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**Large scale experimentation
of a serious game
targeting oral comprehension
in ESL for 6–8 year-olds:
Some lessons learned**

Foreign Language instruction in France

- "Late" introduction of languages in elementary
 - FL introduced in elementary school in 2002 (MEN, 2002)
 - Language awareness in kindergarten since 2015 (MEN, 2015)
 - Time constraints: 1.5h/week → 54h/year
- Difficulties
 - « Certains enseignants ont un niveau très faible et ne peuvent donc pas s'exprimer devant les élèves » (Delasalle 2008, 375)
 - Survey in training
 - 23 respondents / 52
 - 21 like to teach English (what about 29 others?)
 - 66% → 1 English session per week (~30 min)

Oral: a priority

- Official instruction (MEN, 2015)
- Elementary school = appropriate age
 - Learning anxiety less inhibiting (Voise, 2019)
 - Better acquisition of foreign language phonology
- Comprehension first (Asher, 2012)
 - Important not to force early learners to produce
 - Comprehension activities have an effect on production

Luciole game design foundations

- Importance of input
(Bybee, 2008)
 - Provide learners with frequent native input
 - Repetition of vocabulary and structures
- Short activities, regularly repeated
- Learning strategies
 - Phase 1: Presentation
Language focus
 - Phase 2: Training
Repetition
 - Phase 3: Contextualization
Final task
 - Message decoding, keyword identification, etc.
 - Input gradually more complex

Serious game

- "Game designed, prescribed or used with both the aim of entertaining and an external finality targeting the player" (Loiseau & Noûs, 2022)
- "Make knowledge a tool rather than an end" (Holland, Jenkins, and Squire 2003)
- Provoke a "Lusory attitude" (Suits, 1978)
 - « cette attitude ambivalente faite à la fois de distance et d'implication » (Silva, 2008, 18)

The Game

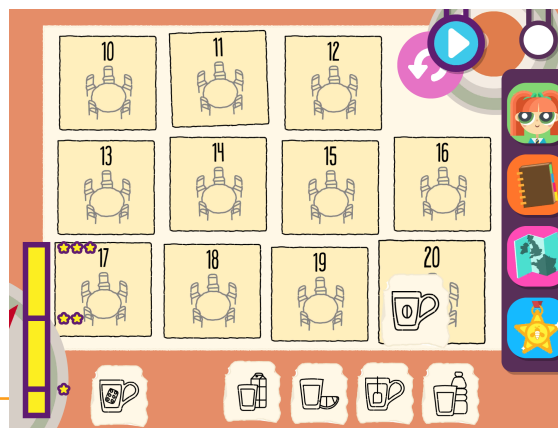


Intro

Jeu

Outro

Activité



The Fluence project (2017–2022)

- Hypotheses (Meyer, Diard, & Valdois, 2017)
 - Reading fluency, long term predictor of academic success
 - Action video games improve reading underlying processes
 - Visuo-attentional span
 - Attentional shift
- Aim of the project
 - Building video games that would support these underlying processes
 - Testing their effect

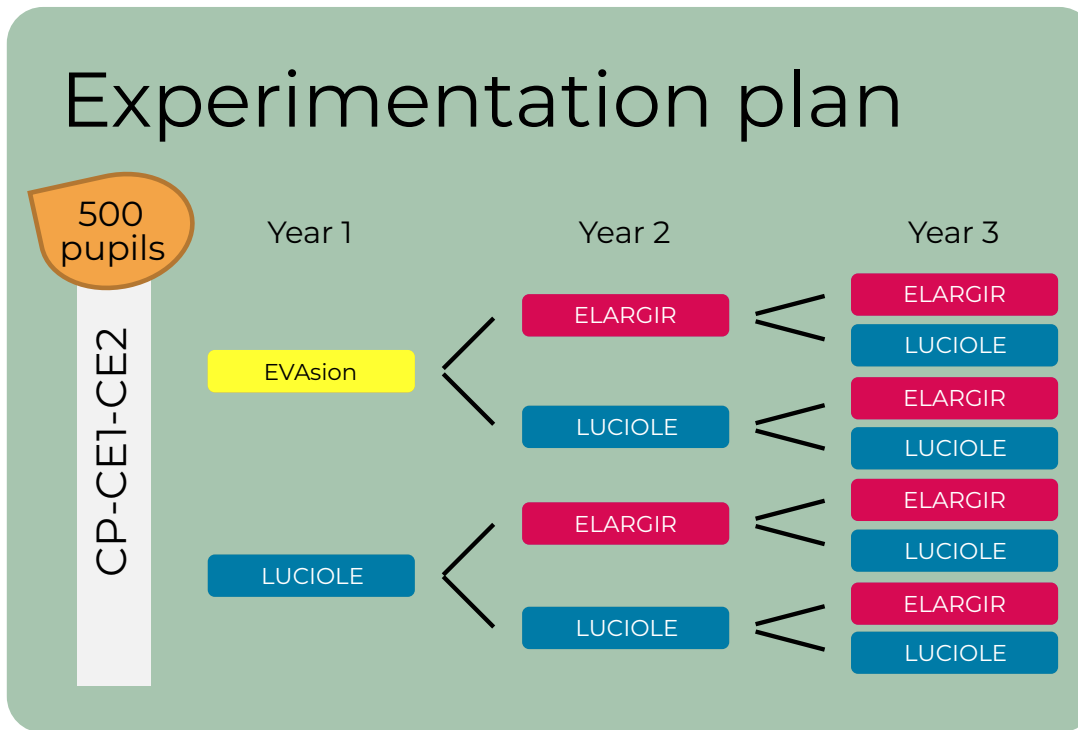
Experimental Design: neutralizing the Hawthorne effect (Koch et al., 2018, p. 3)

