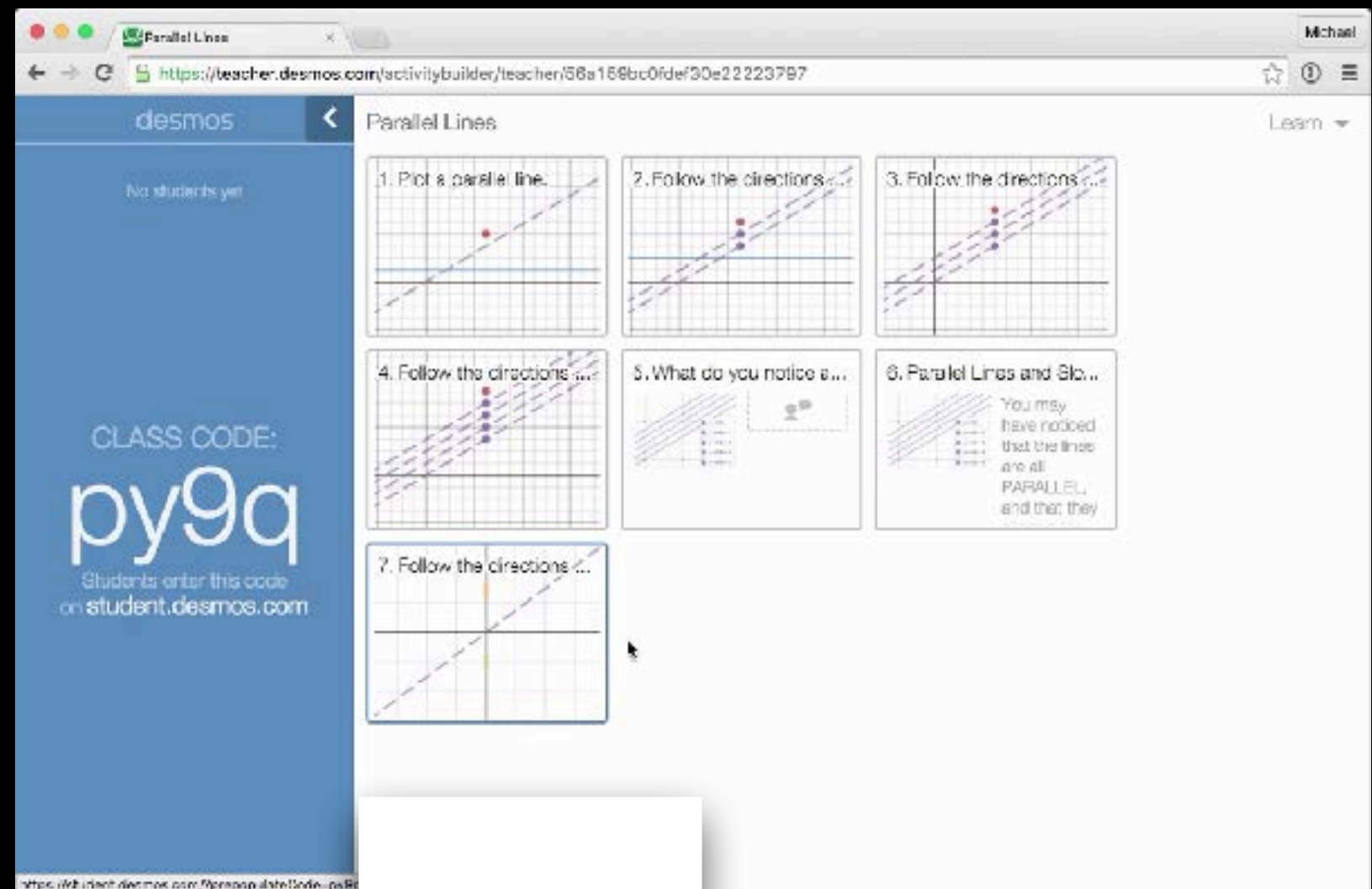


Realtime

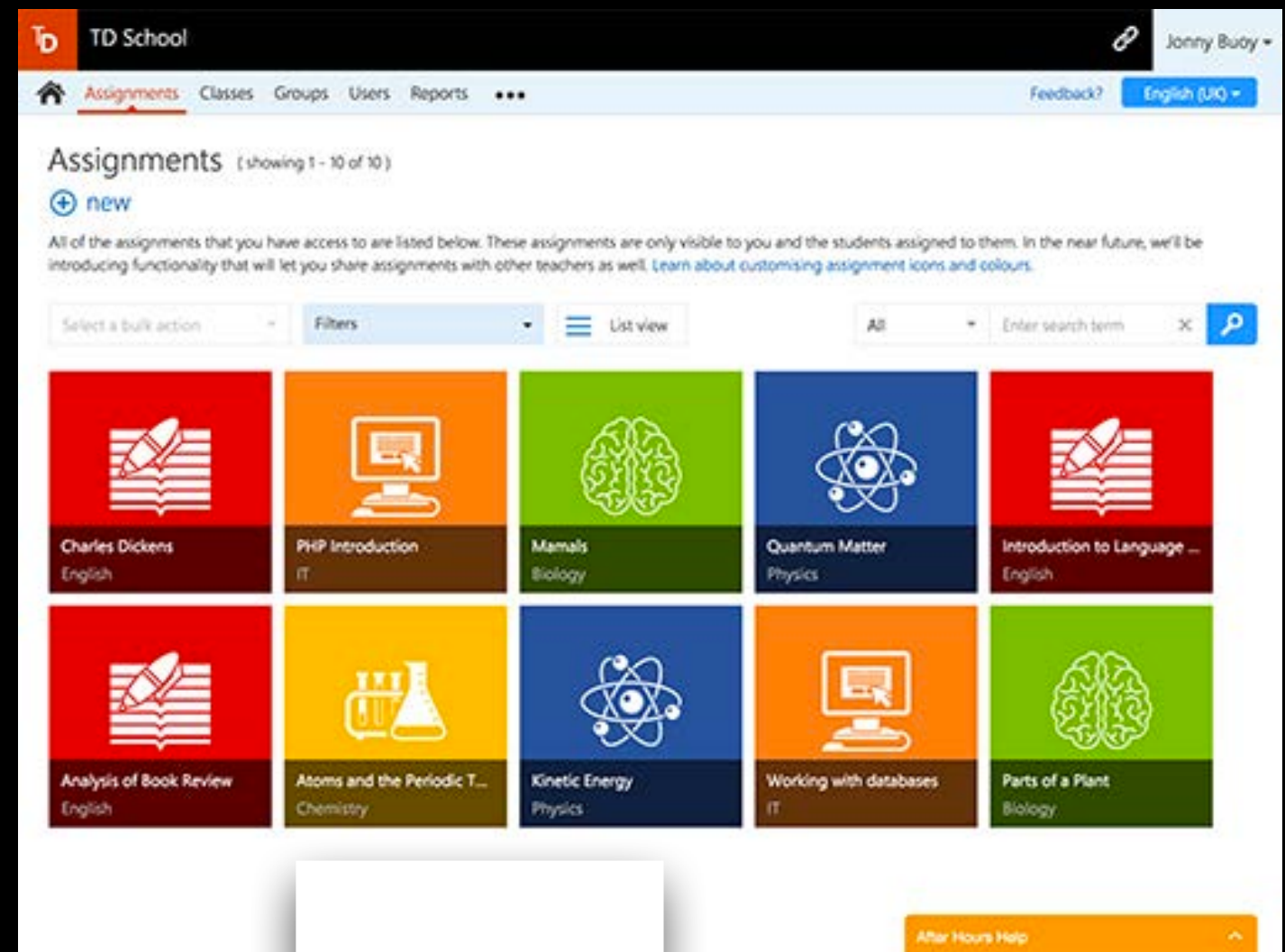
Data

Visualisation

Replay



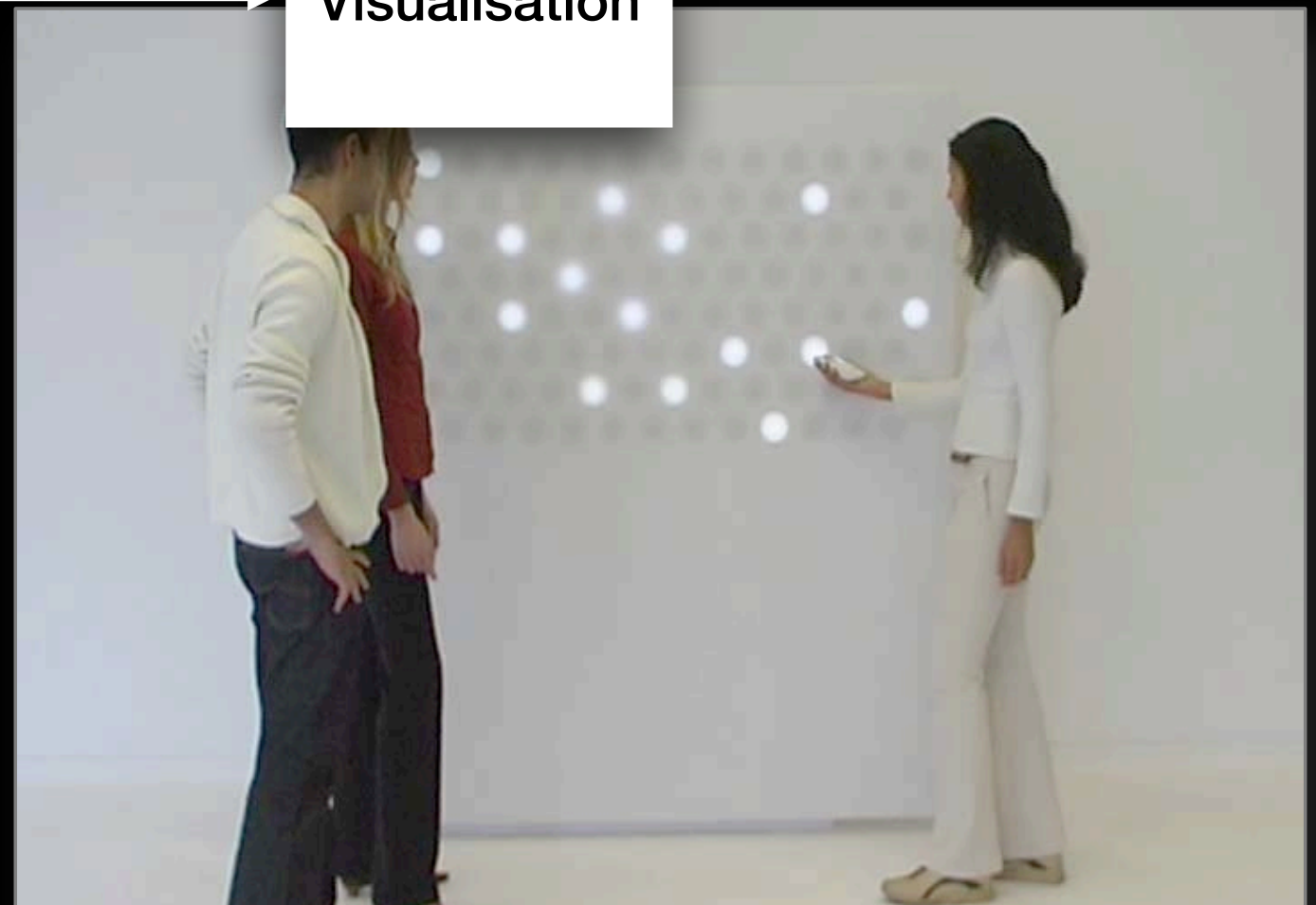
Focal



Data

Visualisation

Peripheral
(ambient)

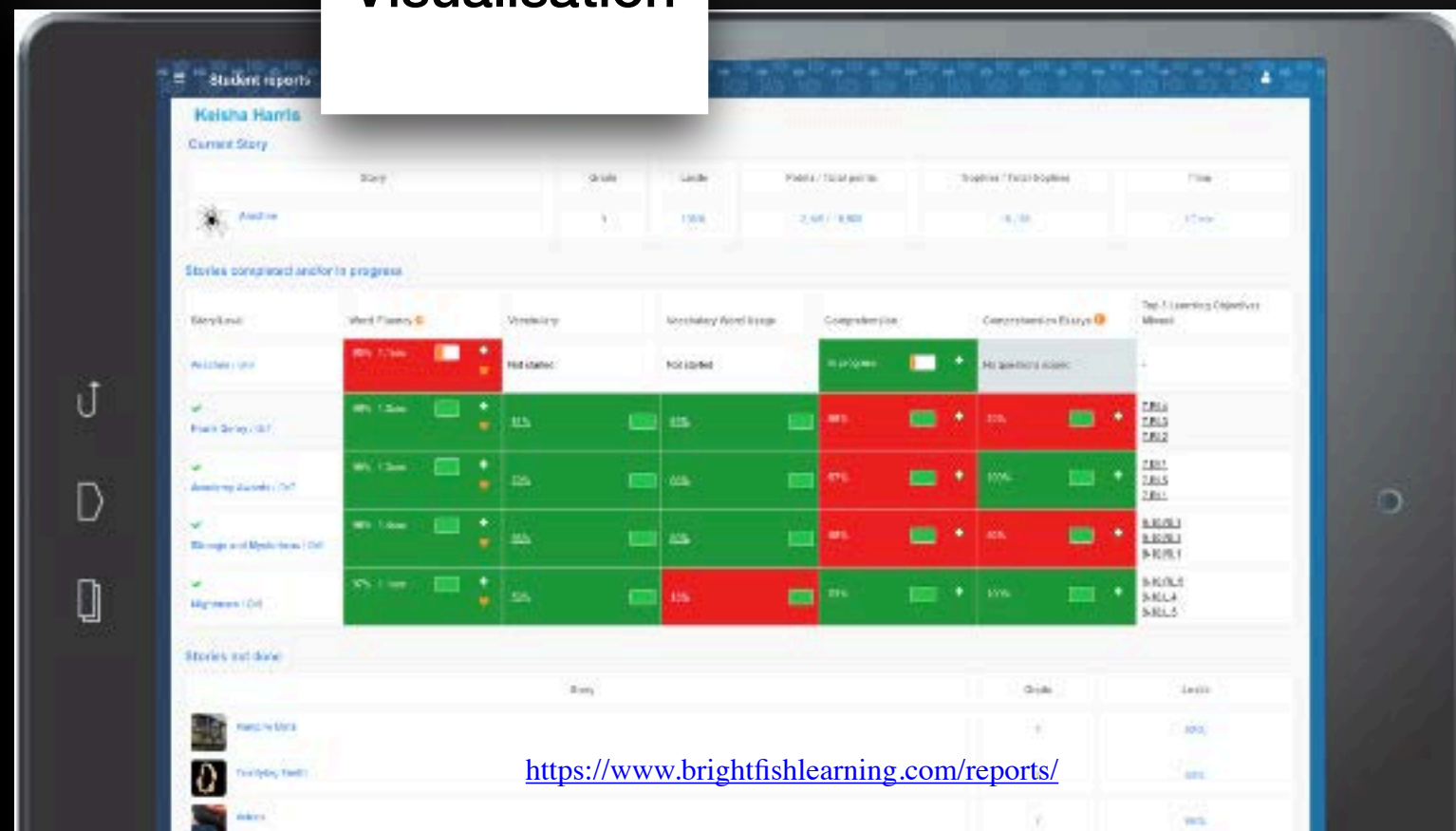


