

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.

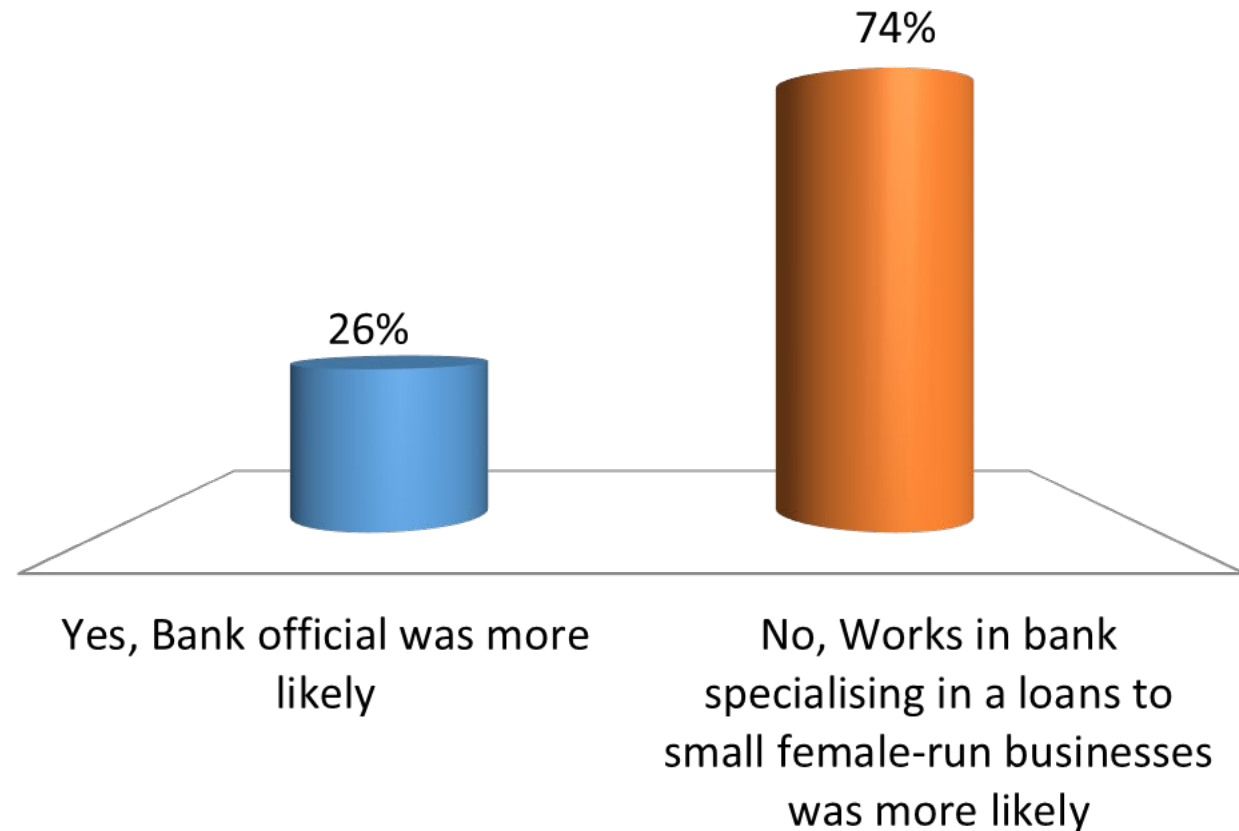
Rank in order from most likely (1) to least likely (5) what you think her job is now:

- 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?

