Classware

EPFL

P.Dillenbourg

Quelle plateforme digitale pour mon école ?

Welche digitale Plattform für meine Schule?

https://cdn.shopify.com/s/files/1/0552/1029/products/RSVN8R_NEWUltimateKit02_620x.jpg?v=1562168838

Digital School Ecosystem

Gestion projets

Simulations

Exercices

Vidéos de cours

Notes de cours

Robots

Chat

Partage

Forums

Portfolio

Outils informatiques

LMS

Site Web

Curricula

Notes

Bibliothèque

Horaires

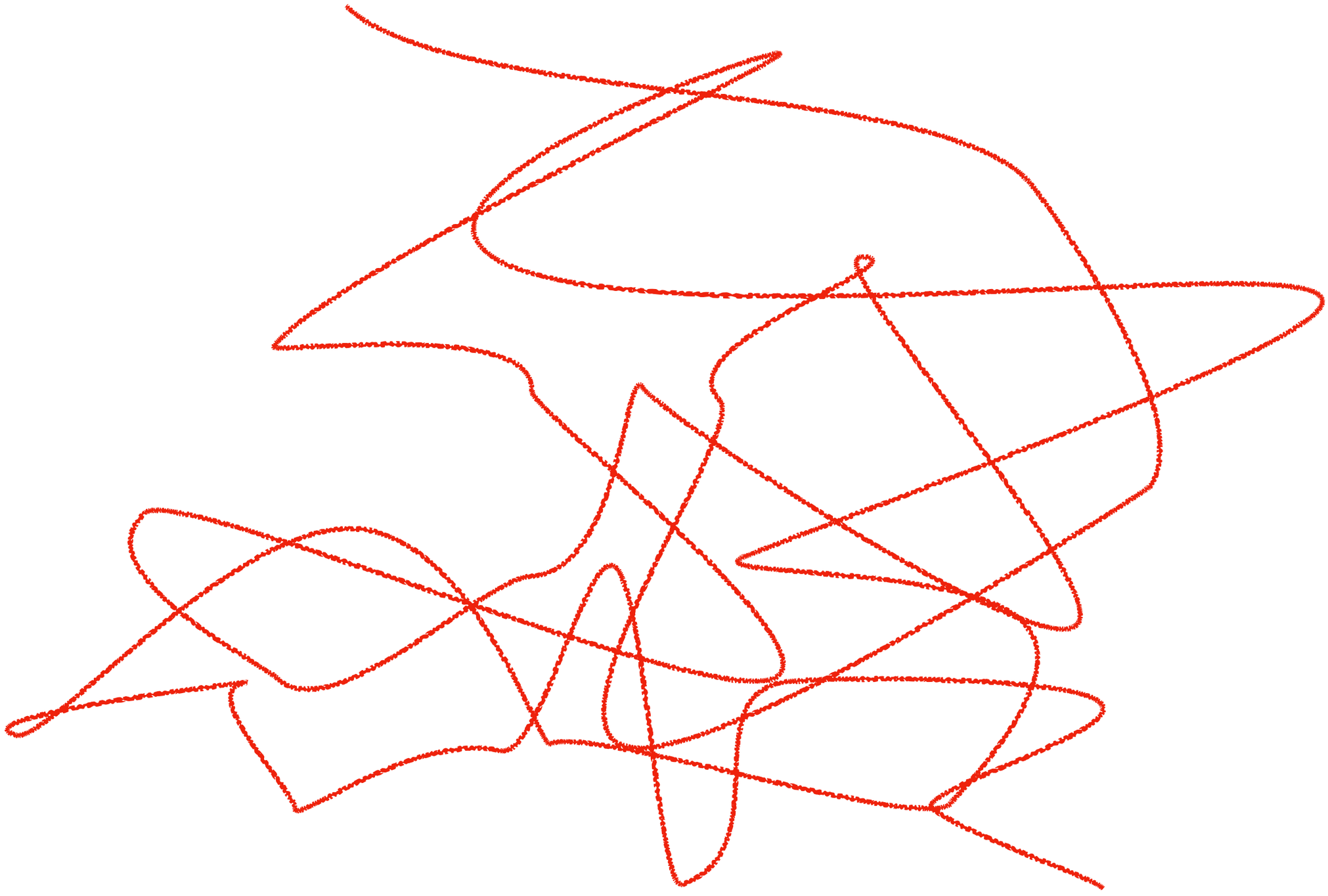
Salles

Etudiant(e)s

Enseignant(e)s

Salaires

Comptabilité



Gestion projets

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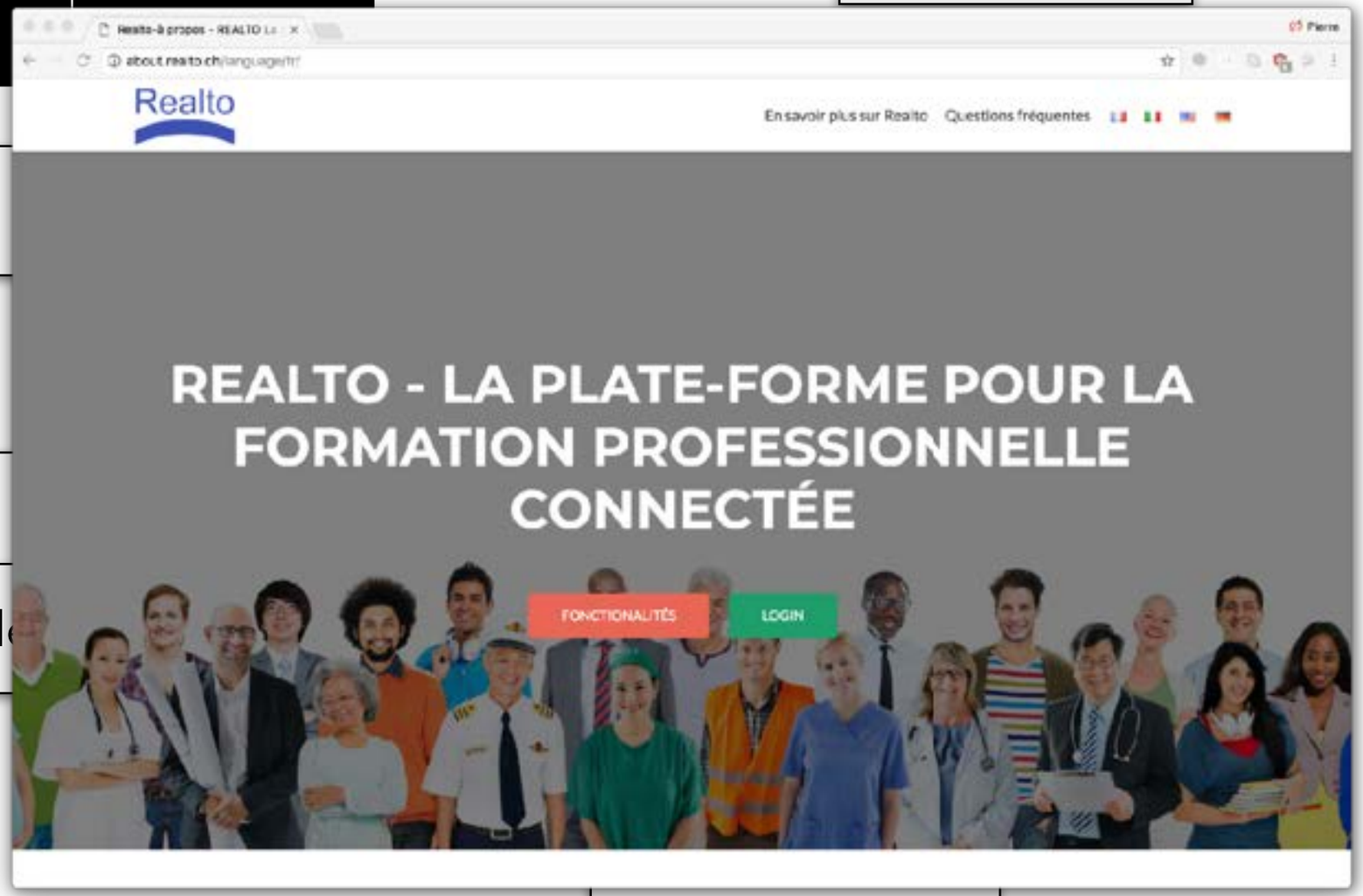
Salle

Comptabilité



Outils informatiques

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Gestion projets

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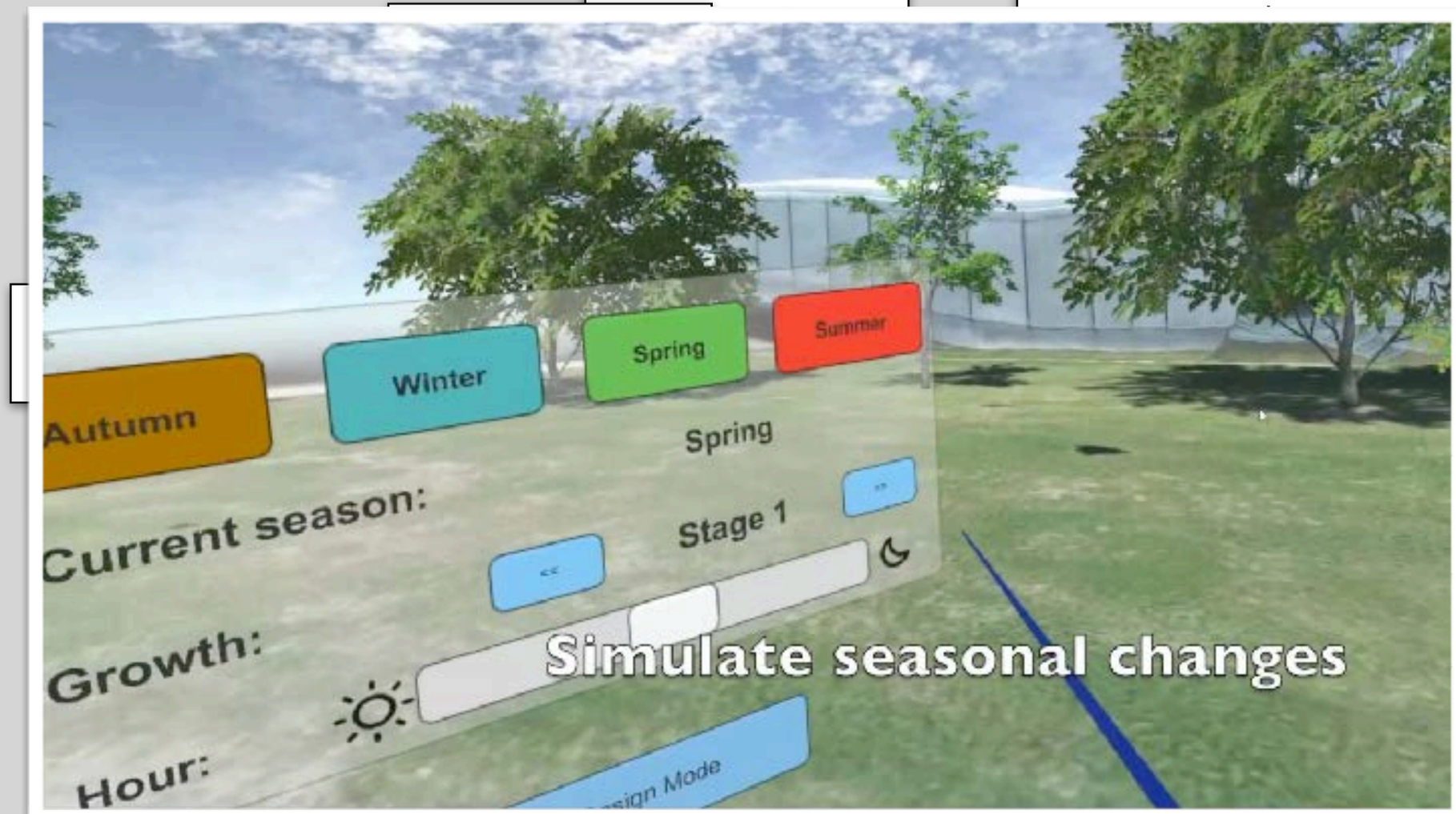