Public Dashboard

Data

Visualisation

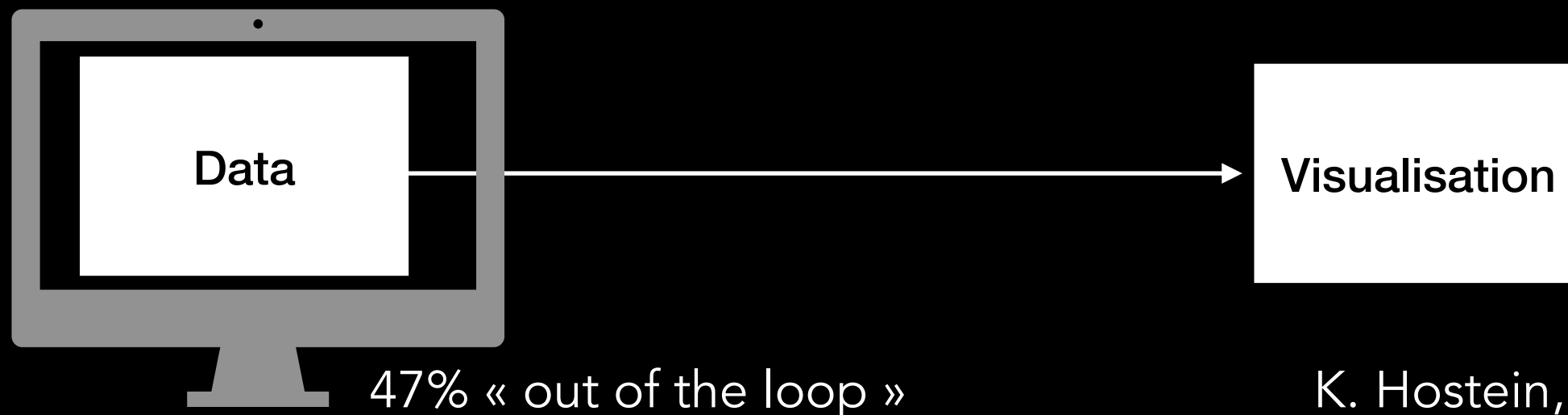
Private Dashboard



<https://www.brightfishlearning.com/reports/>

LUMILO

a pair of **glasses** that tune teachers in to
the **real-time, continuous assessments** that



