

Learning Analytics as an Intelligent Personal Assistant for Lifelong Learners

Kirsty Kitto

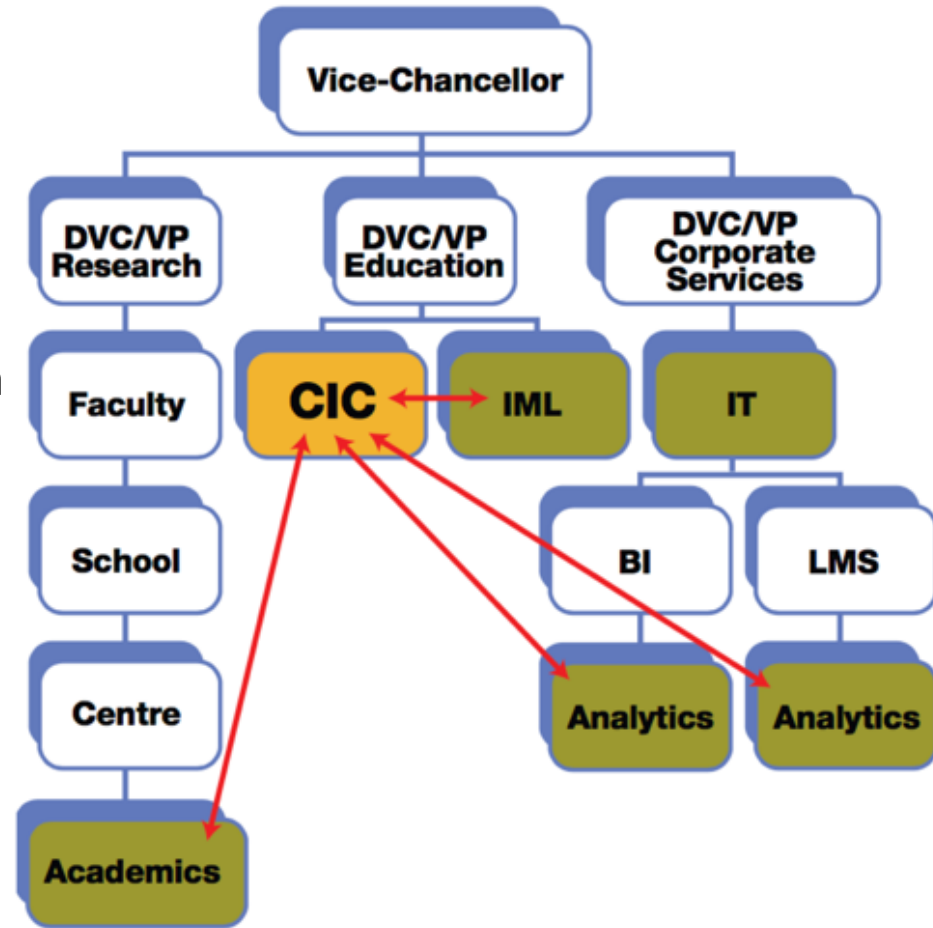
Connected Intelligence Centre

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what is UTS:CIC?

University of Technology Sydney -
Connected Intelligence Centre

- UTS innovation lab specialising in Learning Analytics
- provides in house data science consultancy
- academics teach data science and perform research
- trains PhD students in Learning Analytics



what is learning analytics? (LA)

Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs

SoLAR definition



July 2018

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Welcome to 36103 - Statistical Thinking for Data Science!

traditionally EdTech has focused upon providing analytics within the confines of specific systems built by vendors...
(e.g. LMSs, eBooks, SIS)

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Resources, texts, and good online courses

+ Module 0: Preparing for statistical thinking

Am I ready for statistical thinking?



but learning happens everywhere!

The infographic illustrates the journey of a learner from age 6 to 70, centered around the City Learner Passport. The learner's path is shown as a winding road with various milestones and support points:

- Age 6 months:** The learner starts at the "Cradle".
- Age 18 years:** The learner is "Leaving school" and considers "College, travel or job?".
- Age 21:** The learner receives the "City Learner Passport".
- Age 26:** The learner is "3 years working for the council" and considers "I'll use my City Learner Passport to apply to College and get a better job".
- Age 30:** The learner is "Can't afford University" but considers "I can apply for a Foundation Degree using my learning plan".
- Age 40:** The learner is "Finished my work based learning degree" and considers "I'm looking for a new job with skills evidenced in my e-portfolio".
- Age 60:** The learner is "I've kept my e-portfolio up to date" and considers "Now I can carry on adding to it, to support my voluntary work".
- Age 70:** The learner is shown as an older adult.

Support points along the way include:

- 18 months:** "Nursery visiting delivery of Foundation Degree".
- 21:** "Rotherham Learner Data transferred from City eProgress file to University system to support wider access to higher education".
- 26:** "NCPLE giving students access to a lifelong learning record through a work journal".
- 30:** "Learners' work".
- 40:** "PHEP/PCOL supporting online PSP for work-based learners on degree courses".
- 60:** "Local College".
- 70:** "NCPLE providing nationally accredited training for senior representatives through a 18 month network of colleges, with centrally based learning materials. NCPLE works to develop nationally accredited lifelong learning networks".
- 70:** "Local authority supporting the legal and income management issues relating to the management of the lifelong learning record".

Key messages at the top include:

- "The passport represents a learner growing up within this system. She has difficult decisions to make at key stages throughout her life as a learner and will need support and guidance. However, those who have the benefit of a lifelong learning record or a Portfolio to assist her in making decisions, her school, college, employers and friends will support her to maintain a valuable record and to make effective use of it throughout her life. It is key for courses and jobs as well as making informed personal decisions to ensure she leads a fulfilled career".
- "Rotherham: evaluating the student's learning experience at college and university".
- "Liverpool: exploring transition between college and university using PSP".

