Developing Self-Regulated Learning Skills: Is there an app for that?

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"the ultimate goal of education is to shift to the individual the ultimate goal of pursuing his (sic) own education"

John W. Gardner, US Secretary of Education 1965-1968

"Many students have trouble making the transition to the more independent learning required at university compared with their previous study"

UK Higher Education Academy 2014

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(Why) do students need help with self-regulated learning?

Mary graduated from university 12 years ago with a master's degree in English literature. She wrote her dissertation on the representation of female domestic servants in 19 century American novels.

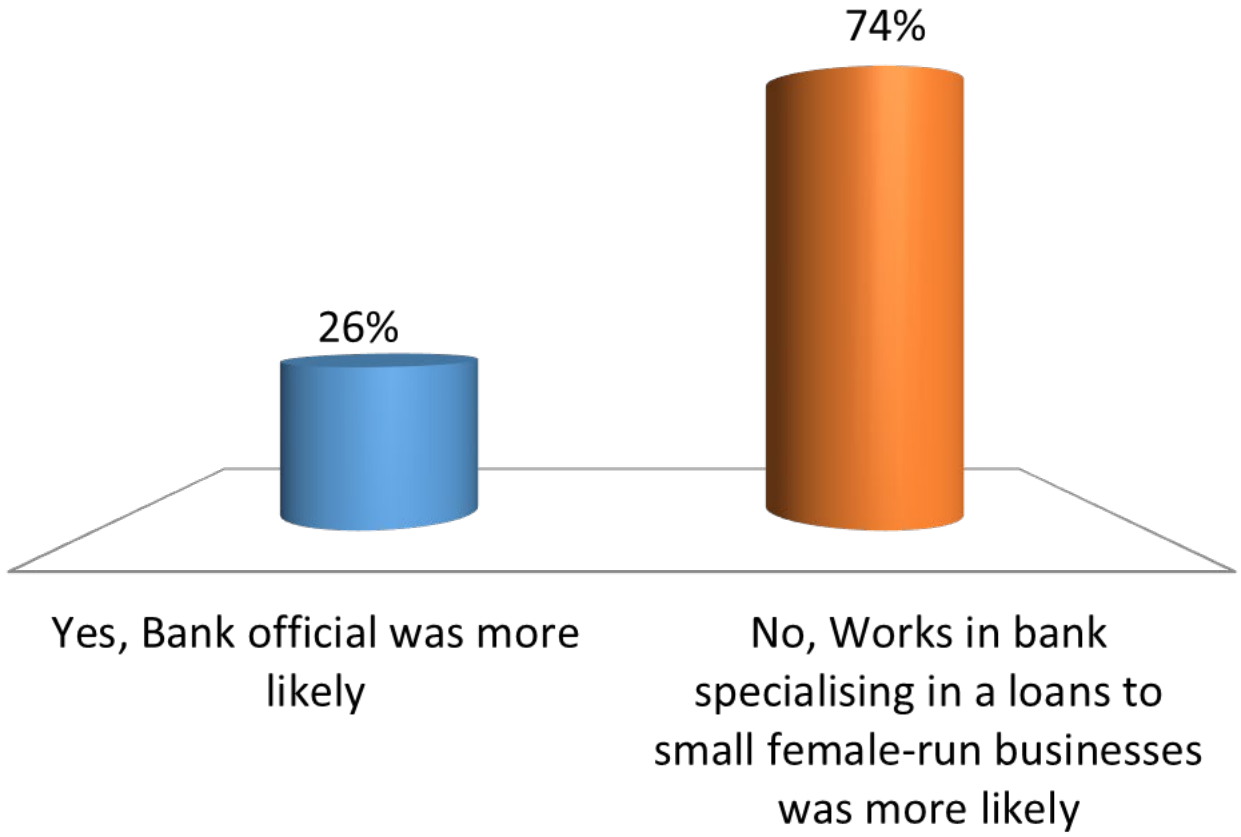
Rank in order from most likely (1) to least likely (5) what you think her job is now:

- Manages a chain of 4 child care crèches
- Bank official
- Owns a small bookshop
- Works in bank specialising in a loans to small female-run businesses
- Is a librarian in the library of a research institute

How satisfied are you that your answer is probably correct?

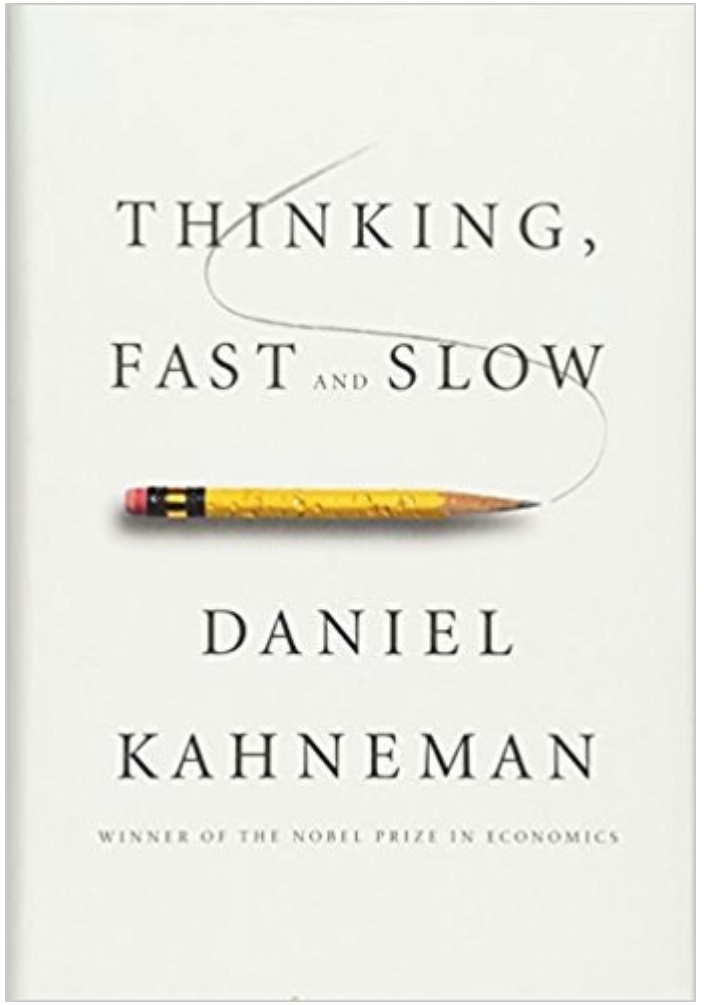
In the question about Mary's job did you rate "Bank official" as being **more** likely than "Works in bank specialising in a loans to small female-run businesses"