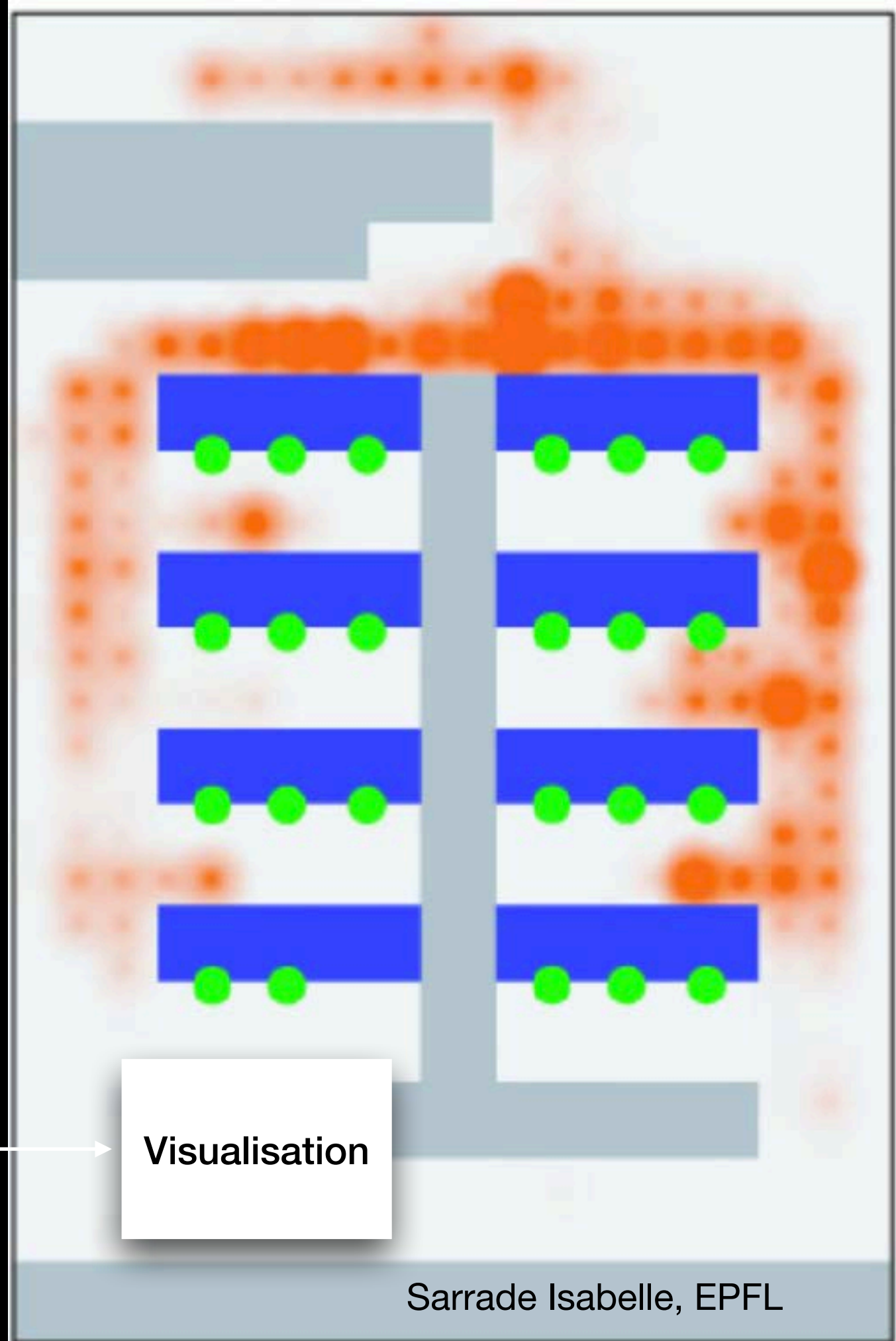
47% « out of the loop »

K. Hostein, V. Alevén & N. Rummel

Teachers'
Data

Visualisation

Sarrade Isabelle, EPFL





Teachers'
Data

Visualisation

You are crazy!
1. Are you crazy?



You are crazy !

1. Are you ~~crazy~~ ?

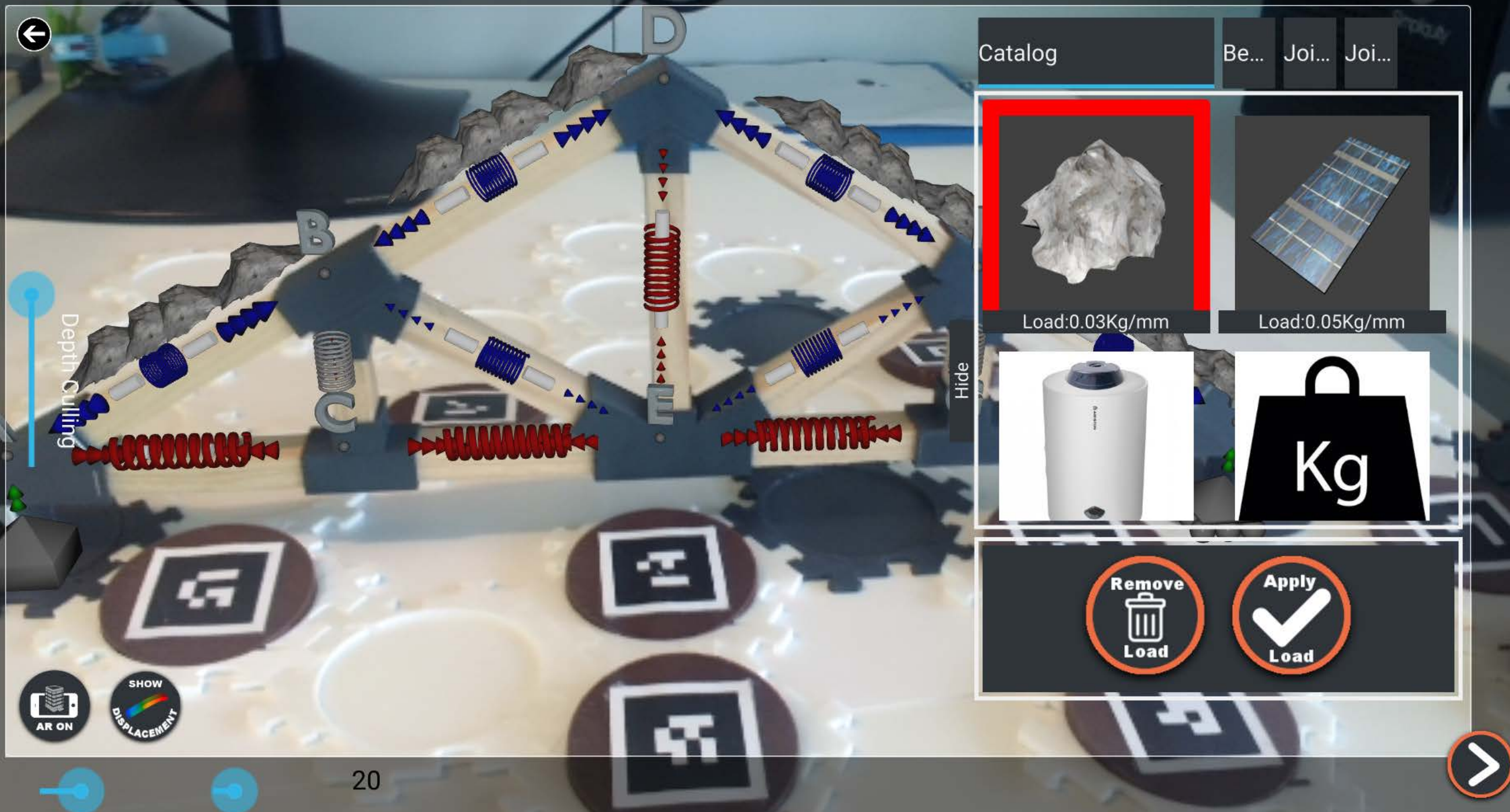
2. Lecturing better or lecturing less ?





Intuitive statics for carpenters ?

Axial Forces: Compression Tension Support



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Administration fédérale admin.ch

Département fédéral de l'économie, de la formation et de la recherche DEFR

Secrétariat d'Etat à la formation, à la recherche et à l'innovation
SEFRI



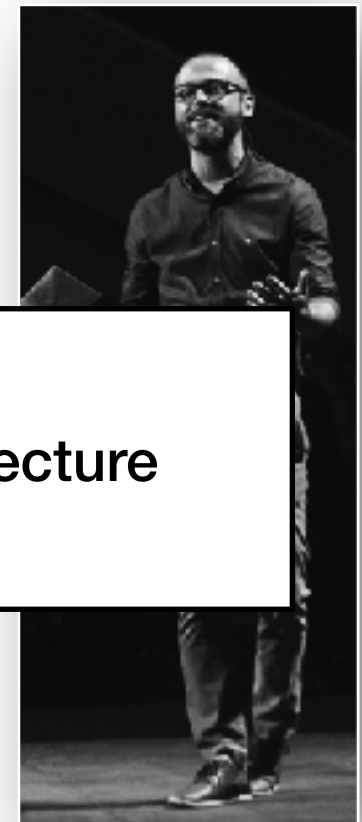


There is a time for telling



Problem Solving

Lecture



“Productive Failure”

Who's the most
consistent striker?

