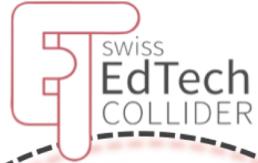


EPFL



Le potentiel du numérique : différencier sans isoler

Dr. Jessica Dehler Zufferey, LEARN



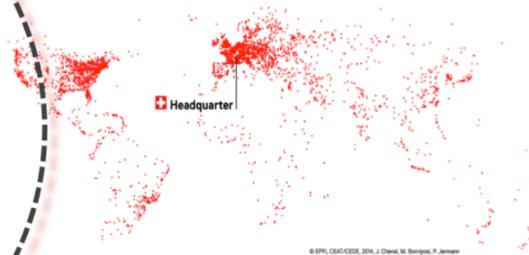
50'000
Thymios



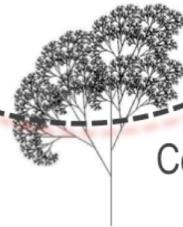
LEARN

EPFL Center for
Learning Sciences

100 MOOCs, > 2M registrations



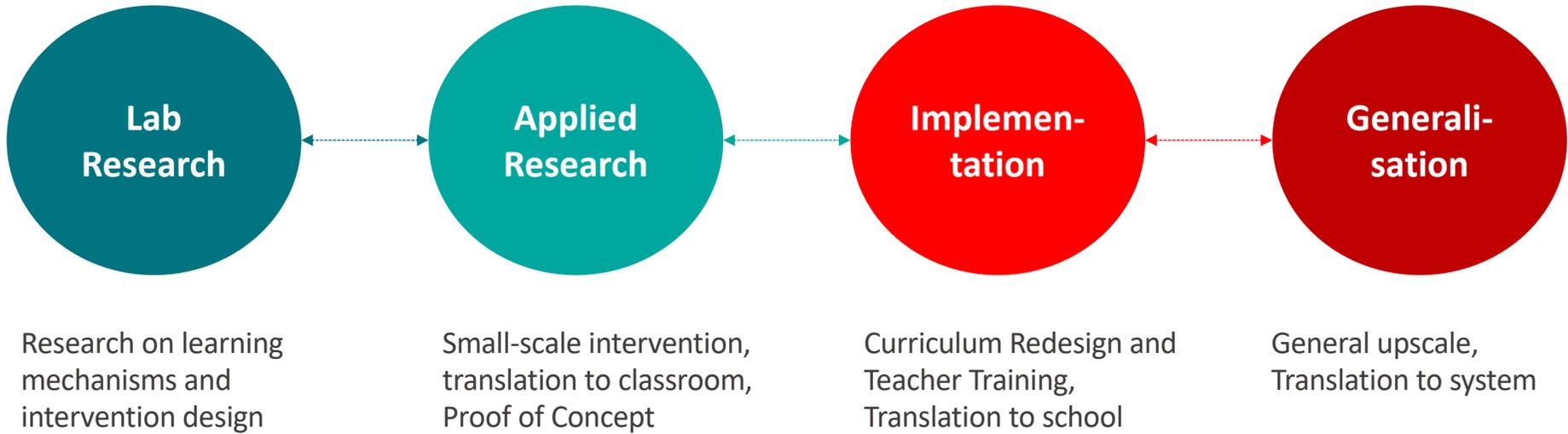
Digitale
Berufsbildung



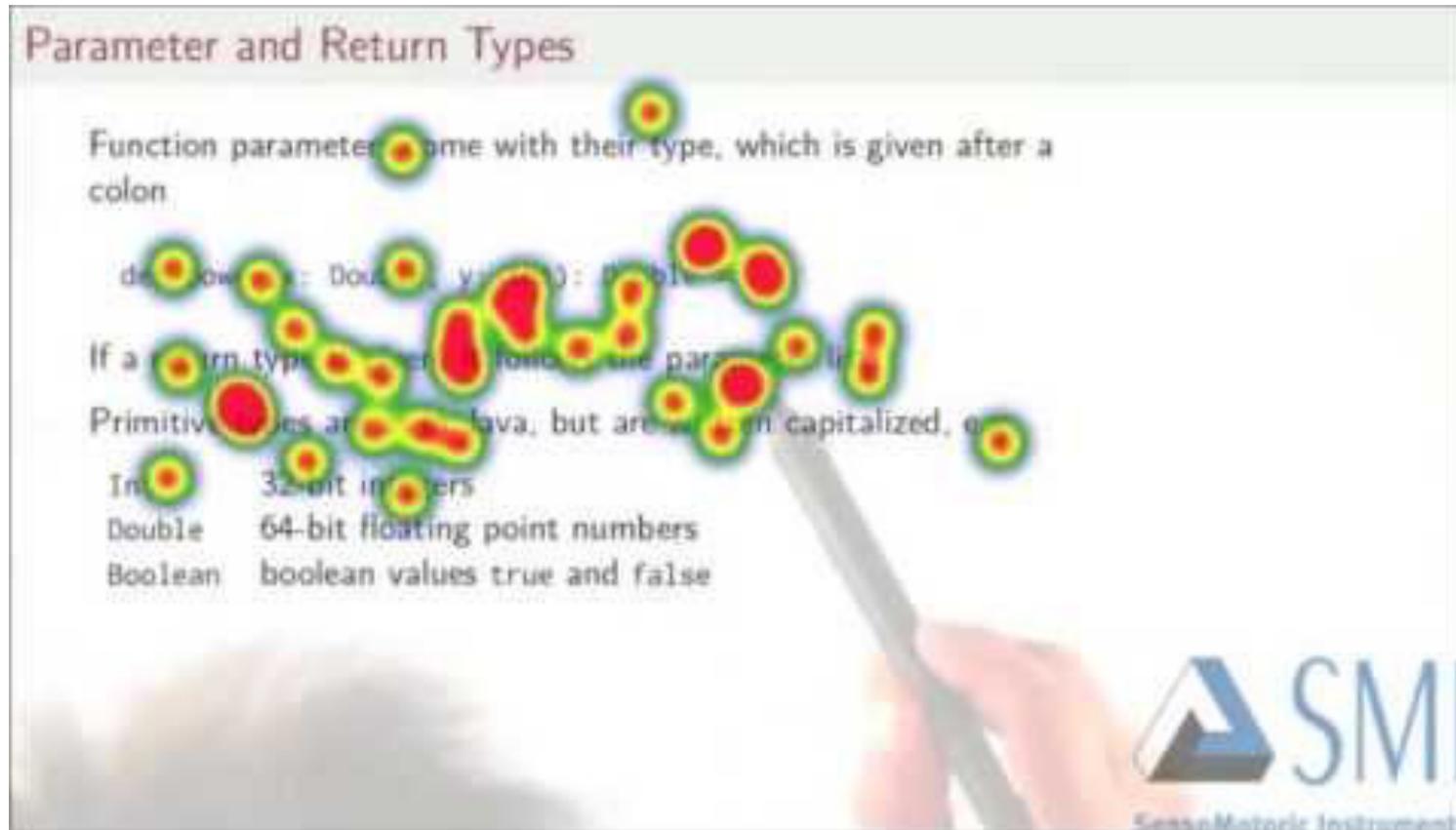
Computational Thinking



LEARN – translational research



Diagnostic facilité par le numérique



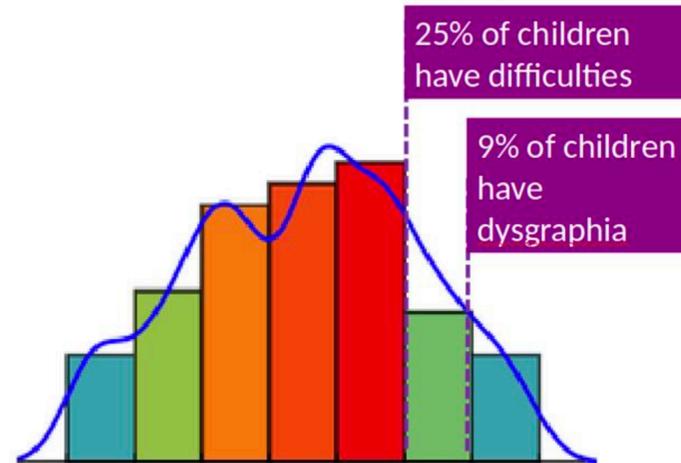
Les traces digitales nous informant sur le processus et la qualité de l'apprentissage.