Notes

Enseignant(e)s

Salaires

Comptabilité

Gestion projets

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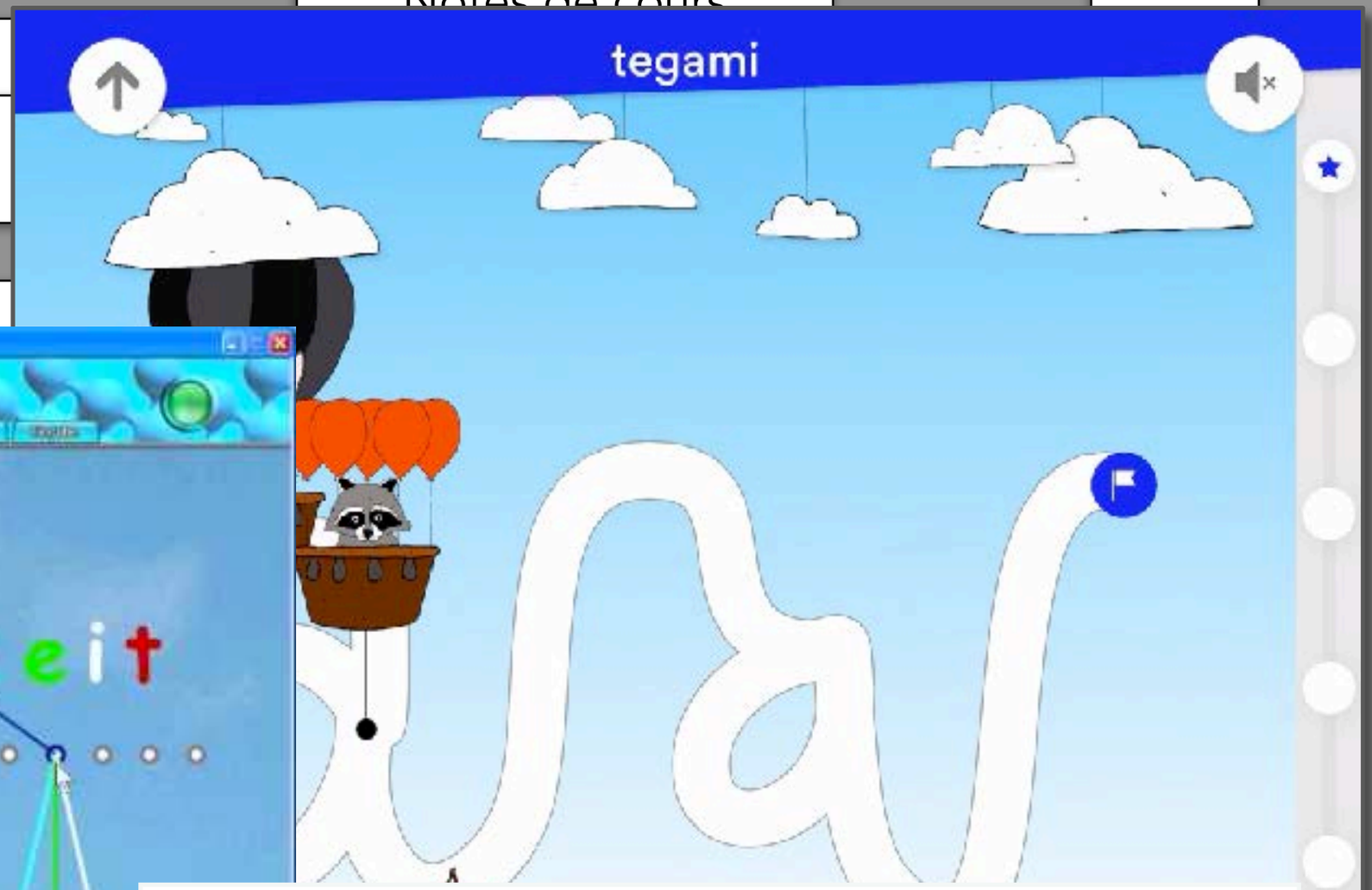
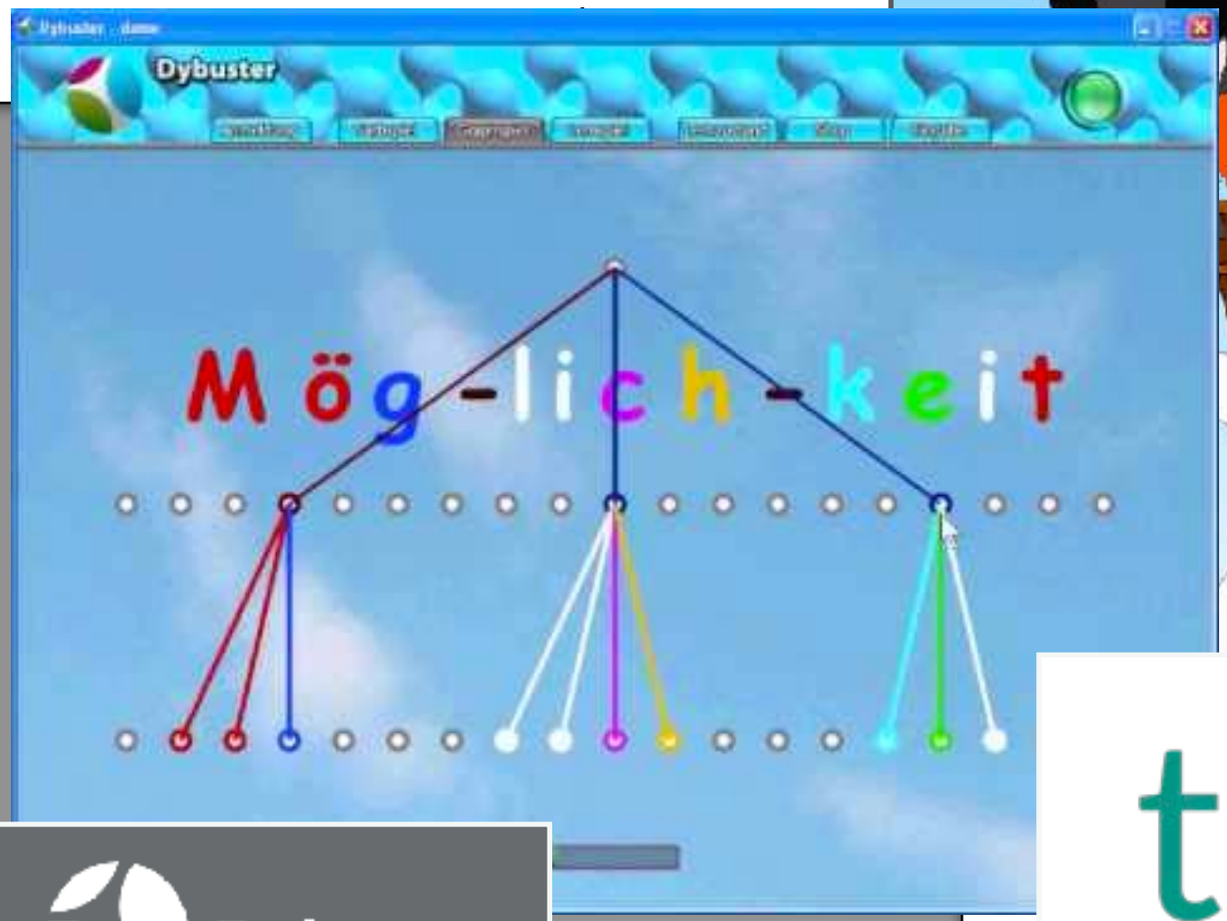




Dybuster

taskbase

Outils informatiques

Gestion projets

Simulations

Vidéos de cours

Notes de cours

Robots

Partage

Chat

Forums

Portfolio

Swiss MOOC Service

MOOCs

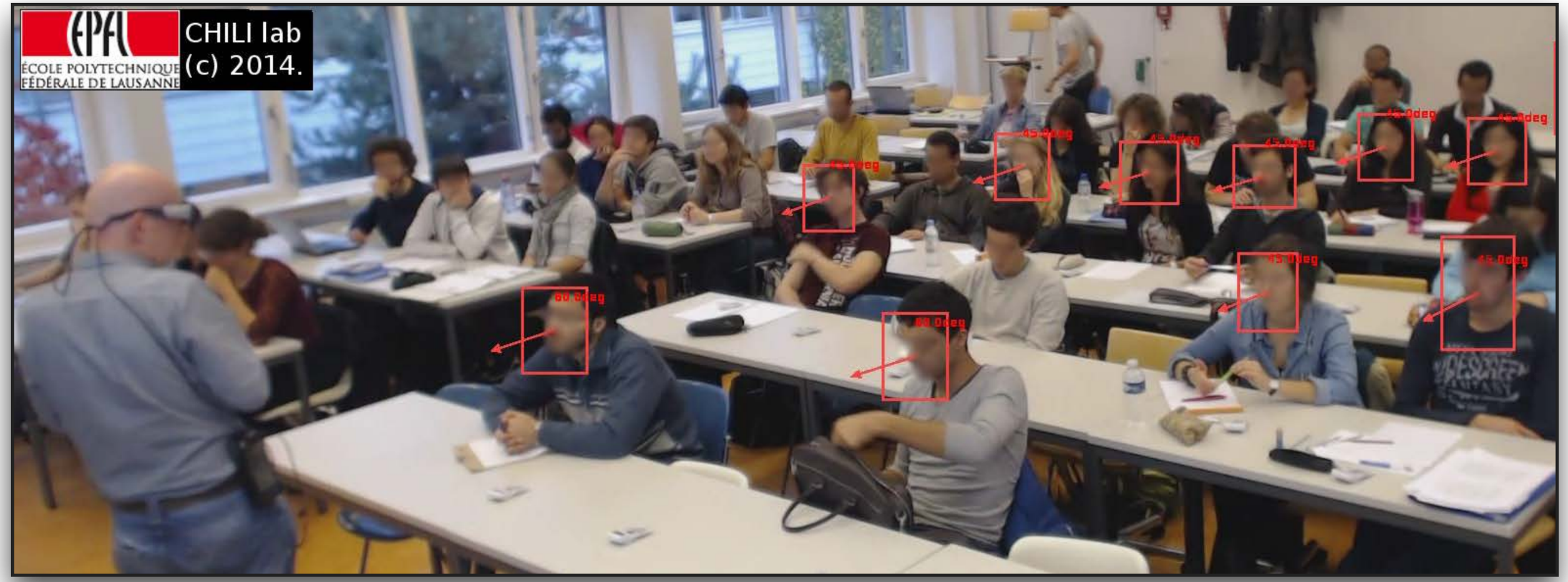
Notes

Salaires

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 ?

Jean vs TED

1896

TEDTalks

EPFL Exercises Session

assistant

works

waits

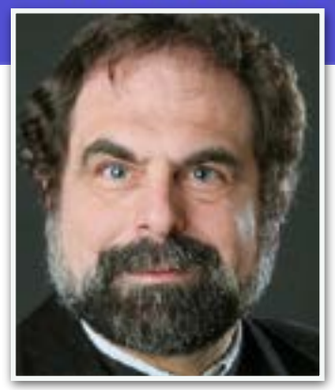
H. Alavi, Olivier Guédat

"While Waiting Productivity" LOSS : 62% ➔ 6%

H. Alavi, Olivier Guédat

SpeakUp

Une app pour favoriser les interactions en/hors cours



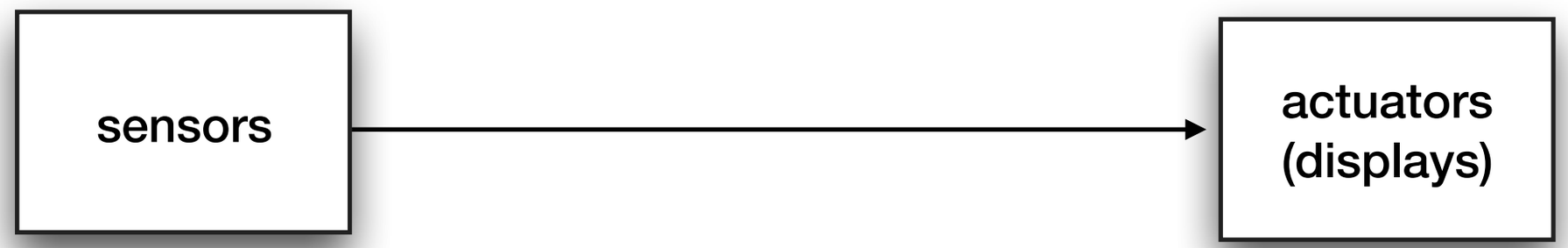
Denis Gillet

Classtime

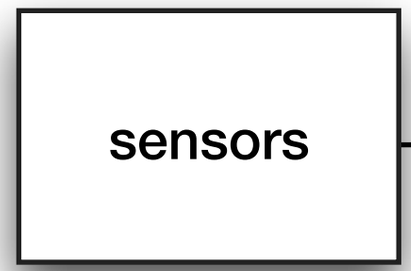
Classware: the classroom is a digital system

« Classware »

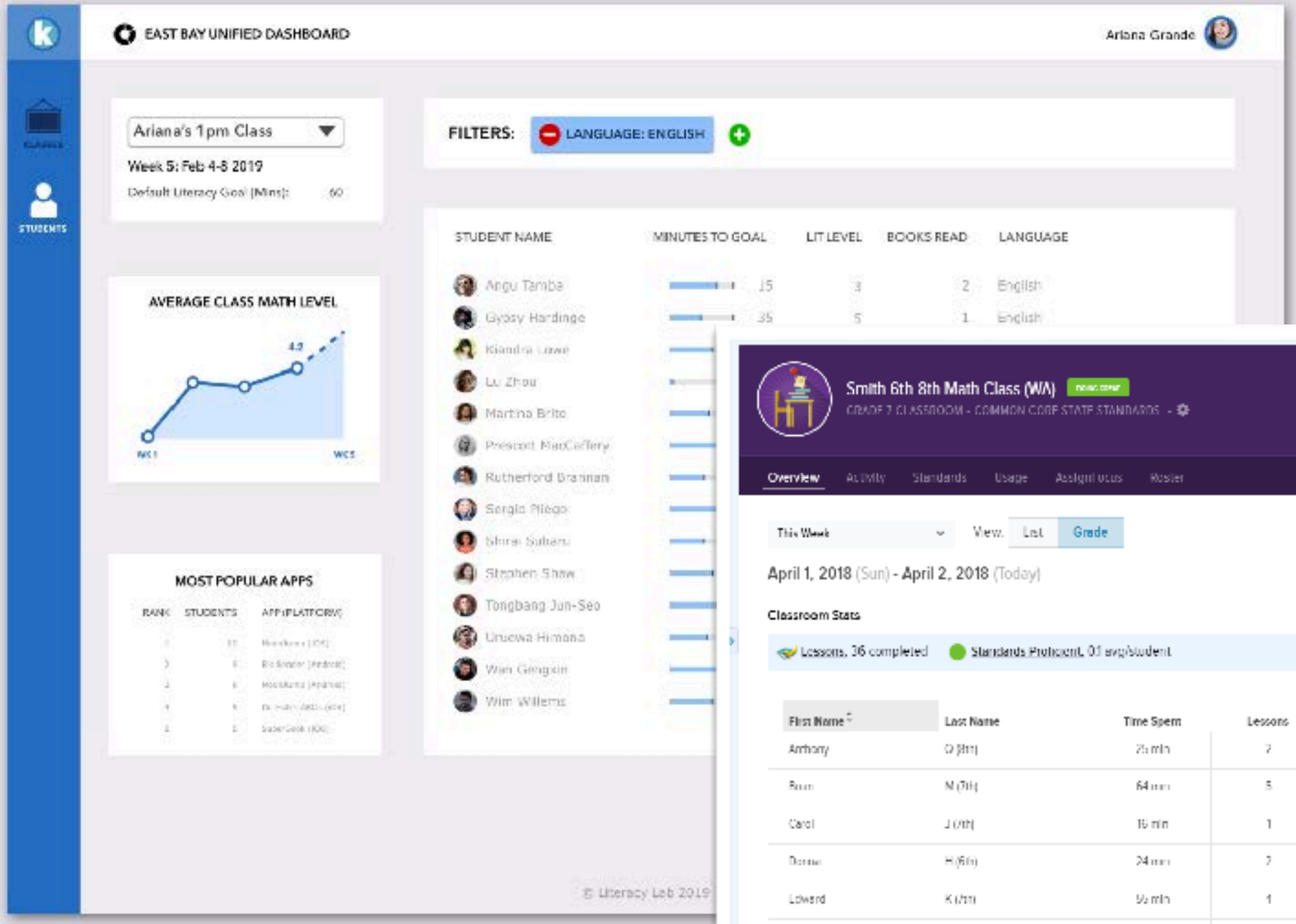
My (physical) classroom is a digital environment