Year	Mike Arwen	Dave Backhand	Ivan Right
1988	14	13	13
1989	9	9	18
1990	14	16	15
1991	10	14	10
1992	15	10	16
1993	11	11	10
1994	15	13	17
1995	11	14	10
1996	16	15	12
1997	12	19	14
1998	16	14	19
1999	12	12	14
2000	17	15	18
2001	13	14	9
2002	17	17	10

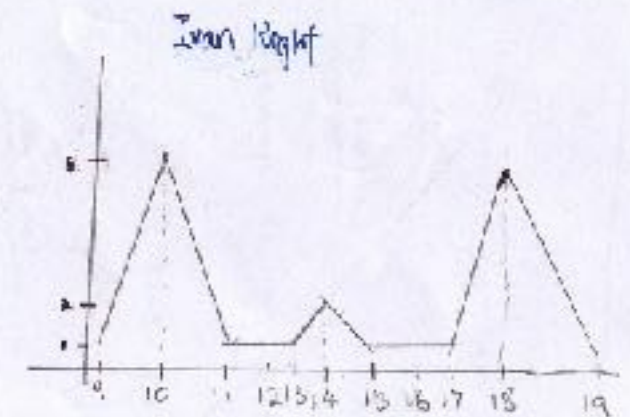
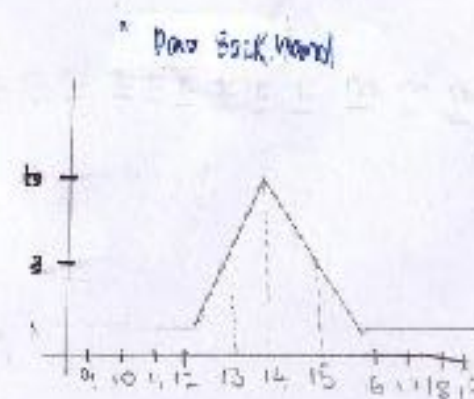
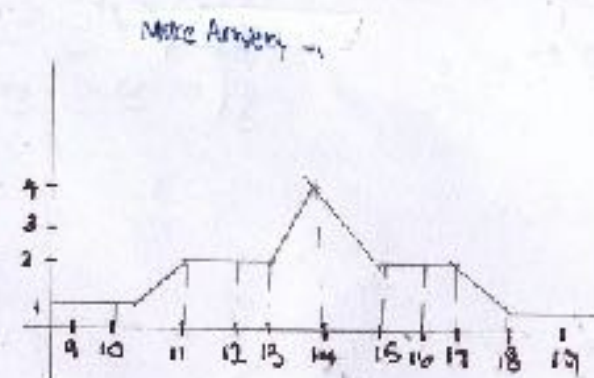
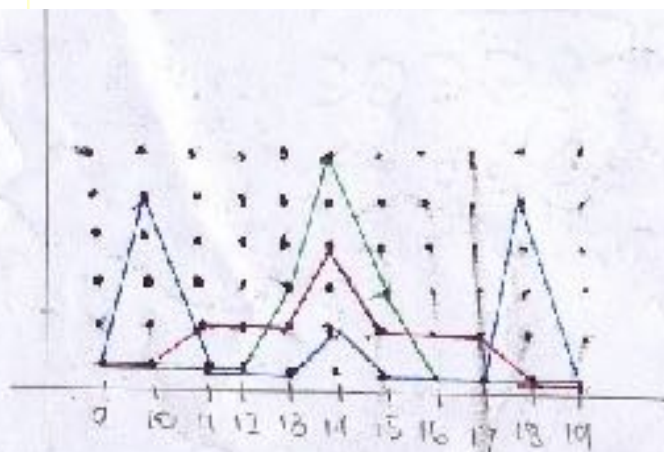
Mike Arwen : Mean = $\frac{280}{20}$
 = 14 goals / year
 Mode = 14

Dave Backhand : Mean = $\frac{280}{20}$
 = 14 goals / year
 Mode = 14

Ivan Right : Mean = $\frac{280}{20}$
 = 14 goals / year
 Mode = 18 and 10

Comparing regularity

9	10	11	12	13	14	15	16	17	18	19
1	1	2	2	2	4	2	2	2	1	1
1	1	1	1	3	6	3	1	1	1	1
1	5	1	1	1	2	1	1	1	5	1



Sum of year-on-year deviation

<u>Mike:</u>	$9 - 14 = -5$ $14 - 9 = 5$ $10 - 14 = -4$ $15 - 10 = 5$ -4 4 -4 5 -4 4 -4 5 -4 4 -4 5 -4 5 -4 0 ✓ <u>Mike</u>	<u>Dave:</u> -4 7 -2 -4 1 2 1 1 4 -5 -2 3 -1 3 -4 1 4 -4 1 -2	<u>Ivan:</u> 5 -3 -5 1 -6 7 -7 2 2 5 -5 4 -9 1 8 -7 -1 8 0 -5
--------------	--	--	--

Average of year-on-year absolute deviation

$$\text{MIKE} = \frac{5+5+4+5+4+4+4+5+4+4+4+5+4+4+4+5+4+5+4}{20} = 84/20 = 4.2$$

DAVE = $\frac{4+7+2+4+1+2+1+1+4+5+2+3+1+3+4+1+4+4+1}{19}$
 $= 54/19 = \underline{2.84}$ DAVE is most consistent

$$\begin{aligned} \text{IVAW} &= \frac{5+3+5+1+6+7+7+2+2+5+5+4+9+1+8+7+1+8+0}{19} \\ &= 4.79 \end{aligned}$$

Range ~~price~~ amount for:

