

# Sharing Experience France, DEPP

Dr. Thierry Rocher

- Student assessment in France
- Very-large-scale assessment
- Innovative assessment
- Two studies:
  - Mode effect
  - Data analytics
- Perspectives and contributions to FLIP+

# French Ministry of Education

## Primary & Secondary education

- 1.1 million employees
  - Largest employer of France
- Organized as 30 “académies”
  - 52,000 elementary schools
  - 11,000 secondary schools
  - 13 million students
- Total budget of 93 billion EUR



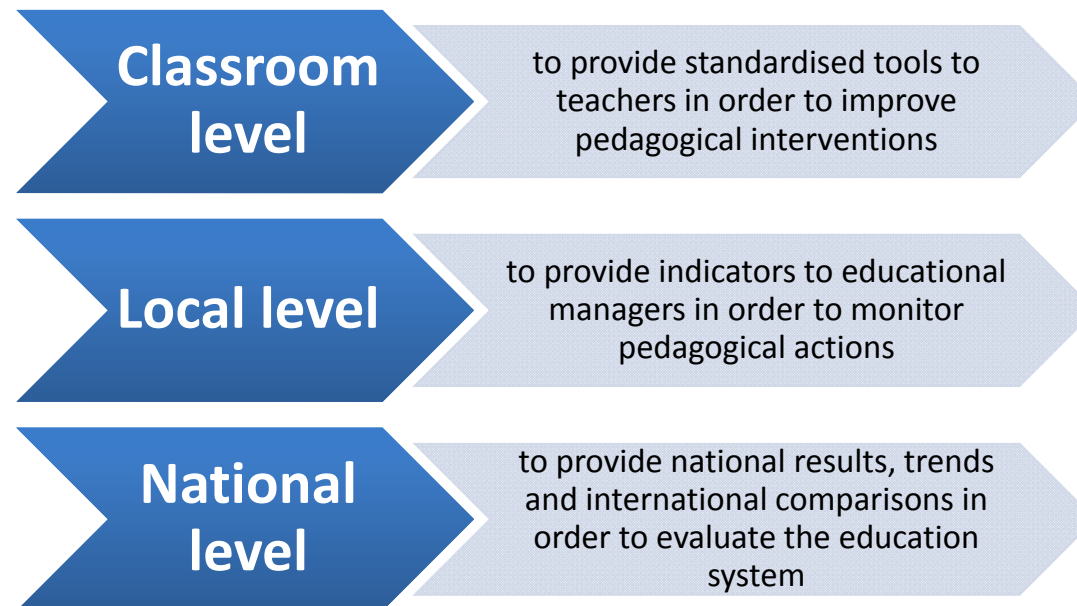
© Ministère de l'Éducation nationale - Mai 2017

# DEPP and student assessment

DEPP is the **Department of Statistics** of the Ministry of Education

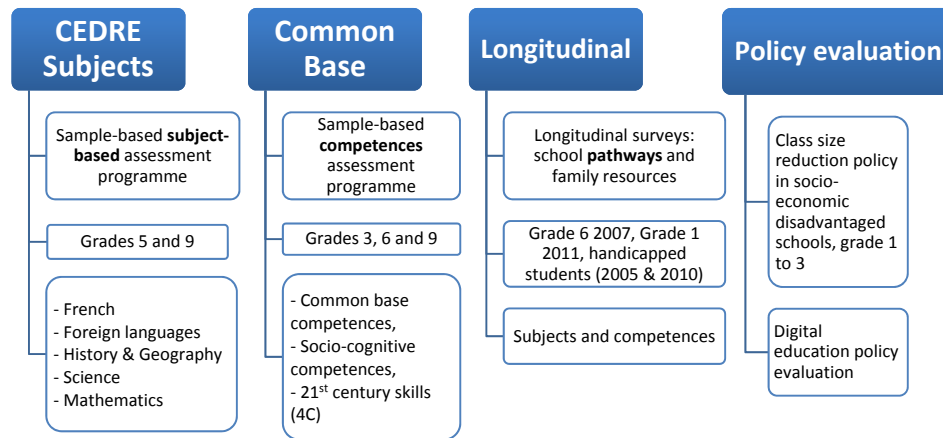
DEPP leads many standardised assessment programmes