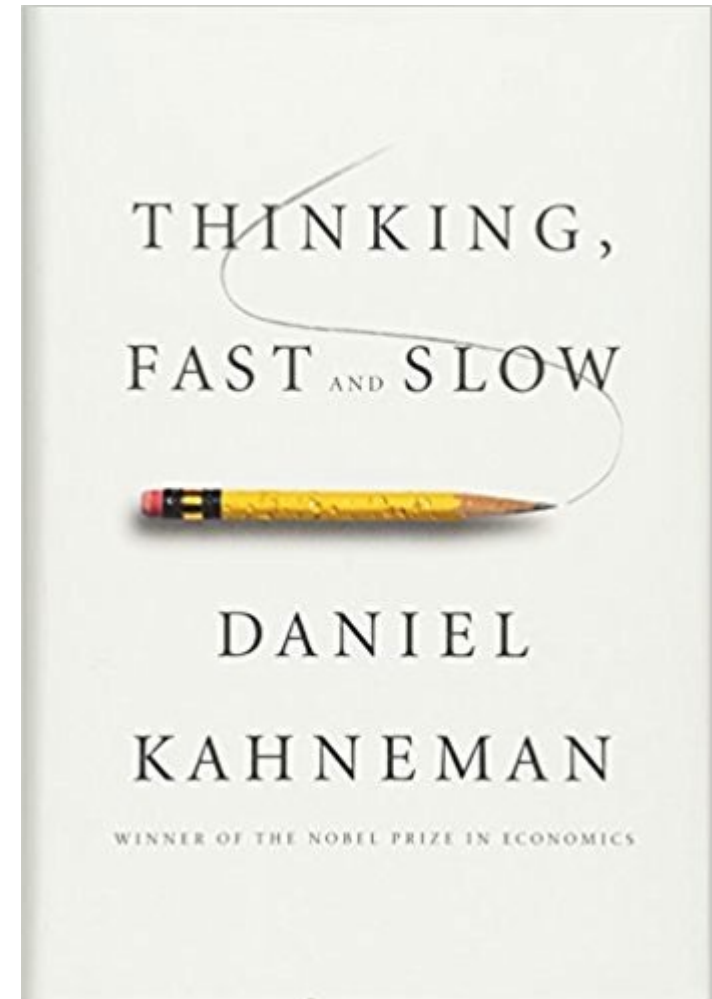
In the question about Mary's job did you rate
“Bank official” as being more likely than “Works in
bank specialising in a loans to small female-run
businesses”