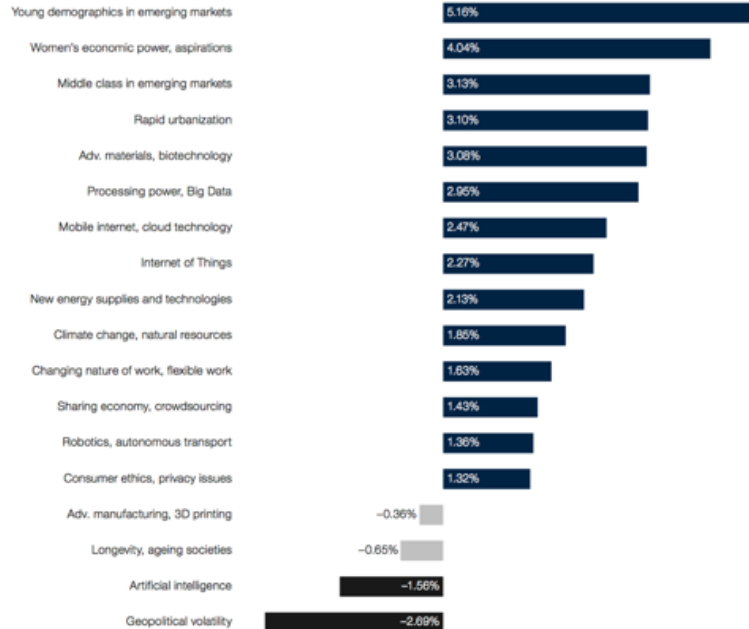
so how can we
help our learners
to succeed?



especially in the light of the fourth industrial revolution!

Figure 4: Employment effect of drivers of change, all job types
Compound growth rate, 2015-2020, %⁷

Drivers of Change, overall	1.73%
Drivers of Change, technological	2.02%
Drivers of Change, demographic and socio-economic	1.50%



Global Challenge Insight Report

The Future of Jobs

Employment, Skills and
Workforce Strategy for the
Fourth Industrial Revolution

January 2016



but first!
what *type* of learning
are we talking about?

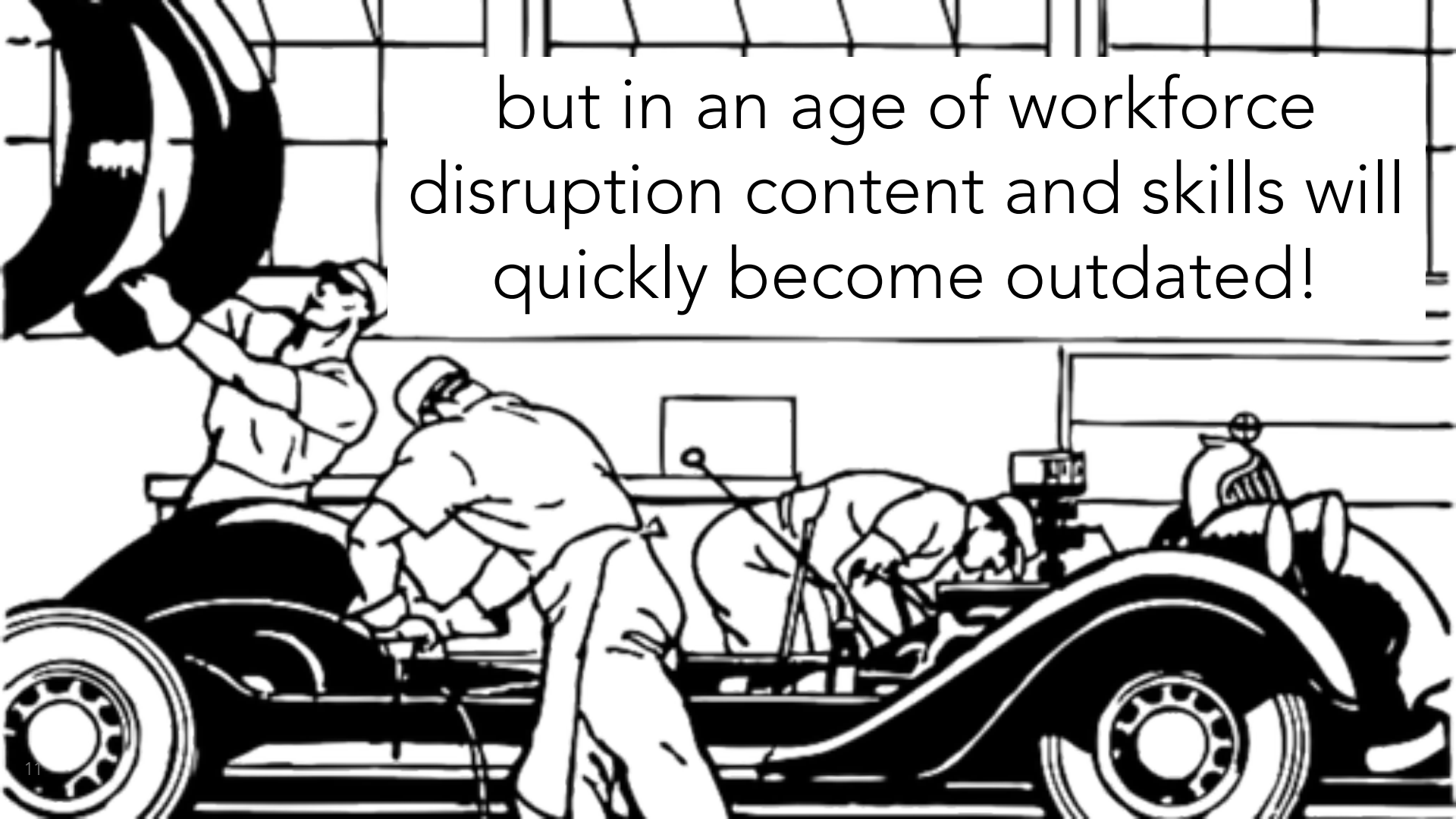
are students acquiring:
content and skills?
or
learning to learn?