- **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

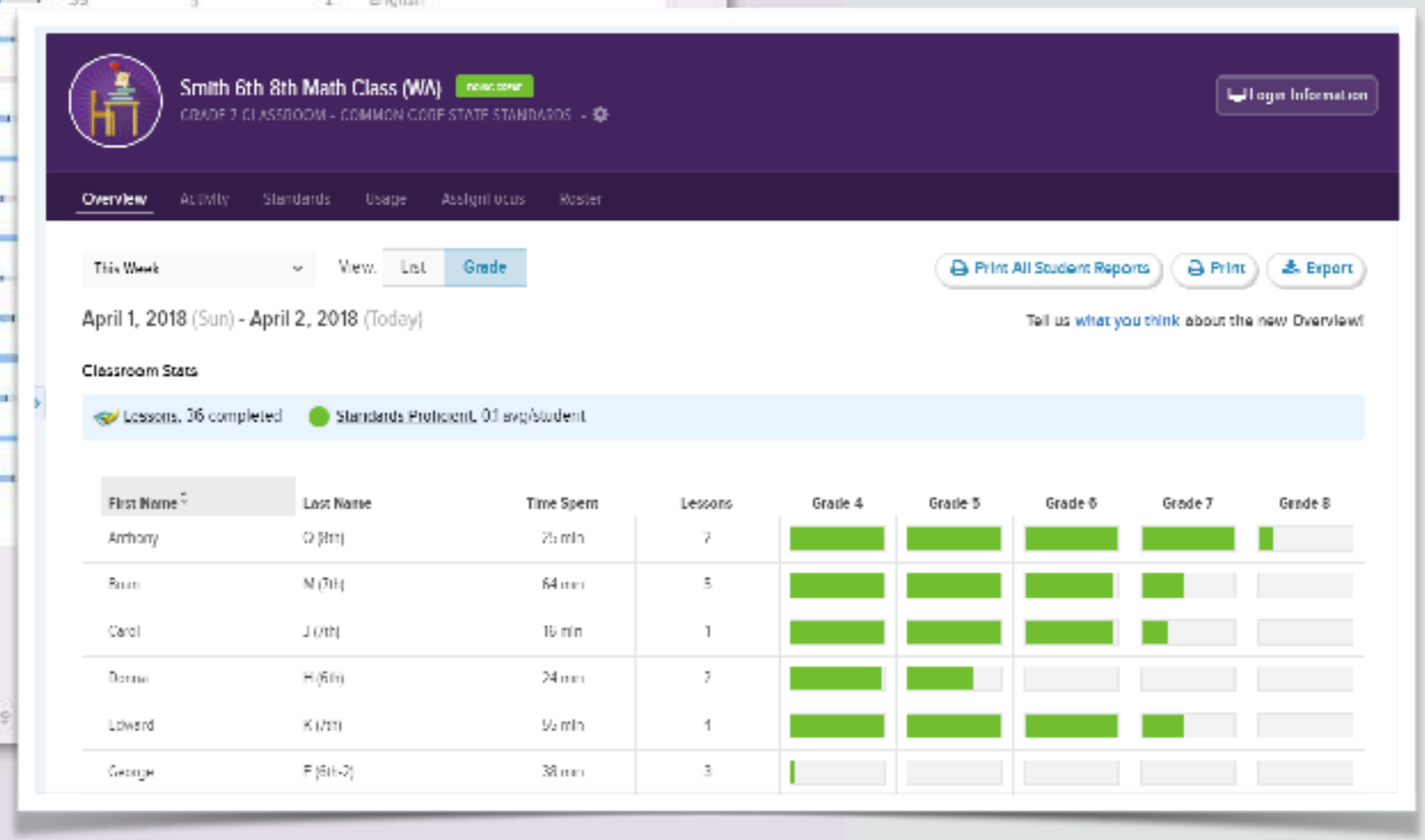


- **Precision Gas Sensor** - Test air quality, carbon monoxide levels
- **Reducing Gas Sensor** - Sense methane, propane, and natural gas leaks
- **Oxidizing Gas Sensor** - Ozone sensing and chlorine leaks
- **Non-Contact Thermometer** - Check food temperature, engine diagnostics, …
- **Humidity Sensor** - 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

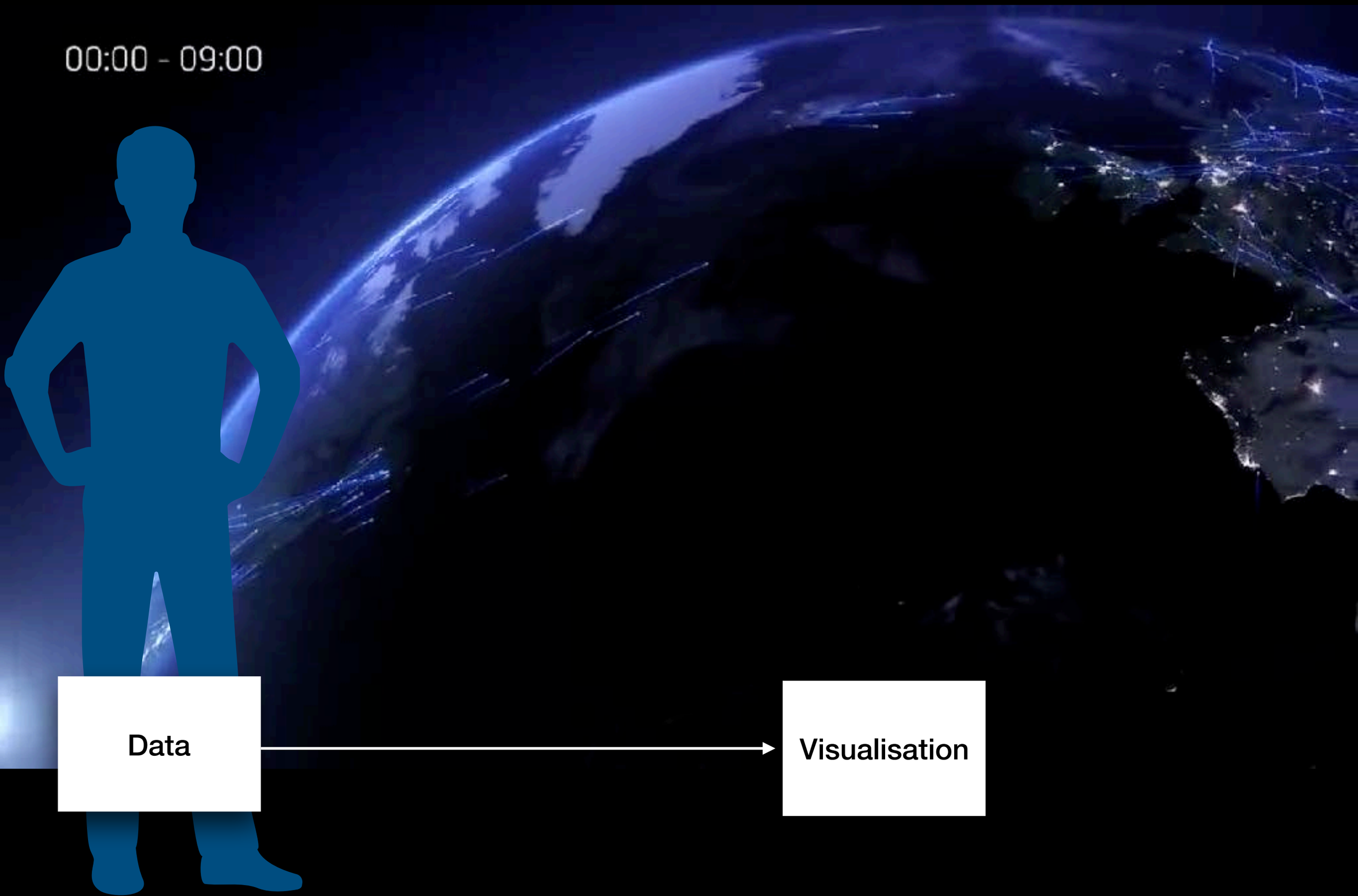


Dashboard

sensors → actuators (displays)


1356
Norway
Sweden
Sweden
Republic of Novgorod
Scotland
Ireland
England
Wales
Denmark
Teutonic Order
Vladimir
Lithuania
Golden Horde Mongols
Poland
Wittelsbachs
Bohemia
Luxembourg
France
Holy Roman Empire
England
Habsburgs
Hungary
Portugal
Castile
Aragon
Angevins
Serbian Empire
Bulgaria
Granada
Sardinia Aragon
Kingdom of Naples
Byzantine Empire
Morocco
Marinid
Algeria
Hafsid
Tunisia
Sicily
Mamluk
Data
Visualisation

00:00 - 09:00



Data

Visualisation

Kidapolis

Dreambox

Dashboard

Classroom
Data

Visualisation

Aggregation, comparison, visualisation,…

classroom

Dashboard

Don’t diagnose what you can’t treat !