- 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

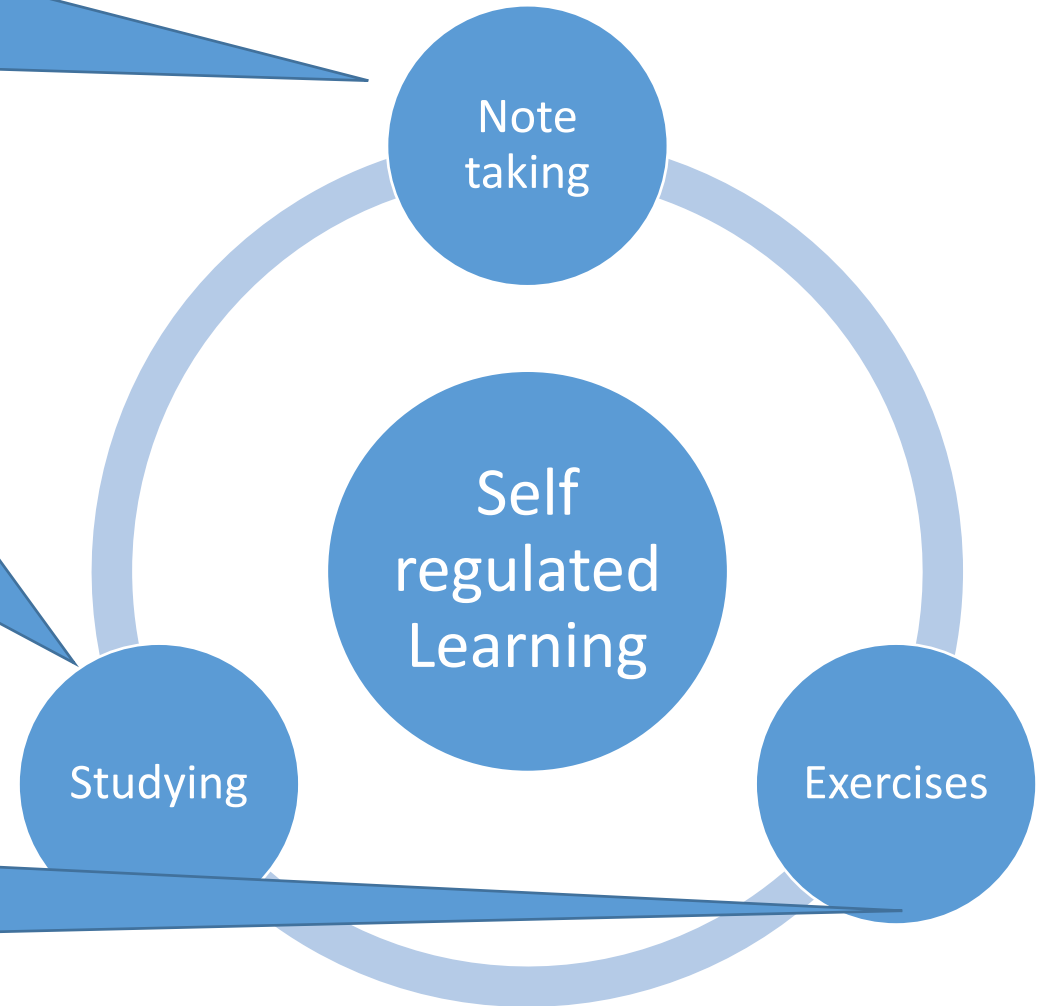


“...synthesizing and summarizing content rather than verbatim transcription can serve as a desirable difficulty...” (Mueller & Oppenheimer 2014)



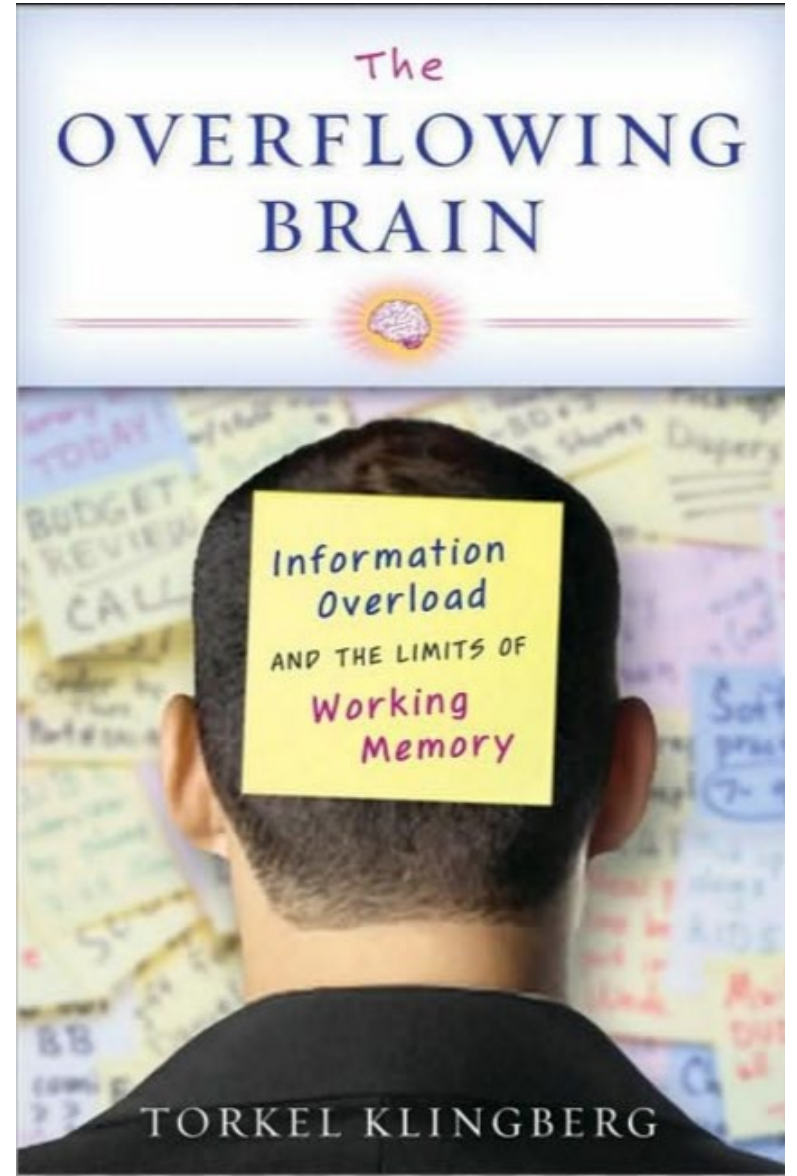
Frequently used techniques (highlighting, re-reading notes) have a negligible impact on learning (Dunlosky et al. 2013)