## 3 levels – 3 Objectives



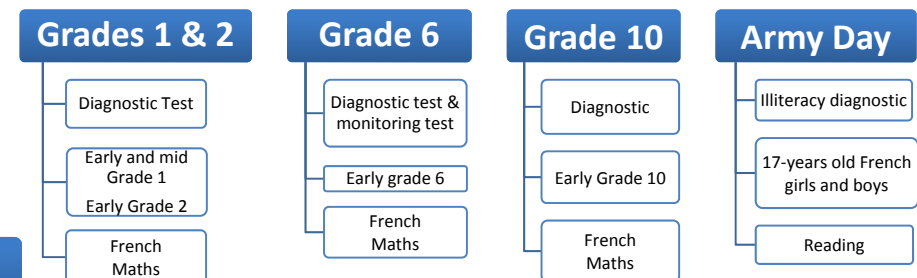
# Assessment Programmes

## National surveys

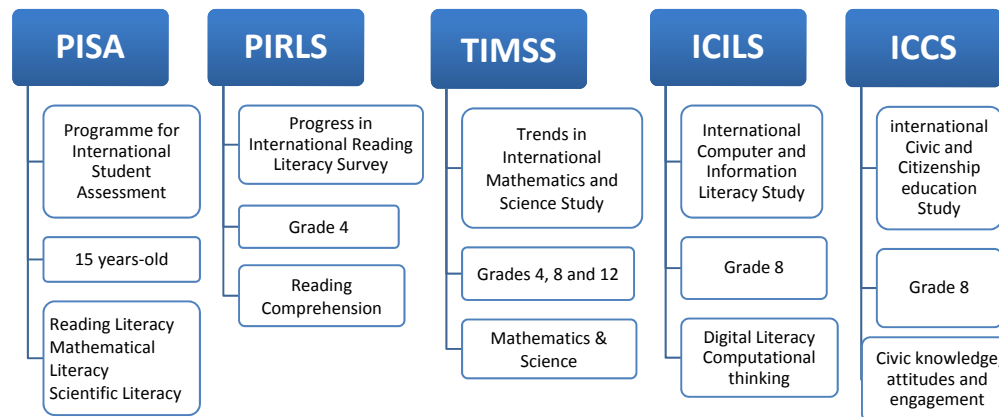


DEPP, **Department of Statistics** of the Min of Ed, leads many standardised assessment programmes

## Nation-wide assessments



## International surveys



# Transition to e-assessment

## Since 2015, transition from paper-based assessment to e-assessment:

- New **opportunities**: cost reduction, potential easiness to implement, in line with digital school, more engaging, ...
- New **features**: multimedia, interactivity, simulated situations, 21<sup>st</sup> century skills, adaptive testing, log-data, ...
- New **challenges**: comparability PBA/eA, usability, equipment, security, confidentiality, ...

## 2 axes as 2 added values of e-assessment:

1. Very-large-scale assessment
2. Innovative assessment

# E-assessment in practice

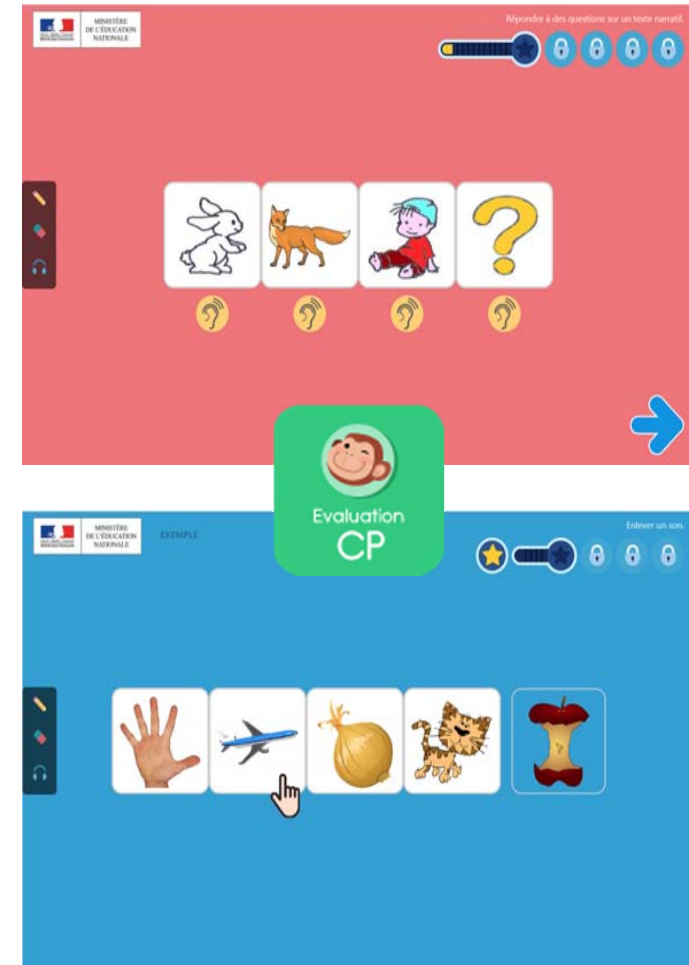
## Dependency on school equipment:

- **Primary schools**
  - Offline tablet solution (mobile classes)
  - Mainly sample-based programmes
- **Secondary schools**
  - Online solution (schools' computers)
  - Sample-based and nation-wide programmes



