

# CLASSIFICATION ET EFFETS DES TABLEAUX DE BORD D'APPRENTISSAGE

## UNE REVUE SYSTEMATIQUE

SARA LEJEUNE  
DOMINIQUE VERPOORTEN

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CHAIRE DE RECHERCHE DU CANADA  
sur le numérique  
en éducation

# 8<sup>e</sup>

## Colloque international en éducation:

enjeux actuels et futurs  
de la formation et de  
la profession  
enseignante

[colloque.crifpe.ca](http://colloque.crifpe.ca)  
[#crifpe21](https://twitter.com/crifpe21)



# PRESENTATION

Enseignante (spécialisé type 5)

Mémoire

Master en Sciences de l'éducation

1.

# INTRODUCTION ET CONTEXTE

Introduction  
Définitions  
Balises théoriques



# LE TABLEAU DE BORD D'APPRENTISSAGE

Définitions

“

*Affichage des informations les plus importantes pour réaliser un ou plusieurs objectifs , rassemblées et arrangées sur un seul écran , afin que l'information puisse être évaluée en coup d'oeil .*

Few, 2005

“

*Affichage unique qui regroupe différents indicateurs à propos des apprenants , des processus d'apprentissage , et des contextes d'apprentissage en une ou de multiples visualisations .*

Schwendimann et al., 2017

“

*Arrangement visuel et pensé  
d'indicateurs jugés significatifs du  
déroulement d'une activité  
d'enseignement/d'apprentissage et  
permettant d'en suivre l'évolution ,  
d'en connaître les résultats et de  
jauger ses écarts par rapport à des  
valeurs de référence .*

Verpoorten et al., 2016





## ELEMENTS **CENTRAUX**

- ▶ Arrangement visuel pertinent
- ▶ Un seul écran
- ▶ Indicateurs
  - ▶ *Apprenants*
  - ▶ *Processus d'apprentissage*
  - ▶ *Activité d'enseignement*
- ▶ Résultats, évolution, objectifs