A. Yes, Bank official was more likely
B. No, Works in bank specialising in a loans to small female-run businesses was more likely



People make (predictable) errors

- Attention is costly, our brain prefers not to pay, if possible
- We have practices which have become automated (two systems principle)
- Our brain favours automatic processes when possible (lazy controller principle)
- When faced with a complex problem, our brain solves an easier one (heuristics)
- We have confidence in our judgements (overconfidence bias)

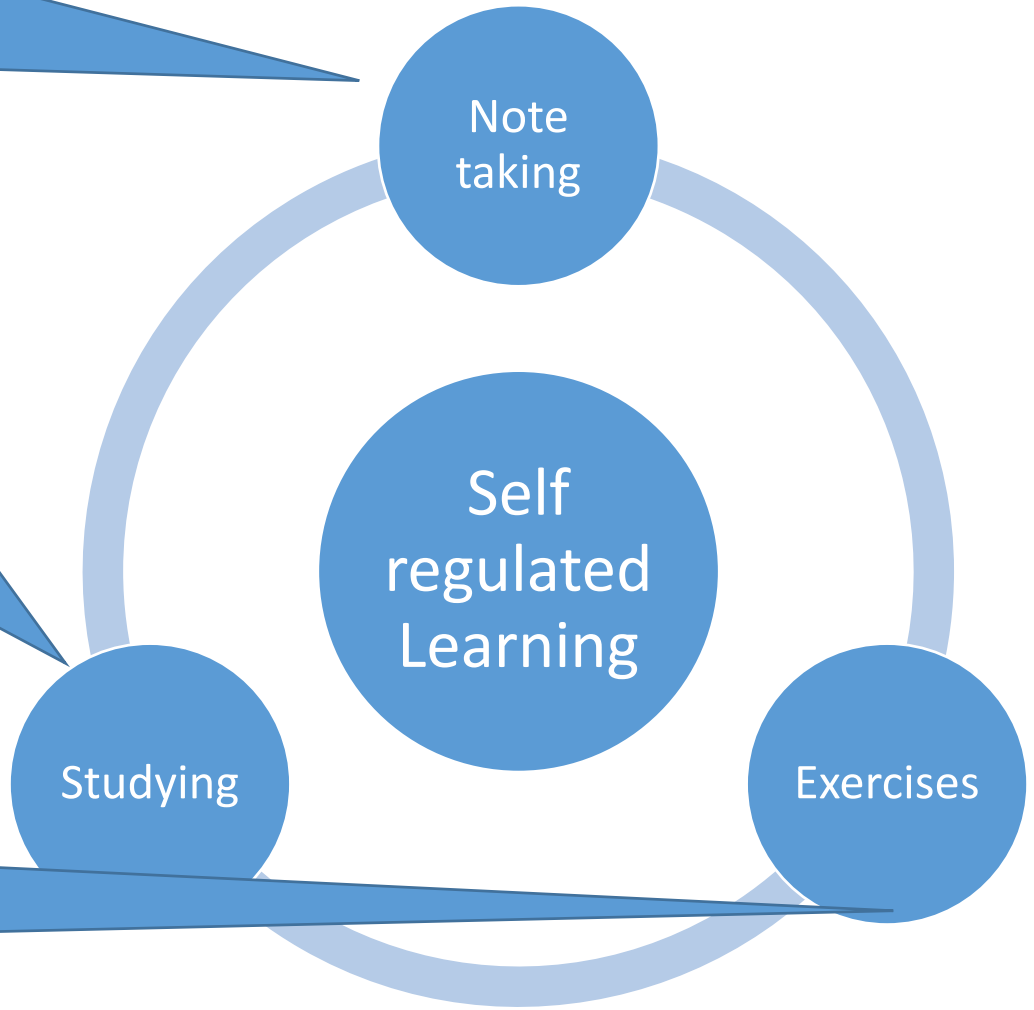


Automated learning routines in University

"…synthesizing and summarizing content rather than verbatim transcription can serve as a desirable difficulty…" (Mueller & Oppenheimer 2014)

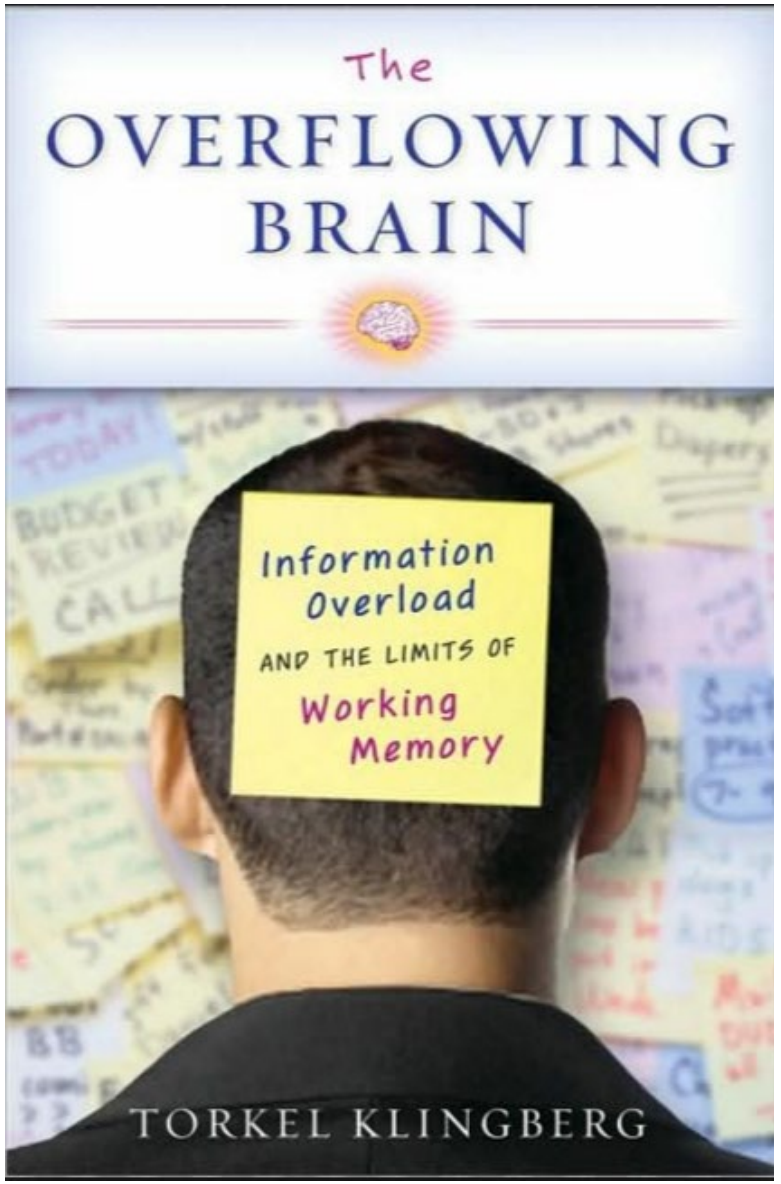
Frequently used techniques (highlighting, re-reading notes) have a negligible impact on learning (Dunlosky et al. 2013)