# Tablet-based assessment

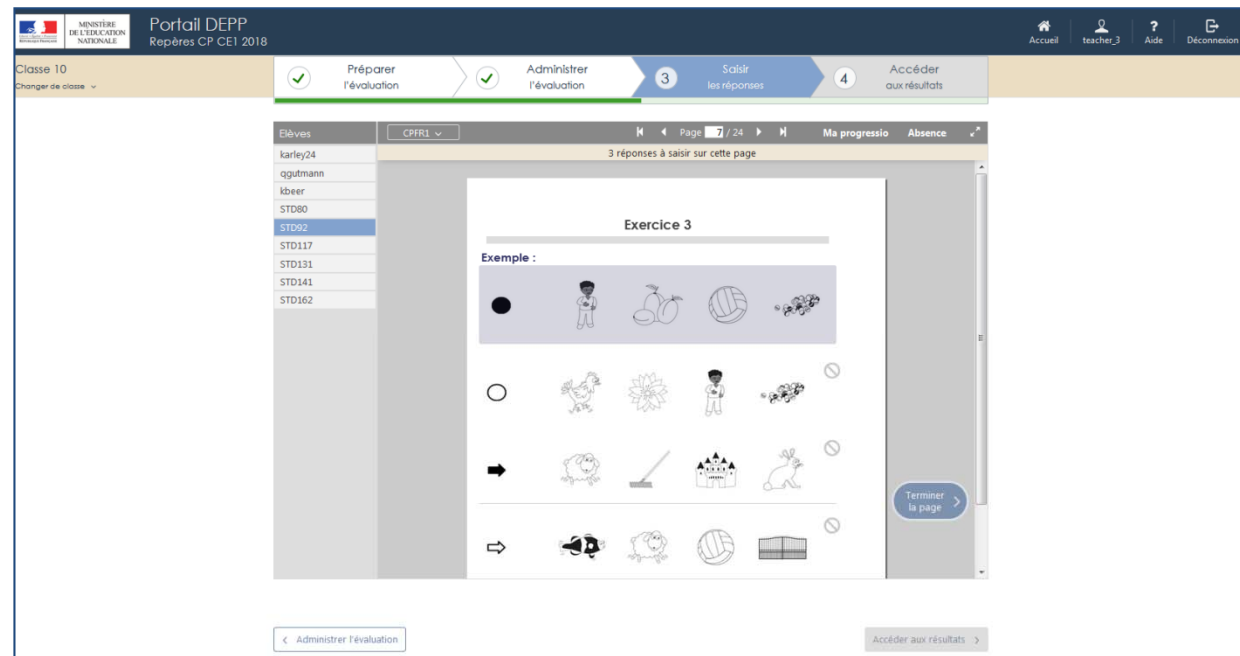
- **Primary schools**
  - Mobile App (D-Tab)
  - Adapted to young children
  - E.g. : 30,000 **grade 1 and grade 2** students longitudinal survey
- **Next step: nation-wide?**





# Nation-wide primary schools assessment

- **Early grade 1 and grade 2 nation-wide assessment**
  - September 2018:
    - 1.7 millions grade 1 & grade 2 students, paper-based (portals dev)
    - + Tablet app version available



# Very-large-scale e-assessment

- **Grade 6 & Grade 10 nation-wide e-assessment**

- Grade 6: 830,000 students / 7,100 schools
- Grade 10: 830,000 students / 4,500 schools
- French and Maths, adaptive (MST)
- TAO full web

- **Feedback**

- Participation rate: 95%
- Scalability: up to 50 000 simultaneous connections
- Offline version for schools with low bandwidth



- **Successful very-large scale assessments thanks to e-assessment**

# Item samples

Évaluation séquence1 | ttc1 | Déconnexion

Lecture

Avancement de l'évaluation (0 %)

**Texte B**

Lisez le texte qui a plusieurs pages, puis répondez.

1 2 3 4

**Question 2/4**

Pourquoi les koalas mâchouillent-ils des feuilles d'eucalyptus ?

☐ Pour s'amuser.  
☐ Pour se nourrir.  
☐ Pour se désaltérer.  
☐ Pour se laver.

En ce temps là, l'Australie ne s'appelait pas encore l'Australie. En ce temps-là, cette immense île était peuplée uniquement de tribus aborigènes\*. En ce temps-là, les koalas\*\* n'existaient pas. Pour vivre, hommes, femmes et enfants pêchaient, chassaient, cueillaient. Tous. Tous, sauf un jeune garçon aussi paresseux que désagréable. Orphelin, il n'aidait jamais les autres membres de la tribu. Même pendant les périodes de grande sécheresse, il refusait d'aller chercher l'eau au puits lointain. Il préférait jouer, rêvasser, puis mendier quelques gouttes de précieux breuvage quand il avait soif.

Mais un jour, tous en eurent assez. Ils cachèrent leurs réserves d'eau avant de partir qui à la chasse, qui à la cueillette.

\*aborigènes : personnes originaires de l'Australie  
\*\*koala : petit mammifère d'Australie

Page 1 / 4

Précédent Suivant

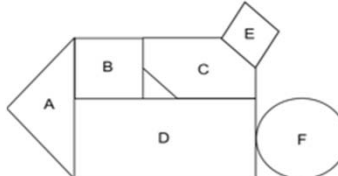
## Calculatrice cassée

Certaines touches de la calculatrice sont cassées. En utilisant les touches restantes, affiche **1,5** à l'écran.



**Décrire une figure**

Voici une figure complexe composée de plusieurs figures. Identifier le nom de la figure A.



La figure A est :

☐ un cercle  
☐ un triangle  
☐ un carré  
☐ un losange

Évaluation séquence2 | ttc3 | Déconnexion

Sciences et technologie

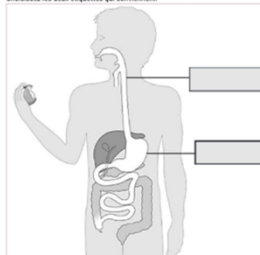
Avancement de l'évaluation (10 %)

**Le corps humain**

Sur le schéma, on a représenté un jeune homme en train de manger une pomme. Les organes de son appareil digestif ont été représentés.

**Légendez les organes de l'appareil digestif.**

Choisissez les deux étiquettes qui conviennent.