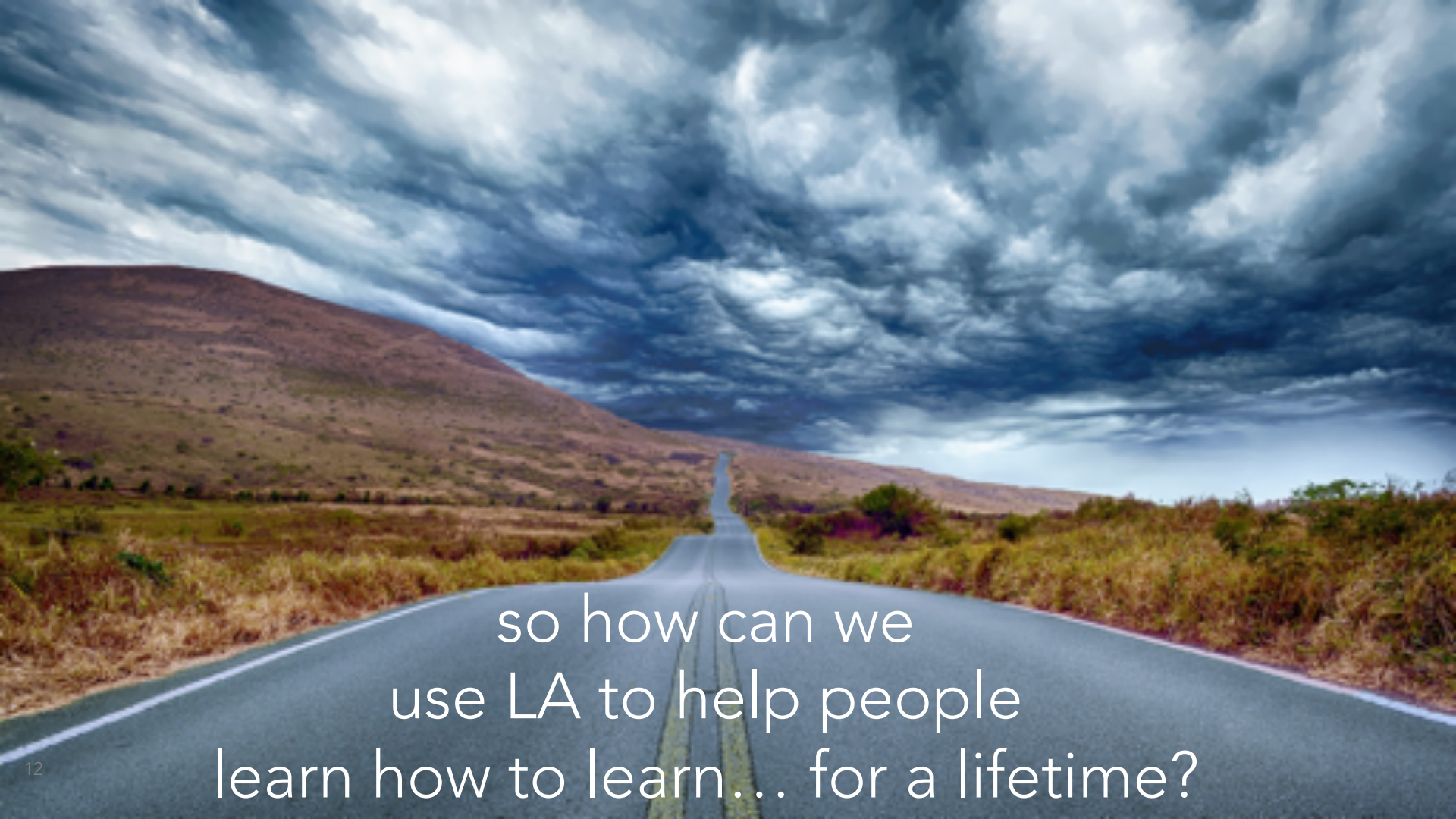


content and skills are well suited to adaptive learning and intelligent tutoring systems



but in an age of workforce
disruption content and skills will
quickly become outdated!





so how can we
use LA to help people
learn how to learn... for a lifetime?



my approach: student facing LA

CAUTION

- a “go look at it” approach tends to fail
- students don't apply knowledge
 - limited reflection
 - often blindly believe LA instead of questioning it and reinterpreting
 - and it can be **hard to use** (Learning Design is essential!)

example 1: learning to write

We ^{should} shold not make ^b nanobots ^{for} fore multipul ^{ple reason} reesuns. As you probibly know in the ^a rong ^{wrong} hands thay can be ^{ea} dangerous. So to ^{an} fined out the rest you are going to have to ^{ea} reed the rest of this ^{ea} exsithing artikul.