# LE TABLEAU DE BORD D'APPRENTISSAGE

Potentiel pédagogique



Bodily & Verbert, 2017

Identification, analyse et synthèse des données



Renvoyées aux étudiants



Réflexion



*Actionable feedback*

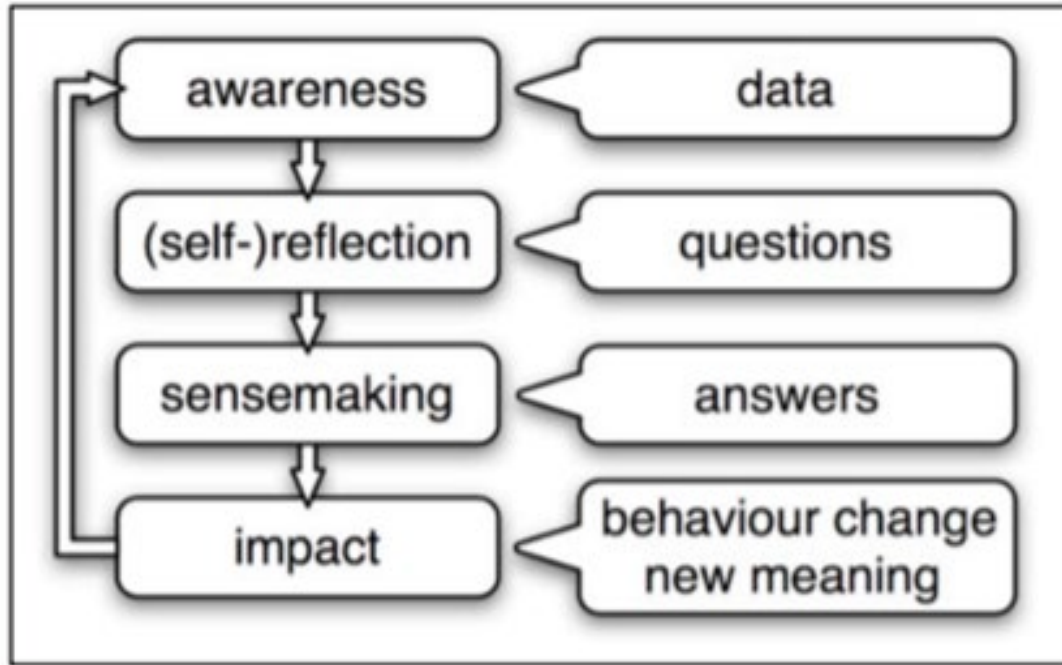


Sentiment de contrôle



Motivation intrinsèque

# Learning analytics process model



# 2.

## REVUE SYSTEMATIQUE DE LA LITTERATURE

Méthodologie  
Résultats  
Conclusions

# QUESTION DE RECHERCHE

## POPULATION

Étudiants du supérieur suivant un cours ou une remédiation sur une plateforme.

P

## INTERVENTION

Utilisation des LA du *mirroring* de traces, d'un TBA à destination des étudiants.

I

Identifier études sur l'efficacité des TBA au niveau pédagogique et réflexif.

## OBJECTIF

O

Enseignement supérieur

## CONTEXTE

C

## QUESTION DE RECHERCHE

Quel impact **pédagogique** et **réflexif**  
possible des TBA sur les **étudiants** ?



# CRITERES DE LA RECHERCHE

→ > 2009

→ Enseignement  
supérieur

→ Public = étudiants

→ Potentiel  
pédagogique

→ Tout types d'études

→ Langue française ou  
anglaise



# STRATEGIE DE RECHERCHE

- ERIC
- ERA
- PsycInfo
- Scopus
- HAL
- Thèses.fr
- EPPI-Reviewer web
- Zotero

	Mot-clé 1		Mot-clé 2		Mot-clé 3		Mot-clé 4 <sup>2</sup>
	Dashboard	AND	Higher Education	AND	Learning Analytics	AND	Trace(s)
	OR		OR		OR		OR
Synonymes Dérivés Concepts inclus	Learning dashboard Tableau de bord Tableau de bord d'apprentissage		College Universit* Enseignement supérieur		Learner Analytics Educational Data Mining Education Analytics Data Analysis Data Visualization Datafication		Activity Trace(s) Indicators Mirroring

Identification

**Documents identifiés dans les bases de données (n = 281)**  
ERA (n =43) PsycInfo (n=8) HAL (n=18)  
ERIC (n=29) Thèses.fr (n= 39)

Sélection

**Nombre de documents conservés après exclusion des doublons  
n = 256**

Nombre de documents conservés après lecture  
des titres et/ou des abstracts  
n = 94

Nombre de documents exclus sur base  
de titres et/ou d'abstract  
n = 162

Éligibilité

Nombre de documents conservés  
après lecture complète et sur base des  
critères d'inclusion (n = 10)

Nombre de documents exclus après  
lecture complète et sur base des critères  
d'inclusion (n = 84)

Inclusion

**Nombre de documents inclus  
dans la synthèse n = 10**



# RESULTATS

Synthèse descriptive des données

- 10 articles
- 12 TBA
- Enseignement universitaire
- Diverses matières
- Niveau bac



## CATEGORIES DE TBA

Public

Contexte

Données

Etudiants

Enseignement  
supérieur

→ Nouvelle  
classification

# Classification des TBA



TBContenus



TBHabilités



TBAcadémique



TBEmotions

## I. Quel tableau ?

→ Selon les objectifs poursuivis

## I. Quelles données ?

→ Selon ce dont elles sont prédictrices

## I. Quelles représentations?

→ Selon leur lisibilité, et selon les envies des utilisateurs

## I. Comment procéder?

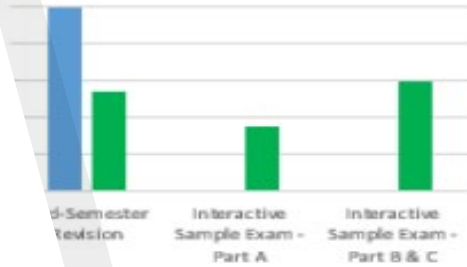
→ Bases théoriques et implication des acteurs