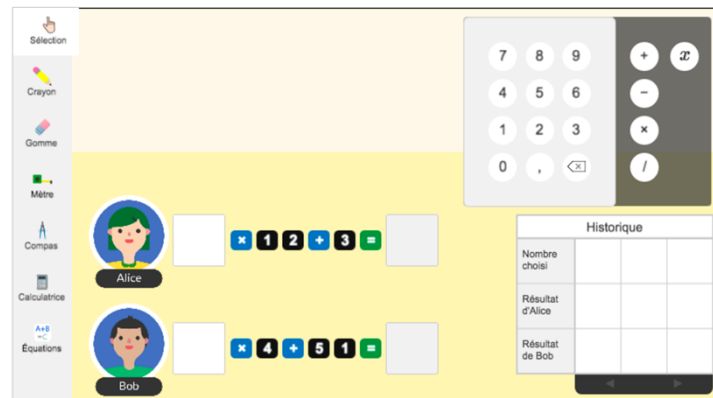


Estomac Foie Gros intestin Intestin grêle Cœsophage

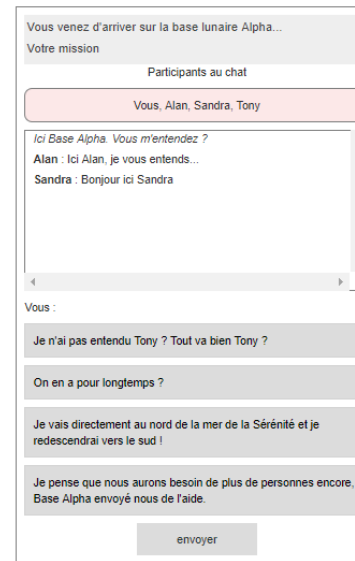
Précédent Suivant

# Technology Enhanced Items

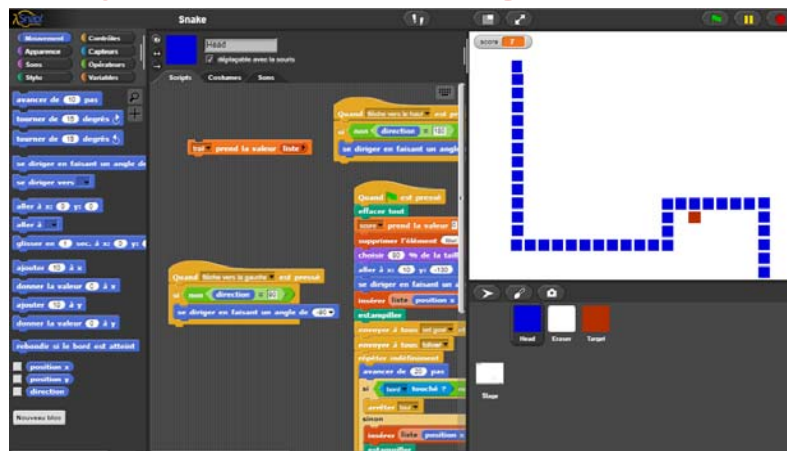
## Maths (with Luxembourg)



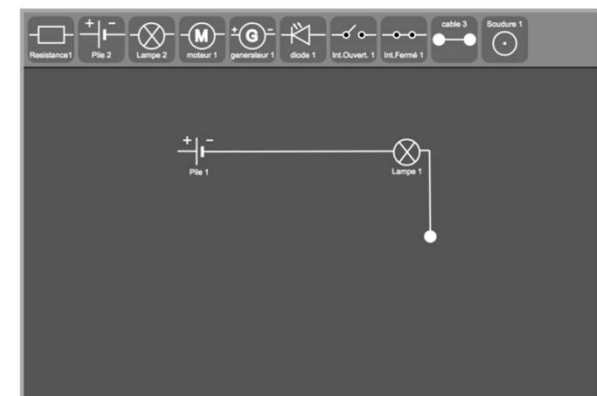
## ChatBot



## Computational thinking



## Physics



# What's new since last year

- **Very-large-scale assessment**
  - e-assessment in grade 10, in addition to grade 6
  - assessment in grades 1 and 2, portal development
- **Innovative assessment (see dev session)**
  - tablet-based app development and implementation (early grades)
  - development and implementation of Technology-Enhanced Items (TEI) in maths and 21<sup>st</sup> century skills
- **Studies**
  - Mode-effect (bridge) studies
  - Process data analytics