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

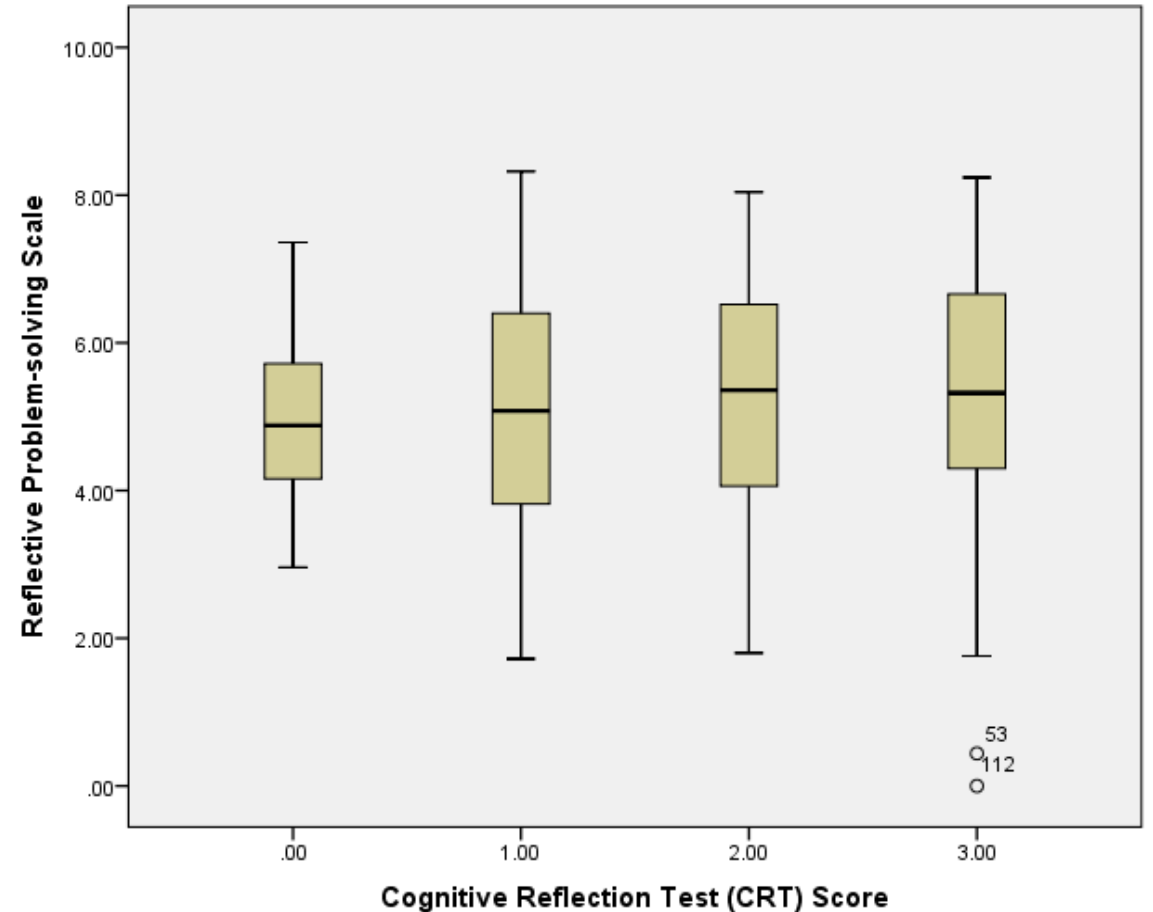


Are students metacognitive?

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?