## I. Quelle plus -value?

→ Bases théoriques et évaluation des utilisateurs

## Organisms

### REVISION TEST

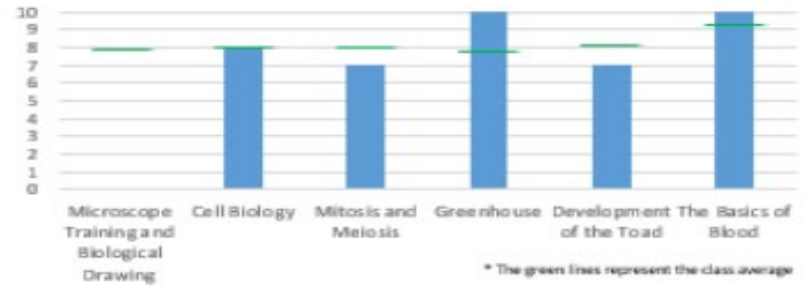


Prelab Fractions	3/4
Prelab Graphs	6/6
Prelab Probability	3/5
Protostomes & Metastomes	In progress
Vertebrate Animals	In progress

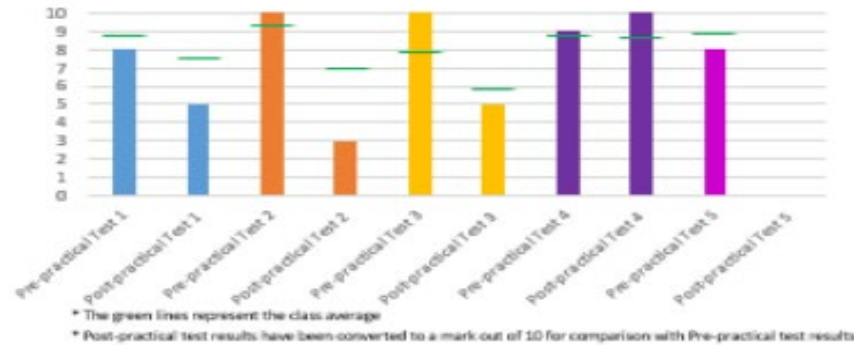
### MS SITE



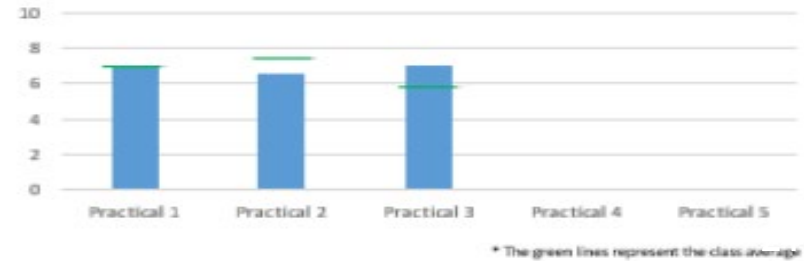
### INDEPENDANT LEARNING TASKS



### ONLINE PRACTICAL TESTS



### TOTAL PRACTICAL MARKS



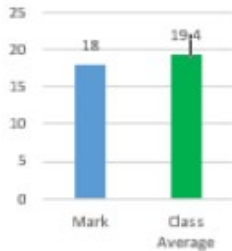
ILLUSTRATIONS



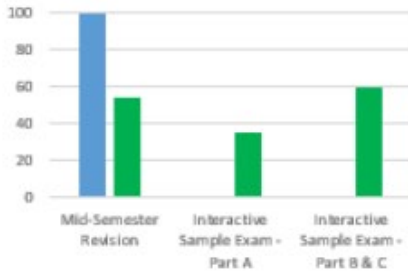


Student Name  
Student Number  
Biology of Cells and Organisms

MID-SEMESTER TEST

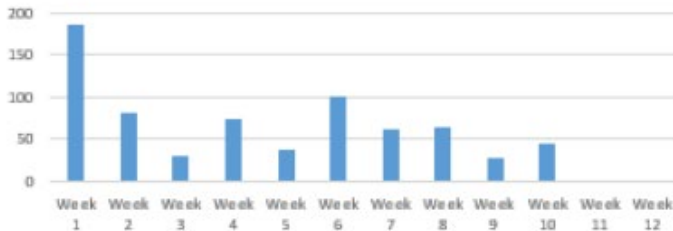


REVISION TEST

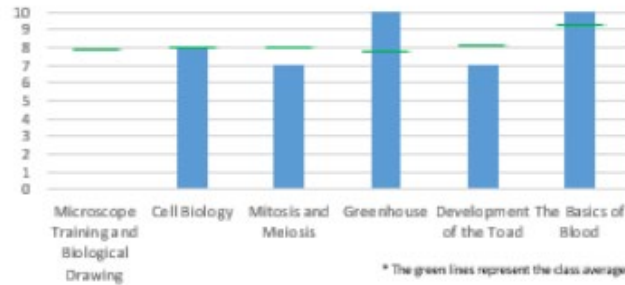


Supplementary Activities	Result		
Academic Honesty	6/6	Prelab Fractions	3/4
Prelab Terminology	9/11	Prelab Graphs	6/6
Terminology Crossword	6/6	Prelab Probability	3/5
Prelab Chemistry	4/5	Protostomes & Deuterostomes	In progress