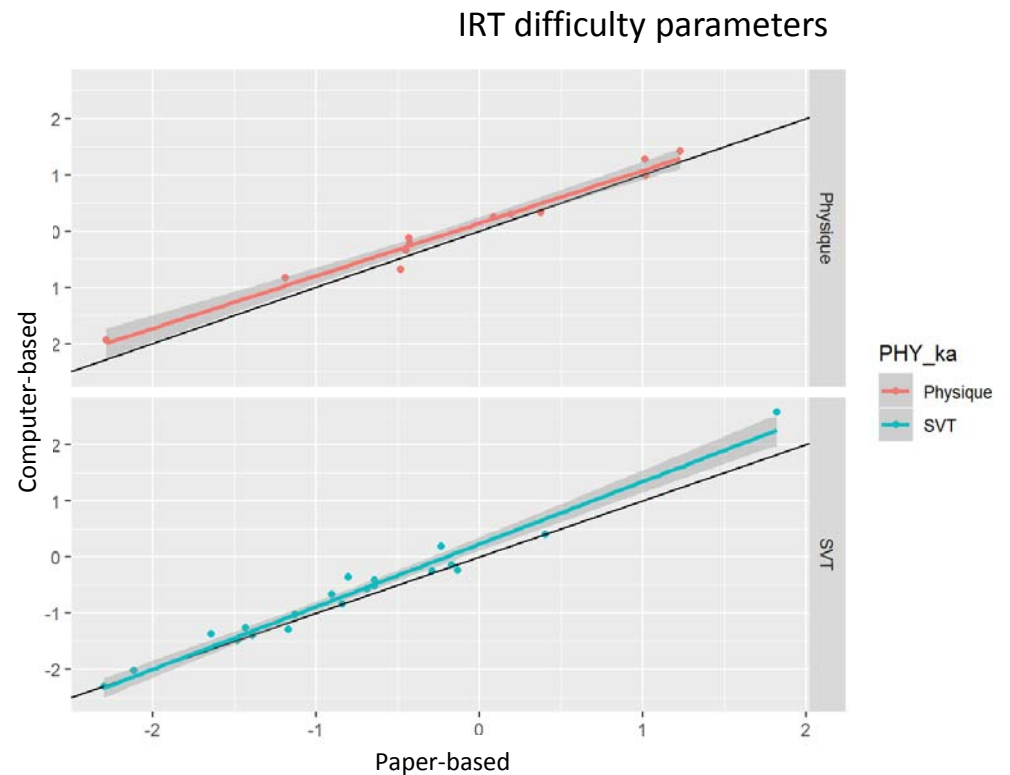
# Mode-effect study 1

- **Study:**

- May 2018 grade 9 students
- PB versus CB
- Science
- 4,000 students
- Counterbalanced design

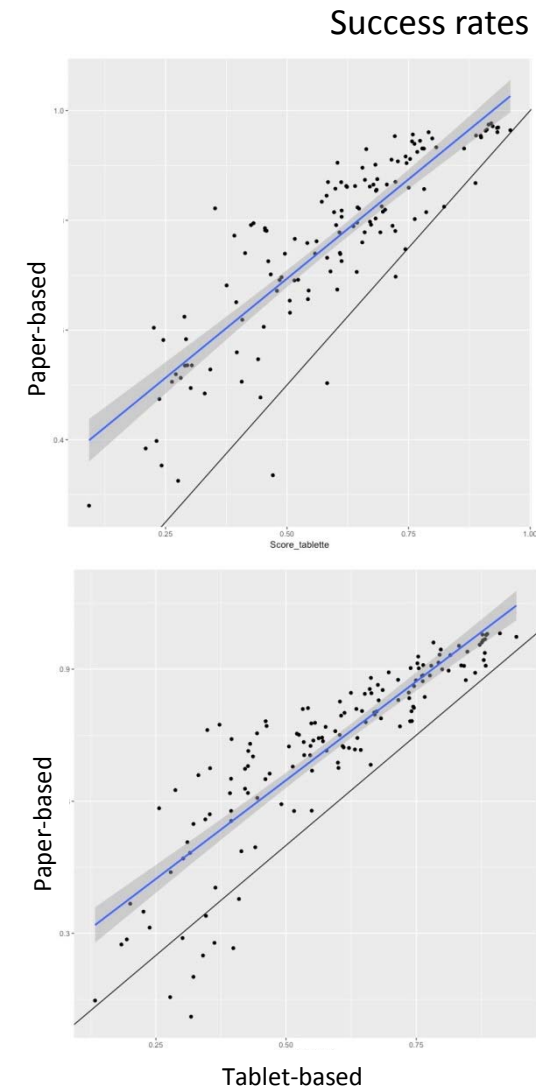
- **Results:**

- More difficult on CBA
- Effect: 15%-20% score standard deviation



# Mode-effect study 2

- **Study:**
  - Sep 2018 grades 1-2 students
  - PB versus Tablet-based
  - French & Maths
  - 4,000 students
  - Separated samples design
- **Results:**
  - More difficult on tablet
  - Effect: 14%-17% average success rate differences



# A need for more UX researches

- **Questions:**
  - Role on motivation
  - Impact on speed
  - Role of familiarity
  - Understanding of what is expected: Individual tablet-based against collective administration
  - Etc.



# Process data analytics

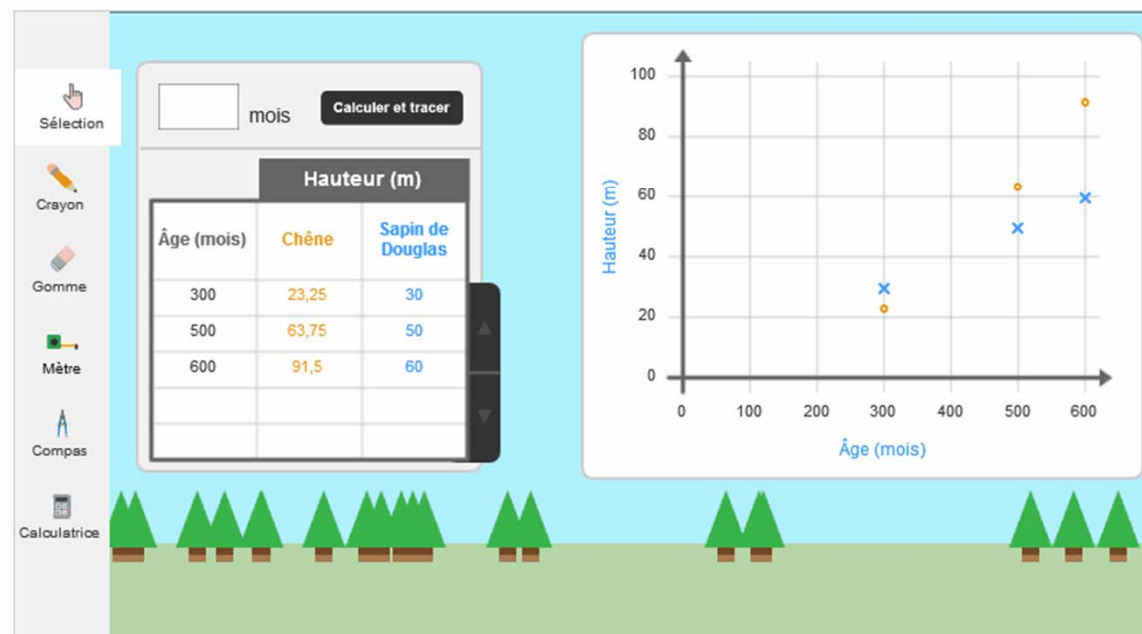
Deux graines d'arbres sont plantées au même moment : un chêne et un sapin de Douglas.