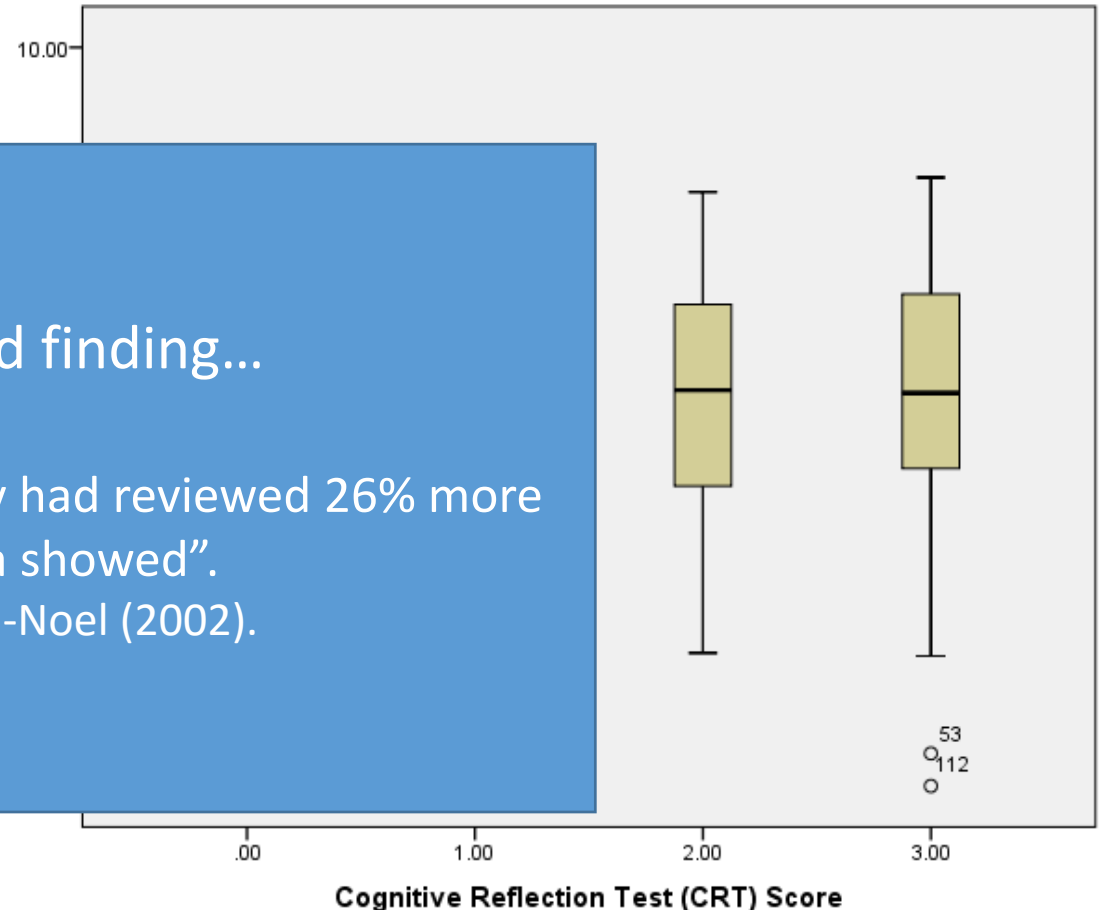
169 2nd year Computer Science students

Two instruments:

- **Objective** measure of (Winne & Jamieson-Noel, 2005)
 - Short problems with incorrect
- **Subjective** measure of Problem Solving Scale
 - I ask myself if I have solved a problem.
- Self report (Reflective) correlated with objective

- ...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).



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

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)

Why don't teachers use the tools
being created?

How education has changed...(or not)