Prelab Measurement	4/5	Simple Animals	In progress
Prelab Percentage	4/4		

ACCESS TO BIOLOGY LMS SITE



INDEPENDANT LEARNING TASKS

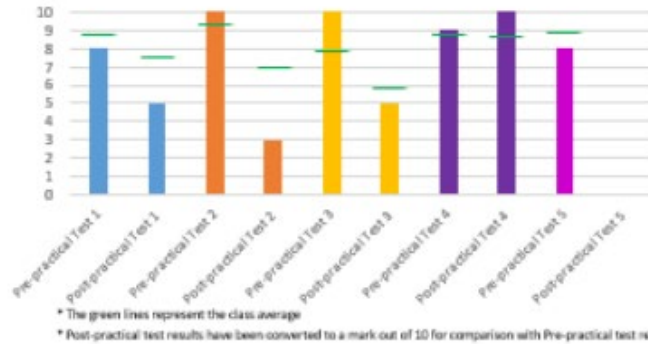


Corrin & De Barbra, 2014

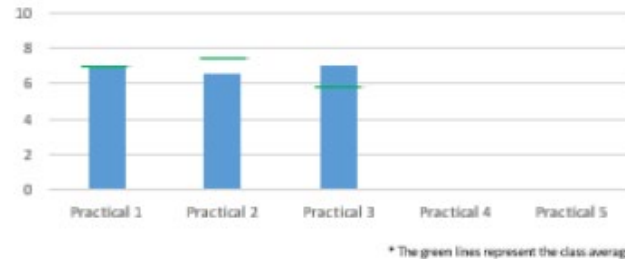


TBContentus

ONLINE PRACTICAL TESTS



TOTAL PRACTICAL MARKS





TBContentus

## Content Recommender Dashboard

Send Feedback

Mastery Graph

Total Mastery Over Time

SEE CONCEPTS FROM UNIT: Unit 3



## QUESTION RECOMMENDATIONS FOR CONCEPT 9.6

Try these quiz questions

3

Quiz Question	Correct	Attempts	
Given the following average bond energies, C-H bond 413 kJ/mol, O=O bond 498 kJ/mol, O-H bond is 4...	✗	0	<a href="#">↩</a> <a href="#">E</a>
Using the following $\Delta H_f^\circ$ values, methane ( $\text{CH}_4$ ) -74.8 kJ/mol, water -285.8 kJ/mol, and carbon ...	✗	0	<a href="#">↩</a> <a href="#">E</a>
Calculate the enthalpy ( $\Delta H$ ) for the reaction of ethylene ( $\text{C}_2\text{H}_4$ ) with elemental fluorine, C...	✗	0	<a href="#">↩</a> <a href="#">E</a>