En entrant dans la première colonne, l'âge (en mois) des arbres, on obtient leur hauteur (en mètre) dans les deuxième et troisième colonnes.

Les points correspondants s'affichent sur le graphique : en orange le chêne, en bleu le sapin.

**A quel âge (autre que 0 mois) ont-ils la même hauteur ?**

L'âge est de  mois.



# Data

```

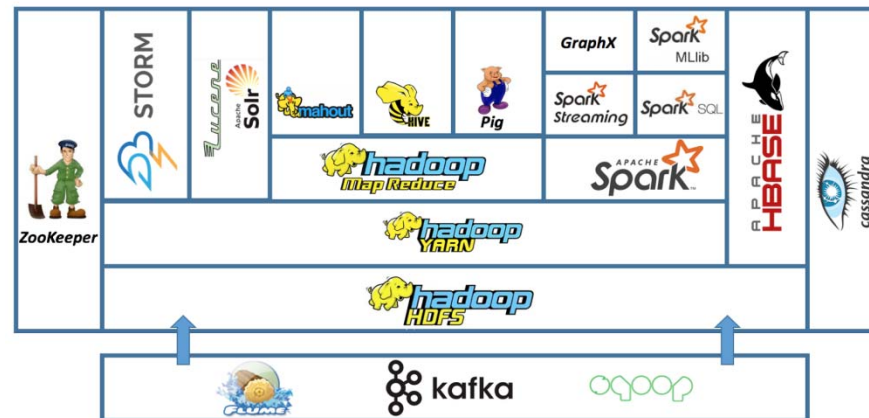
arbre
1
{"component_instances":[{"log_id":{"timestamp":1529070659879,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item","component_instance_index":1,"component_type_id":"item"}}, {"log_id":{"timestamp":1529070659879,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/mouse","component_instance_index":2,"parent_component_instance_id":"item"}}, {"log_id":{"timestamp":1529070659879,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/keyboard","component_type_id":"keyboard_capture","component_instance_index":3,"parent_component_instance_id":"item"}}, {"log_id":{"timestamp":1529070659923,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar","component_type_id":"toolbar","component_instance_index":4,"parent_component_instance_id":"item"}}, {"log_id":{"timestamp":1529070659923,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar/HAND","component_type_id":"toolbar_hand","component_instance_index":5,"parent_component_instance_id":"item/toolbar"}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar/COMPASS","component_type_id":"toolbar_compass","component_instance_index":6,"parent_component_instance_id":"item/toolbar"}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar/PENCIL","component_type_id":"toolbar_r_pencil","component_instance_index":7,"parent_component_instance_id":"item/toolbar"}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar/ERASER","component_type_id":"toolbar_eraser","component_instance_index":8,"parent_component_instance_id":"item/toolbar"}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar/RULER","component_type_id":"toolbar_ruler","component_instance_index":9,"parent_component_instance_id":"item/toolbar"}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar/CALCULATOR","component_type_id":"toolbar_calculator","component_instance_index":10,"parent_component_instance_id":"item/toolbar"}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro","component_type_id":"arbreMaestro","component_instance_index":11,"parent_component_instance_id":"item"}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro/graphingTable","component_type_id":"graphingTable","component_instance_index":12,"parent_component_instance_id":"item/arbreMaestro"}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro/treeDataTable","component_type_id":"treeDataTable","component_instance_index":13,"parent_component_instance_id":"item/arbreMaestro"}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro/inputMonths","component_type_id":"numberInput","component_instance_index":14,"parent_component_instance_id":"item/arbreMaestro"}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/numpadPC","component_type_id":"undefined","component_instance_index":15,"parent_component_instance_id":"item"}}, {"component_events":[{"log_id":{"timestamp":1529070659879,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item","component_type_id":"item","component_event_id":"itemPCInitEvent","data":{"pci_id":"vrt0604arbrae"}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar","component_event_id":"ToolSelectEvent","data":{"tool_id":"HAND","tool_name":"Selection","is_auto":true}}}, {"log_id":{"timestamp":1529070659924,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/toolbar","component_event_id":"ToolInitEvent","data":{"state":{"selected_tool_id":"HAND","selected_tool_name":"Selection","visible_tools_id":["HAND","COMPASS","PENCIL","ERASER","RULER","CALCULATOR"]}}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro/graphingTable","component_instance_index":null,"component_type_id":"graphingTable","component_event_id":"ArbreGraphInitEvent","data":{"treeData":{"x00,y00,600}}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro/treeDataTable","component_instance_index":null,"component_type_id":"treeDataTable","component_event_id":"ArbreTableInitEvent","data":{"state":{"dataList":[{"month":300,"tree1Height":23.25,"tree2Height":30}, {"month":500,"tree1Height":63.75,"tree2Height":50}, {"month":600,"tree1Height":91.5,"tree2Height":60}], "currentStep":0,"selectedRow":-1,"selectedIndex":1,"numOfBeginning":3}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/arbreMaestro/inputMonths","component_instance_index":null,"component_type_id":"numberInput","component_event_id":"inputInit","data":{"x":35,"y":50,"isSelected":false,"value":"","visible":true,"isLocked":false}}}, {"log_id":{"timestamp":1529070660051,"session_hash":"","session_index":0,"device_hash":"","user_id":null,"entry":{"component_instance_id":"item/numpadPC","component_instance_index":null,"component_type_id":"undefined","component_event_id":"onNumpadInit","data":{"visible":false,"x":0,"y":0}}}, {"log_id":{"timestamp":1529070660567,"session_hash":