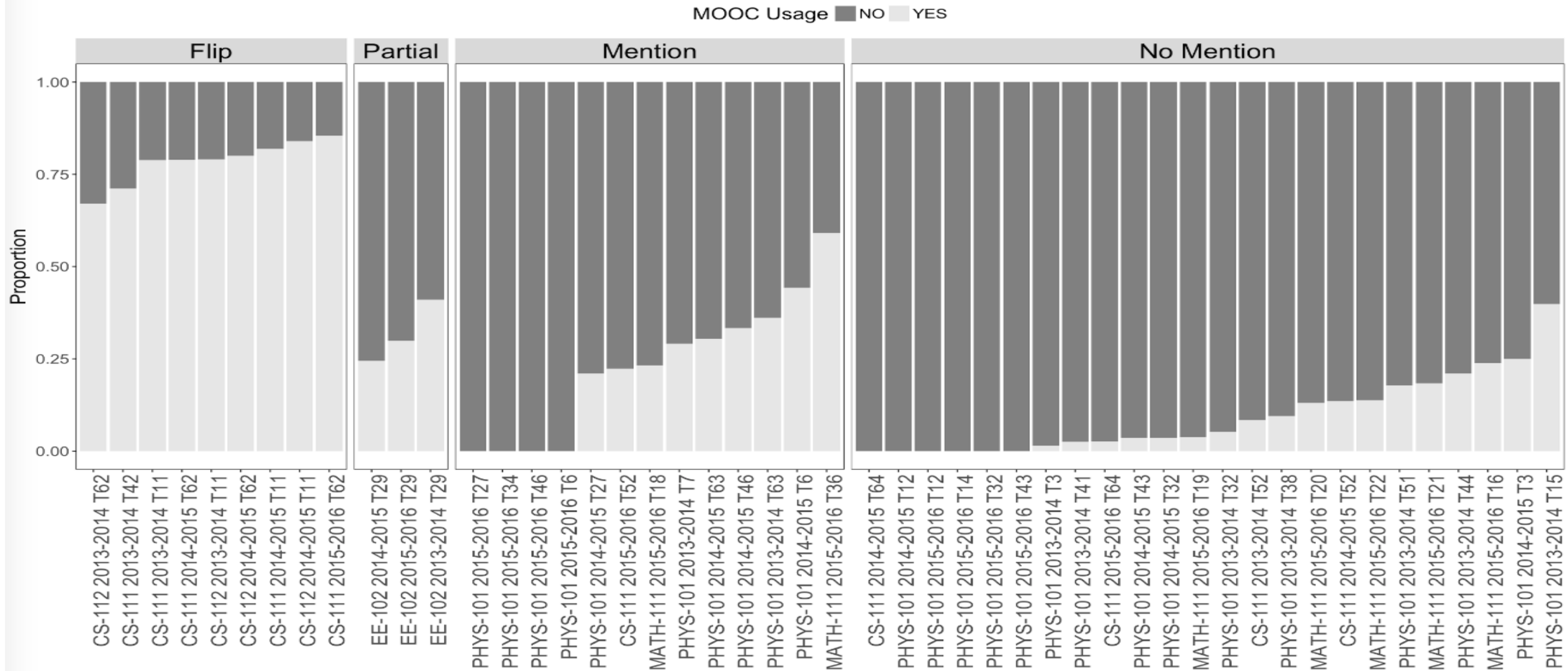
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Lausanne 2014

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

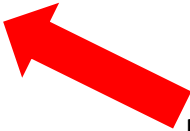



LearningCompanion

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

Exercice 1 (6.1.1) (enquête)

Avez-vous réussi cet exercice ? *

- ☐ J'ai réussi à le résoudre
- ☒ Je n'ai pas réussi à le résoudre
- ☐ Je n'ai pas essayé

Avez-vous rencontré des difficultés en faisant cet exercice ? (sélectionnez toutes les options applicables)

- ☐ Je ne sais pas quelle(s) erreur(s) j'ai fait
- ☐ Je n'ai pas réussi à me souvenir de ce qui a été vu en cours
- ☐ Je n'ai pas compris le cours
- ☐ J'avais compris le cours mais je n'ai pas réussi à l'appliquer à l'exercice
- ☐ Il me manquait des outils mathématiques (formules de trigonométrie, manipulation de fonctions logarithme, etc.)
- ☐ Je ne voyais pas comment commencer
- ☐ J'ai essayé différentes méthodes et aucune n'a marché
- ☐ J'ai essayé une méthode et je suis resté bloqué
- ☐ Je pensais avoir réussi à résoudre l'exercice mais la méthode que j'ai utilisée n'était pas la bonne
- ☐ Ma méthode était juste mais j'ai fait des erreurs de calcul (arithmétique, algébrique, trigonométrie, etc.)
- ☐ J'ai abandonné alors que j'aurais dû essayer un peu plus longtemps

Enregistrer et continuer

Précédent

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)

[Accueil](#) > Suivi des exercices

Vous n'avez pas répondu au questionnaires suivant :