https://www.youtube.com/watch?v=lpzw_aFQOkg

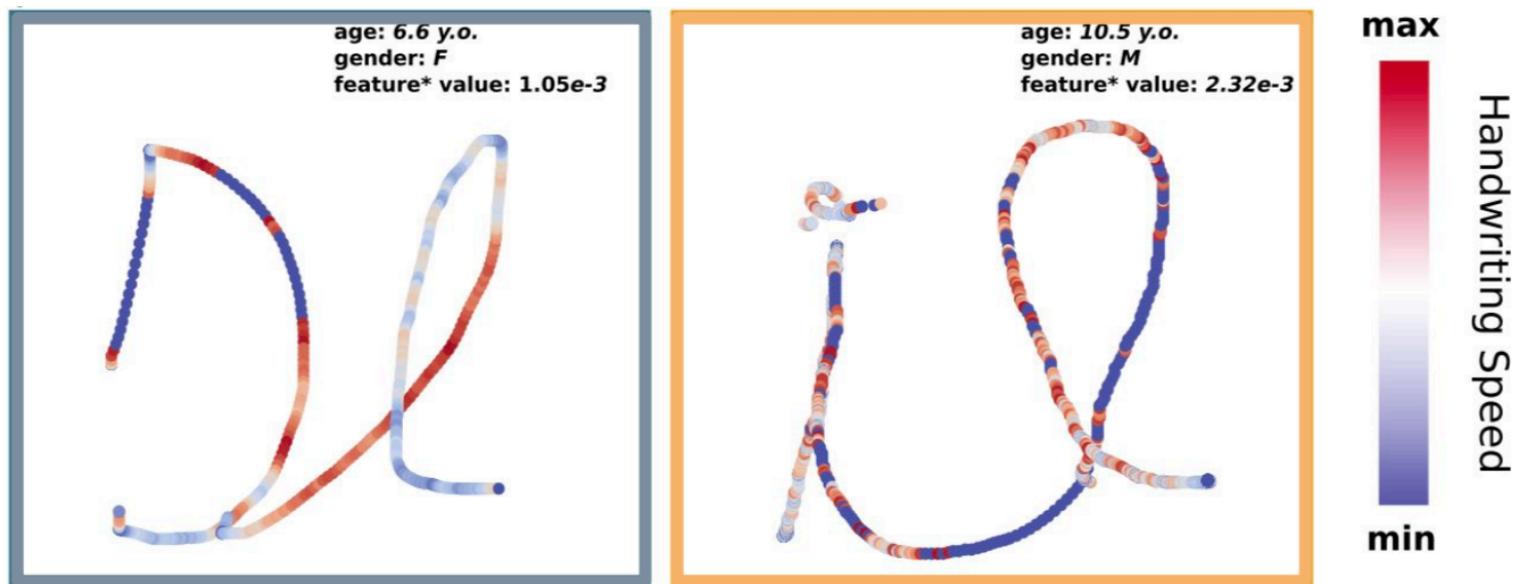
Dysgraphie

CRITÈRES						TOTAL	
1. Ecriture grande							
2. Inclinaison de la marge vers la droite							
	Phrases	1	2	3	4	5	
3. Lignes non planes							
4. Mots serrés							
5. Ecriture chaotique							
6. Liens interrompus entre les lettres							
7. Télescopages							
8. Variation dans la grandeur des lettres troncs							
9. Hauteur relative incorrecte							
10. Distorsion des lettres							
11. Formes de lettres ambiguës							
12. Lettres retouchées							
13. Hésitations et tremblements							
Score Total							