Mike Armen: 9 - 19 = 10

Dave husband: 9 - 19 = 10

Ivan Right: 9 - 19 = 10

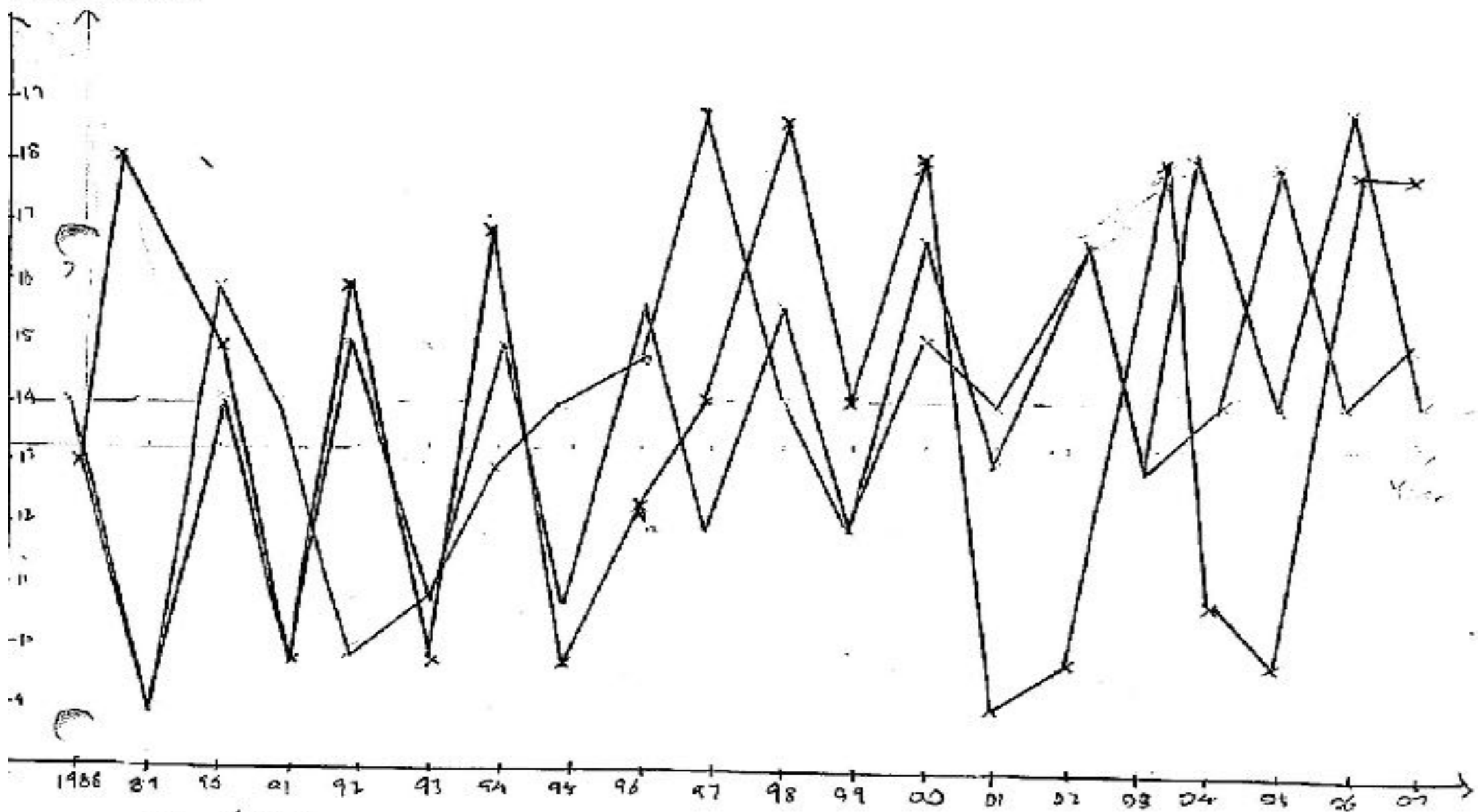
] x

Sum of deviations about the mean

Year	Avg	M.A	D.B	I.R	X		
1988	14	14	13	13	0	-1	-10
1989	14	9	14	18	-5	-5	4
1990	14	14	16	15	0	+2	+
1991	14	10	14	10	-4	0	-4
1992	14	15	10	16	+1	-4	+2
1993	14	11	11	10	-3	-3	-4
1994	14	15	13	17	+1	-1	+3
1995	14	11	14	10	-3	0	-4
1996	14	16	15	12	+2	+1	-2
1997	14	12	19	14	-2	+5	0
1998	14	16	14	19	+2	0	+5
1999	14	12	12	14	-2	-2	0
2000	10	17	15	18	+3	+1	+4
2001	14	13	14	9	-1	0	-5
2002	14	12	17	10	+3	+3	-4
2003	14	13	13	18	-1	-1	+4
2004	14	18	14	11	+4	0	-3
2005	14	14	18	10	0	+4	-4
2006	14	19	14	18	+5	0	+4
2007	14	14	15	18	0	+1	+4

1. **Model:**   

Goals Scored



— Mike Arwen
 - - - Dave Backlund
 . . . Ivan Right

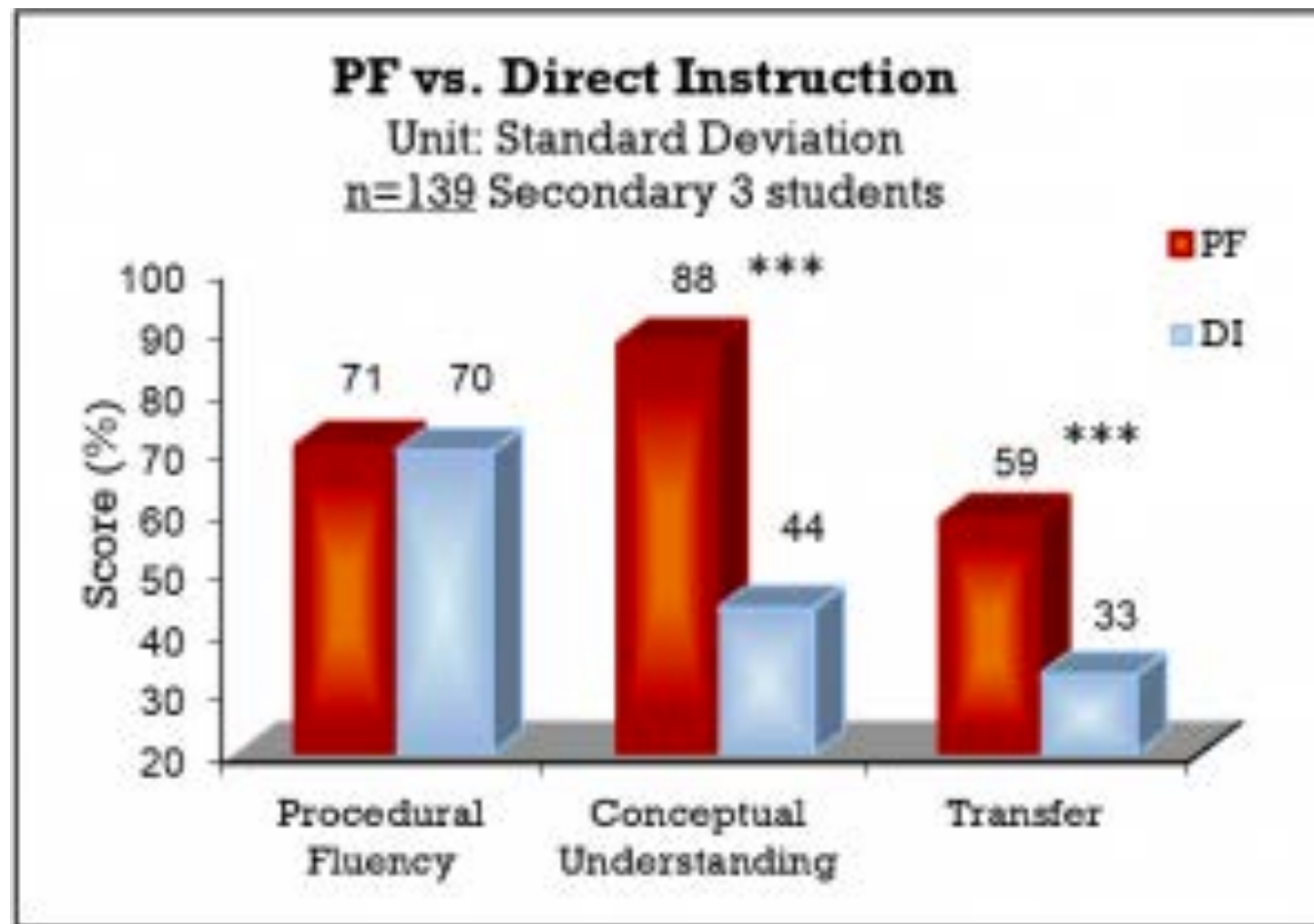
Idea 3 Measure Graph Length

$$\begin{aligned}
 \text{MA} & \sqrt{26} + \sqrt{26} + \sqrt{17} + \sqrt{26} + \sqrt{17} + \sqrt{17} + \sqrt{17} + \sqrt{26} + \sqrt{10} + \sqrt{10} + \sqrt{10} + \sqrt{26} + \sqrt{17} + \sqrt{17} + \sqrt{17} + \sqrt{26} + \sqrt{17} + \sqrt{26} + \sqrt{26} = 83.26 \\
 \text{DB} & \sqrt{17} + \sqrt{50} + \sqrt{5} + \sqrt{17} + \sqrt{2} + \sqrt{5} + \sqrt{2} + \sqrt{2} + \sqrt{17} + \sqrt{26} + \sqrt{5} + \sqrt{10} + \sqrt{2} + \sqrt{5} + \sqrt{10} + \sqrt{2} + \sqrt{17} + \sqrt{17} + \sqrt{2} = 56.54 \\
 \text{IR} & \sqrt{26} + \sqrt{10} + \sqrt{26} + \sqrt{37} + \sqrt{51} + \sqrt{50} + \sqrt{50} + \sqrt{5} + \sqrt{5} + \sqrt{26} + \sqrt{26} + \sqrt{17} + \sqrt{182} + \sqrt{12} + \sqrt{65} + \sqrt{50} + \sqrt{2} + \sqrt{65} + 1 = 94.54
 \end{aligned}$$

∴ Dave Backlund is the most consistent player as he has the shortest 'stretched-out' graph, showing consistency over time.

Azaan
 Akaan

3



There is a time for telling

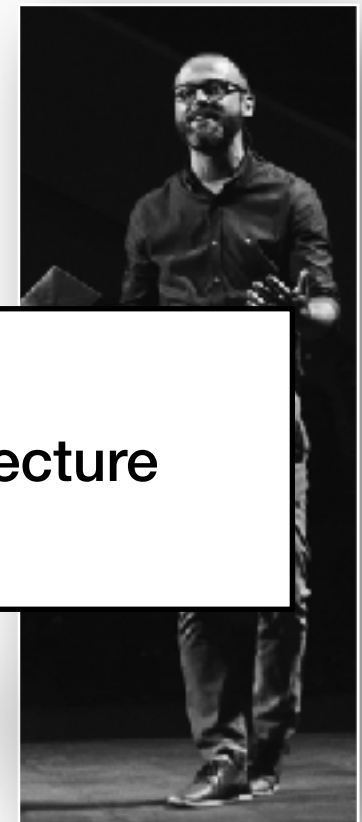


Problem Solving



Lecture

The art of debriefing





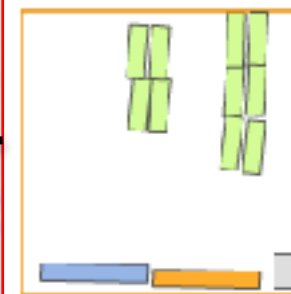


Orange



Comparaison

✓ Afficher les statistiques



Brute: 256m2
Brute stock.: 236m2
Nette: 30m2
Étagères: 12
Degré d'util.: 12.6%
Chariot: gerbeur
Temps/palette: 115s
Temps simul.: 0:13:49



Brute: 256m2
Brute stock.: 220m2
Nette: 36m2
Étagères: 12
Degré d'util.: 16.4%
Chariot: gerbeur
Temps/palette: 130s
Temps simul.: 0:23:40



Question

Please order a standard return 2nd class

Enter command
from Lausanne to Davos standard C2|re

Question

Please order a young return 2nd class ticket from Basel to Geneva without bike.