For one a nanobot could have a bug and start ^{ea} eeting ^{any} enything ^{bon} cardin ^{ea} basted or just not work at all. ^{ea} Another thing is that thay may allso eat the ^{ea} rong ^{ea} substins, ^{ea} wich wold onle be bade in some cases. Wat is ^{ea} rile bad if one has a bug ^{ea} cold make ^{ea} mor with the same ^{ea} problem. Now I know that you are ^{ea} wondering wat I am ^{ea} tolking abot, I ^{ea} mean how could it make ^{ea} mor of its ^{ea} problem ^{ea} inles it ^{ea} colud ^{ea} rerite uthur ^{ea} nanobots ^{ea} programs. Well some ^{ea} sientintists are ^{ea} tring to ^{ea} figyer out how to ^{ea} mak it ^{ea} posibul for them to ^{ea} copy ^{ea} themsells. So one might be able to ^{ea} ^{key} bekum 100.

Also thay are planing to make them ^{ea} abule to ^{ea} cile ^{ea} baktery, and there thay might eat away at the ^{ea} intestens ^{ea} insted. But don't be ^{ea} werryd thay mite make it so that thay will go ^{ea} throw the body with the rest of th ^{ea} food. Also thay might ^{ea} program them to ^{ea} tern of after a ^{ea} serten amout of time.

They are also planing to make ^{ea} smal ^{ea} traking ^{ea} divises so kids wont get lost. I just hope thay are ^{ea} haker safe and thay aren't over used. I don't want the ^{ea} ^{ea} goverment to know to much. I also don't want some ^{ea} sikeco ^{ea} thraking me.

So as you can see there are lots of problems. There is bugs, ^{ea} hackers, ^{ea} goverment ^{ea} overyuos, and ^{ea} faling into the ^{ea} rong hands. There is ^{ea} good ^{ea} noos I think we are ^{ea} stile ^{ea} alitaule ^{ea} fare from ^{ea} geting a lot of ^{ea} nanobots ^{ea} just yet. ^{news}

feedback – reflective writing

Key

- ☐ Words associated with strong feelings
- ☒ Expressions indicating belief, learning, or knowledge.
- ☒ Expressions indicating self critique
- ☒ One or more keywords missing
- ☒ Sentence too long, might disengage the reader. Try breaking it into smaller sentences
- ☒ Initial thoughts and feelings about a significant experience.
- ☒ The challenge of new surprising or unfamiliar ideas, problems or learning experiences.
- ☒ Deeper reflection, personally applied.
- ☒ How new knowledge can lead to a change

Auto feedback: [Get Feedback](#) [Save](#) [Export to PDF](#) [Key](#)

Feedback (Reflective)

Initially had no idea what sort of Community Pharmacy setting. It has been a journey which exposed my strengths and weaknesses as a health care professional. I personally saw it as a journey which exposed my strengths and weaknesses. I saw my preceptor as someone who guided me to help address my weaknesses. However, I began to realise that this was only to a certain extent. The most important thing I learnt from these experiences is that I can only develop my skills if I actively contribute to the pharmacy by demonstrating initiative. This initiative was a product of my inner passion and motivation to practise as a pharmacist in future. Various encounters along my journey proved to me that every day presents with a new challenge. I initially could not comprehend just how diverse the members of the community were, particularly in regards to their health issues and understanding of their condition. I found that my clinical placement allowed me to see things from a perspective that I would never have imagined. In order to illustrate these notions, I have decided to reflect upon two major ideas.

Effective patient communication was a skill I had significantly developed during my clinical placement. A specific example was when I dispensed rosuvastatin for a patient. It was one of the first weeks of clinical placement and by this time I had become quite efficient at the dispensing process. A female patient came in

LA must be linked to the pedagogical purpose!

reflective writing

Depth	Intention						What change is likely to lead to future benefits?	
	Integration				What impact on my goals/aspirations?	What other ideas could I use to change myself?	How do others address these challenges?	How can I learn from other perspectives?
	Internalisation		What do these feelings say about me?	How is this a problem that challenges me?	Why do I need to change?	How can I change?		
	Interpretation	What does it mean for me?	Why do I feel this way?					
	Impression	What do I notice about my situation?						
	Thoughts	Feelings	Challenge	Self critique	Potential solution	Learning opportunity		
	CONTEXT			CHALLENGE		CHANGE		
	Narrative							

Gibson, A., Aitken, A., Sándor, Á., Buckingham Shum, S., Tsingos-Lucas, C., & Knight, S. (2017, March). Reflective writing analytics for actionable feedback. In Proceedings of the Seventh International Learning Analytics & Knowledge Conference (pp. 153-162).

research writing (CARS model)

Move 1 – Establishing a research territory:

E – Emphasis of a significant or important idea

B – Background information and reviewing previous work

Move 2 – Establishing a niche:

C – Contrasting idea, tension, disagreement or critical insight

Q – Question or gap in previous knowledge

Move 3 – Occupying the niche

N – Novelty and value of your research

S – Summary of the authors goal, nature of the research or structure of the paper

Abel, S., Kitto, K., Knight, S., Buckingham Shum, S. (2018). Designing personalised, automated feedback to develop students' research writing skills. In Proceedings ASCILITE 2018. In Press.

See www.heta.io for more details

feedback – reflective writing

Key

- ☐ Words associated with strong feelings
- ☒ Expressions indicating belief, learning, or knowledge.
- ☒ Expressions indicating self critique
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- ☒ Deeper reflection, personally applied.
- ☒ How new knowledge can lead to a change

Auto feedback: [Get Feedback](#) [Save](#) [Export to PDF](#) [Key](#)

Feedback (Reflective)

■ Prior to starting my clinical placement, I honestly had no idea what sort of challenges *I would* have to face in a Community Pharmacy setting. It has essentially provided me with a perspective of the expectations of a pharmacist as a health care professional.■ I personally saw it as a journey which exposed my strengths and weaknesses.■ I saw my preceptor as someone who guided me to help address my weaknesses.■ However, *I began to realise* that this was only to a certain extent.■ The most important thing I learnt from these experiences is that **I can only develop my skills if I actively contribute to the pharmacy by demonstrating initiative.**■ This initiative was a product of my inner passion and motivation to practise as a pharmacist in future.● Various encounters along my journey proved to me that every day presents with a new challenge.● – *I initially could* not comprehend just how diverse the members of the community were, particularly in regards to their health issues and understanding of their condition.■● I found that my clinical placement allowed me to see things from a perspective that *I would never have imagined*.■● In order to illustrate these notions, I have decided to reflect upon two major ideas.