When faced with unfamiliar problems roughly 60% of solution attempts were "of the 'read, make a decision quickly and pursue that direction come hell or high water' variety". (Schoenfeld, 1992)



SRL and Automaticity

- Synchronous conscious control of SRL is cognitively costly
- SRL processes need to become automated (Winne, 2018)
- Reflection on SRL should be non-synchronous when the learning task is cognitively costly



Are students metacognitive?

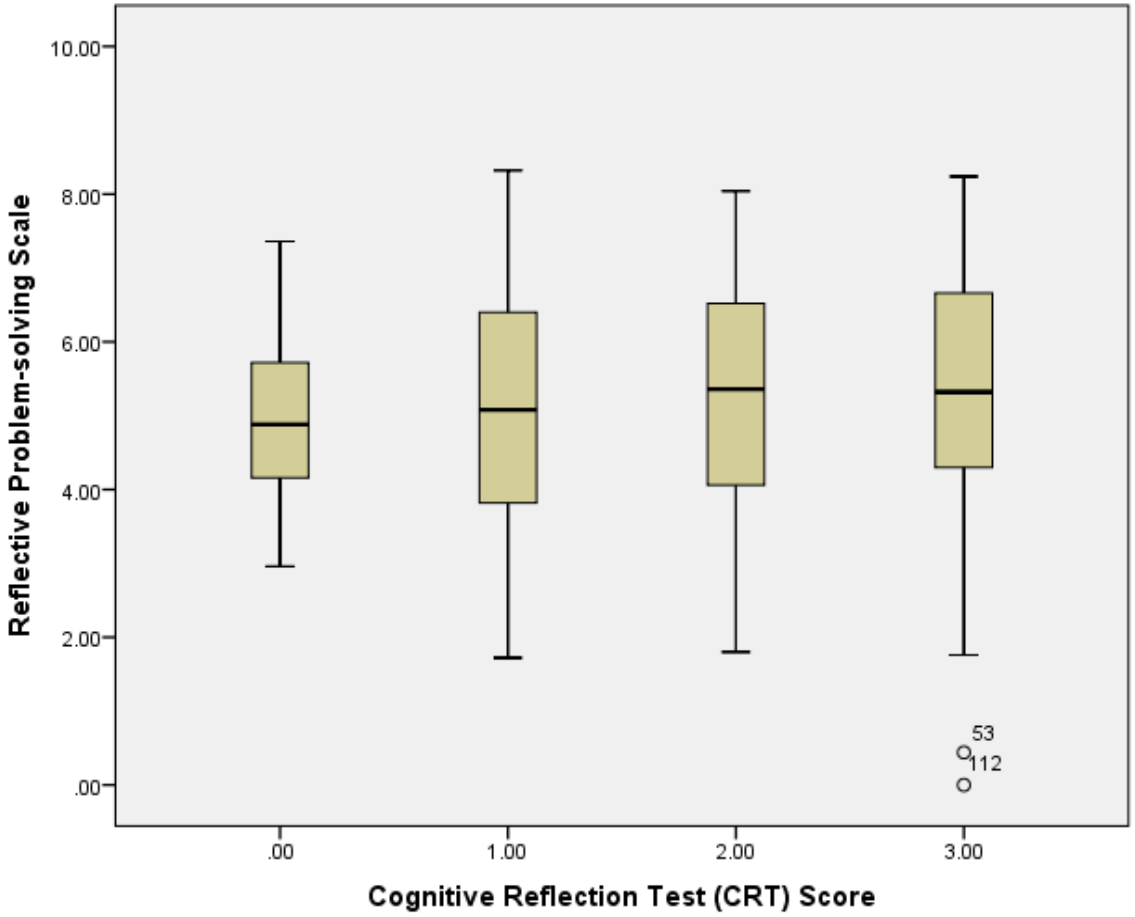
169 2nd year Computer Science students

Two instruments:

- **Objective** measure of self-checking (CRT, Frederick, 2005)
  - Short problems with intuitive response which is incorrect
- **Subjective** measure of self-checking (Reflective Problem Solving Scale, Schraw and Dennison 1994)
  - I ask myself if I have considered all the options after I solve a problem.

- Self report (Reflective Problem Solving) was not correlated with objective score (CRT) (r=.061)

- **…although many students are weak at monitoring their work, they are not particularly aware of this weakness**



Maëlle Colussi, Audrey Cuenin, Ting-Hsuan Lee, and Joana Machado (2014) Do student know enough about their learning to tell us about it? HPL Project

Are students metacognitive?