Your Ticket

From
Basel

To
Geneve

Travel
Return

Fare

Class

Bike

City

Basel

Geneve

Davos

Lausanne

Zurich

Fribourg

Neuchatel

Travel

Fare

Class

Bike

One-way

Return

Standard

Young

Half-fare

Question

Please order a standard return 2nd class ticket

From:
Fribourg

To:
Zurich

Travel:
Return

Fare:
Standard

Class:
2nd

Bike:
No

Question

Please order a standard return 2nd class ticket from Basel to Zurich with a bike.



From
Basel

To
Zurich

Travel

Fare

Class

Bike

☐ One-way

☐ Return

☐ Standard

☐ Young

☐ Half-fare

☐ 1st

☐ 2nd

☐ Yes

☐ No

⌚ :24

⌚ :36

HELP

BUY

Please select the interfaces and rank them with 1 being the best and 4 being the worst. Please justify your ranking.



If you rarely buy a train ticket rank the interfaces in the order that you would most prefer them.

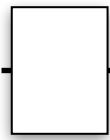
Ryan's List

1	Drag and Drop	↓	↑
2	Command	↓	↑
3	Form	↓	↑
4	Map	↓	↑

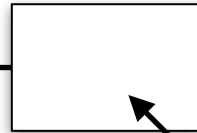
The drag and drop is easiest to see all of the options.

Submit

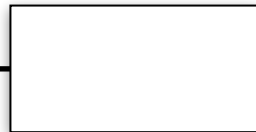
Class



Team



Solo



Chat (group/A1)

Group Chat

I had really liked the drag and drop because everything was so visible

Jenny

It was so slow though. All of the movement took forever

Ryan

What about the form? Everything was still visible but relatively fast with familiar interactions.

Jenny

yeah ok

Jenny

What after that?

Group Preference (group/A1)

You and your partner must have the same ranking to submit.

Rank the interfaces in the order that you would most prefer them.

Ryan's List

1 Form

2 Drag and Drop

3 Command

4 Map

Jenny's List

1 Form

2 Drag and Drop

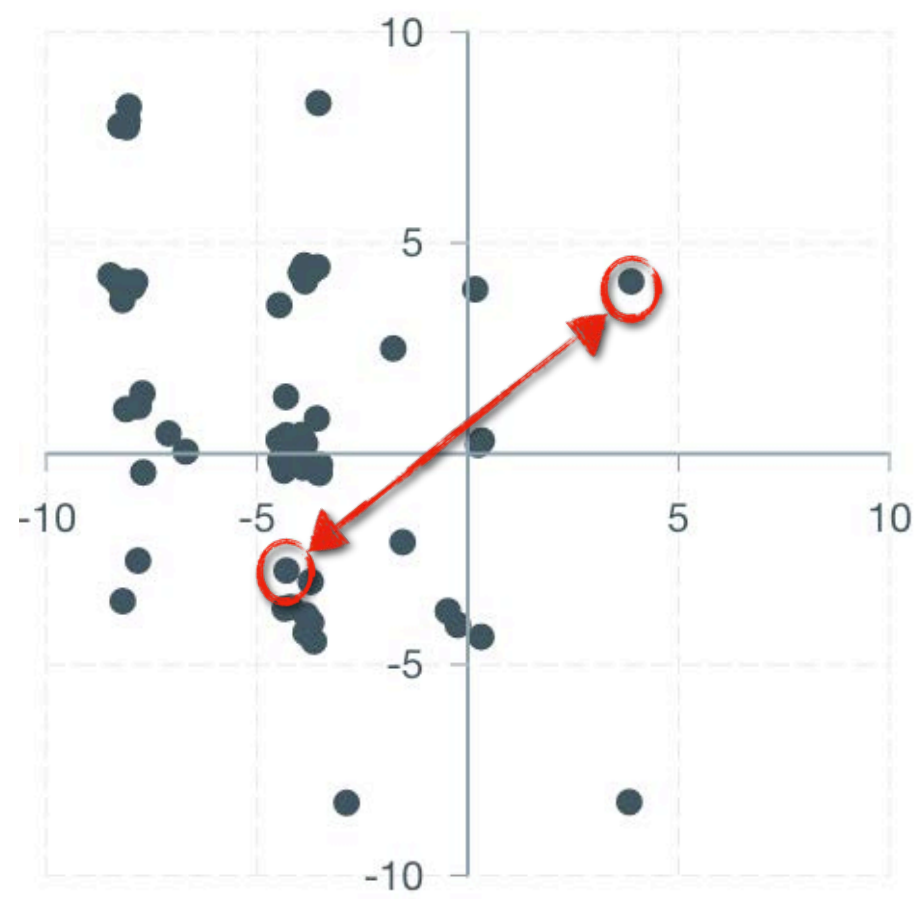
3 Command

4 Map

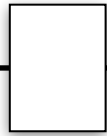
The form showed all the choices but was still pretty fast.

Submit

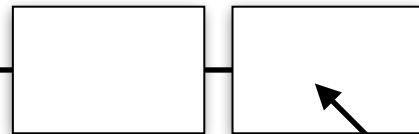
Socio-cognitive conflict



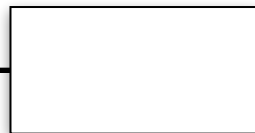
Class



Team



Solo



Chat (group/alone)

Group Chat

Friendly robot

Hello Guys :) I-33 CHILIAns

Friendly robot

Ryan ranked the interfaces in the following order: Command, Drag and Drop, Form, Map, with the justification 'The command is fastest once you have practice.'

Group Preference with Data (group/alone)

You and your partner must have the same ranking to submit.

Rank the interfaces in the order that you would most prefer them.

Ryan's List

At rank 1, add item:

Form

Drag and Drop

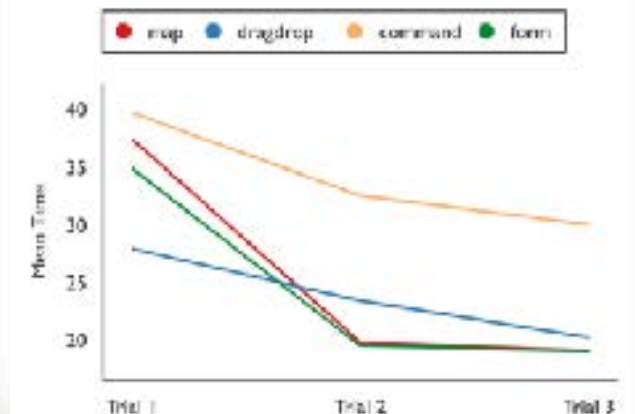
Command

Map

Train Data (group/alone)