TBContentus

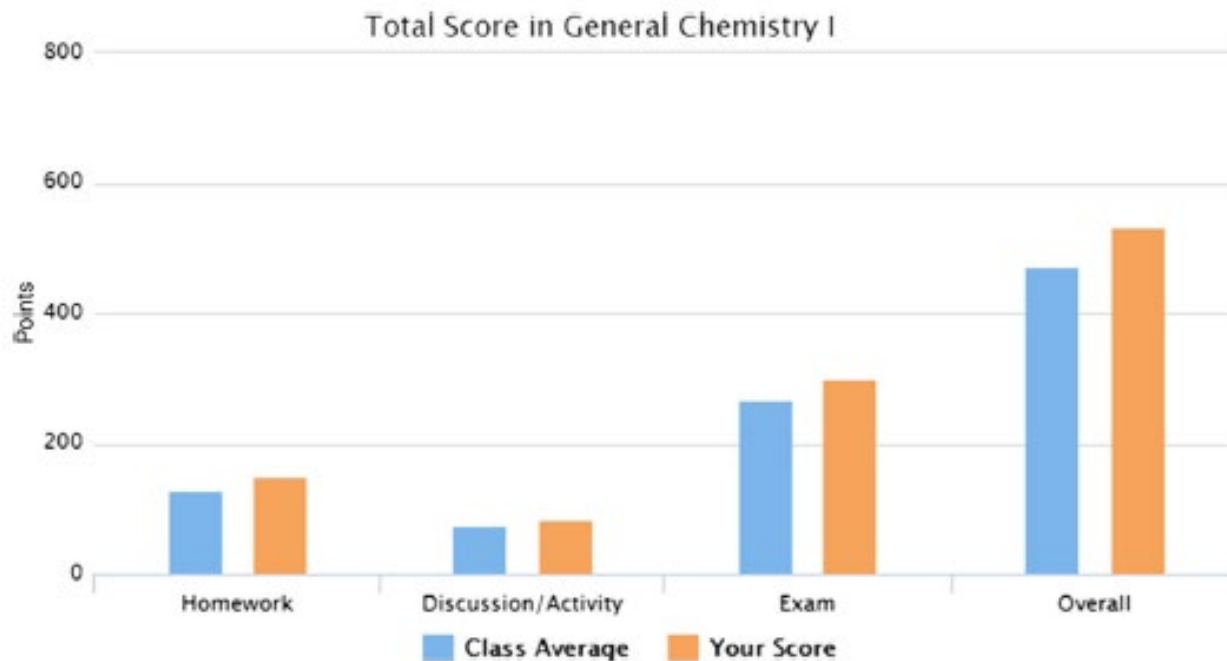


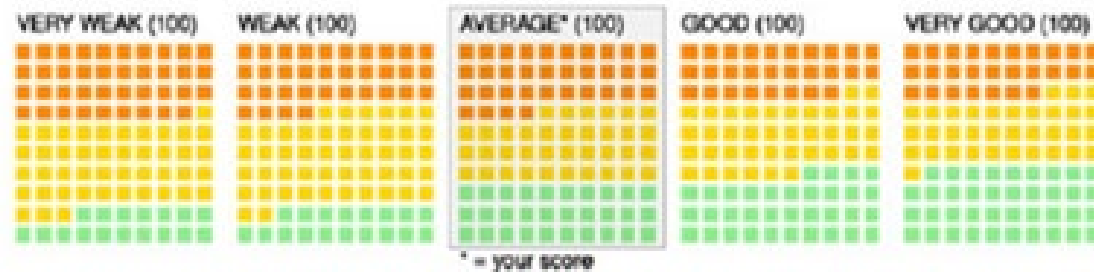
Fig. 1 Top section of elements of success

#### CURRENT PERCENTILE RANK AND PREDICTED OUTCOME

Your currentGrade as of 12/08/2015 is **590.54** out of **659.27**. This is the **86th** percentile in the course. Our current best estimate is you are on pace to earn a **A-**.

## Previous year

Below you can see which study efficiency (SE) first year students in the [@nameStudyProgram@](#) achieved last year in June, in relation to their time management score. The **your score** group has been explicitly labeled. Every dot represents one student with the following color code: a **green** dot is a student with a study efficiency higher than 80% ( $SE \geq 80\%$ ), an **yellow** dot is a student with a study efficiency between 30% and 80% ( $30\% \leq SE < 80\%$ ), and a **red** dot is a student with a study efficiency lower than 30% ( $SE < 30\%$ ).