CH-161(b) Beck : Semaine 4

Questionnaire

CH-161(a) Terrettaz : Semaine 4

Questionnaire

UNIL-112 Fuerbringer : Serie No 4

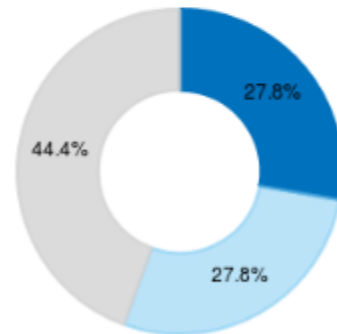
Questionnaire

Total exercices

18 réponses

Résultats

● réussi ● pas réussi ● pas essayé

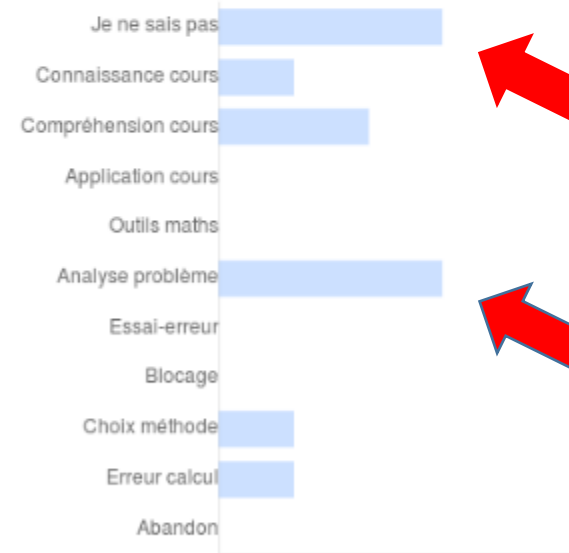


Conseils

[\[montrer plus\]](#)

CH-161(b) Beck

Difficultés



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

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

[Accueil](#) > Suivi des exercices

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[Questionnaire](#)

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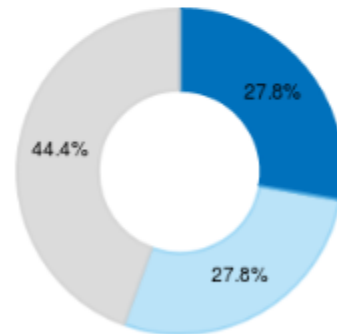
[Questionnaire](#)

Total exercices

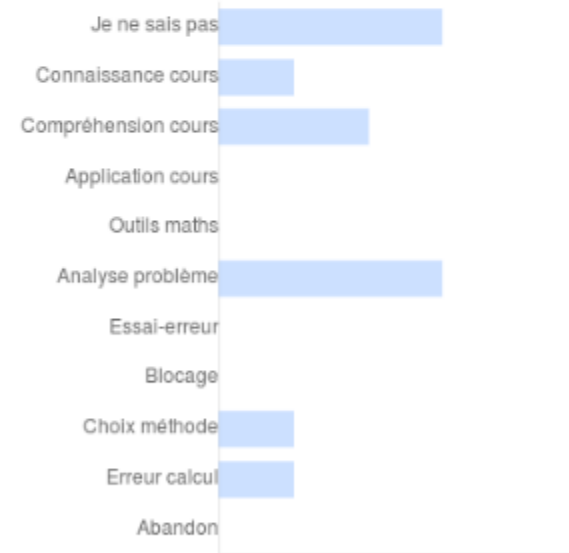
18 réponses

Résultats

● réussi ● pas réussi ● pas essayé



Difficultés



Conseils

[\[montrer plus\]](#)

CH-161(b) Beck


- 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)

 **Croyances sur les problèmes**

Si vous abordez la conduite d'un 33 tonnes comme vous aborderiez la conduite d'une voiture, vous risquez d'avoir des surprises. C'est un peu la même chose pour la résolution des exercices. Alors comment abordez-vous la résolution des problèmes complexes ?

[Take the quiz!](#)

 **Auto-régulation** Score : 
[\[montrer plus\]](#)

Details : Vous avez une vision moyenne du jeu, vous identifiez certaines de vos difficultés mais en vous manquez peut-être d'autres.

Tip : Parmi les 3 étapes suivantes, choisissez celle sur laquelle vous pensez avoir le plus de difficultés et travaillez spécifiquement sur cette étape : 1/Avant un cours, demandez-vous ce que vous allez apprendre et comment vous allez l'apprendre. 2/Pendant le cours, demandez-vous si vous comprenez. 3/Après le cours, passez en revue ce que vous avez appris et déterminez si vous devez adapter votre stratégie avant le prochain cours.