EVAsion & ELARGIR Teams POV

Test groups

Control groups

52 schools
730 pupils



Luciole Team POV

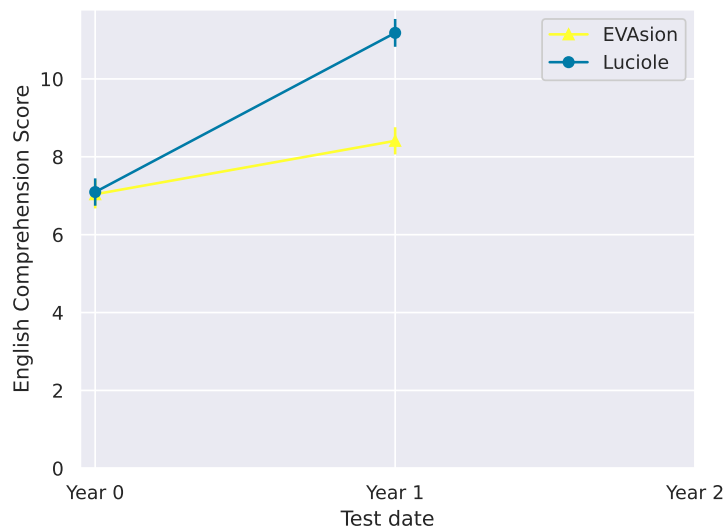
Test groups

Control groups

Research environment/ Constraints

- 3 years × 10 weeks × 3 sessions × 20 min. play
- ipad app
- Little or no written text
- No "action video game" (not binary)
(Green, Li, & Bavelier 2010, 203)
 - extraordinary speed,
 - high degree of perceptual, cognitive, and motor load in the service of an accurate motor plan,
 - unpredictability,
 - emphasis on peripheral processing.

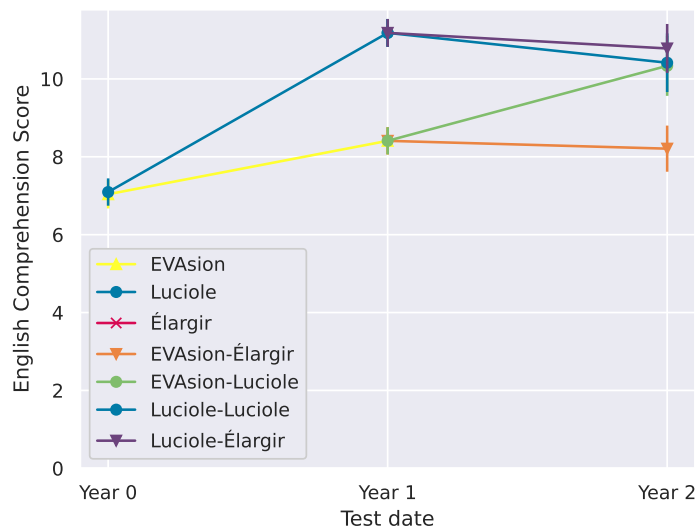
Results



- Luciole = 11.18
Evasion = 8.41
- $t = -10.59$
 $df = 676$
 $p < 10^{-23}$

Results

- \exists Luciole = 10.44
 \neg Luciole = 8.21
- $t = -6.095023$
 $df = 321.469034$
 $p < 10^{-10}$