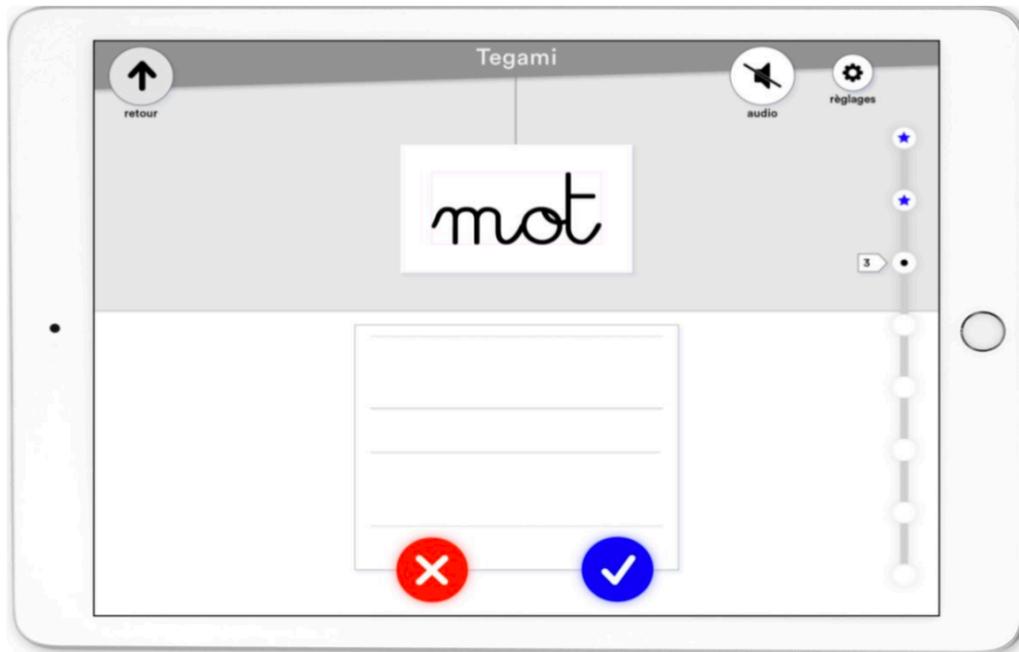
lapin lapin



Potentiel diagnostique de Tegami

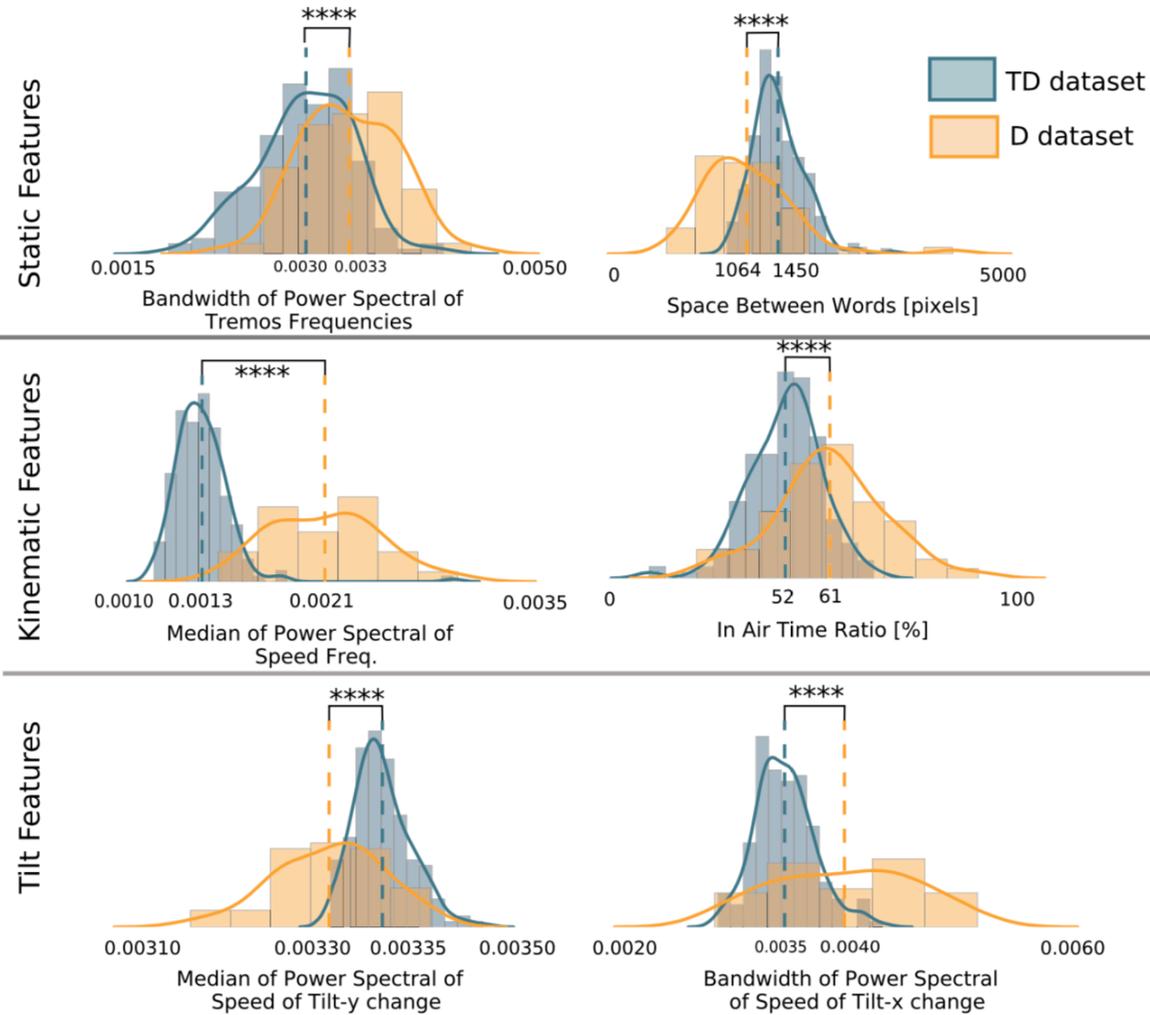


Profile Tegami

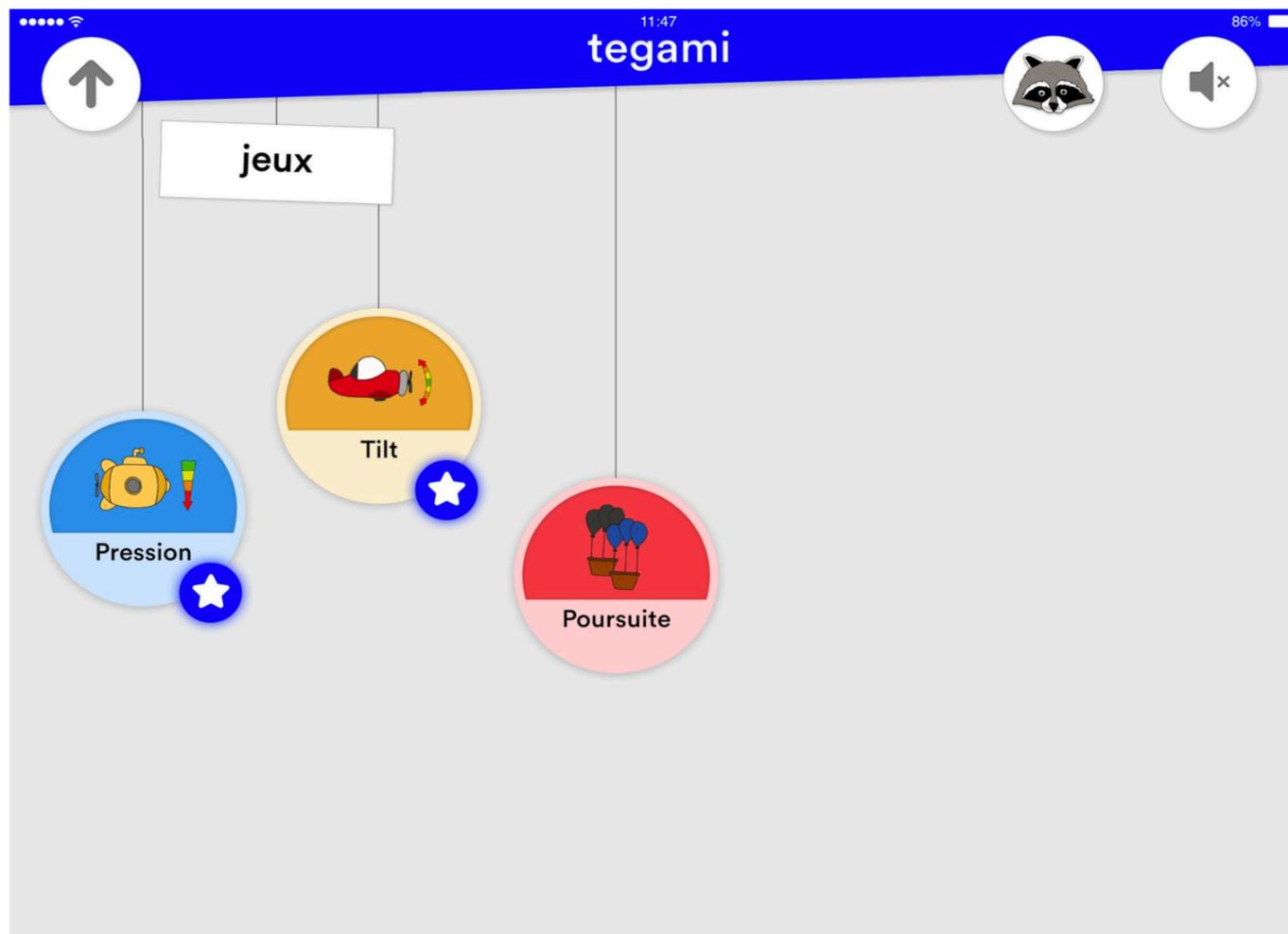


Static		
Space Between Words	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tremolo	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Moment of handwriting	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Kinematic		
In air time	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Max speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mean speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Std. speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Frequencies speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pressure		