Monitoring
Intervention

Distributed

Data

Visualisation

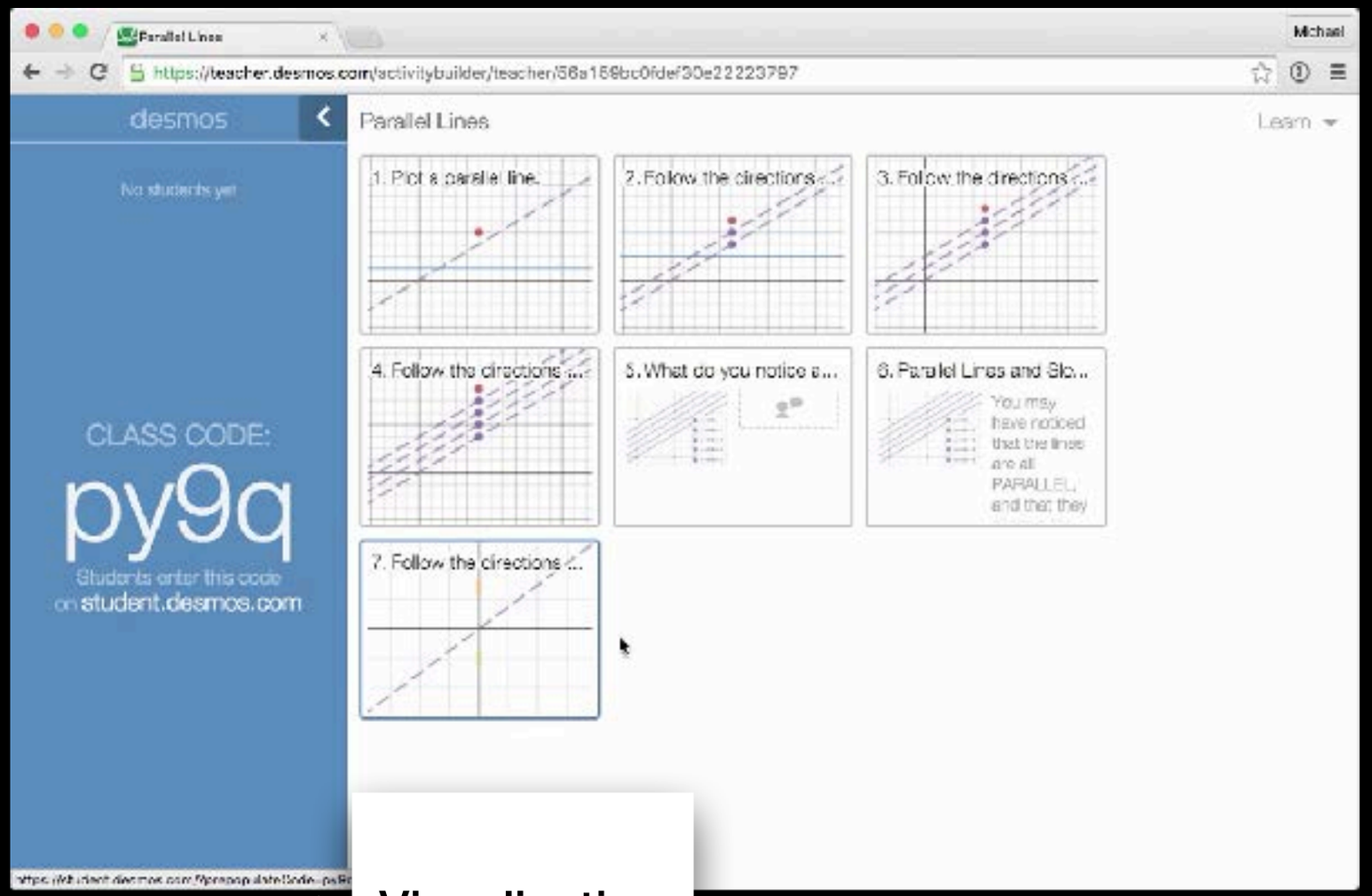
Centralized

Real-time

Reflection-in-action

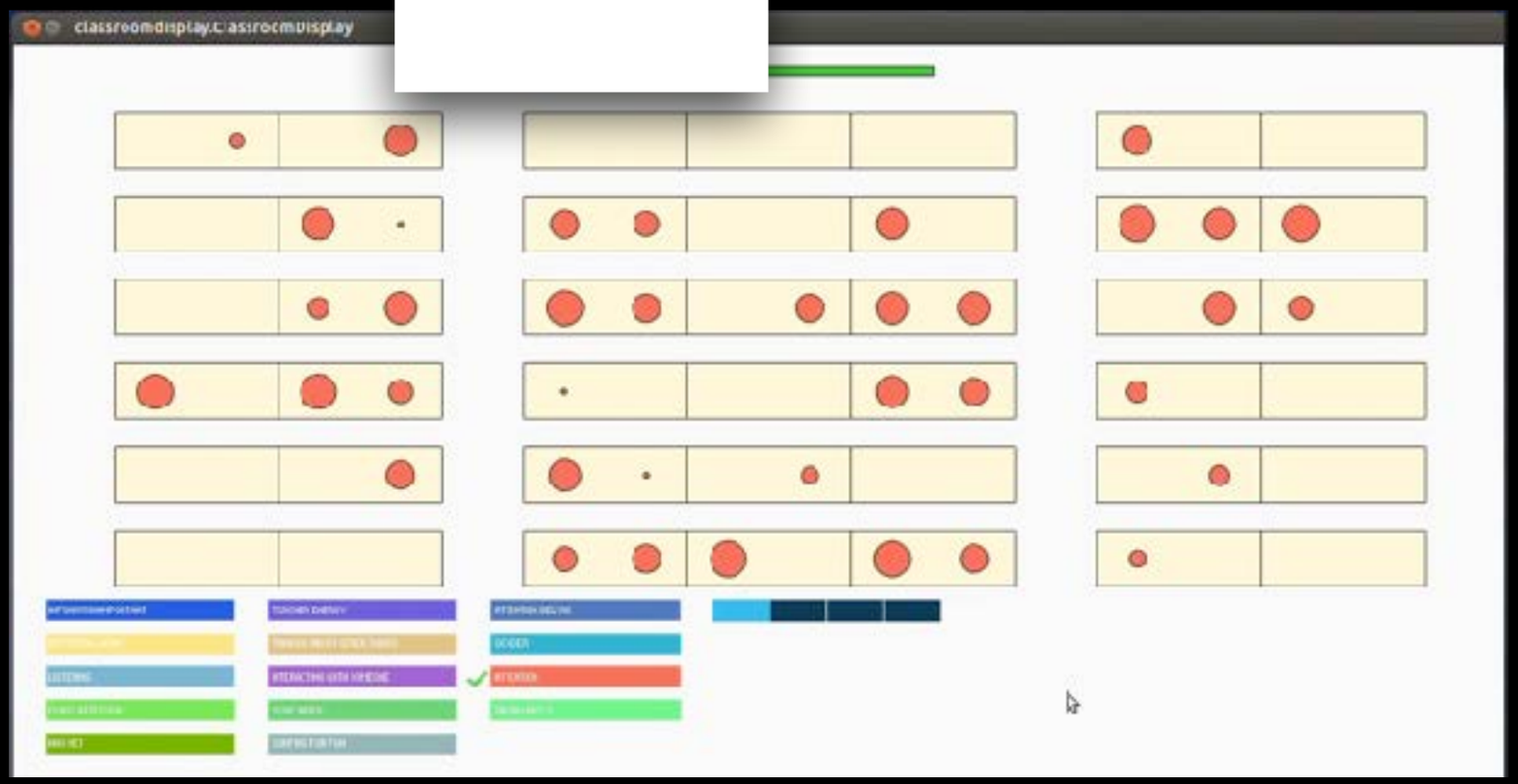
Data

Visualisation

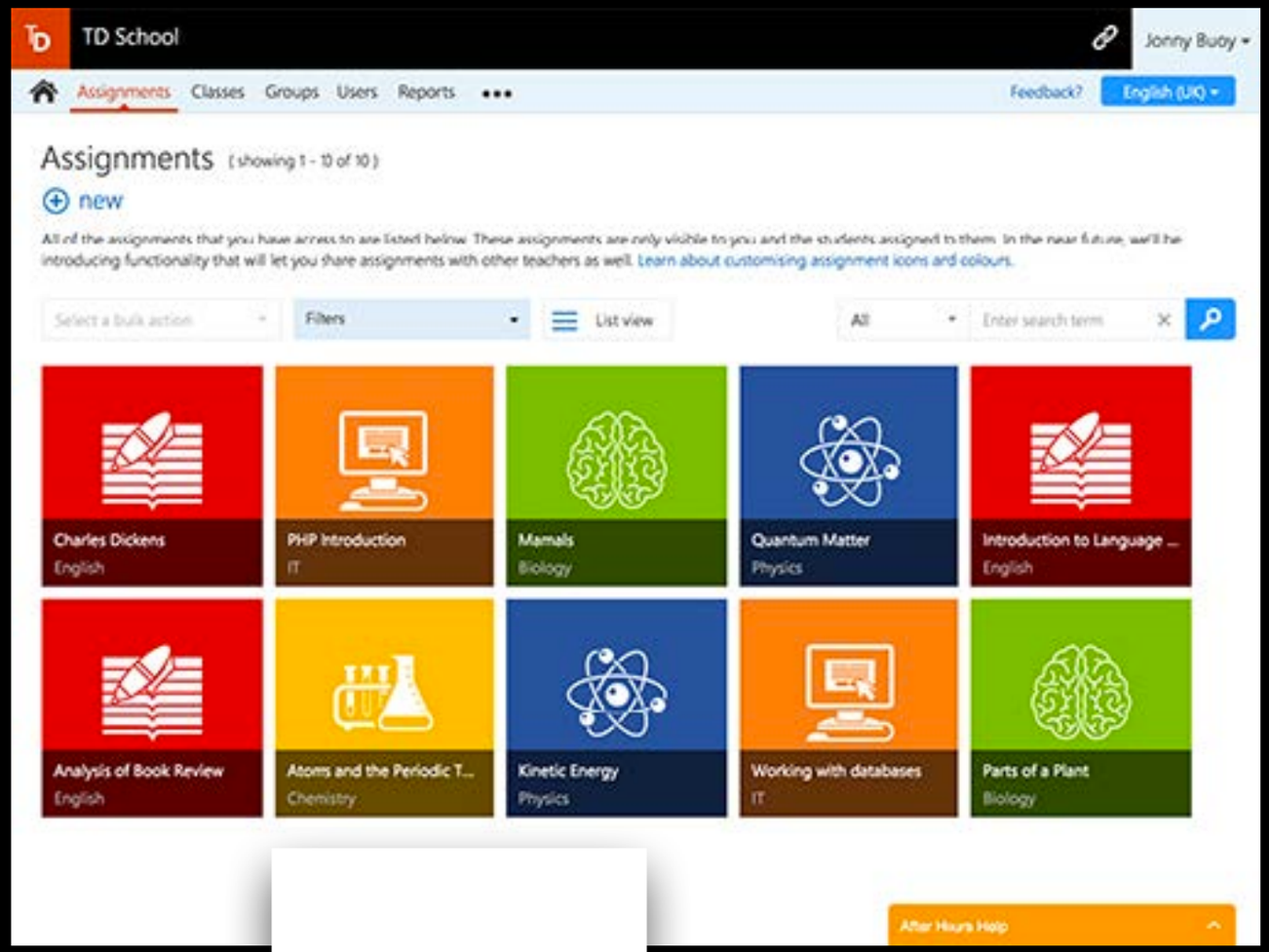


Replay

Reflection-on-action



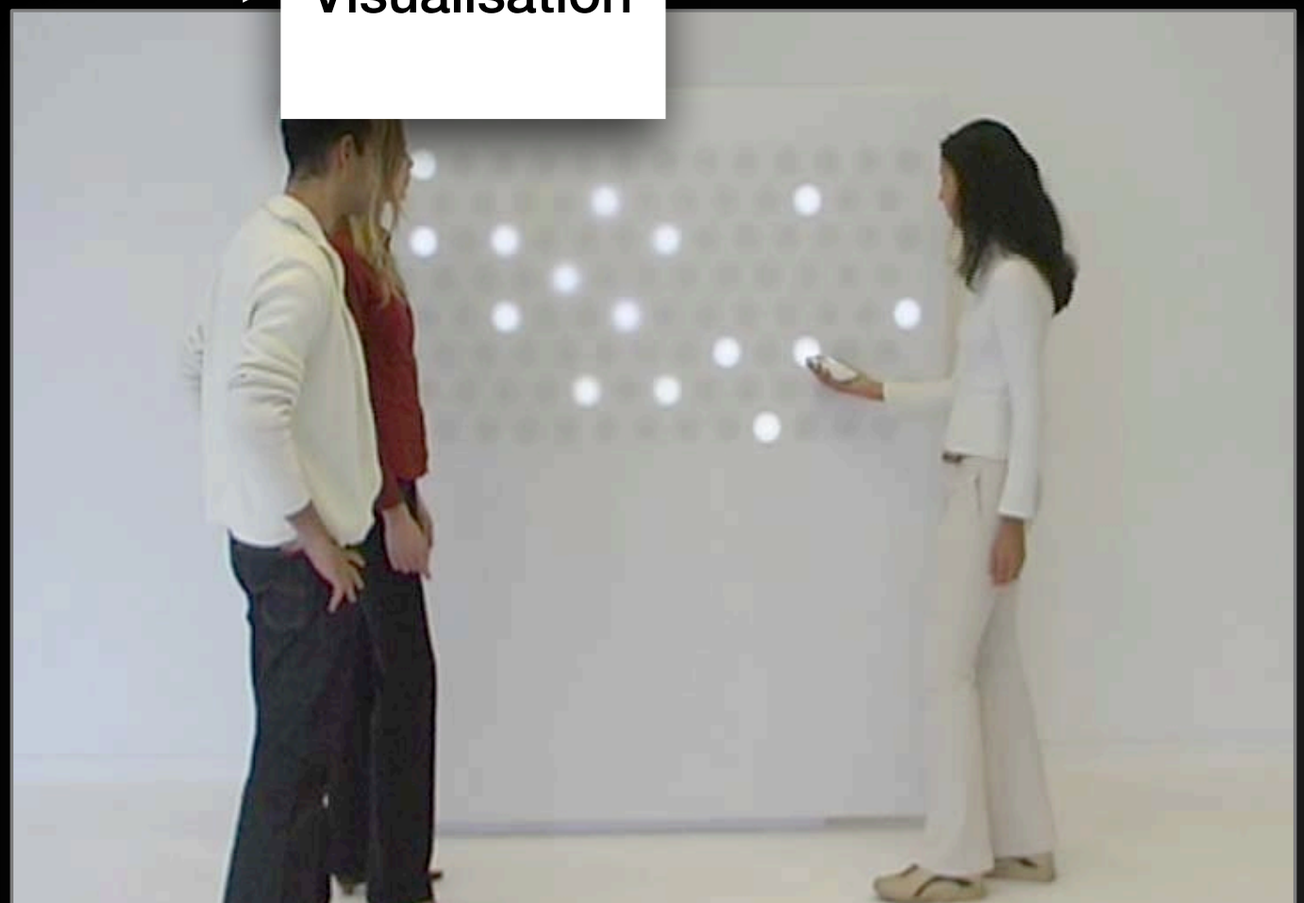
Focal



Data

Visualisation

Peripheral
(ambient)

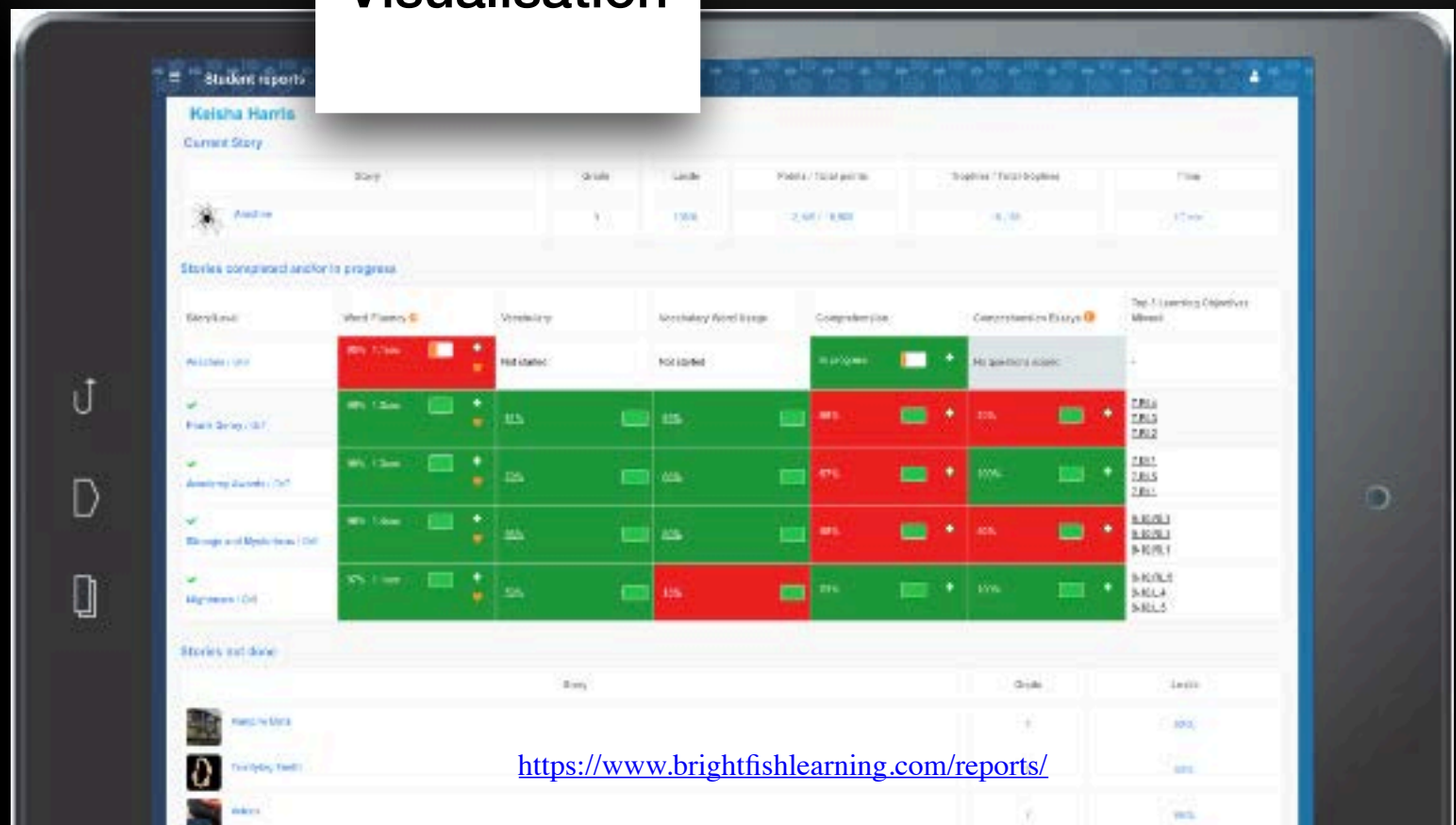


Public Dashboard

Data

Visualisation

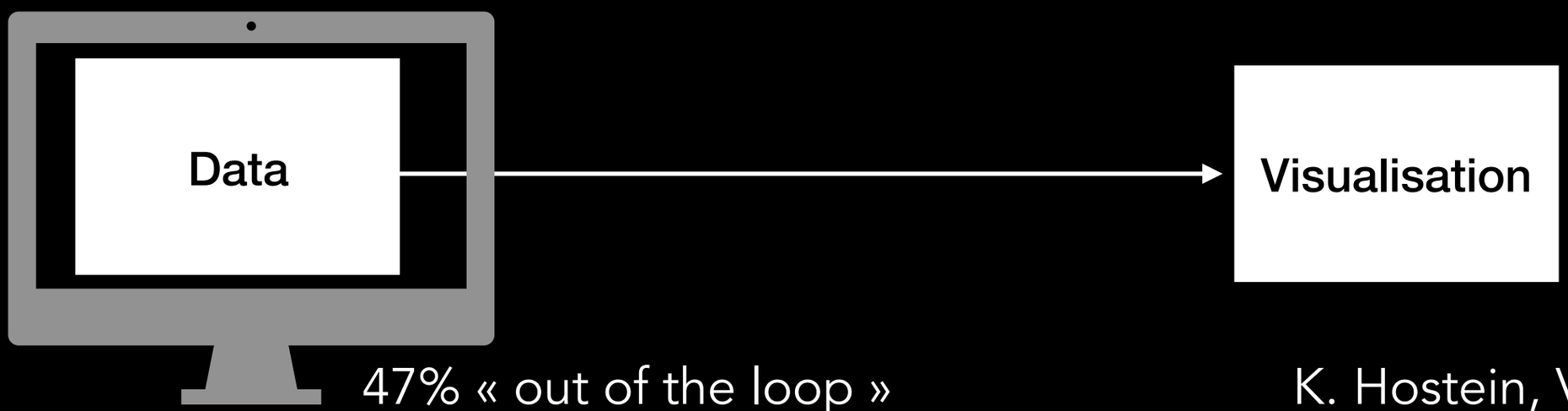
Private Dashboard



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. Aleven & N. Rummel

ribuited

Teachers’
Data

Visualisation

Teachers' Data → Visualisation

You are crazy !

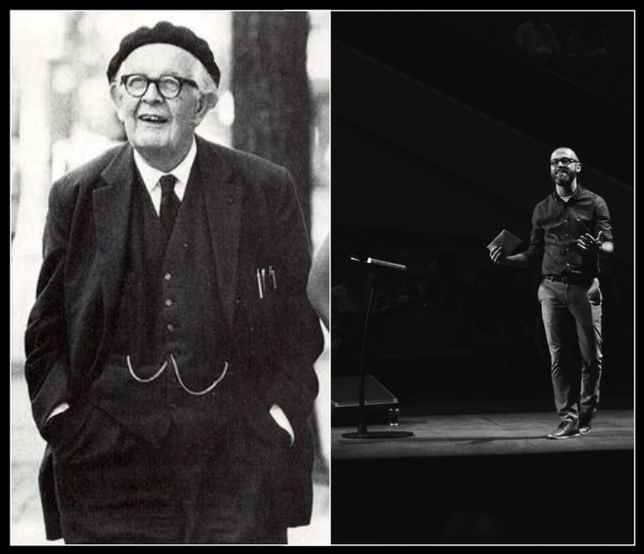
1. Are you **crazy** ?

IMEC ITEC KULeuven

You are crazy !