```

Is there signal in the noise?

# IT Big data solutions are needed

- Development of new IT environments
- E.g.: Hadoop & Spark frameworks
  - Hadoop: free and opensource framework, designed to deal with huge volumes of data, in a distributed environment.



# Theory is needed

- **Knowledge from didactics**
  - The concept of function, through the simulation of a real life situation.

- **Two possible approaches:**

**Operational approach : « input/output »:**

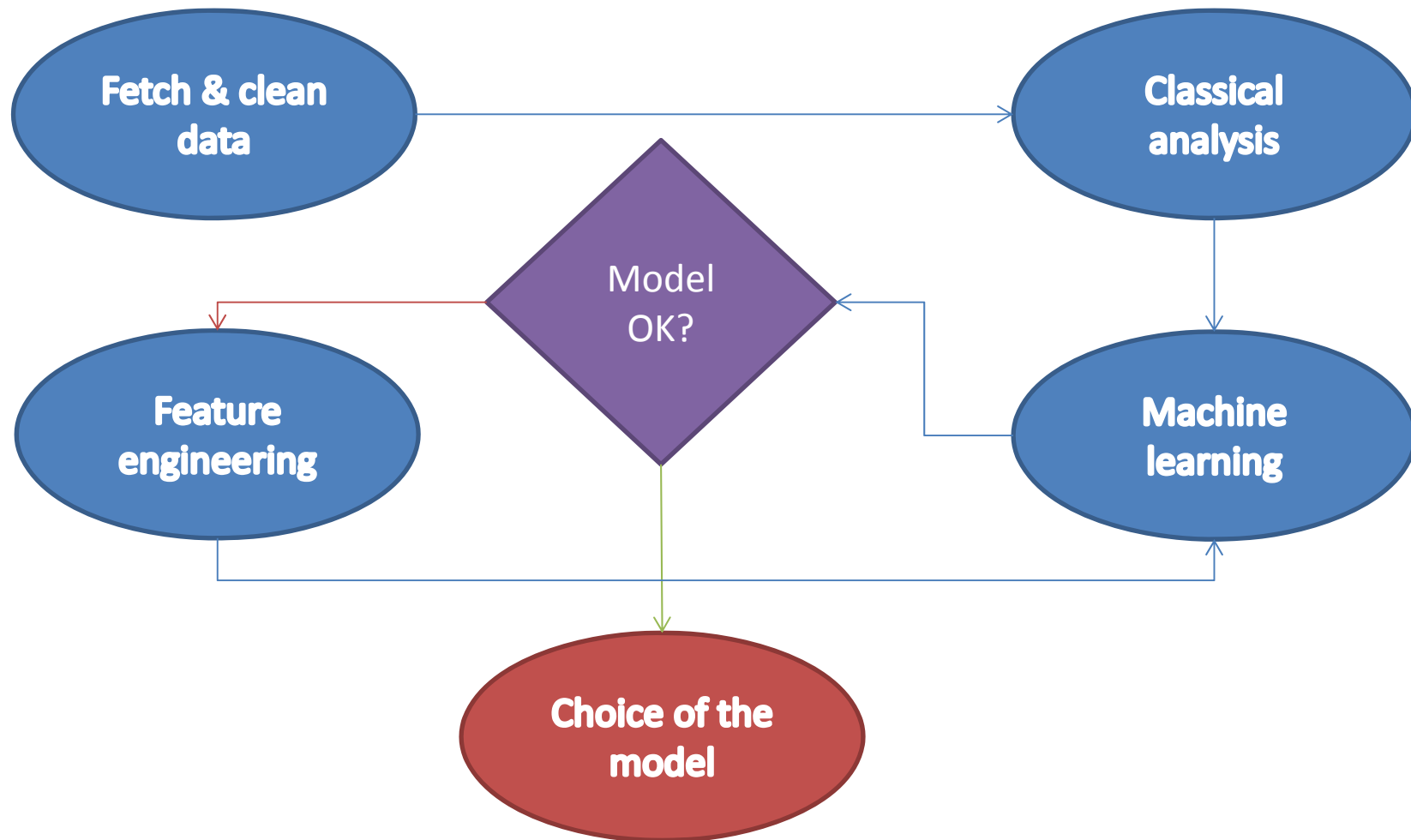
- The function is understood as a sequence of values

**Structural approach : graphical perception**

- The function is understood as a math object with properties

References: Sfard (1991), Drijvers (2012)