STATS

MEAN TIME PER TICKET FOR EACH INTERFACE

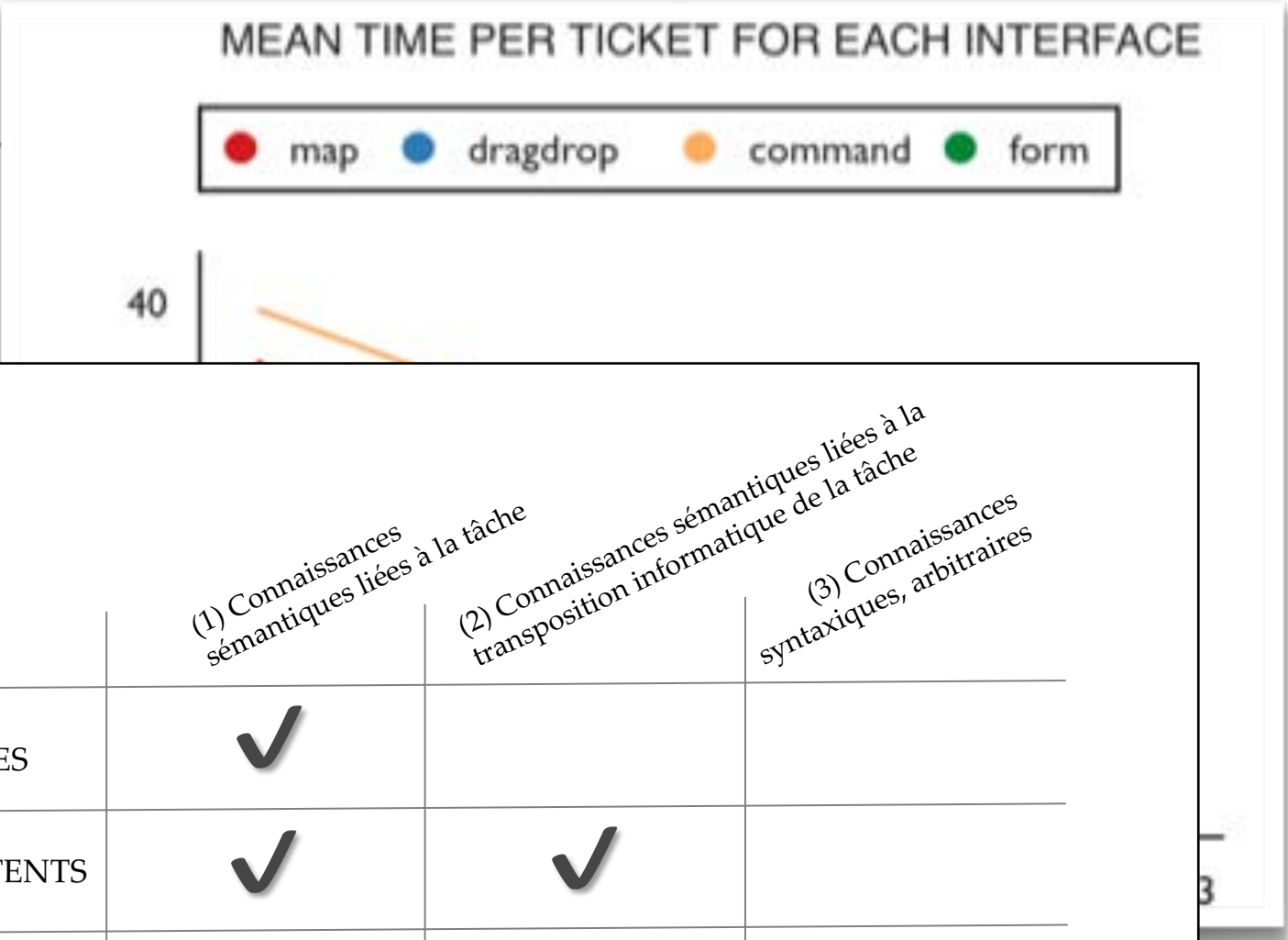
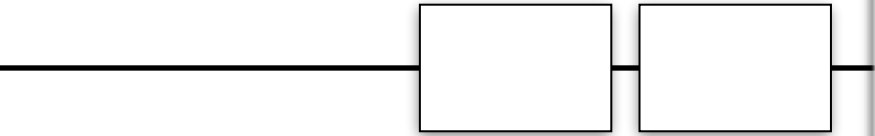


Arguing with data

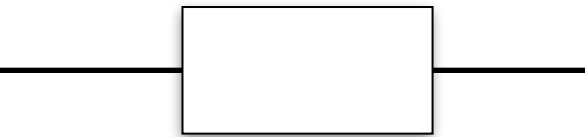
Class



Team



Solo



	(1) Connaissances sémantiques liées à la tâche	(2) Connaissances sémantiques liées à la transposition informatique de la tâche	(3) Connaissances syntaxiques, arbitraires
NOVICES	✓		
INTERMITTENTS	✓	✓	
EXPERTS	✓	✓	✓