TBHabilités

## How to improve?

### Tips to work on your time management skills

- It is important to realize that you are responsible for your own time management, you can control your time usage. The following activities can help you improve your time management.
- Start by formulating specific learning goals for a very specific period, for example next week. Formulate your goals as specific and realistic as possible. (Also see the tips on motivation to help you formulate

Student Skills Dashboard

Send Feedback

CHANGE VIEW

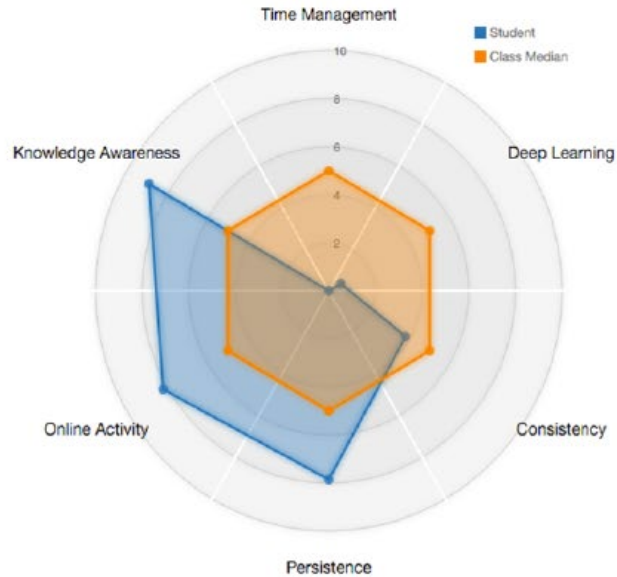
See my skills graph

See all skill recommendations

See skills over time

My Student Skills

Compare to class



Knowledge Awareness

To increase your knowledge awareness score:

1. Try to more accurately rate your confidence level when you answer a quiz question.

2. Check out these resources

How good are you at predicting your test scores? (video, start at 3:58)

The importance of knowing what you know (and what you don't)

Increasing your self-awareness



TBHabilités



Intro



Scores



Progress



Tips



Regulations

Please provide feedback on your scores to unlock the charts.

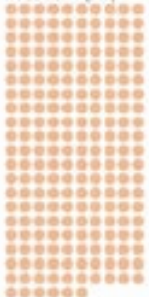
### Analysis, Part 1

Score: 11/20

How do you feel about this score?



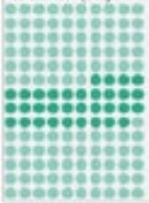
NAO TOT 7 (206)



8 TOT 9 (117)



10 TOT 13\* (140)



\* = your score

14 TOT 20 (32)



### Fundamentals of Communication and Information Theory

Score: 13/20

How do you feel about this score?



NAO TOT 7 (206)



8 TOT 9 (117)



10 TOT 13\* (140)



14 TOT 20 (32)



TBAcadémique



TBAcadémique



Figure 1: Final design of the dashboard in September. From left to right: (A) Histogram showing performance of peers for each key moment. (B) Column for a key moment with all courses of that moment. (C) Histogram of peer performance for a course. (D) Column for all failed courses and the option to deliberate. (E) Planning module to plan your bachelor. (F) Histogram of study trajectory of previous students with a similar profile. (G) Overview of study trajectories for different profiles