Effective patient communication was a skill I had significantly developed during my clinical placement. A specific example was when I dispensed rosuvastatin for a patient.■ It was one of the first weeks of clinical placement and by this time I had become quite efficient at the dispensing process. A female patient came in

feedback – research writing

Analytical Report

Feedback

Resources

Move 1: Establishing a research territory

- E** Emphasis of a significant or an important idea
- B** Background information and reviewing previous work

Move 2: Establishing a Niche

- C** Contrasting idea, tension, disagreement or critical insight
- Q** Question or gap in previous knowledge

Move 3: Occupying the Niche

- N** Novelty and value of your research
- S** Summary of the author's goal or nature of the research, or structure of the paper

E B ABSTRACT:

It is now widely accepted that timely, actionable feedback is essential for effective learning. In response to this, data science is now impacting the education sector, with a growing number of commercial products and research prototypes providing "learning dashboards", aiming to provide real time progress indicators. **E C** From a human-centred computing perspective, the end-user's interpretation of these visualisations is a critical challenge to design for, with empirical evidence already showing that 'usable' visualisations are not necessarily effective from a learning perspective. Since an educator's interpretation of visualised data is essentially the construction of a narrative about student progress, we draw on the growing body of work on Data Storytelling (DS) as the inspiration for a set of enhancements that could be applied to data visualisations to improve their communicative power. **S** We present a pilot study that explores the effectiveness of these DS elements based on educators' responses to paper prototypes. **S** The dual purpose is understanding

Analytical Report

Feedback

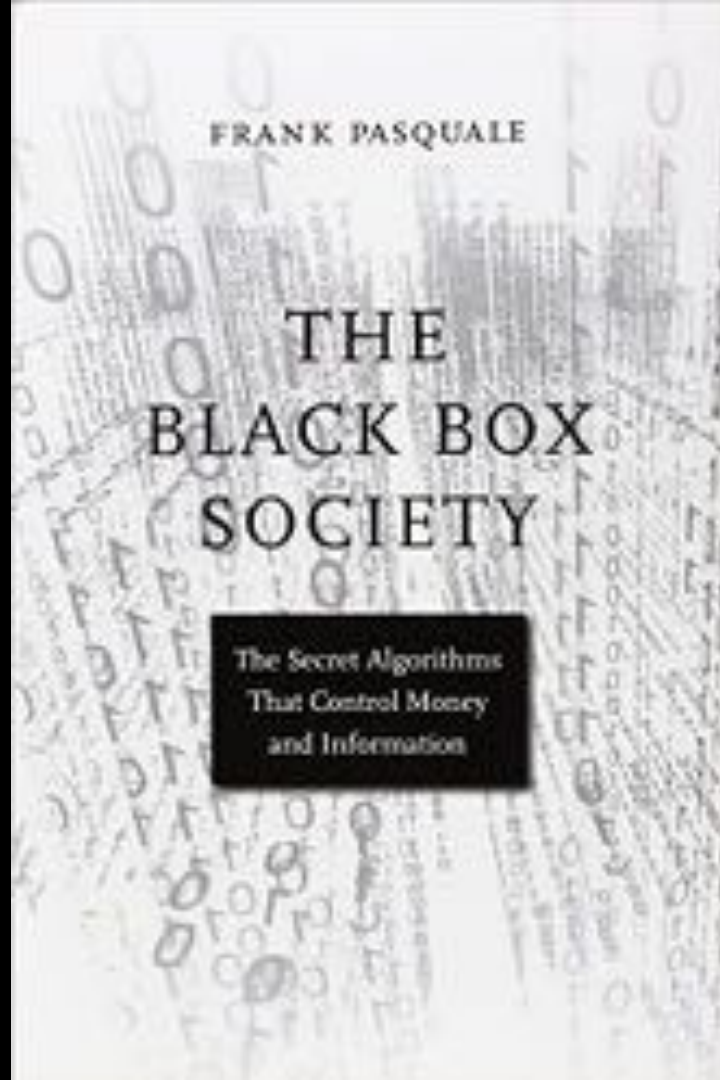
Resources

Thank you for submitting your draft to AcaWriter. Quality writing comes from revision. Research shows that writing drafts and revising your text helps improve the quality of your writing.

Remember AcaWriter is a machine – so it may not highlight all your moves correctly and could give you incorrect feedback. So, don't be afraid to disagree with the feedback, if you believe you have included all three moves in the correct order.

i It seems you have stated how your research fills the gap and/or solves the research problem [Move 3 – Occupying the niche (S or N sentences)] before you have indicated the gap and/or explained your research problem [Move 2 Establishing a niche (C or Q sentences)]. It is more effective to indicate the gap and explain the research problem before you state your solution and aim of your study. AcaWriter suggests putting Move 3 – Occupying the niche (S or N sentences) after Move 2 Establishing a niche (C or Q sentences).