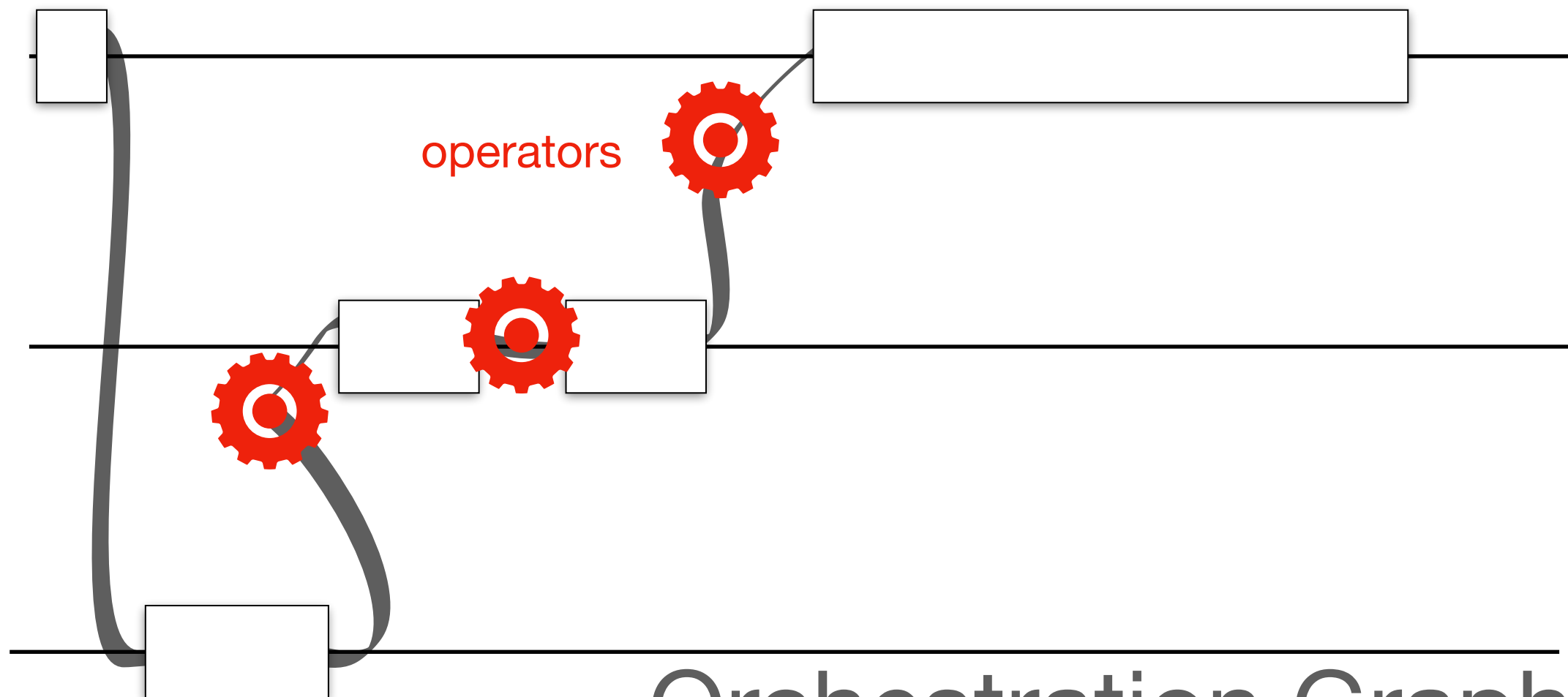
Class

Team

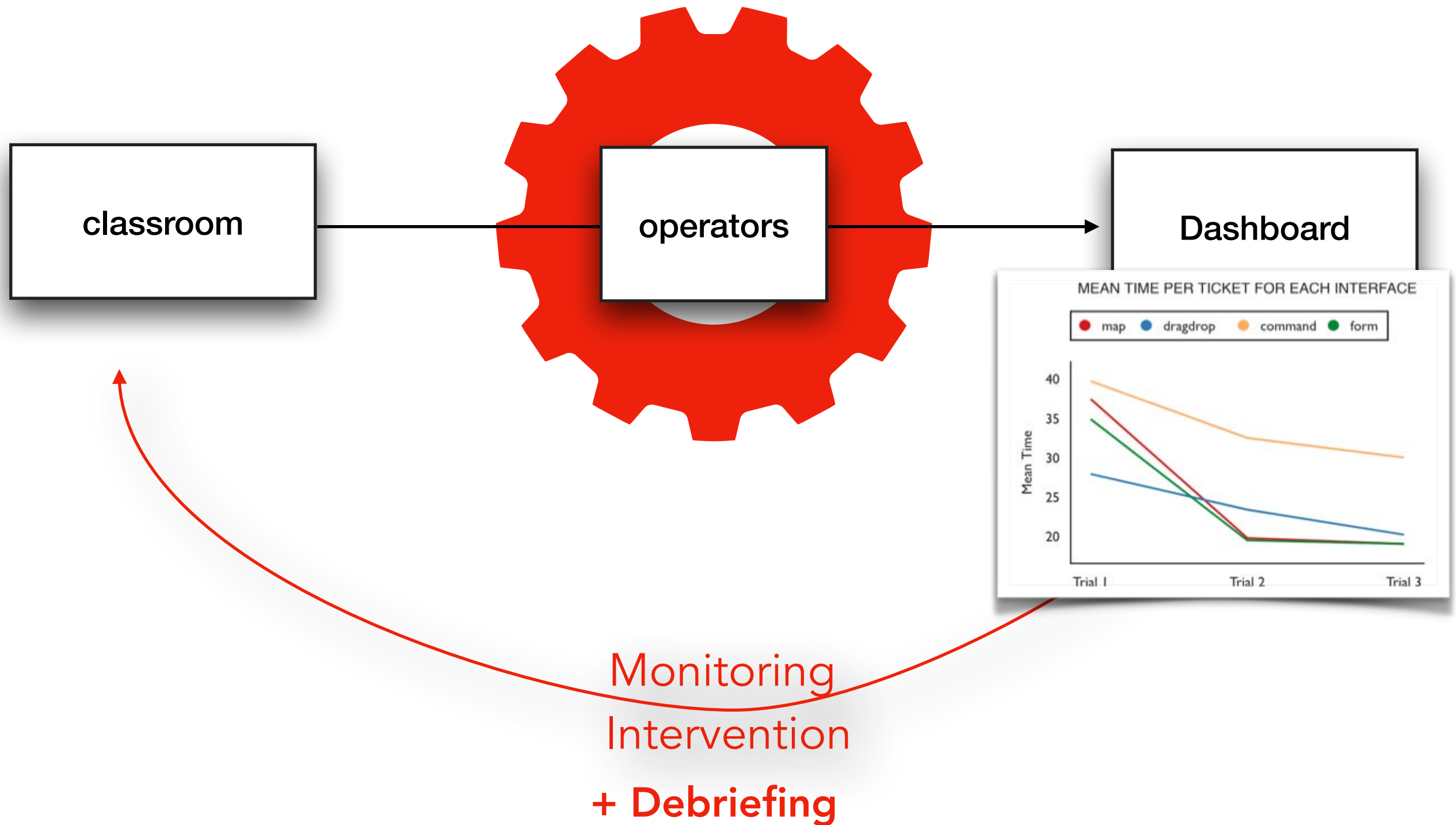
Solo

operators

Orchestration Graph

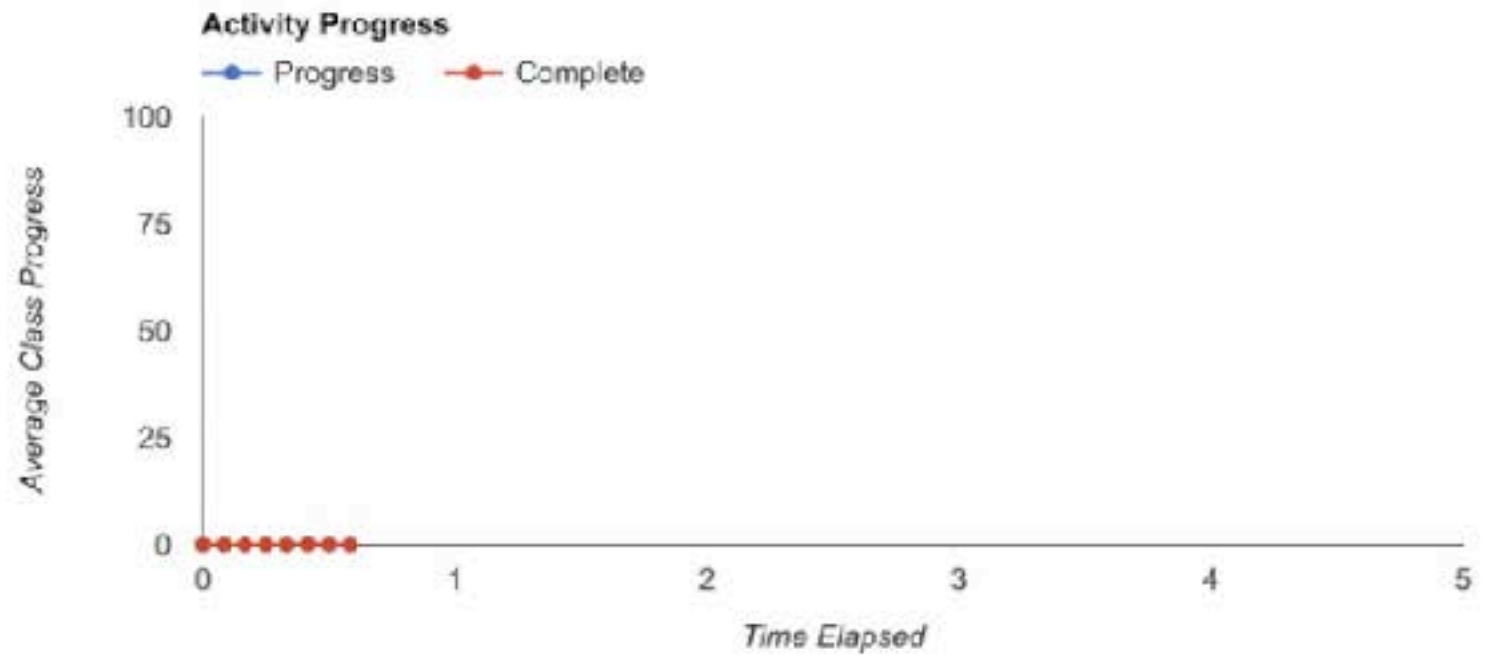


Aggregation, comparison, visualisation,....



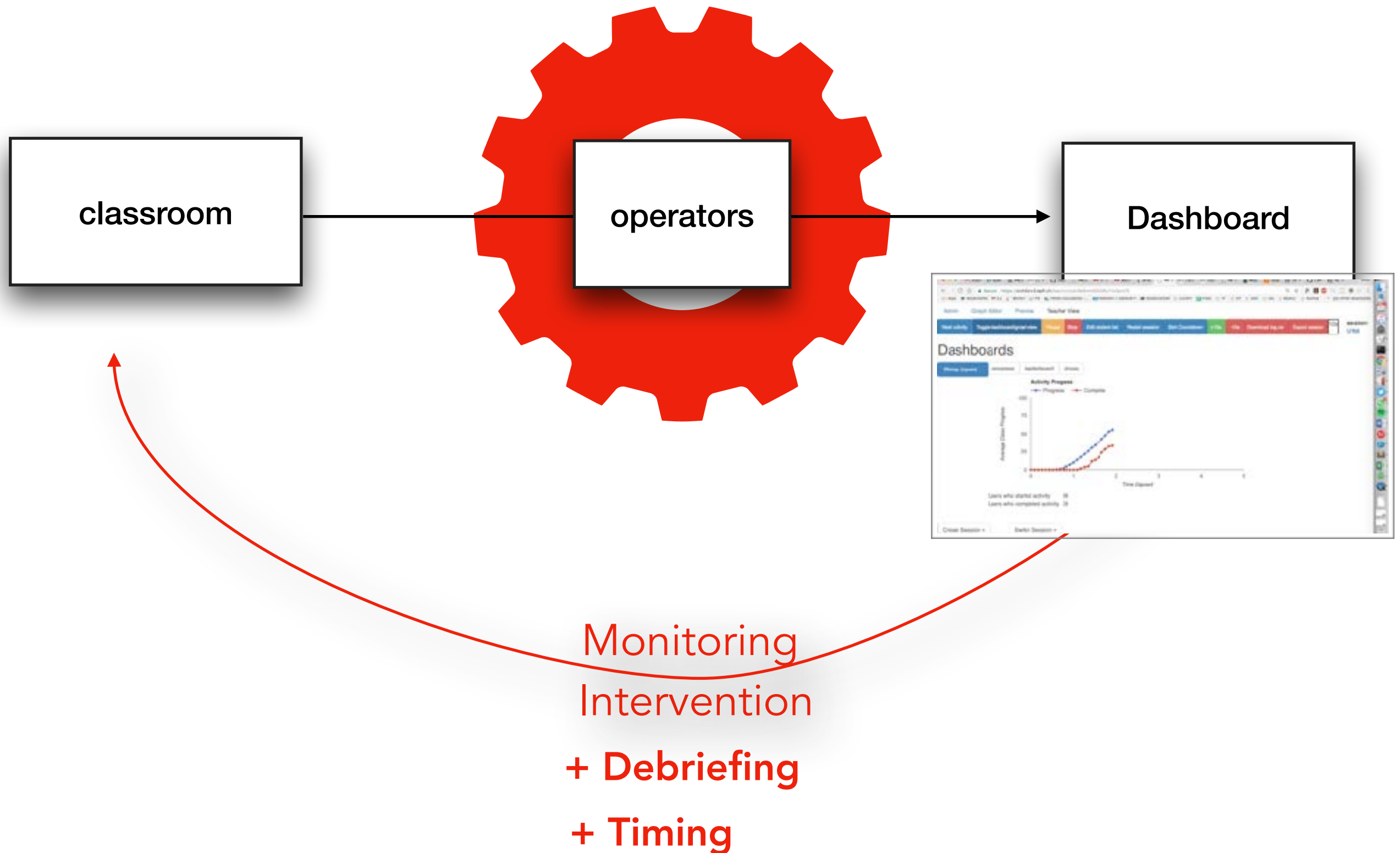
Dashboards

Stroop (open) progress leaderboard stroop



Users who started activity 3
Users who completed activity 0

Aggregation, comparison, visualisation,....



Looking for a postdoc or project manager

Monitoring
Intervention
Debriefing
Timing

Classware = orchestration technology

Monitoring
Intervention
+ Debriefing
+ Timing