Number of peaks pressure change	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Max speed of pressure change	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mean speed of pressure change	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Frequencies pressure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tilt		
Maximum tilt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Std. tilt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Frequencies tilt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Evaluation



Du diagnostique à l'adaptation



Le remède et le “machine learning”

Static

- Space Between Words
- Tremolo
- Moment of handwriting

Kinematic

- In air time
- Max speed
- Mean speed
- Std. speed
- Frequencies speed

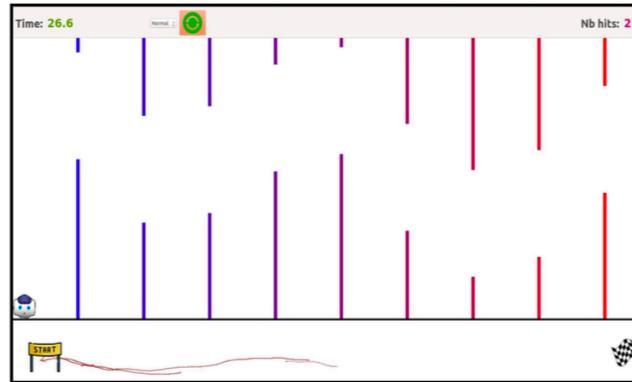
Pressure

- Number of peaks pressure change
- Max speed of pressure change
- Mean speed of pressure change
- Frequencies pressure