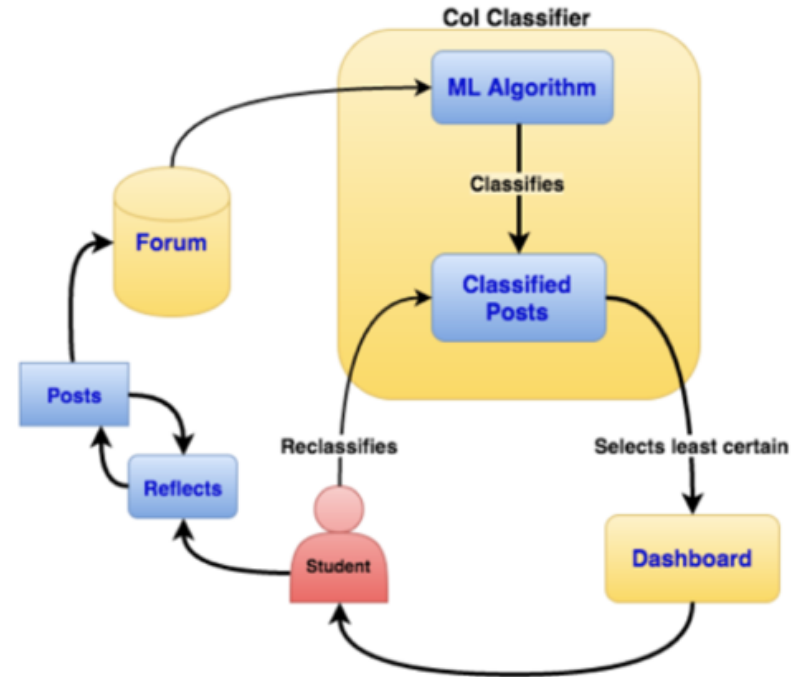
example 2:
learning to open
the black box



active learning squared (AL²)

a learning design we are starting to use:

the student trains the classifier...
...while it is training the student...



cognitive presence

"extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication."

Triggering



Exploration



Integration



Resolution

Garrison, Anderson, Archer (2001) Critical thinking, cognitive presence, and computer conferencing in distance education. American journal of distance education, 15(1):7-23

The screenshot shows a Twitter thread by Stefan P. Schmid. Annotations on the right side map specific parts of the thread to the phases of cognitive presence:

- Problem presentation, Triggering phase:** Points to the tweet text "The terror of tweeting".
- Relation to previous post, Triggering phase:** Points to the link in the tweet text.
- Tagging participants:** Points to the list of users tagged in the tweet.
- Shared resource, Triggering phase:** Points to the link in the tweet text.
- Insight, Opinion, Triggering phase Exploration phase:** Points to the first reply by Laura Gibbs.
- Related video, Exploration phase:** Points to the second reply by Stefan P. Schmid showing a video.
- Reference to previous post, Integration phase:** Points to the third reply by Mark Poole.
- Related original content, Integration phase:** Points to the link in the third reply.
- Insight, opinion, Resolution phase:** Points to the fourth reply by George Station.

<https://plus.google.com/u/0/+StefanPSchmid/posts/4wrUbFzFwpJ>

we can use machine learning to classify discussion forum text using this construct

Kovanović, Joksimović, Waters, Gašević, Kitto, Hatala, Siemens (2016). Towards automated content analysis of discussion transcripts: a cognitive presence case. In Proceedings of the Sixth International Conference on Learning Analytics & Knowledge (LAK '16). ACM, New York, NY, USA, 15-24.

Towards Automated Content Analysis of Discussion Transcripts: A Cognitive Presence Case

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ABSTRACT

In this paper, we present the results of an exploratory study that examined the problem of automating content analysis of student online discussion transcripts. We focused on the problem of coding discussion transcripts for the levels of cognitive presence, one of the three main constructs in the Community of Inquiry (CoI) model of distance education. Using Coh-Metrix and LINC features, together with a set of custom features developed to capture discussion content, we developed a random forest classification system that achieved 70.9% classification accuracy and 0.63 Cohen's kappa, which is significantly higher than values reported in the previous studies. Besides improvement in classification accuracy, the developed system is also less sensitive to overfitting as it uses only 205 classification features, which is around 100 times less features than in similar systems based on bag-of-words features. We also provide an overview of the classification features most indicative of the different phases of cognitive presence that gives an additional insight into the nature of cognitive presence learning cycle. Overall, our results show great potential of the proposed approach, with an added benefit of providing further characterization of the cognitive presence coding scheme.

Keywords

Community of Inquiry (CoI) model, content analysis, content analytics, online discussions, text classification

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DOI: <http://dx.doi.org/10.1145/2803851.2803950>

1. INTRODUCTION

Online discussions are commonly used in modern higher education, both for blended and fully-online learning [42]. In distance education, given the absence of face-to-face interactions, online discussions represent an important component of the whole educational experience. This is especially important for the social-constructivist pedagogies which emphasize the value of social construction of knowledge through interactions and discussions among a group of learners [2]. In this regard, the Community of Inquiry (CoI) model [22, 31] represents, perhaps, one of the best researched and validated models of online and distance education, focused on explaining important dimensions – also known as presences – that shape students' online learning experience.

The most commonly used approaches to the analysis of online discussion transcripts are based on the quantitative content analysis (QCA) [12, 54, 51, 15]. According to Krippendorff [37], content analysis is "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contents of their use" [p18]. In the case of the study presented in this paper, contents is online learning environments. QCA is a well defined research technique commonly used in social science research, and it makes use of specifically designed coding schemes to analyze text artifacts with respect to the defined research goals and objectives. For instance, the CoI model defines a set of coding schemes which are used by the educational researchers to assess the levels of three CoI presences.