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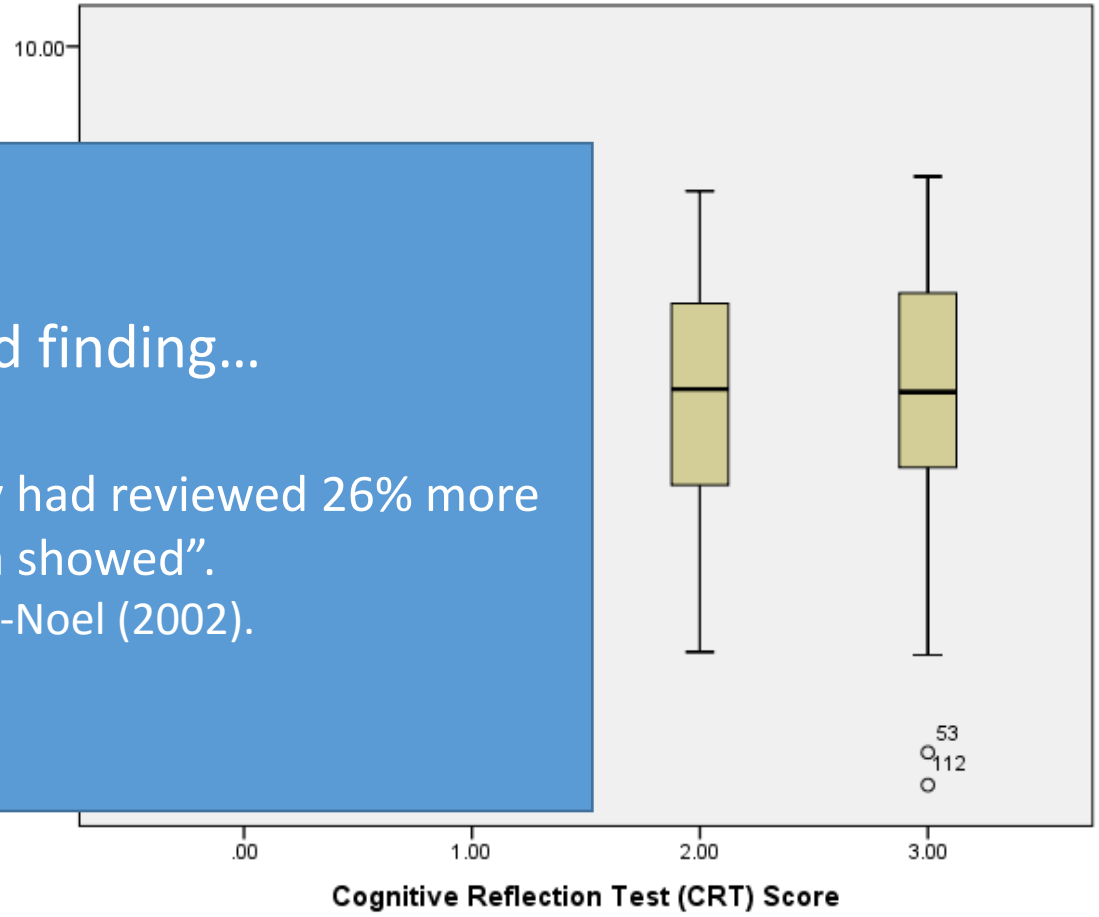
Two instruments:

- **Objective** measure of 2005)
  - Short problems with incorrect
- **Subjective** measure o Problem Solving Scale
  - I ask myself if I have solve a problem.
- Self report (Reflective correlated with object
- **…although many students are weak at monitoring their work, they are not particularly aware of this weakness**

Not an isolated finding…

"Students estimated that they had reviewed 26% more than trace data showed".
Winne & Jamieson-Noel (2002).



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Measuring and Becoming

- Wave 1: Self-report measures of SRL
  - E.g. Motivated Strategies for Learning Questionnaire (Pintrich et al., 1991)
  - Valid (+), Reliable (+), Correlated with attainment (+), but self-report bias (-)
- Wave 2: On task process measures
  - Think aloud (Ericsson and Simon, 1993)
  - Direct observation (video/audio)
  - Traces (eye tracking, log files)/ Microanalytical measures (Winne & Jamieson-Noel, D. 2002)
- Wave 3: Measurement is intervention "Schrödinger principle"
  - Diaries with time series analysis (Schmitz & Perels, 2011)

Panadero, Klug and Järvelä, 2015

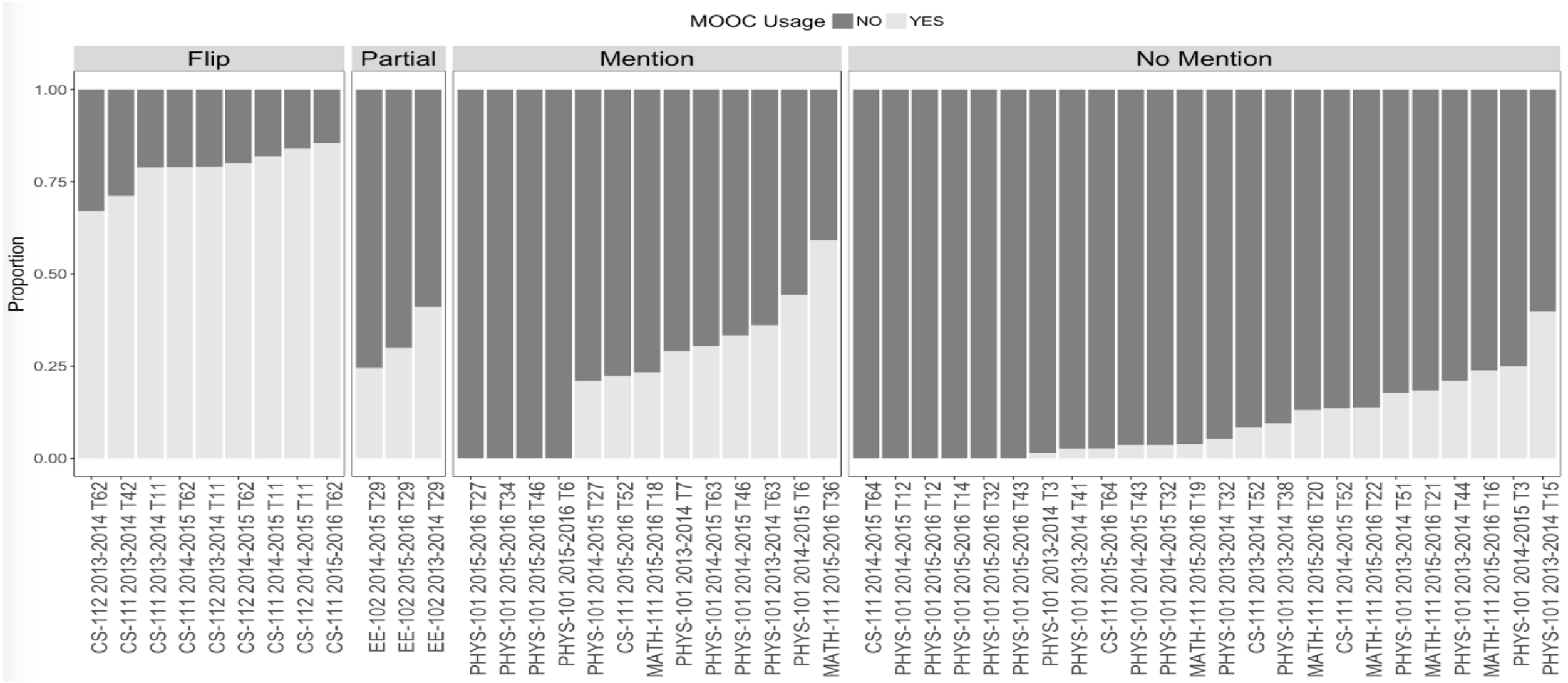
Why don’t teachers use the tools being created?