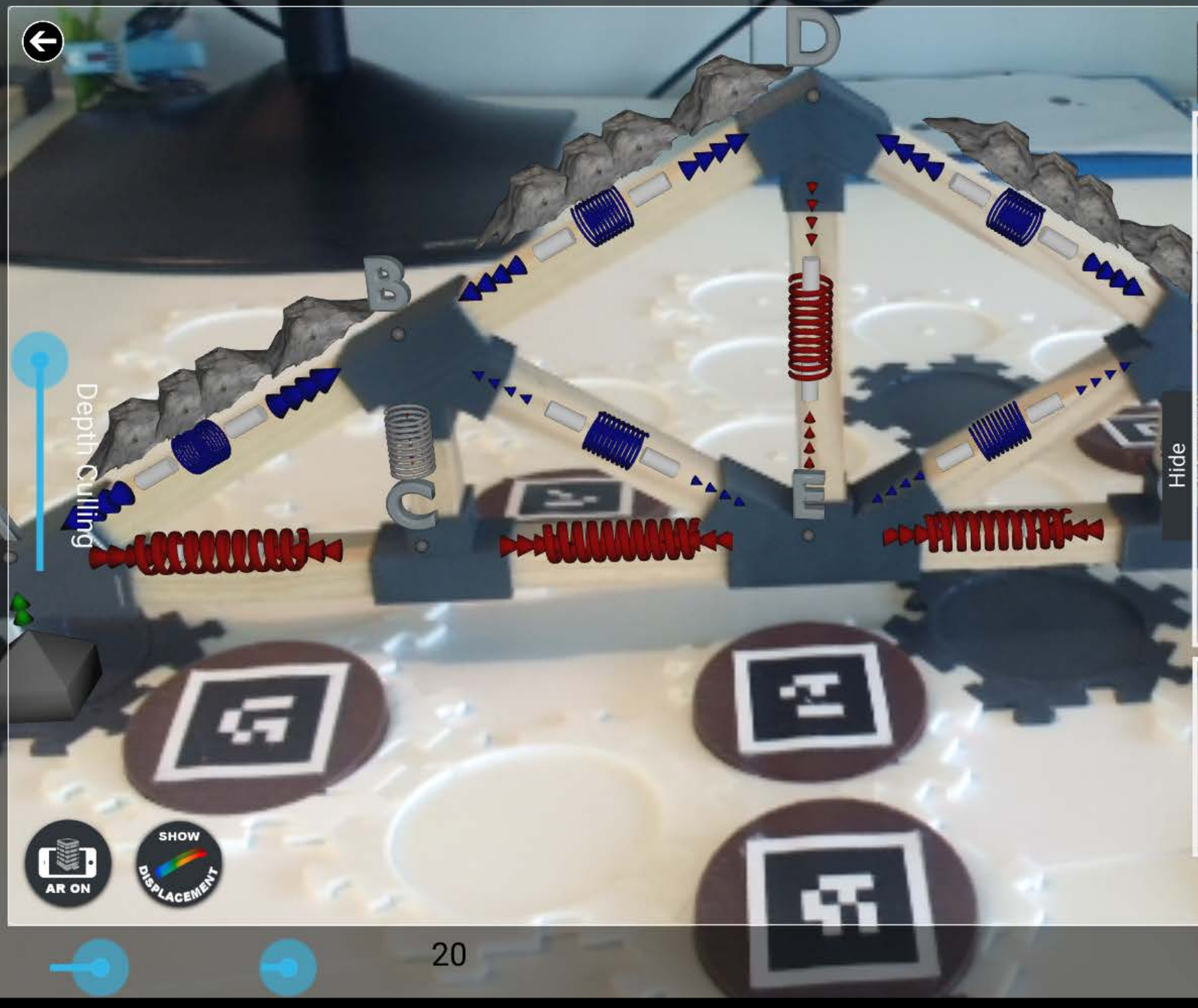
1. Are you **crazy** ?

2. Lecturing better or lecturing less ?



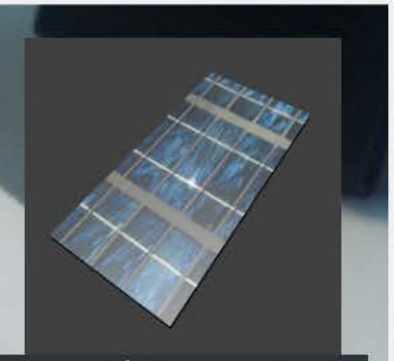
Intuitive statics for carpenters ?

Axial Forces: Compression Tension Support



Catalog | Be... | Joi... | Joi...


Load:0.03Kg/mm


Load:0.05Kg/mm

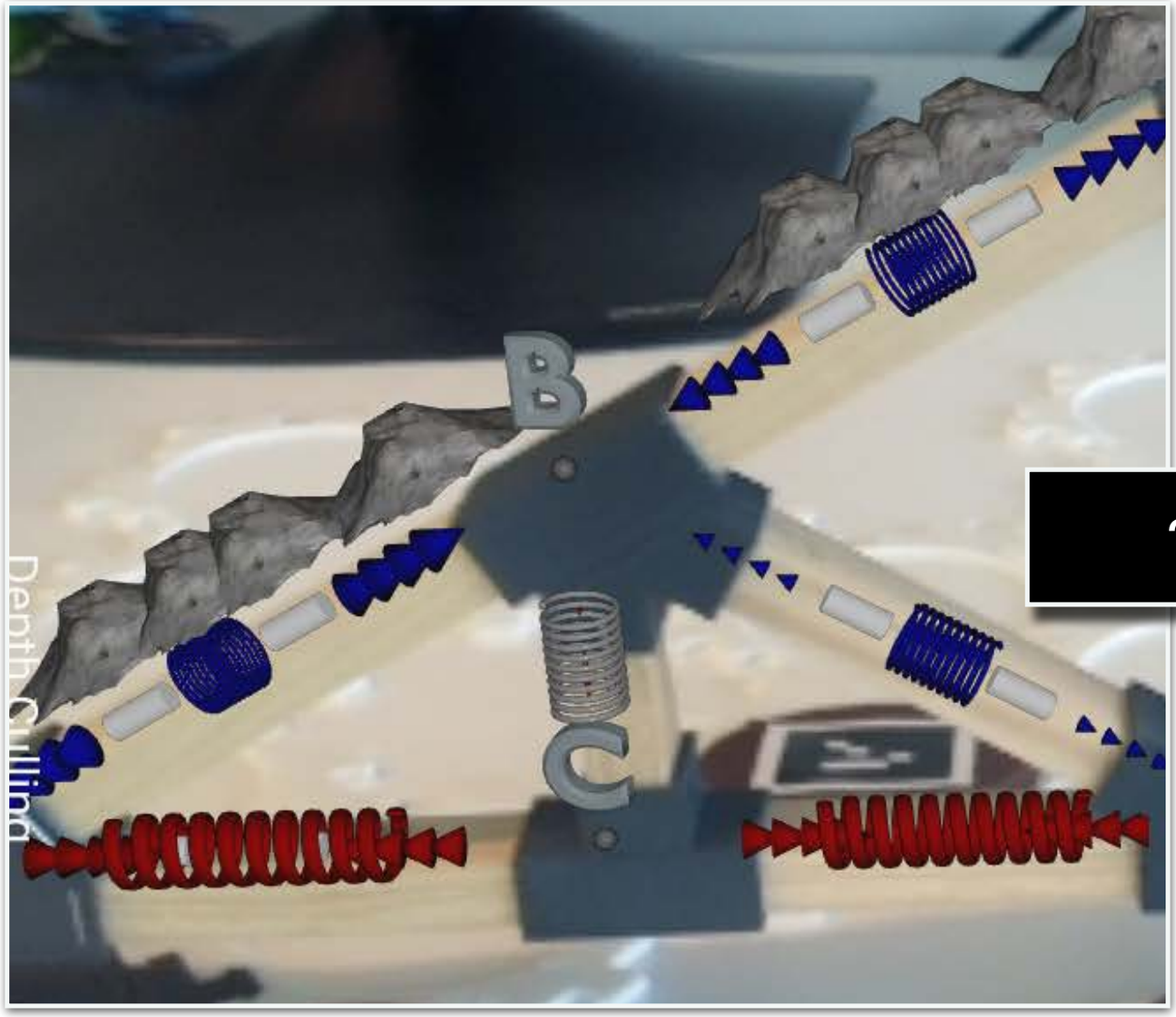
Remove Load

Apply Load

AR ON

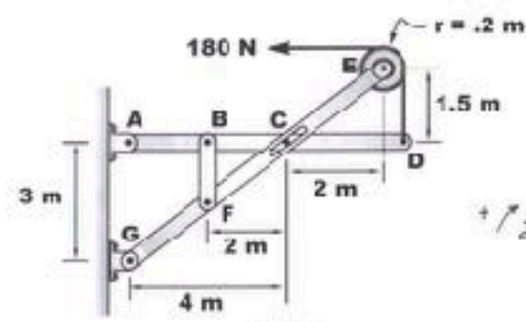
SHOW DISPLACEMENT

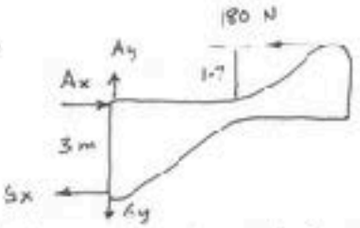
20



???

2. (25 points) The frame shown below supports a load of ~~400~~ 180 N from its cable. Determine the reactions at A, B, and C necessary for equilibrium. Draw a final picture of member ABCD with forces properly oriented.

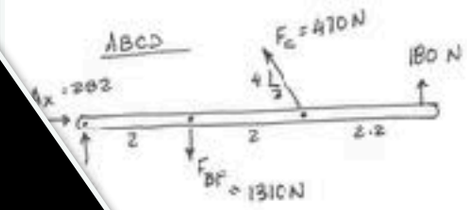




$+\circlearrowleft \Sigma M_G = 0;\quad A_y(3) - 180(4.7) = 0;$

$A_y = 282\ N \uparrow$

$G_x = 102\ N \leftarrow$



ABCD

$\rightarrow \Sigma F_x = 0;\quad 282 - \frac{3}{5} F_c = 0$

$F_c = 470\ N \nearrow 3/5$

$+\circlearrowleft \Sigma M_A = 0;\quad \frac{3}{5}470(4) + 180(6.2) - F_{BF}(2) = 0;$

$F_{BF} = 1310\ N \downarrow$

$+\uparrow \Sigma F_y = 0;\quad A_y - 1310 + \frac{3}{5}470 + 180 = 0$

$A_y = 754\ N \uparrow$

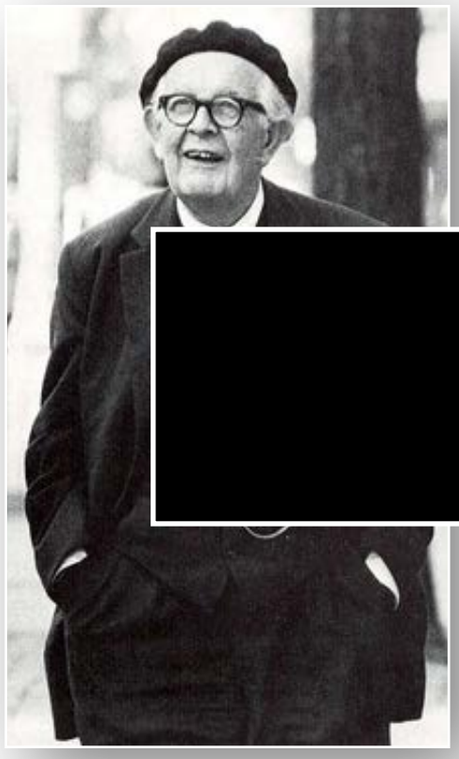
Slope wrong on F_c ...

$F_c = \frac{5}{4}282 = 352.5\ N$

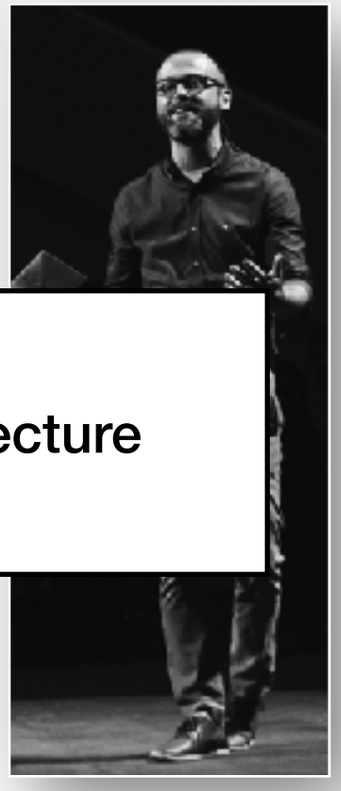
Don't need slot at C!
Just a pin at C (no BF),
or BF and no pin at C.

282
Ax, Gx = 102
Support Rx's: ≥ 15 pts, ...

There is a time for telling



Problem Solving



Lecture

Who's the most consistent striker?

"Productive Failure"

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

Kapur, M., & Bielaczyc, K. (2012). Designing for productive failure. *Journal of the Learning Sciences*, *21*(1), 45-83.

Comparing regularity

Mike Arwen : Mean = $\frac{280}{20}$

= 14 goals / year

Mode = 14

Dave Backhand : Mean = $\frac{280}{20}$

= 14 goals / year

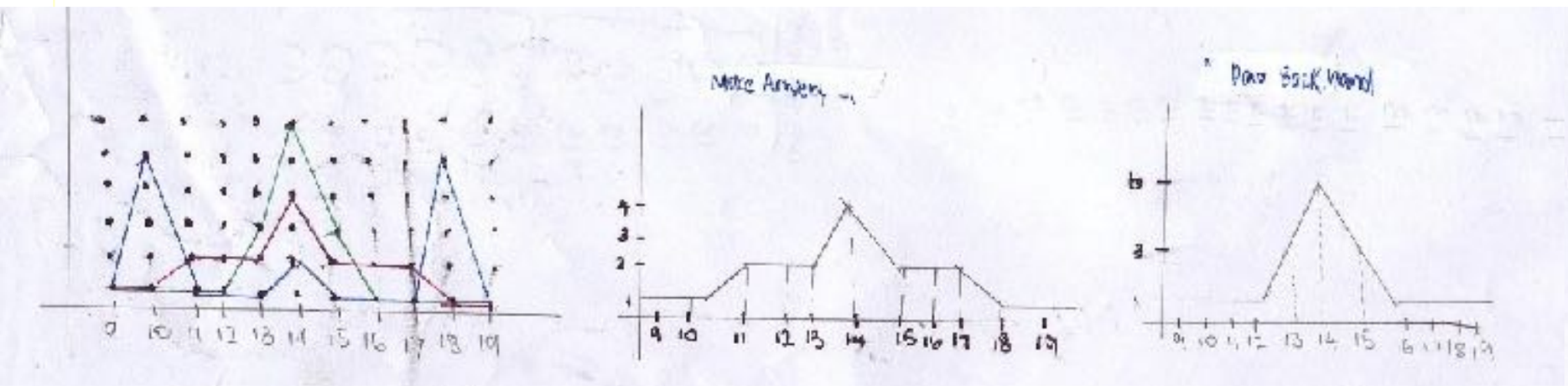
Mode = 14

Ivan Right : Mean = $\frac{280}{20}$

= 14 goals / year

Mode = 18 and 10

	9	10	11	12	13	14	15	16	17	18	19
Mike Arwen	1	1	2	2	2	4	2	2	2	1	1
Dave Backhand	1	1	1	1	3	6	3	1	1	1	1
Ivan Right	1	5	1	1	1	2	1	1	1	5	1



Kapur, M., & Bielaczyc, K. (2012). Designing for productive failure. *Journal of the Learning Sciences*, *21*(1), 45-83.