In the domain of educational research, QCA of student discussion data have been mainly used for the retrospective and research after the courses are over without an impact on the learners' learning outcomes [53]. In the field of content analytics [36] – which focuses on building analytical models based on the learning content including student-produced content such as online discussion messages – there have been some attempts to automate some of these coding schemes. Most notable are the efforts of McKim [44] and Corich et al. [11] on automation of the CoI coding schemes, which served

Community of Inquiry Classification

Community of Inquiry Classifications

Want to learn about your participation within your learning community?

When you start this activity, you will see one of your posts. We have used machine learning to categorise your *cognitive presence* according the *Community of Inquiry model*.

However, our machine learning tool is still learning and it could be wrong. We would like you to:

1. Think about how your post was classified
2. Choose what category you believe your post belongs to
3. If you like, you may highlight text from your post that you used in making your decision, or add remarks to the text-box about what helped you come to your conclusion
4. You can view your history below

What is Cognitive Presence?

Cognitive presence has four phases: Triggering, Exploration, Integration, and Resolution.

Triggering Phase initiates discussion about a particular issue/topic for inquiry.

Exploration Phase posts explore the issue at hand by exchanging knowledge between members of the community.

Integration Phase interactions build upon the ideas shared and explored in the Exploration phase and begin to construct understanding or a solution about a topic or issue.

Resolution Phase are messages in a discussion that test the solutions or understanding developed in the Integration phase.

Begin

Community of Inquiry Classification

Community of Inquiry Classifications

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Begin

Community of Inquiry Classification

Community of Inquiry Classifications

What is this?

Was classified as: Triggering

Here's a free definition for your buzzword bingo card

Conspectus: an approach to defining the levels at which an institution collects in a given content area. It's about the depth of collecting and there are standard indicators, which you can read about in this IFLA guide to collection development policies. Conspectus is also an approach that can be taken to collection development policy writing, where the policy sets out the target level of depth in particular areas of collecting. It's not used much in Australian libraries any more, and is a bit out of fashion internationally (though used by some research libraries still).

Sharing information/outside links

Triggering

Exploration

Integration

Resolution

Other

Preview:

Author

Posts

July 27, 2015 at 8:52 pm

#402



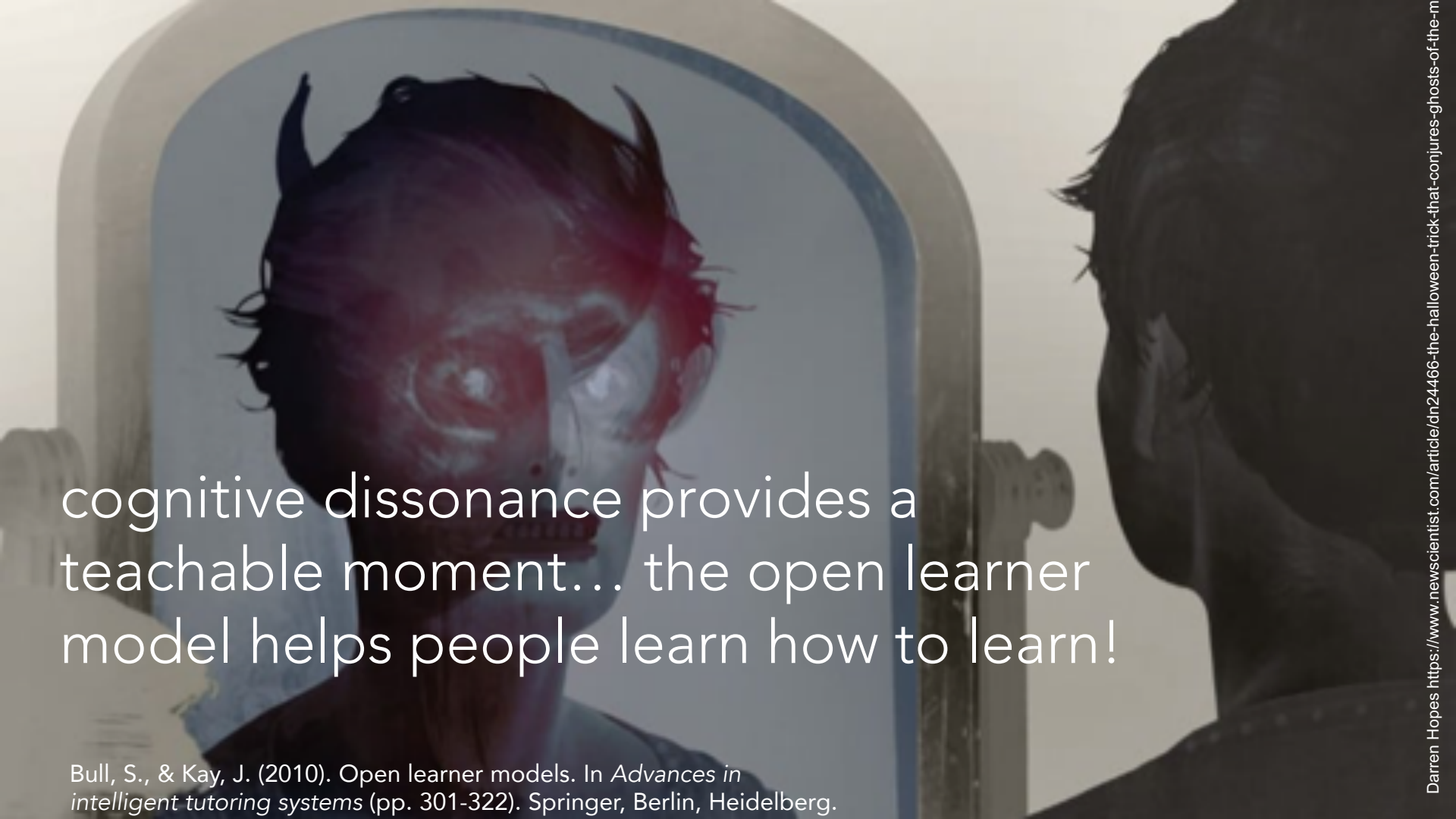
Kate Davis

Keymaster

Here's a free definition for your buzzword bingo card...