Tilt

- Maximum tilt
- Std. tilt
- Frequencies tilt

+



+

Static

- Space Between Words
- Tremolo
- Moment of handwriting

Kinematic

- In air time
- Max speed
- Mean speed
- Std. speed
- Frequencies speed

Pressure

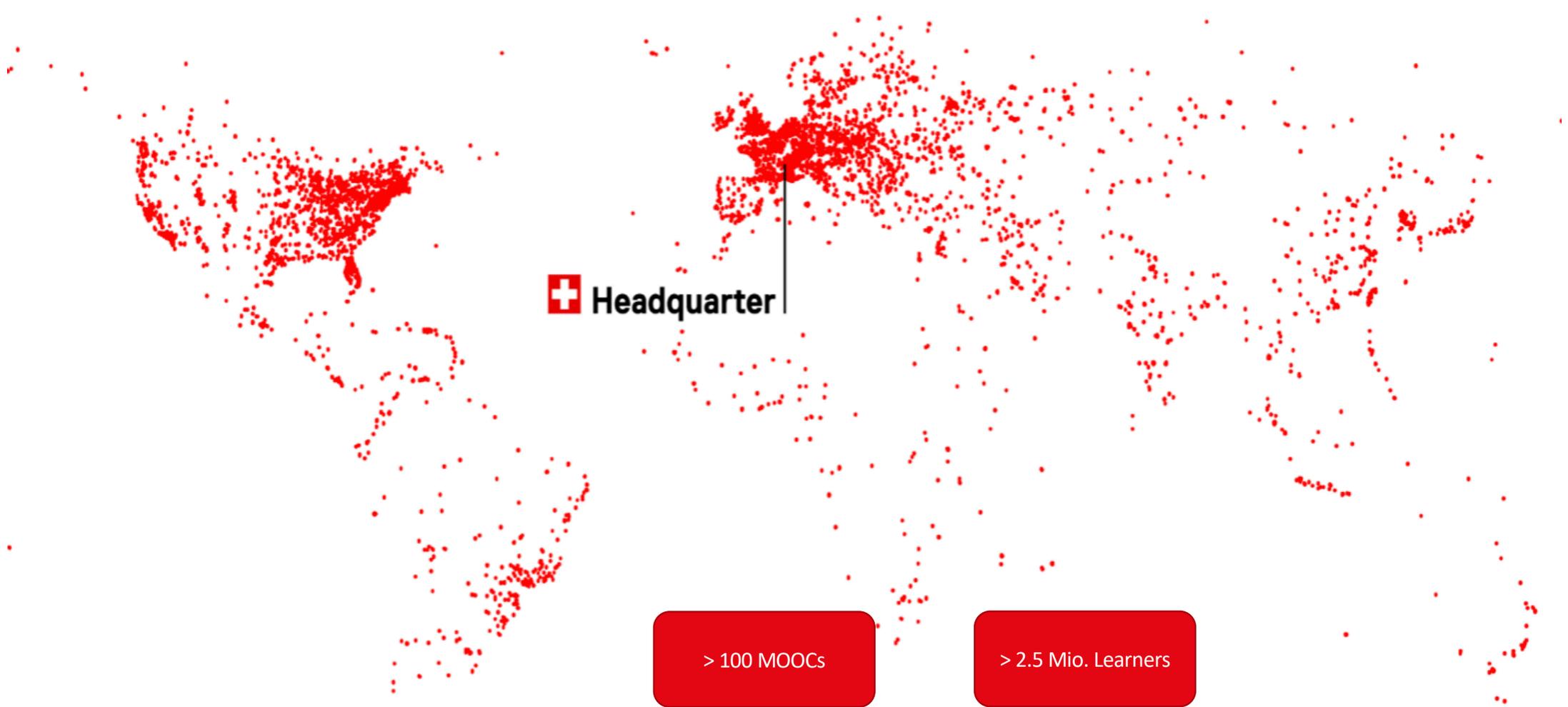
- Number of peaks pressure change
- Max speed of pressure change
- Mean speed of pressure change
- Frequencies pressure

Tilt

- Maximum tilt
- Std. tilt
- Frequencies tilt

= σ features

Cas d'application : MOOCs



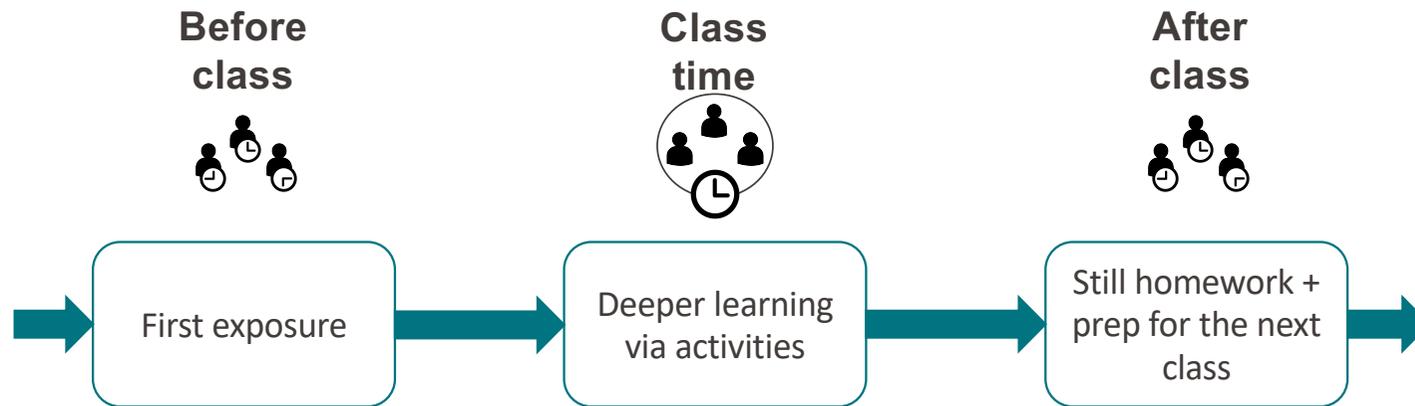
> 100 MOOCs

> 2.5 Mio. Learners

La classe inversée



Structure du cours

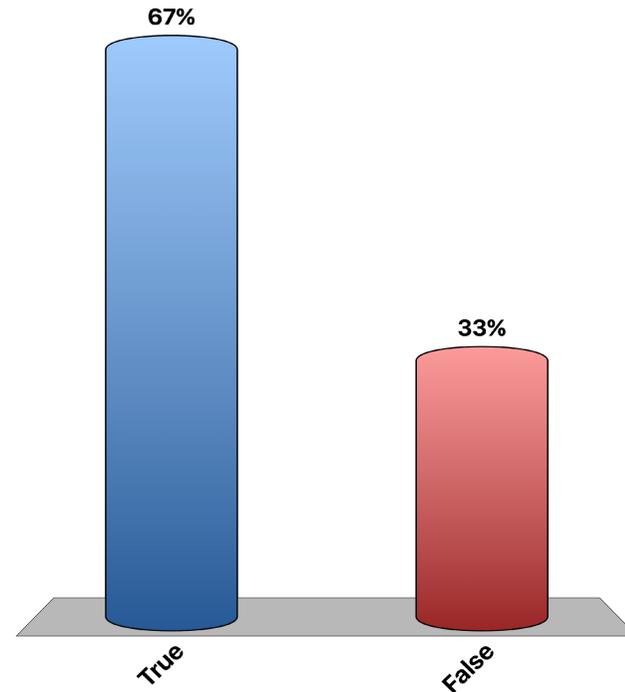


MOOC	2h	Clicker-based activities	2h	Exercises to finish	1h
Videos		Warm up questions		Revisions	
Quizzes		Interactive exercises			
Exercises		Exam-type QCM			
		Exercise sessions	1h		