Figure 3: Visualising motivator scores as a scale

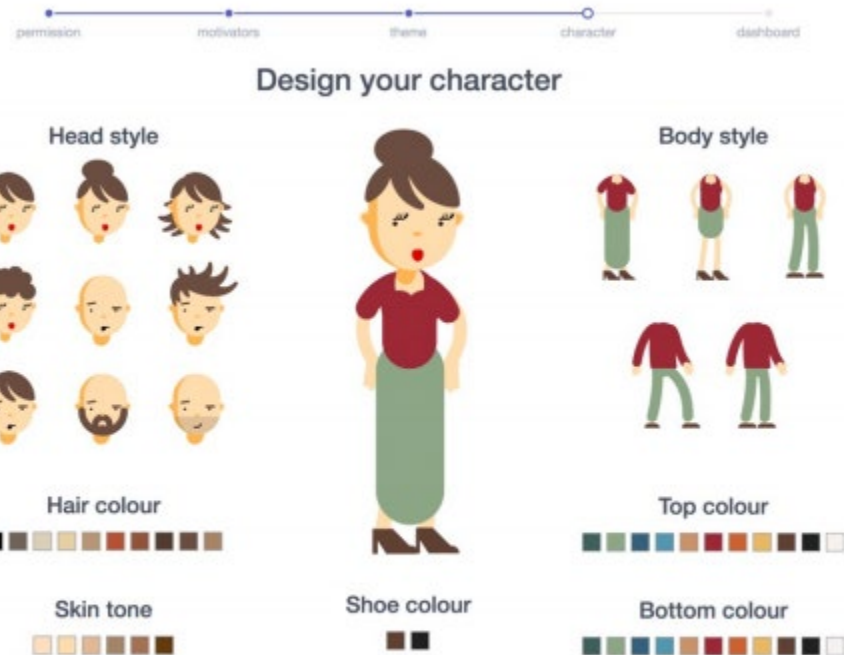
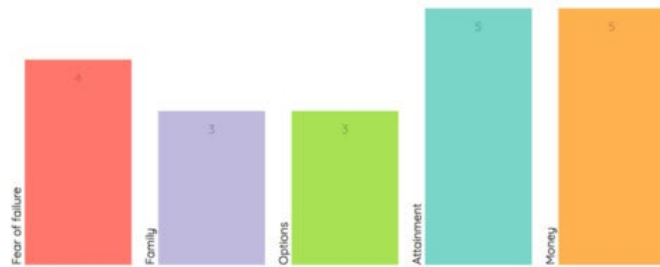


Figure 5: Avatar creator on the “personified” theme



## How would you like to visualise your data?



### professional

I want to see my learning analytics in chart/graph form

Select



### personal

I want to see how my learning activity could affect my future

Select



## User-centred design of a student facing learning analytics dashboard

Dr Ed de Quincey & Chris Briggs School of Computing and Mathematics, Keele University



#### Week 1 recommendations




-   
Read/review more of the resources in the 'Practicals' folder
-   
Read/review more of the resources in the 'Coursework' folder
-   
Try and read/review different resources in the KLE

Tableau 4 : tableau synthétique des résultats		[1a] (ChampC)	[1b] (ChampH)	[2a] LASSI	[2b] REX	[3] /	[4] /	[5] PLD	[6] /	[7] LAPA	[8] Champ	[9] AffectVis	[10] EOS
Quel type de tableau proposer ?	Contenus	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	Habilités		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
	Académique				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>				
	Emotions											<input checked="" type="checkbox"/>	
Quelles données choisir et comment ?	Traces d'utilisation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	Objet d'apprentissage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	Interactions sociales							<input checked="" type="checkbox"/>					
	Questionnaire			<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Données institutionnelles				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
	Données des autres étudiants (comp. sociale)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Quelles représentations choisir ?	Vue classique (graphiques)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Vue personnalisée						<input checked="" type="checkbox"/>						
	Métaphore du feu tricolore	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	Justifient leurs choix	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
	Ne justifient pas			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>	
Comment faire ?	Précisent	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	Ne précisent pas			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>	
Quelle plus-value pour les étudiants ?	Plus-value identifiée			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
	Pas de plus-value identifiée	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	



# DISCUSSION

Pistes de réflexion et limite de la revue systématique



- Maîtrise des concepts
- Motivation et investissement dans les apprentissages
- Réflexion et prise de décisions



- Petit échantillon
- Dimension “enseignement”, et non dimension informatique
- Faible utilisation des TBA



“

*Make sure we are producing systems that students actually want to use, not systems that we are hoping that they use.*

De Quincey et al., 2019



**Merci !**

Questions ?

Remarques ?



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