How education has changed…(or not)

Bologna 1370

Lausanne 2014

Adaption of MOOCs as learning resource



Design Principles for Educational Innovations

- Needs to solve a problem that teachers know they have
- The rewards must be worth the investment
- Must work with these students in this context

SRL: Principles into practice

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Accueil

LearningCompanion

Quelle que soit votre discipline, améliorer votre approche de l'apprentissage peut vous aider à apprendre davantage et à mobiliser ce que vous avez appris au moment où vous en avez besoin.

Suivi des exercices

The when and how of SRL Feedback

- a (more or less) phased process (Zimmermann and Moylan, 2009):
  - forethought
  - performance
  - reflection

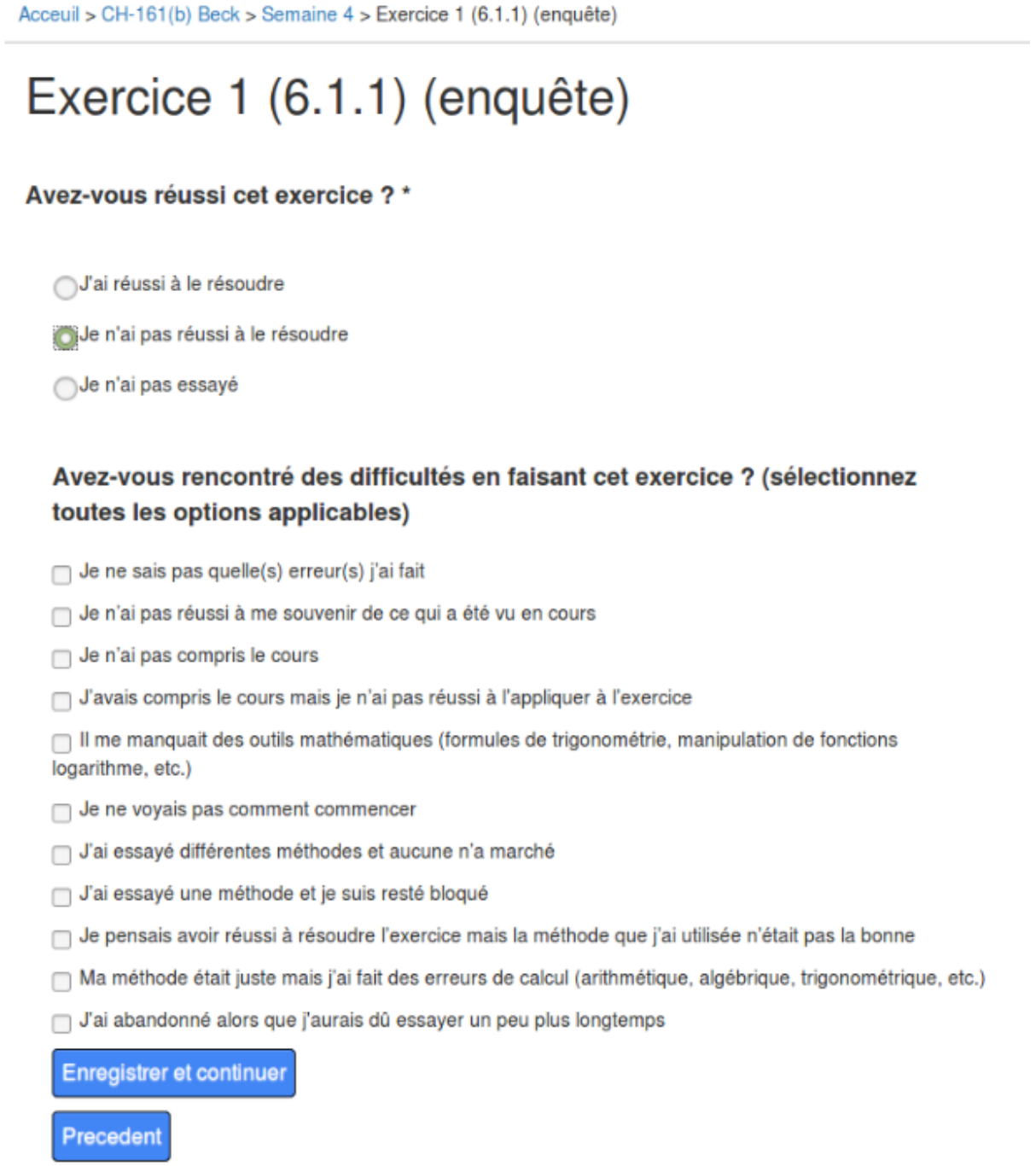
Heavy cognitive load

- Across different levels of organisation (Hadwin, Järvelä and Miller, 2018)
  - Macro (e.g. I organise a study timetable with 6 weeks to the exam)
  - Meso (e.g. I will look at the headings before reading to get an idea of the structure)
  - Micro (e.g. I didn't understand that sentence, read it again.)