Question d'échauffement: vrai/faux

Let W be a subspace of \mathbb{R}^n and \hat{y} the orthogonal projection of $\vec{y} \in \mathbb{R}^n$ on W . Then \hat{y} depends on the choice of the basis of W .

- A. True
- B. False



EPFL Réponses des étudiant.e.s

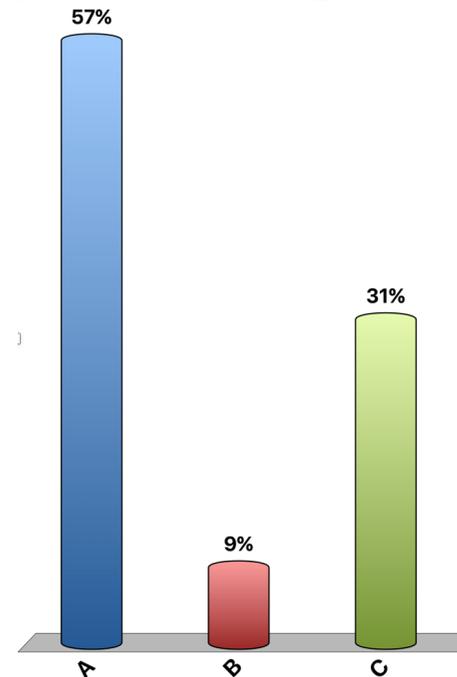
Let $\vec{u} = \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix}$, Give the set W of all the vecteurs orthogonal to \vec{u} .

Is it a subspace ?

A $W = \left\{ t \begin{pmatrix} -1/3 \\ 0 \\ 1 \end{pmatrix} + s \begin{pmatrix} -2/3 \\ 1 \\ 0 \end{pmatrix}, t, s \in \mathbb{R} \right\}$

B base de W : $\begin{pmatrix} 1 \\ 0 \\ -3 \end{pmatrix}$; $\begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix}$

C Autre



QCM por stimuler l'apprentissage collaboratif

Let $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$ be the linear transformation

$$T \left(\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \right) = \begin{pmatrix} -3x_1 \\ x_2 + x_3 \end{pmatrix}.$$

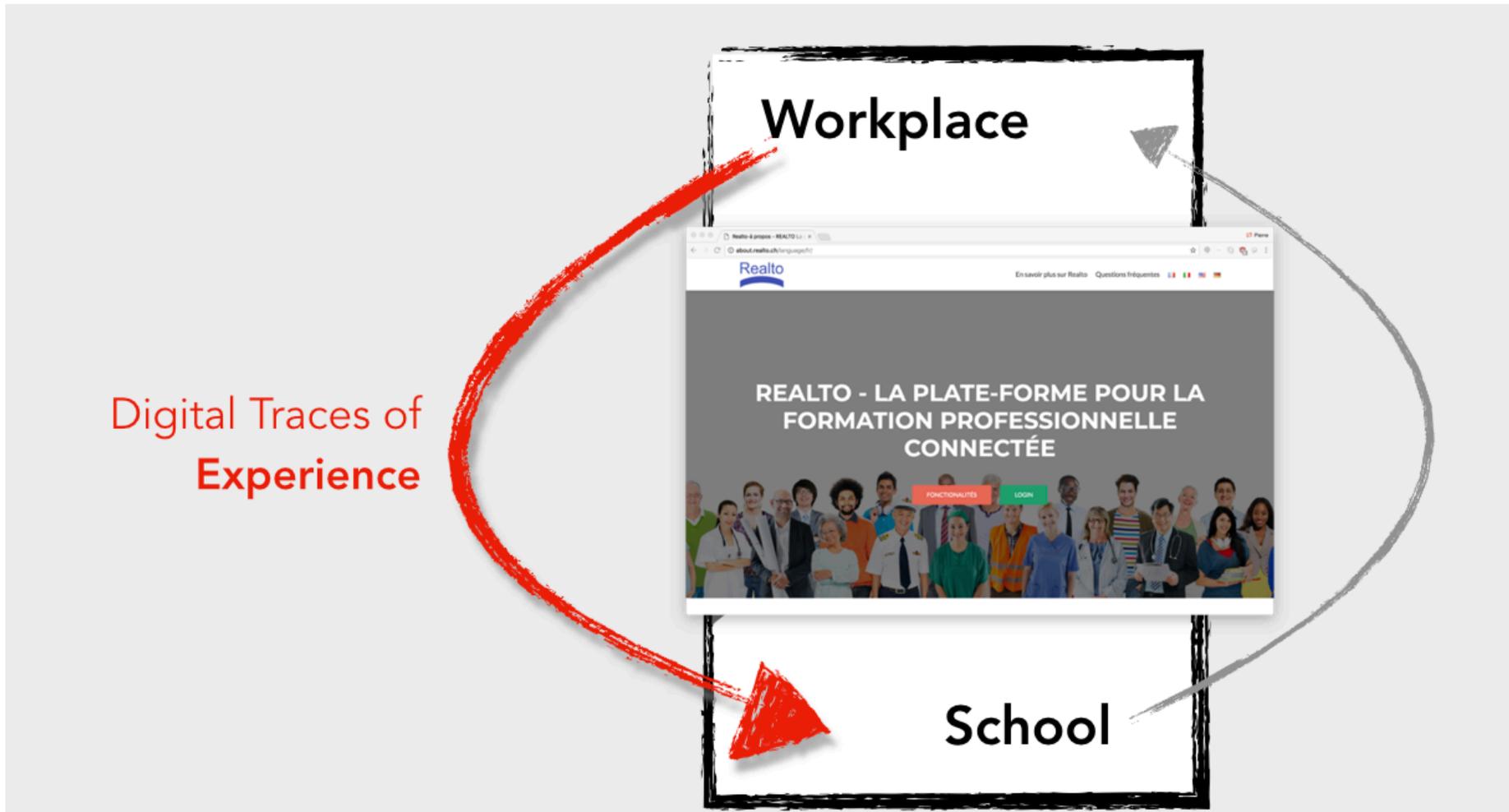
Then the matrix that represents T in the bases