Sum of year-on-year deviation

Mike:
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 ✓ mike

Dave:
-4
7
-2
-4
1
2
1
1
4
-5
-2
3
-1
3
-4
1
4
-4
1
-2

Iuan:
5
-3
-5
1
-6
7
-7
2
2
5
-5
4
-9
1
8
-7
-1
8
0
-5

Range amount for:

Mike Armen: 9 — 19 = 10
Dave Eastland: 9 — 19 = 10
Ivan Right: 9 — 19 = 10
] X

Sum of deviations about the mean

Year	Avg	M.A	D.B	I.R	X		
1983	14	14	13	13	0	-1	-1
1989	14	9	14	18	-5	-5	4
1990	14	14	16	15	0	+2	+1
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	14	17	15	18	+3	+1	+4
2001	14	13	14	9	-1	0	-5
2002	14	17	17	16	+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	12	0	+1	-2
					Total:		

Average of year-on-year absolute deviation

MIKE = $\frac{5+5+4+5+4+4+4+5+4+4+4+5+4+4+4+5+4+5+4}{20-1}$

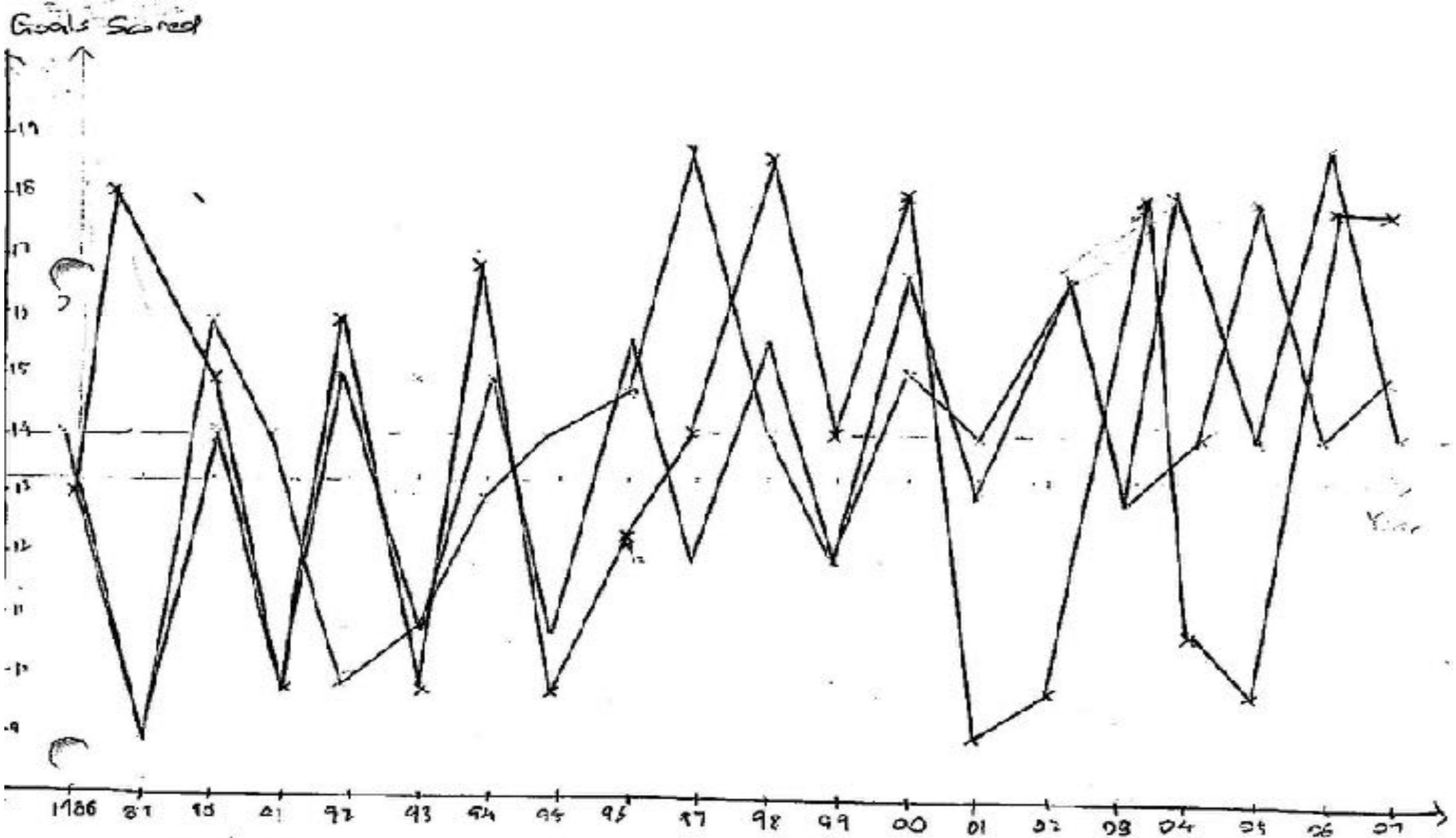
= 84/19 = 4·26

DAVE = $\frac{4+7+2+4+1+2+1+1+4+5+2+3+1+3+4+1+4+4+1}{19}$

= 54/19 = 2·84 DAVE is most consistent ✓

IVAN = $\frac{5+3+5+1+6+7+7+2+2+5+5+4+9+1+8+7+1+8+0}{19}$

= 4·79



Idea 3 Measure Graph Length

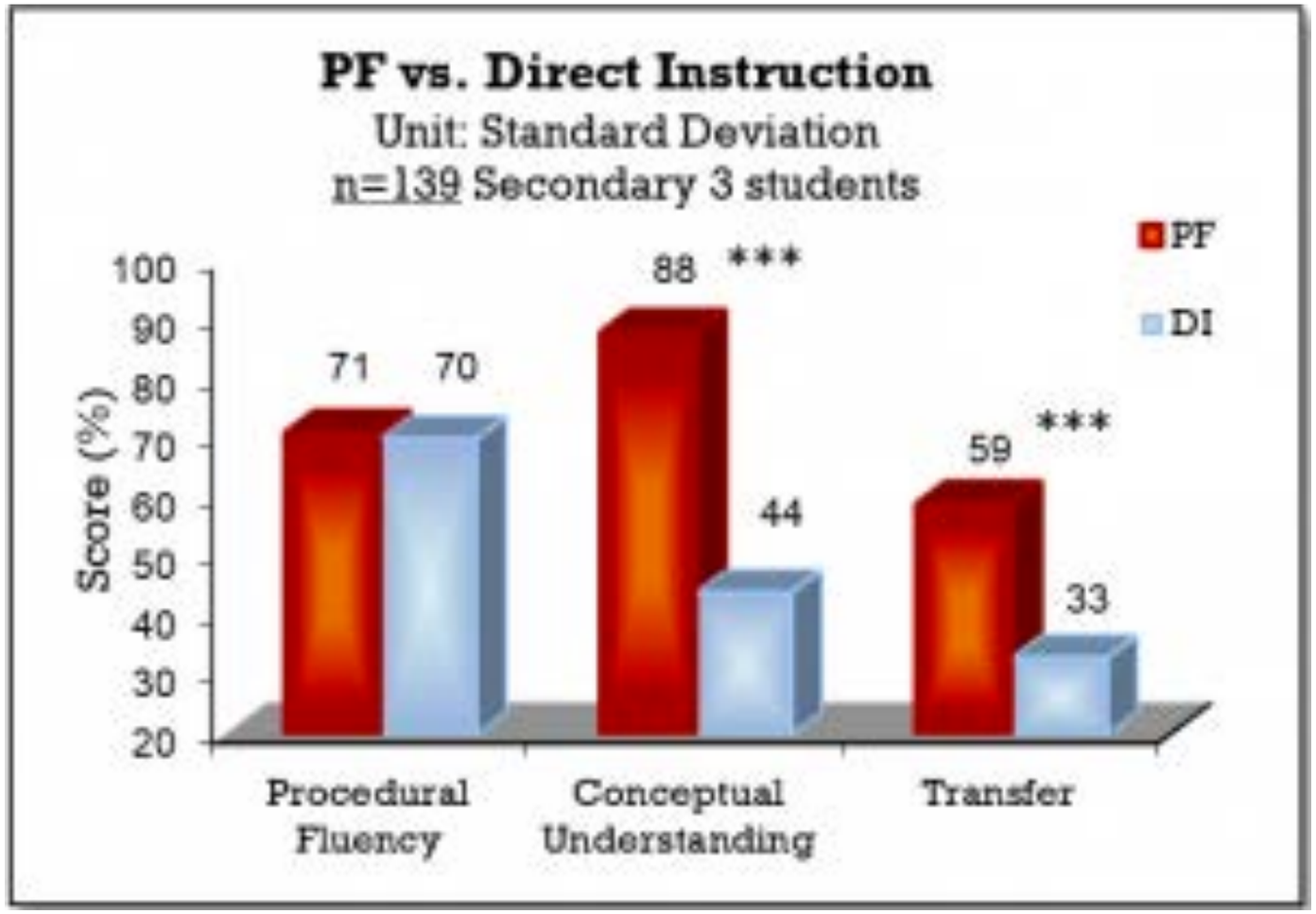
MA $\sqrt{26}+\sqrt{26}+\sqrt{17}+\sqrt{26}+\sqrt{17}+\sqrt{17}+\sqrt{17}+\sqrt{26}+\sqrt{10}+\sqrt{10}+\sqrt{10}+\sqrt{26}+\sqrt{17}+\sqrt{17}+\sqrt{17}+\sqrt{26}+\sqrt{17}+\sqrt{26}+\sqrt{26} = 83.26$

DB $\sqrt{17}+\sqrt{50}+\sqrt{5}+\sqrt{17}+\sqrt{5}+\sqrt{5}+\sqrt{2}+\sqrt{5}+\sqrt{17}+\sqrt{26}+\sqrt{5}+\sqrt{17}+\sqrt{5}+\sqrt{5}+\sqrt{10}+\sqrt{2}+\sqrt{5}+\sqrt{17}+\sqrt{2} = 56.54$

IR $\sqrt{26}+\sqrt{10}+\sqrt{26}+\sqrt{37}+\sqrt{51}+\sqrt{50}+\sqrt{50}+\sqrt{5}+\sqrt{5}+\sqrt{26}+\sqrt{26}+\sqrt{17}+\sqrt{82}+\sqrt{2}+\sqrt{65}+\sqrt{50}+\sqrt{2}+\sqrt{65}+1 = 94.54$

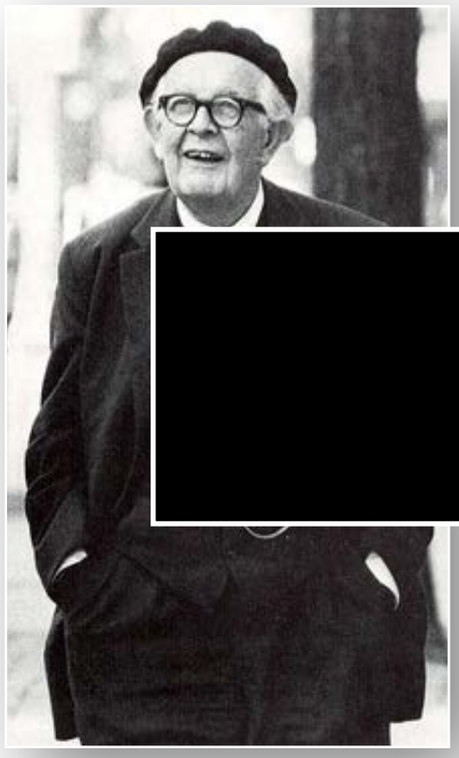
∴ Dave Bockherd is the most consistent player as he has the shortest 'stretched-out' graph, showing consistency over time.

Azaac Aikaan 3



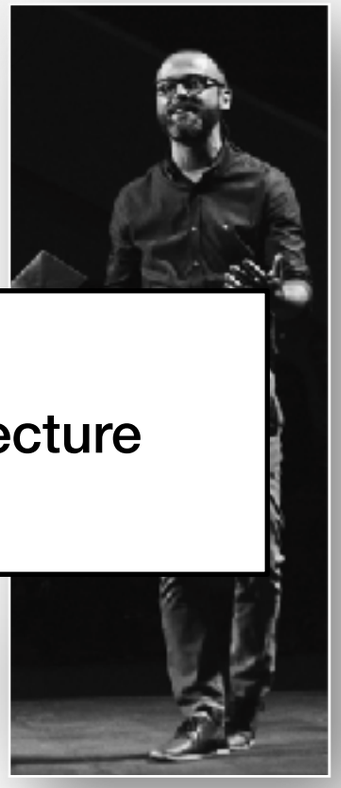
Kapur, M., & Bielaczyc, K. (2012). Designing for productive failure. *Journal of the Learning Sciences*, *21*(1), 45-83.