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Traces analysis

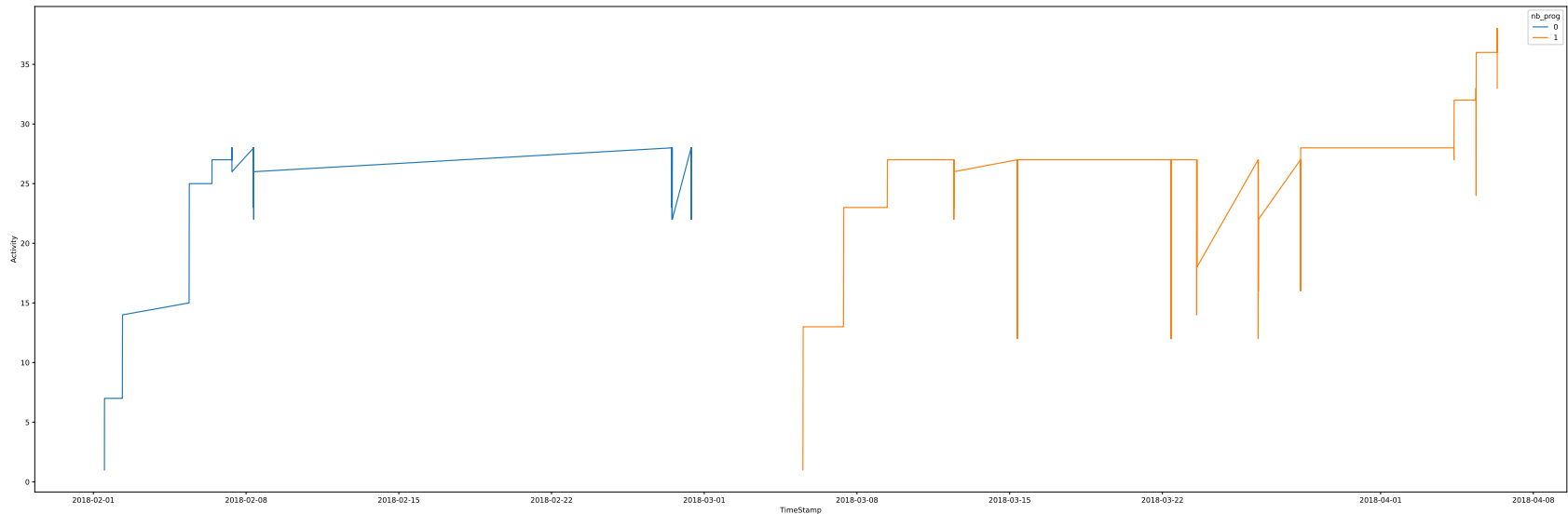
- Game time
 - Year 1 :
 - 5h20 avg (75%: 7h10)
 - not correlated w/ test score
 - 18 sessions avg (75%: 24)
 - not correlated w/ test score
 - Year 2 :
 - 6h avg (75% : 7h10)
 - weak correlation w/ test score ($r=0.18, p < .01$)
 - 20 sessions avg (75%: 25)
 - mild correlation w/ test score ($r=0.23, p < .0005$)
- Progression
 - Year 1 (49 activities)
 - Median: 37 (75%: 38)
 - Mild correlation w/ test score ($r=0.27, p < 10^{-5}$)
 - Year 2 (94 activities)
 - Median: 63 (75% 73)
 - Correlation w/ test score ($r=0.46, p < 10^{-9}$)
- In game score
 - Year 1
 - Mild correlation w/ test score ($r=0.32, p < 10^{-8}$)
 - Year 2
 - Mild correlation w/ test score ($r=0.23, p < .0005$)

Conclusions

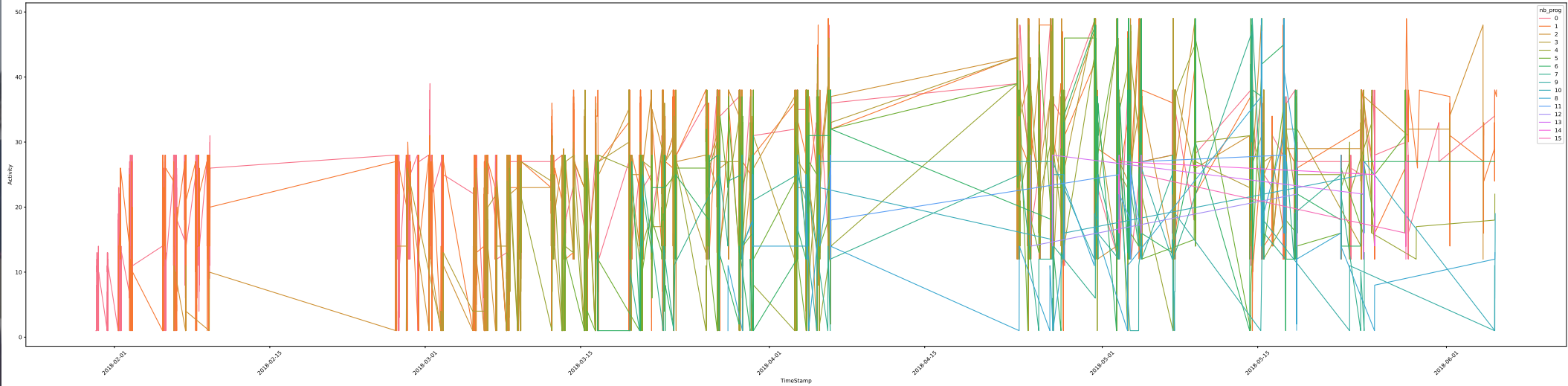
- Updates were not made in time
 - During the experiment
 - Between year 1 & 2
- Some updates were never made

"Progressions"

- Pupils tend to start over in the course of the experiment



"Progressions"!



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Lessons learnt

- $1h \div 24 \rightarrow 4\%$ of time in class
→ how much preparation time can we ask?
 - Reduce to minimal necessary reading
 - About the game
 - About the protocol
 - Reduce to minimal necessary playing
 - → on demand resources
 - Hands-on updates
- Advices
 - More sessions rather than longer playing time
- Data collection
 - **Both** online & offline
 - Each record describe device & **version**

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