Meso level feedback is generally more effective than micro level

Diary function

- During “Reflection” Phase (non-synchronous)
- Focused at process, not task level

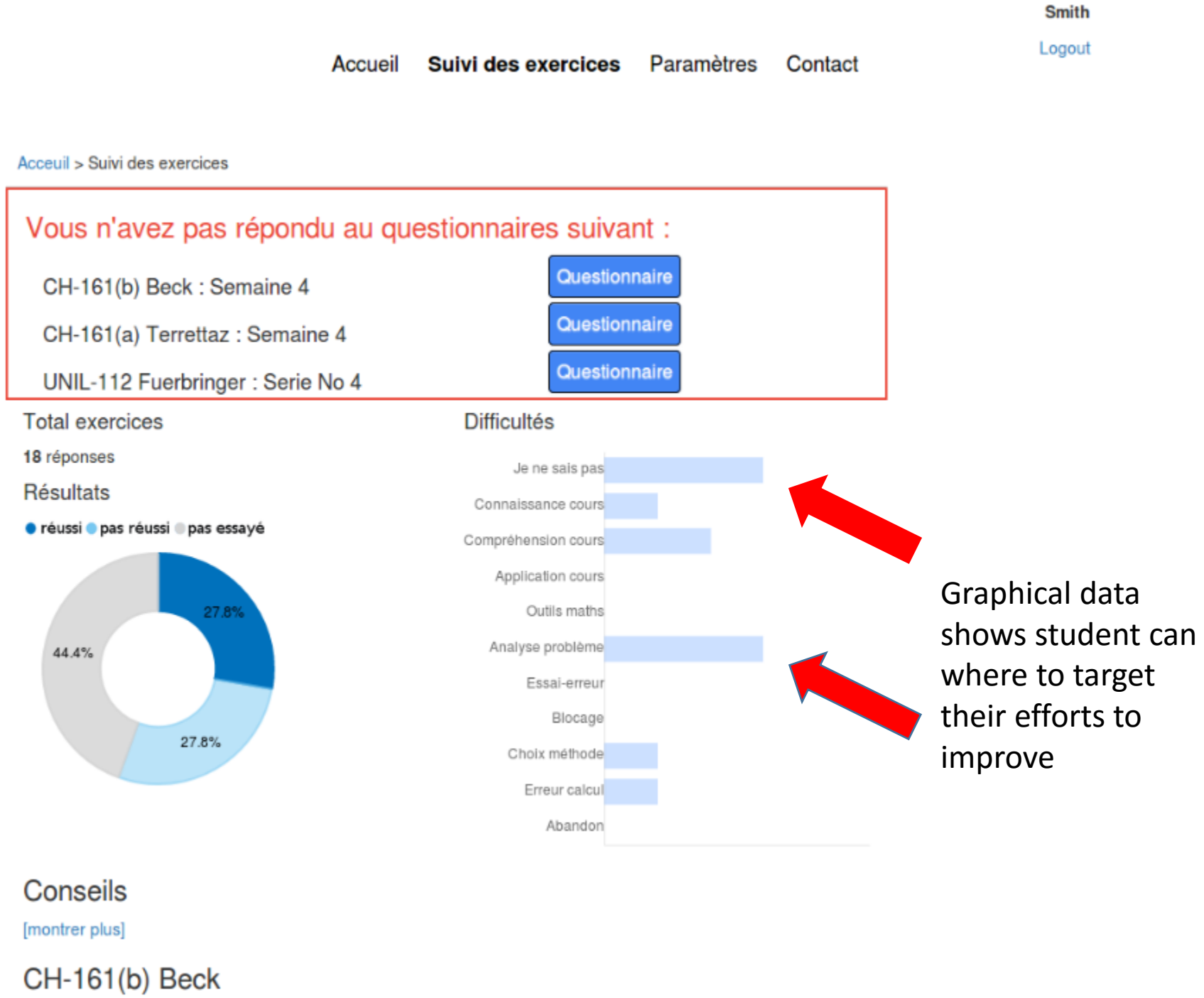


How to present feedback

- “Grade” is less effective than qualitative summaries (Hattie and Timperley, 2006)
  - Graphical may be more effective than numerical

- Emotion and motivation play a role in SRL (Pintrich,1999):
  - Goal orientation (perform well, master skills, pass the test)

- Graphical feedback
- Both successful and non successful students should try to learn from difficulties