$$\left\{ \begin{pmatrix} 2 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 2 \end{pmatrix} \right\} \text{ and } \left\{ \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 1 \end{pmatrix} \right\} \text{ is}$$

A. $\begin{pmatrix} 2 & 7/3 & 2 \\ -4 & -8/3 & -1 \end{pmatrix}$ C. $\begin{pmatrix} -6 & -3 & 0 \\ 0 & 2 & 3 \end{pmatrix}$

B. $\begin{pmatrix} -4 & -3 & 0 \\ 1 & 2 & 3 \end{pmatrix}$ D. $\begin{pmatrix} -2 & 1 & 6 \\ -7 & -4 & 3 \end{pmatrix}$

EPFL Formation professionnelle: Connecter école et entreprise



Schwendimann, B.A., Cattaneo, A.A., Dehler Zufferey, J., Gurtner, J.L., Bétrancourt, M. and Dillenbourg, P., 2015. The 'Erfahrungsraum': A pedagogical model for designing educational technologies in dual vocational systems. *Journal of Vocational Education & Training*, 67(3), pp.367-396.

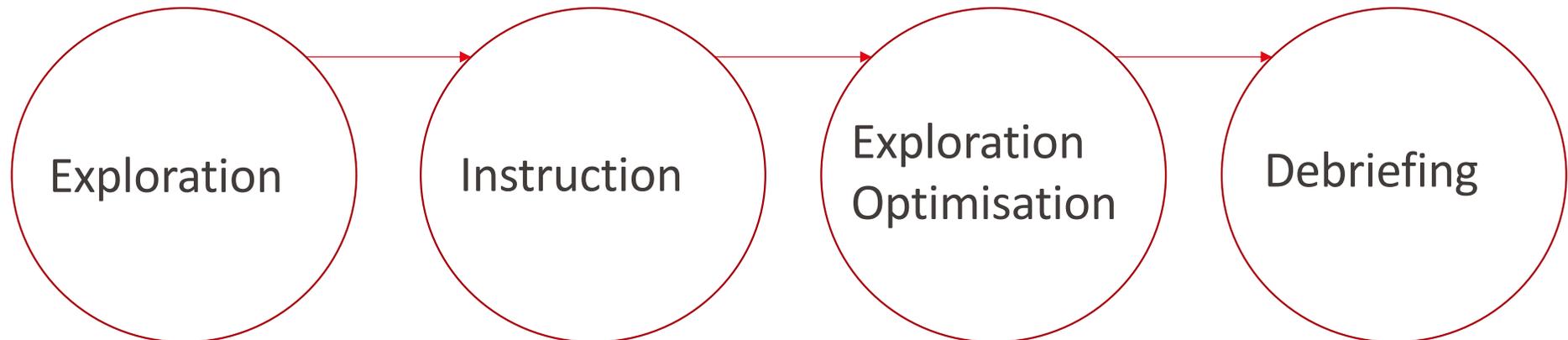
EPFL Réalité augmentée pour la formation en logistique



Carte de
l'enseignant-e

<https://www.youtube.com/watch?v=CYuDYWYxKb8>

Zufferey, G., Jermann, P., Lucchi, A., Dillenbourg, P. (2009). TinkerSheets: using paper forms to control and visualize tangible simulations. Proceedings of the fourth international conference on Tangible, embedded, and embodied interaction.



“Productive Failure”
(Manu Kapur, ETHZ)

Swiss EdTech Collider



EPFL



Merci

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polytechnique
fédérale
de Lausanne