[detailed result](#)

 **Prise de note** Score : 
[\[montrer moins\]](#)

Apprendre est un peu comme faire du sport : c'est l'entraînement qui permet de progresser. La prise de note en cours est un peu comme un entraînement pour votre cerveau. Mais faites-vous travailler efficacement vos neurones quand vous prenez des notes ?

Details : Vous semblez faire des efforts pour réfléchir à ce que l'enseignant-e dit et pour le résumer avec vos propres mots.

Tip : Bravo, vous semblez utiliser les techniques efficaces liées à la prise de note ! Mais le faites-vous systématiquement dans tous les cours ?

[detailed result](#)

“Soft”
quantification

Teacher Dashboard

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

Accueil > UNIL-112 Fuerbringer > Serie No 4 > Question de compréhension a (Resultat)

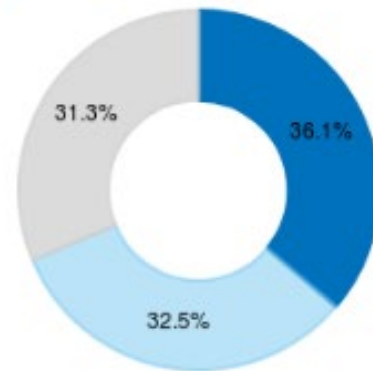
Question de compréhension a

Nombre de participants

83

Résultat

● réussi ● pas réussi ● pas essayé



Difficultés



Les autres exercices :



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...

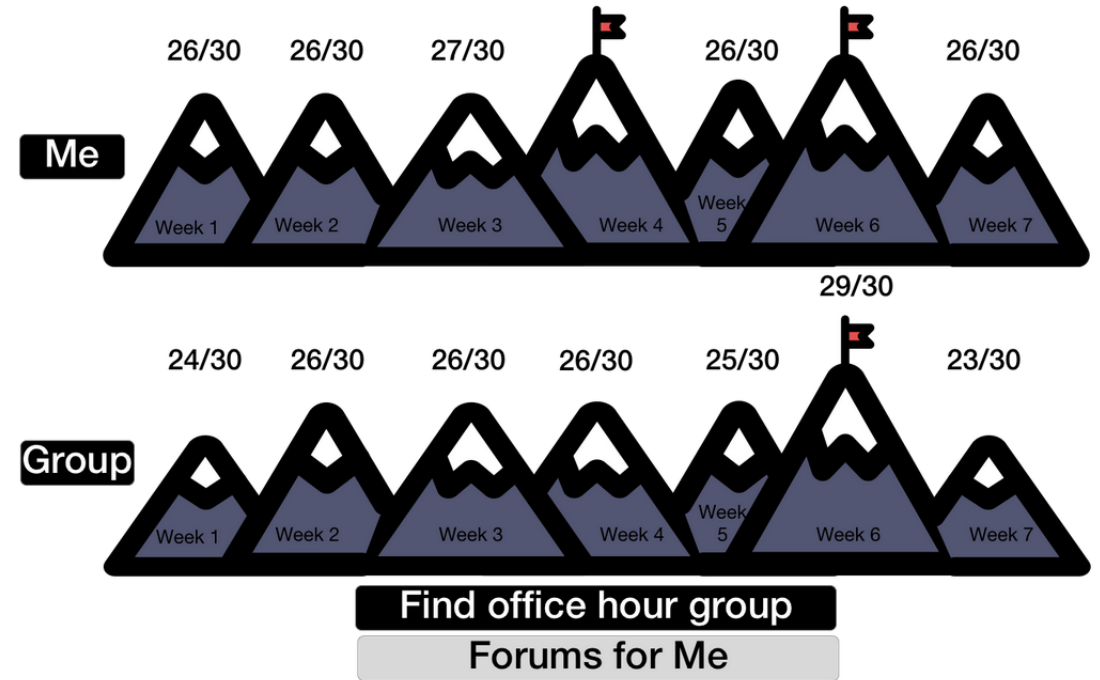


Image by Guillain Léonore Valentine; Sun Tao;
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