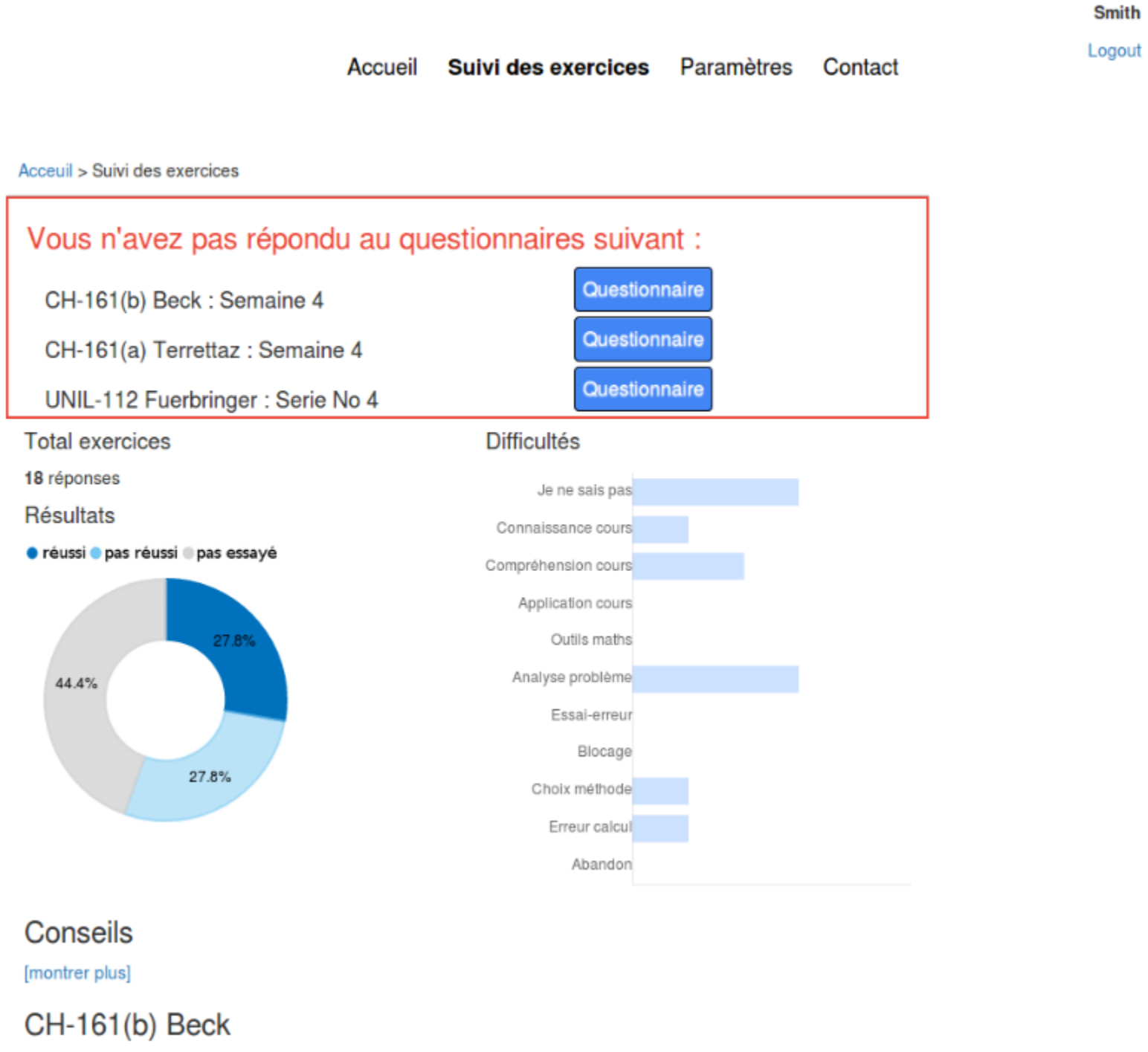


Graphical data shows student can where to target their efforts to improve

- Learners need help with… access to tactics and strategies for learning”

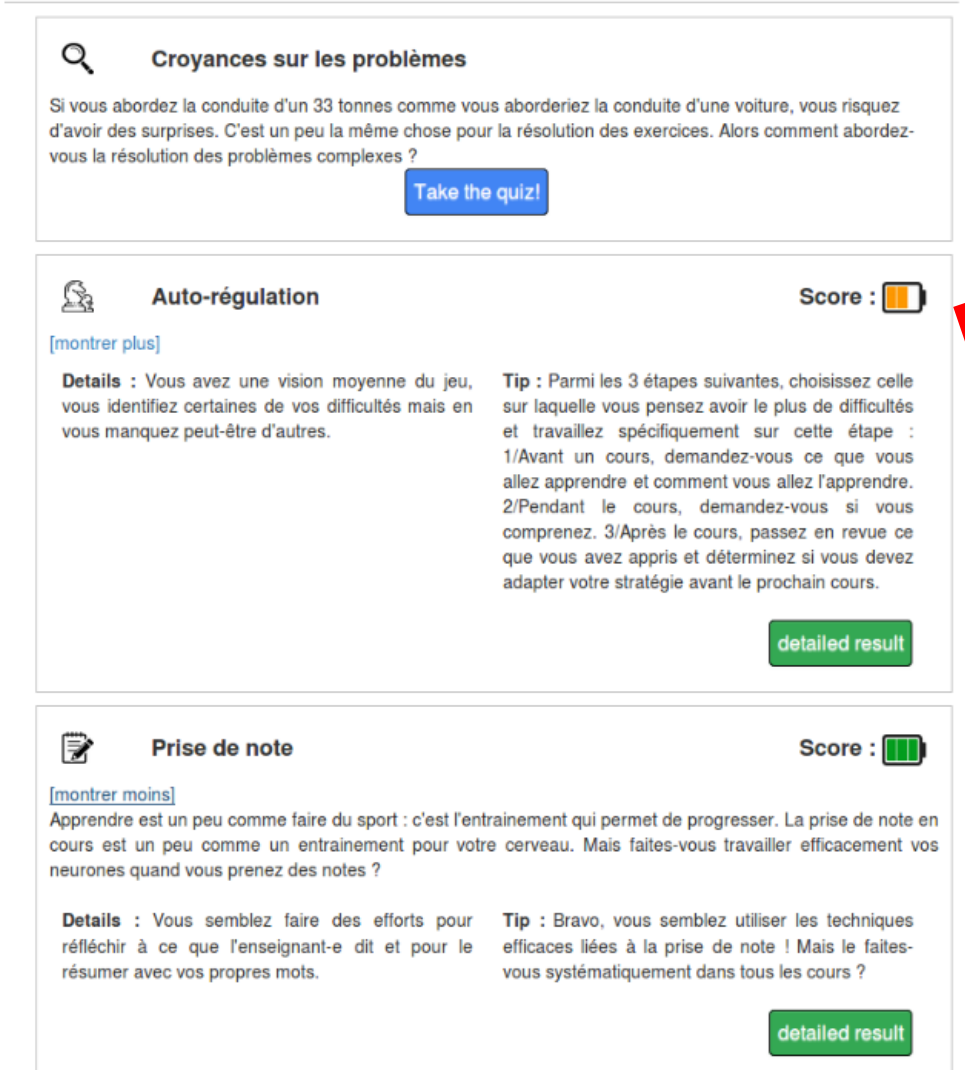
(Winne, 2018)