There is a time for telling



Problem Solving

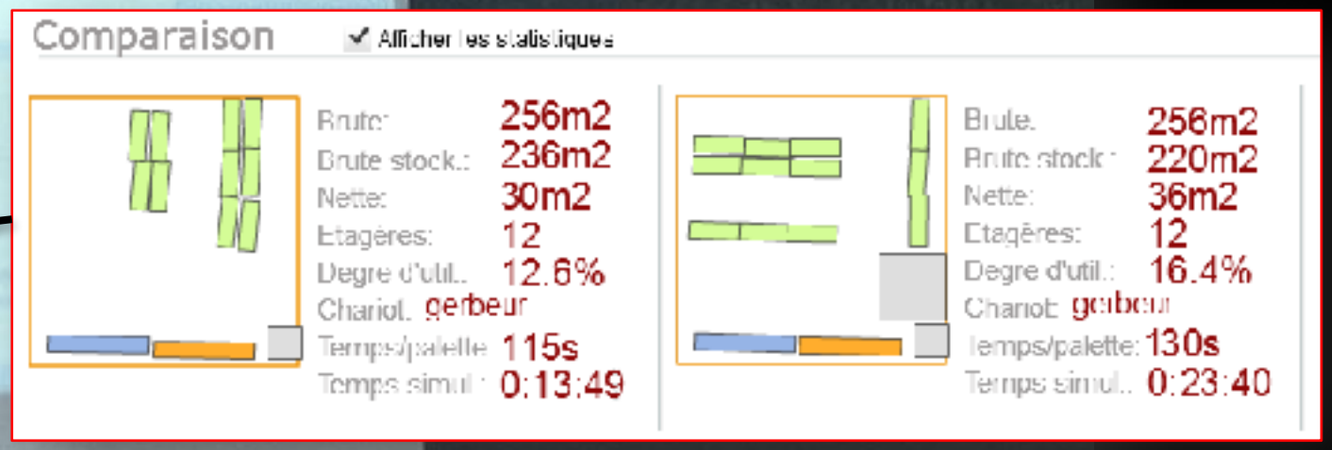
Lecture



The art of debriefing


KOSMOS
200
KOSMOS
INHALT: 5 STK.
MADE IN CHINA
KOSMOS
ART. NR. 658618
INHALT: 5 STK.
MADE IN CHINA


Simpliquity



Son DoLenh, Patrick Jermann

Question

Please order a standard return 2nd clas

Enter command

from Lausanne to Davos standard C2|re

Question

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

Your Ticket

From	To
Basel	Geneve

Travel	Fare
Return	

Class	Bike

City

Basel	Davos	Fribourg
Geneve	Lausanne	Neuchatel
	Zurich	

Travel		Fare		
One-way	Return	Standard	Young	Half-fare

Class | Bike

Question

Please order a standard return 2nd class ti

From:
Fribourg

To:
Zurich

Travel:
Return

Fare:
Standard

Class:
2nd

Bike:
No

:24

Question

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

From: Basel

To: Zurich

Travel: One-way | Return

Fare: Standard | Young | Half-fare

Class: 1st | 2nd

Bike: Yes | No

: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**

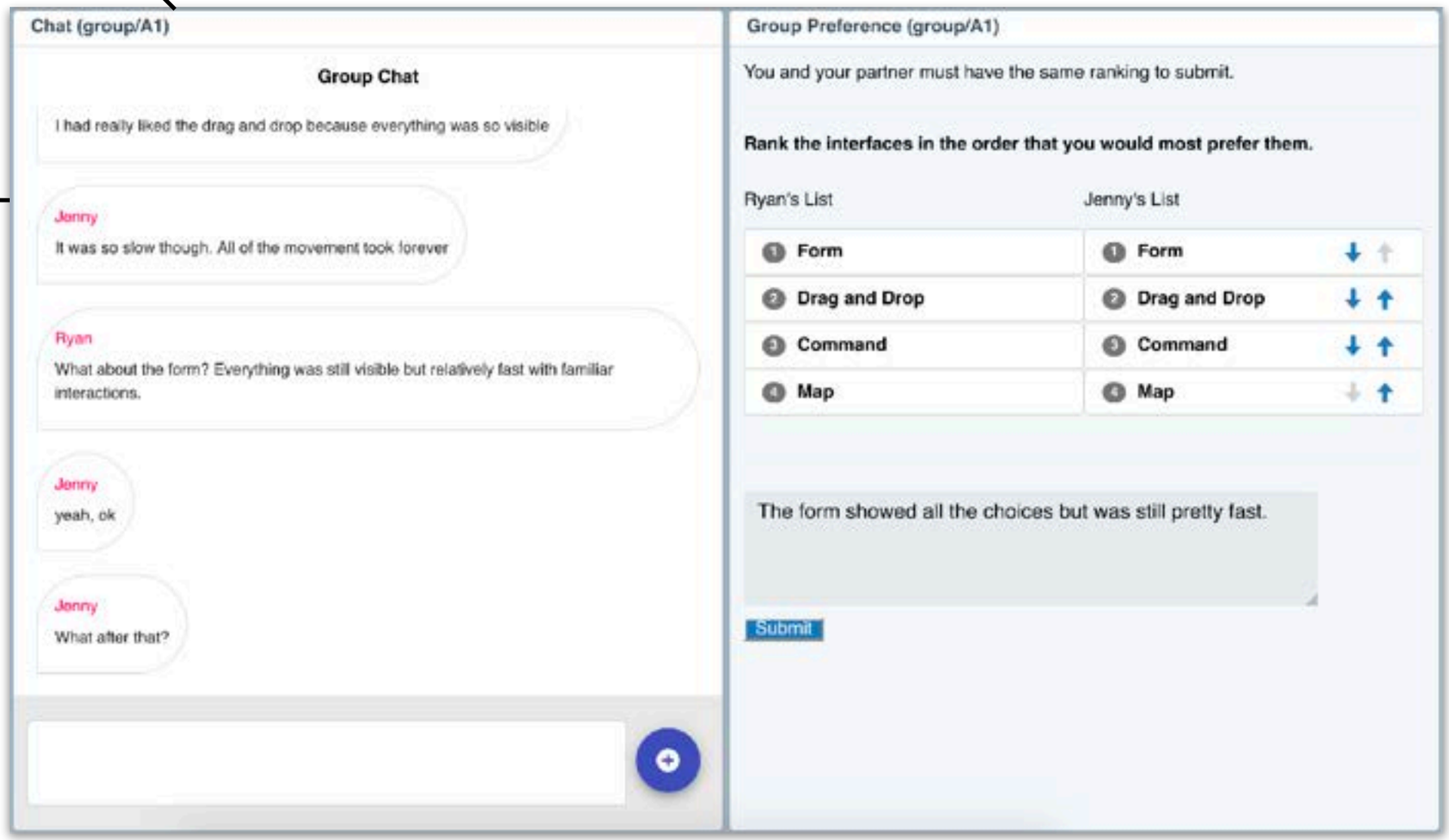
The drag and drop is easiest to see all of the options.