# Workflow

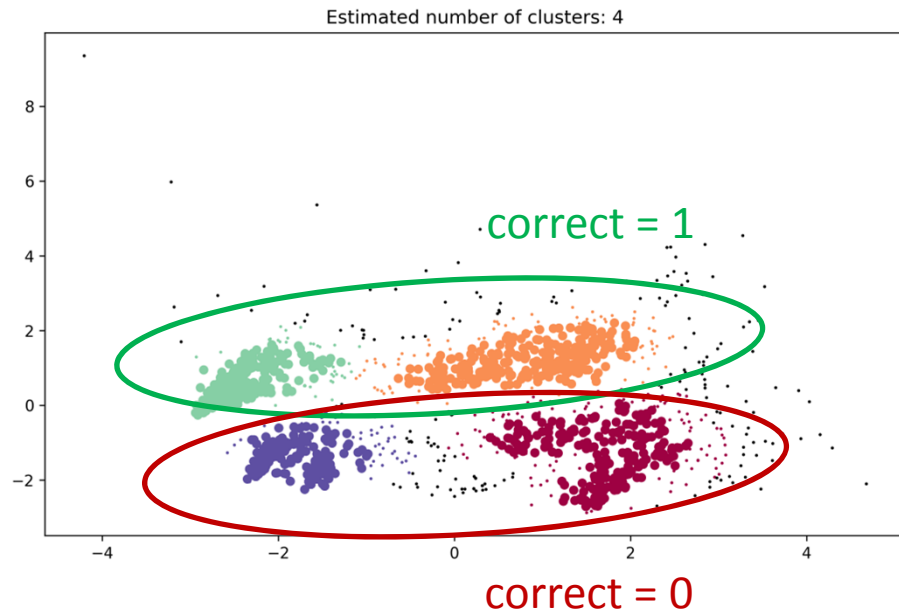


# Data analytics

- **Variable selection**

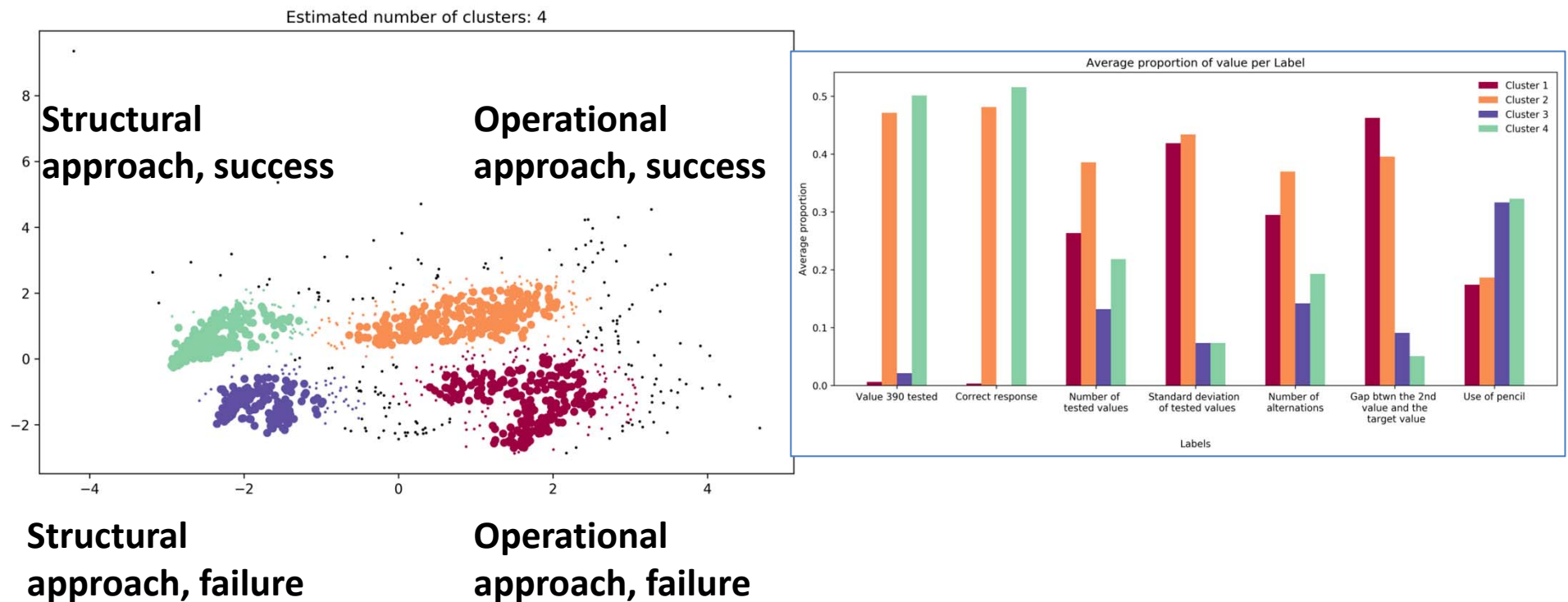
- Performance
- Duration
- Use of tools
- Entered values: first input, distance between the first and the target, alternations, standard deviation

- **Cluster identification**





# Interpretation



# Perspectives

- **Some future experiences to be shared:**
  - Accessibility tools
  - UX studies
  - Data analytics (continuation on process data)
  - IA use (voice recognition: fluency project)
  - Data access and use (portals)
- **Continuation of IT developments (see dev. Sessions)**
- **Sharing contents: TBD**



**THANK YOU!**