Advice, based upon their difficulties profile



Self-report tools

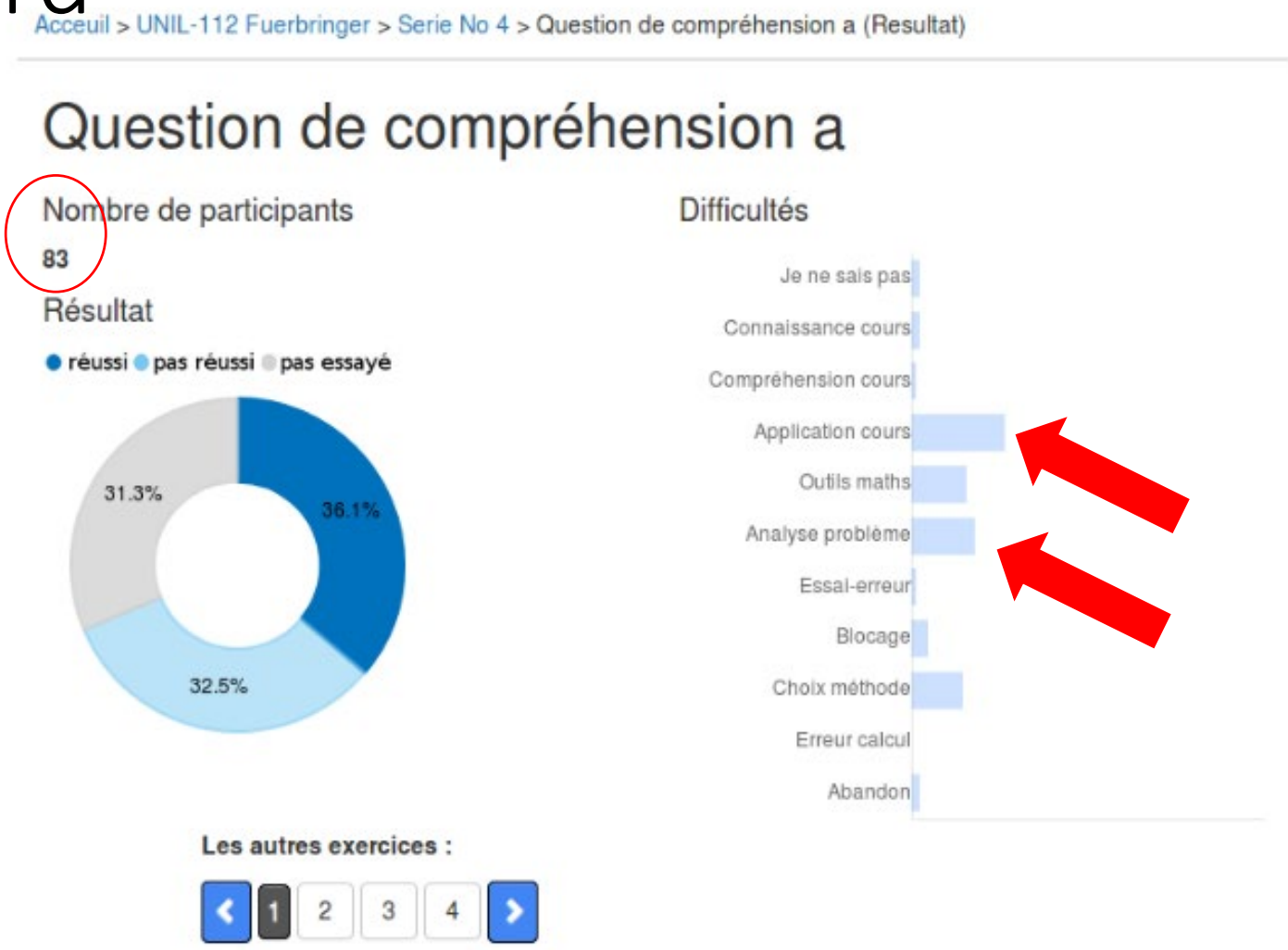
- Self and ego goals (Stress-related beliefs)
  - (Boekaerts and Niemivirta 2000)
- Macro SRL (Revision Planning) & Meso (e.g Note taking)
  - (Hadwin, Järvelä and Miller, 2018)
- Social/Co-regulation of learning (Help-seeking behaviour)
  - (Hadwin, Järvelä and Miller, 2018)



"Soft" quantification

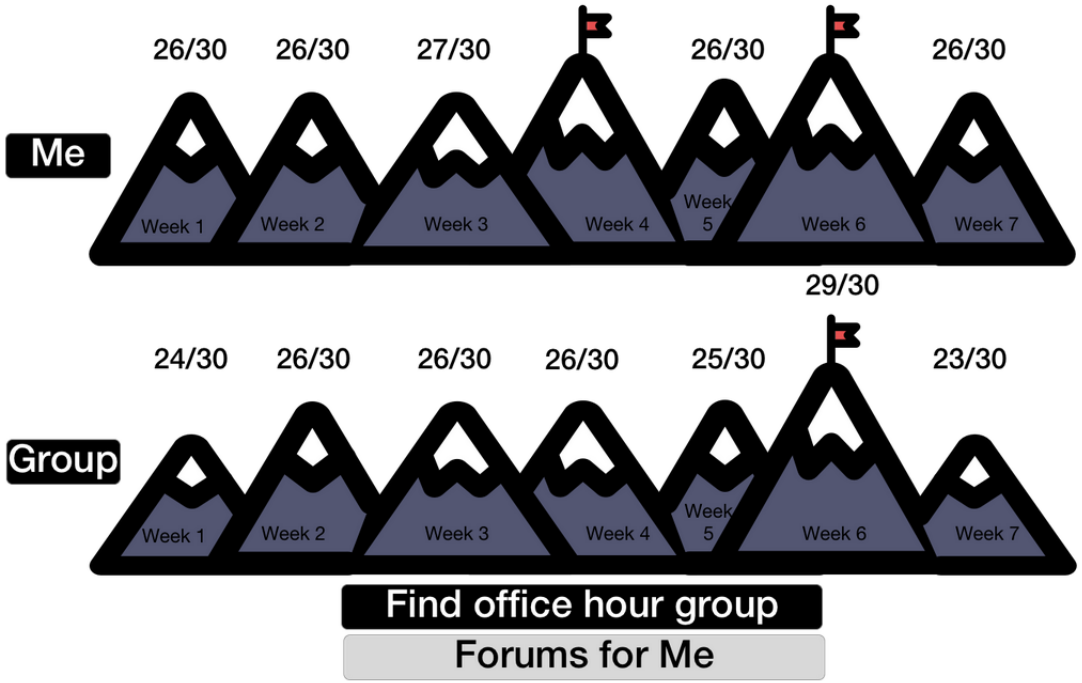
Teacher Dashboard

- Teacher knows about student progress
- Can identify problematic questions/ topics
- Sees student difficulties & can address them in class



Future developments….

- More ‘trace’ elements can be included
  - E.g., Help seeking behaviour
- Alternative visualisations of the data
  - Climbing mountains – toolkit
  - ‘Positive’ visualisations
- More social components
  - Build Community…



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