Submit

Class

Team

Solo



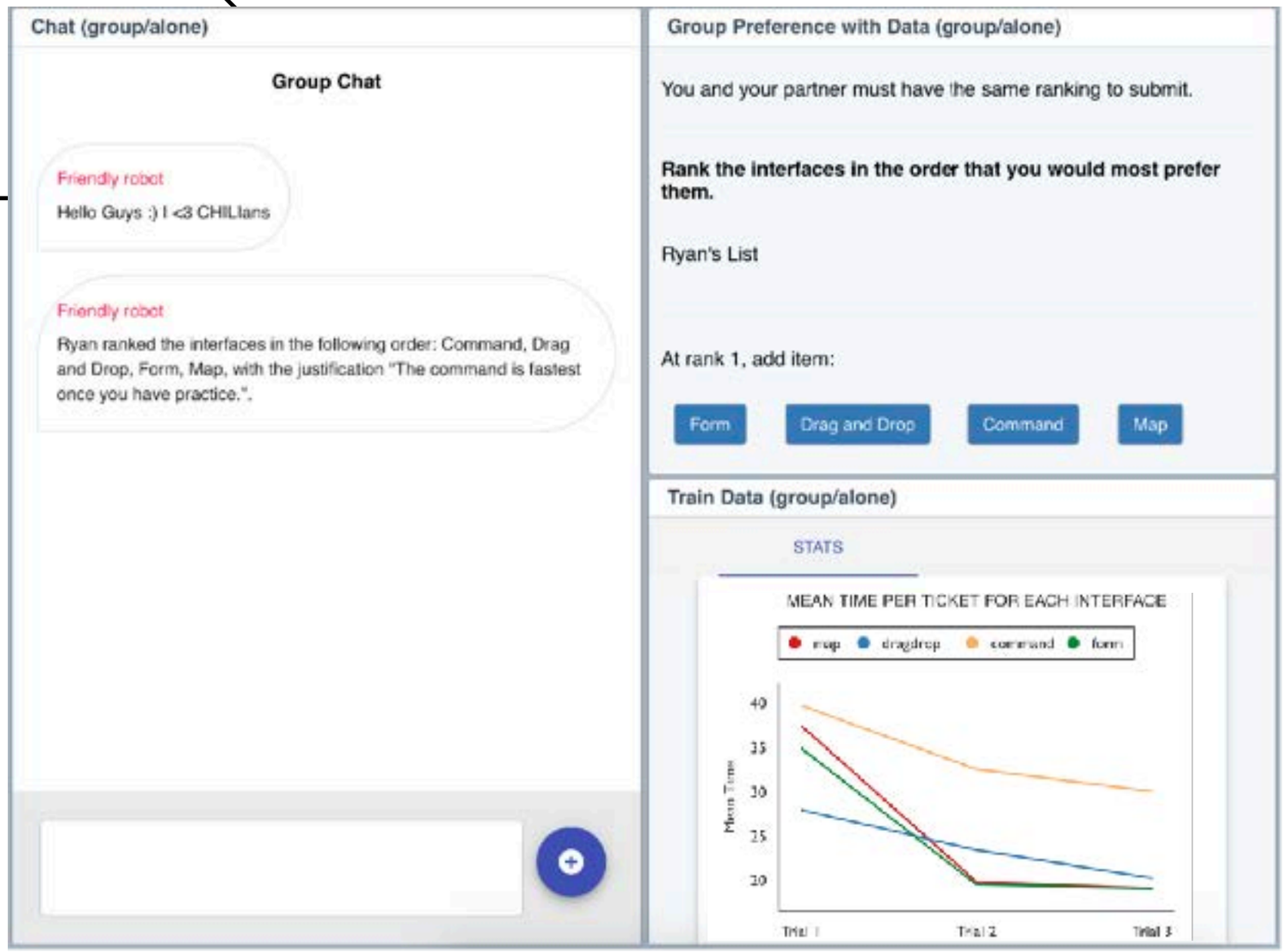
Socio-cognitive conflict

Class

Team

Solo

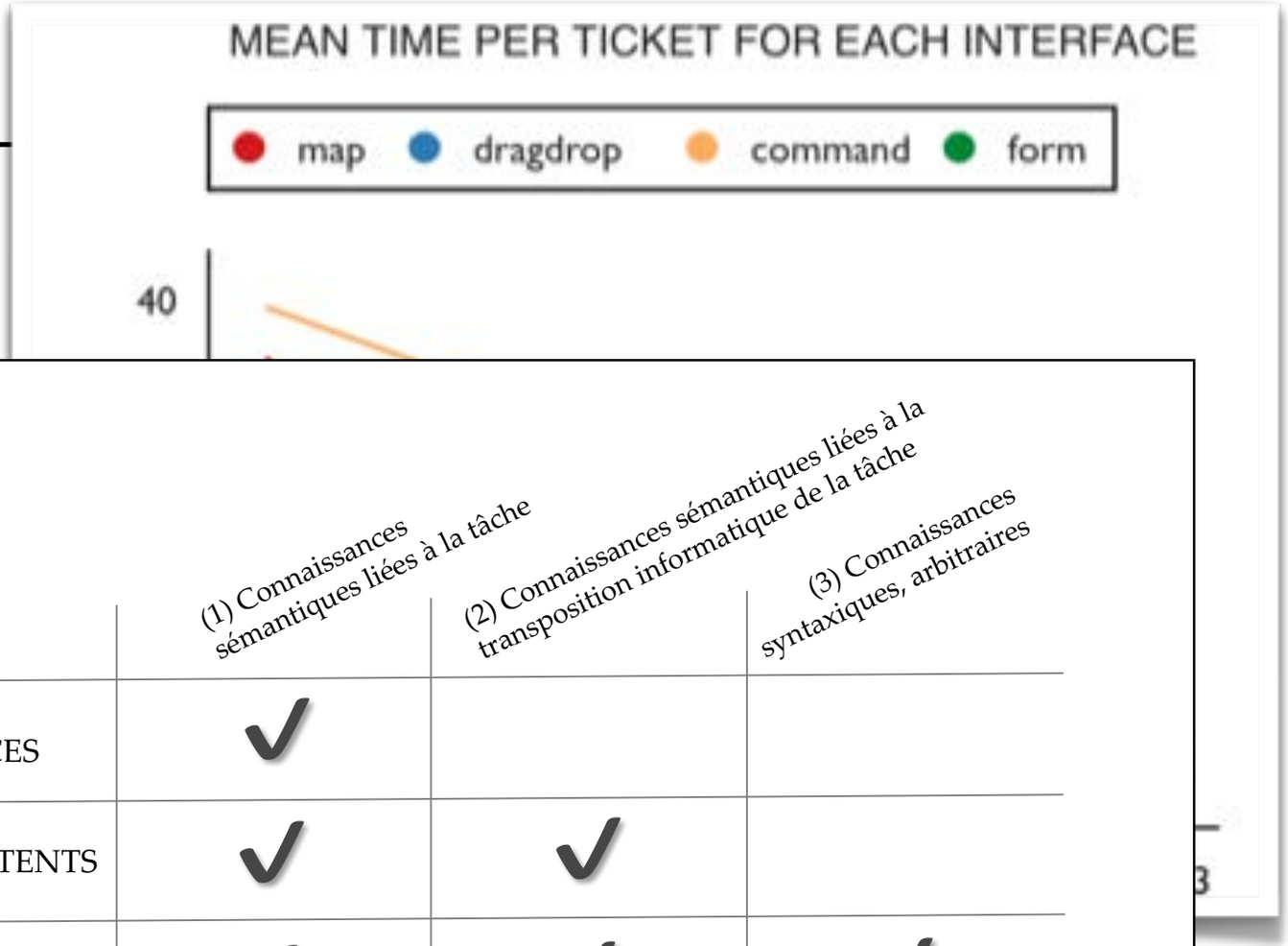
Arguing with data



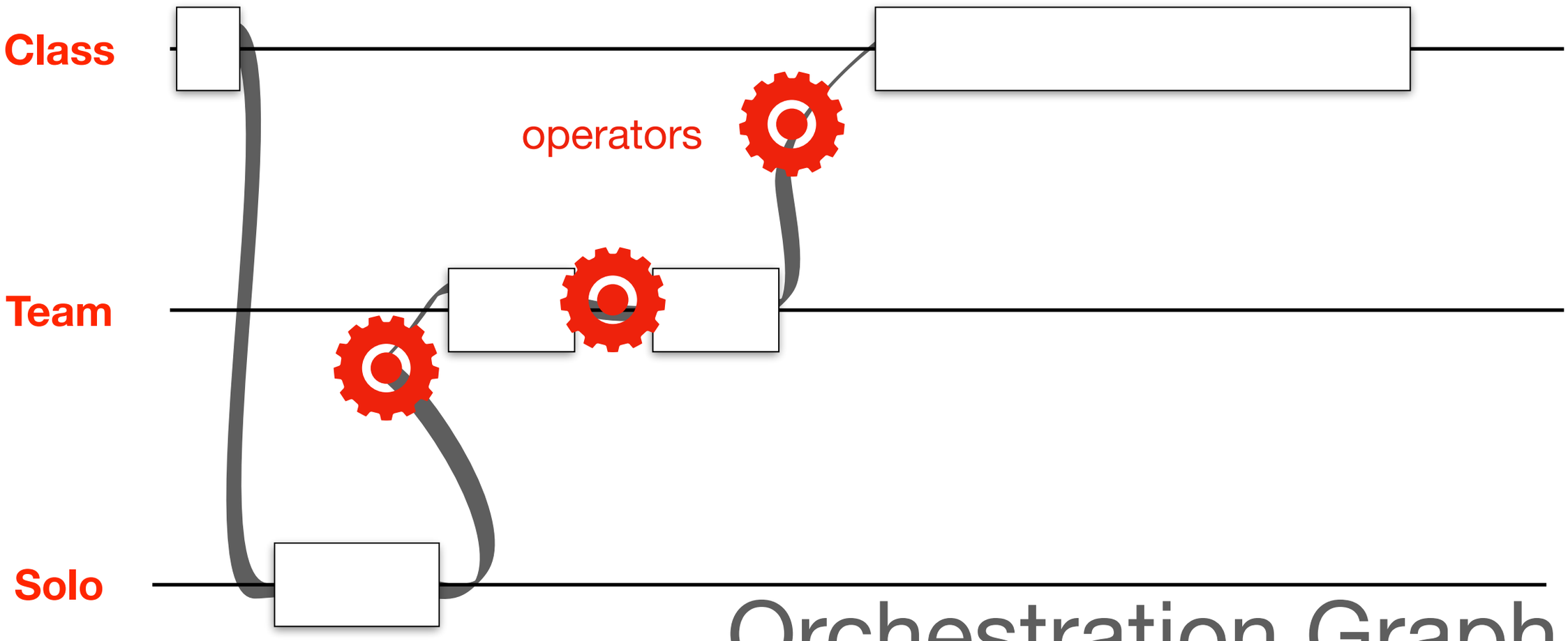
Class

Team

Solo

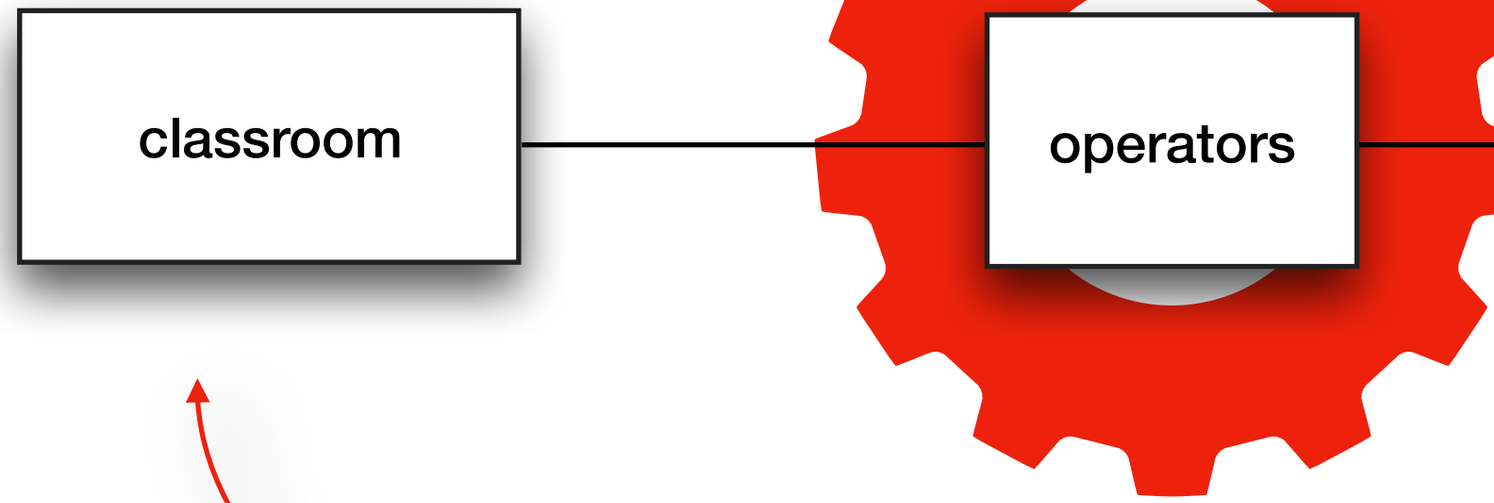


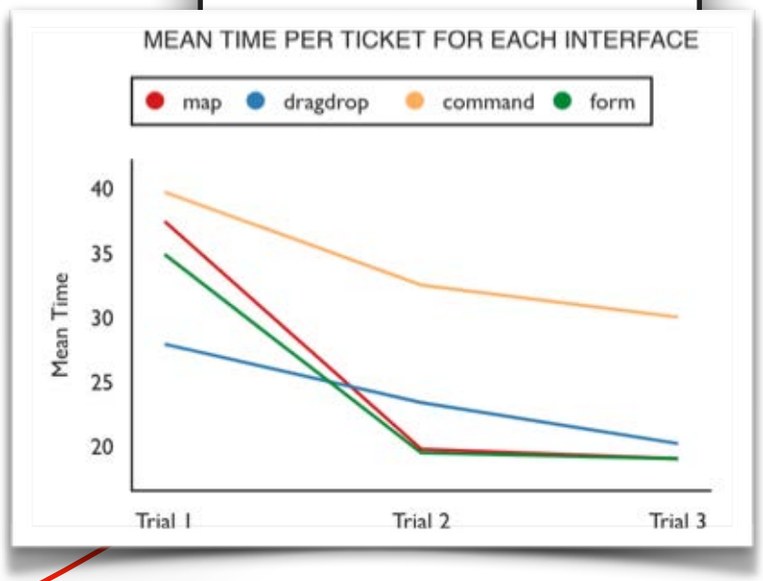
	(1) Connaissances sémantiques liées à la tâche	(2) Connaissances sémantiques liées à la transposition informatique de la tâche	(3) Connaissances syntaxiques, arbitraires
NOVICES	✓		
INTERMITTENTS	✓	✓	
EXPERTS	✓	✓	✓



Orchestration Graph

Aggregation, comparison, visualisation,….





Monitoring

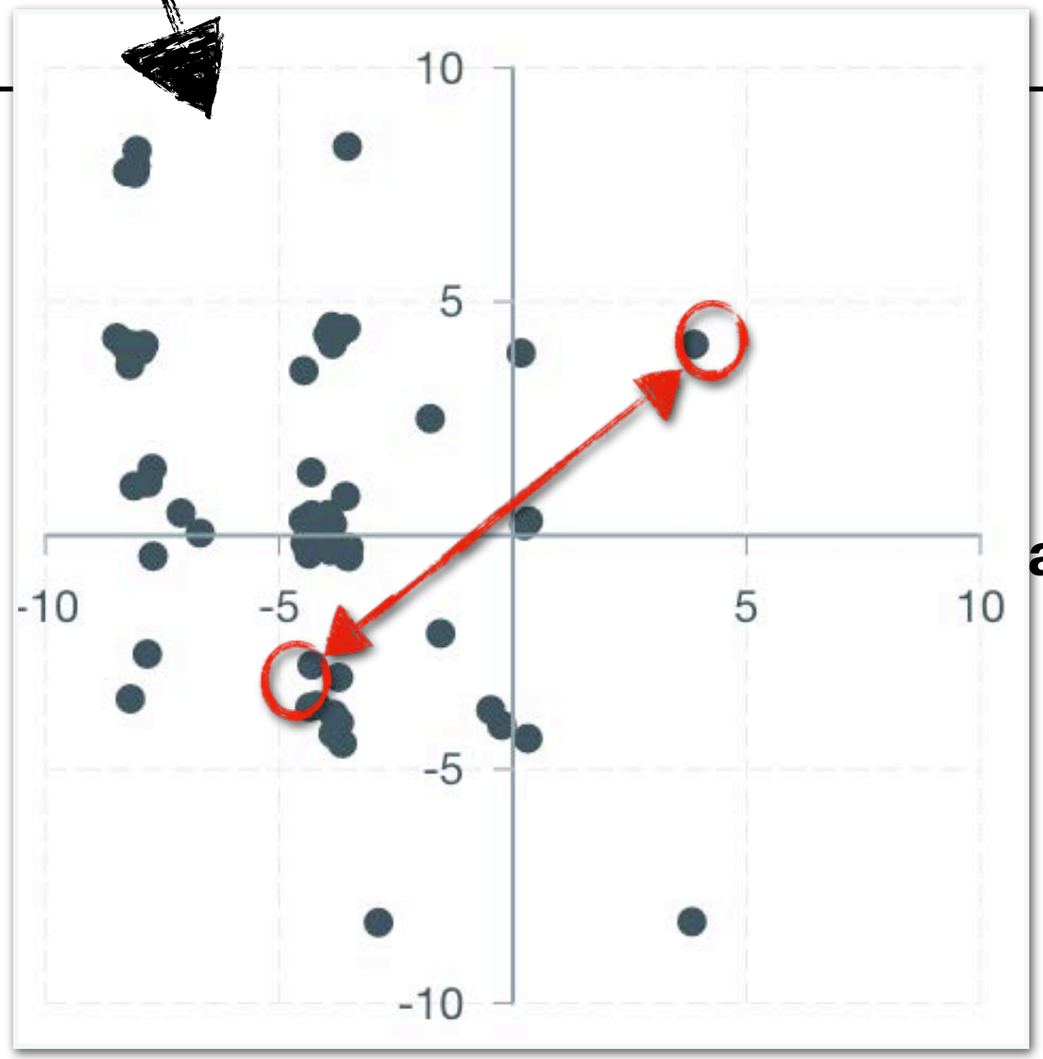
Intervention

+ Debriefing

Class

Team

Solo



ap of opinions

Secure https://icchiiarv3.cpfl.ch/teacher/cjdv9y6nm000l06y11c0prs15

Apps Bookmarks ILL BEAST FR PROG Documents -... Mobilism • General F... bookmarklet LivreFr Food Yr DT wiki GC MyAcc SciHub Other Bookmarks

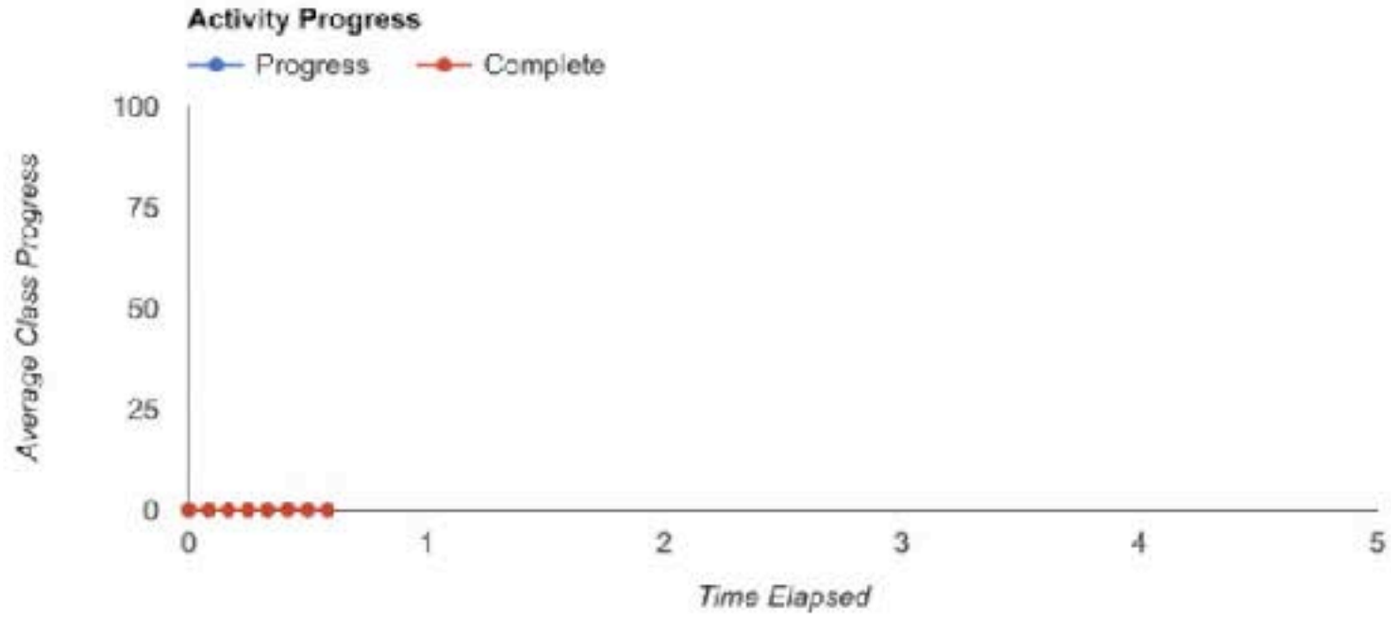
Admin Graph Editor Preview Teacher View

Next Activity | Toggle dashboard/grid view | Pause | Stop | Edit student list | Restart session | Start Countdown | +10s | -10s | Download log csv | Export session | 10s

session: UY56

Dashboards

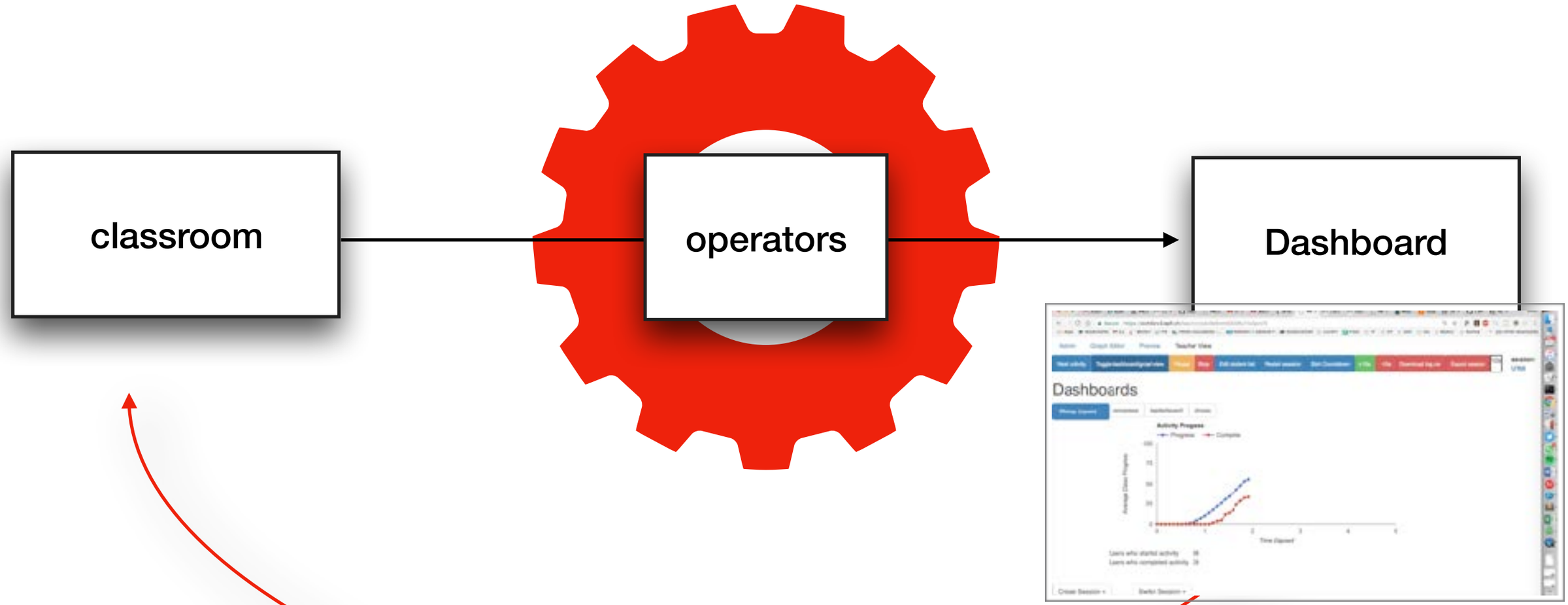
Stroop (open) | progress | leaderboard | stroop



Users who started activity 3
Users who completed activity 0

Create Session ▾ Switch Session ▾

Aggregation, comparison, visualisation,….



Monitoring

Intervention

+ Debriefing

+ Timing

Looking for a postdoc or project manager

Monitoring
Intervention
Debriefing
Timing

Classware = orchestration technology

Monitoring
Intervention
+ Debriefing
+ Timing