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A person is shown in profile, looking into a mirror. The reflection in the mirror is not the person's actual face, but a devil-like face with horns, a wide grin showing teeth, and a red, swirling pattern on the right side of the face. The person's face is mostly in shadow, with only the side of their head and ear visible. The background is a plain, light-colored wall.

cognitive dissonance provides a
teachable moment... the open learner
model helps people learn how to learn!

Bull, S., & Kay, J. (2010). Open learner models. In *Advances in intelligent tutoring systems* (pp. 301-322). Springer, Berlin, Heidelberg.

example 3:
personalised
messaging
to students
based on
activity in
class

**PERSONALISATION
IS NOT ABOUT
FIRST/LAST NAME.
IT'S ABOUT
RELEVANT
CONTENT.**

Dan Jak



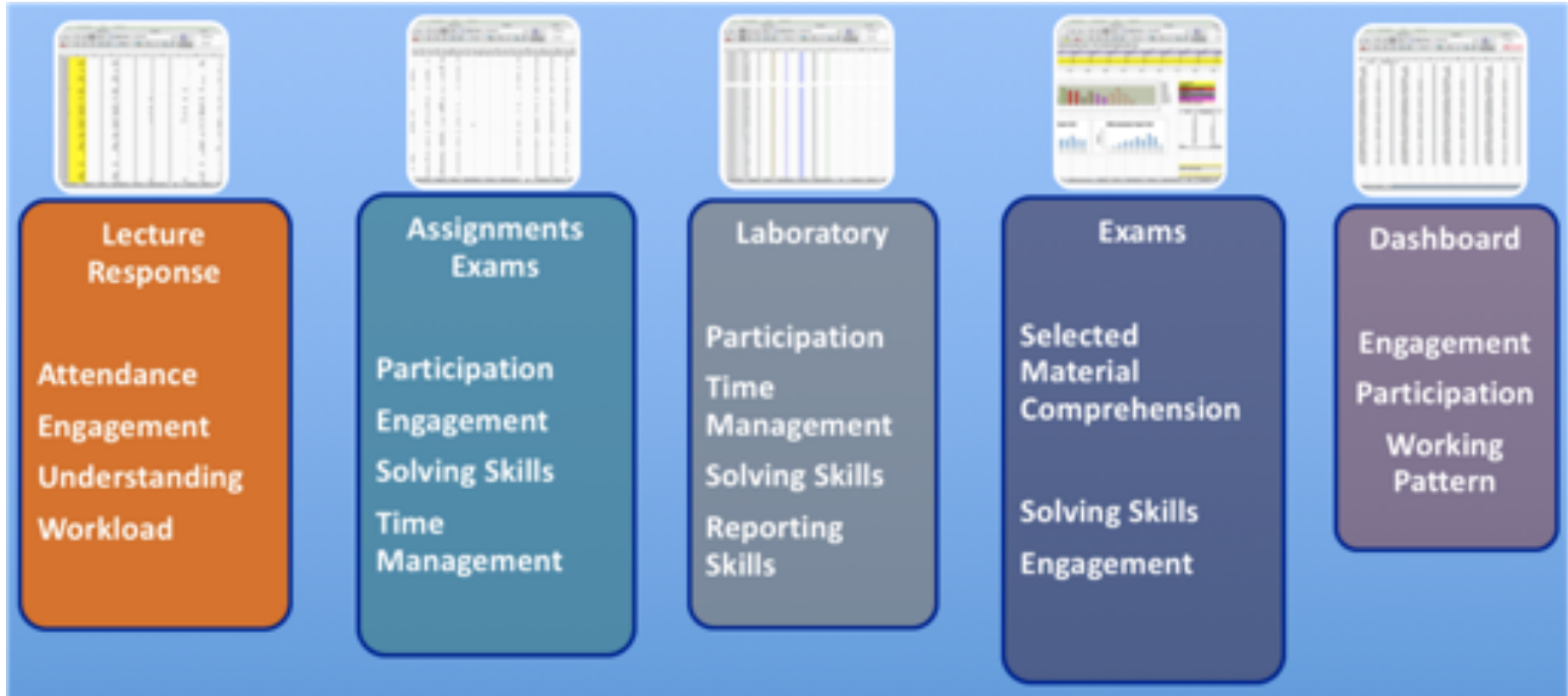
CATHERINEMONGINA



catherinemongina

weekly personalised feedback to 800+ students

(Acknowledgement: Jurgen Schulte, UTS Science)



rapid, personalised feedback at scale to students

(developed by Jurgen Schulte, UTS Science)

End of **week 3** feedback case 3

cond 1

Dear **Osiri**,

cond 2

Quite a few students had to move lab classes the past two weeks. This is just to confirm that I have you on record that you are now in lab **Group 18** and that your online lab report should be submitted at our **Group 18** pages.

cond 6

You had a good start with Physical Modelling and seem to be well on track.

cond 7

You managed to achieve 9 out of 10 marks in your WileyPLUS assignments.

Your lab reports came back with 7 out of 7 marks.

cond 8

I noticed you are a keen participant of our lecture exercises. Did you know that they can be accessed before as well as after the lecture, not just during lecture?

cond 9

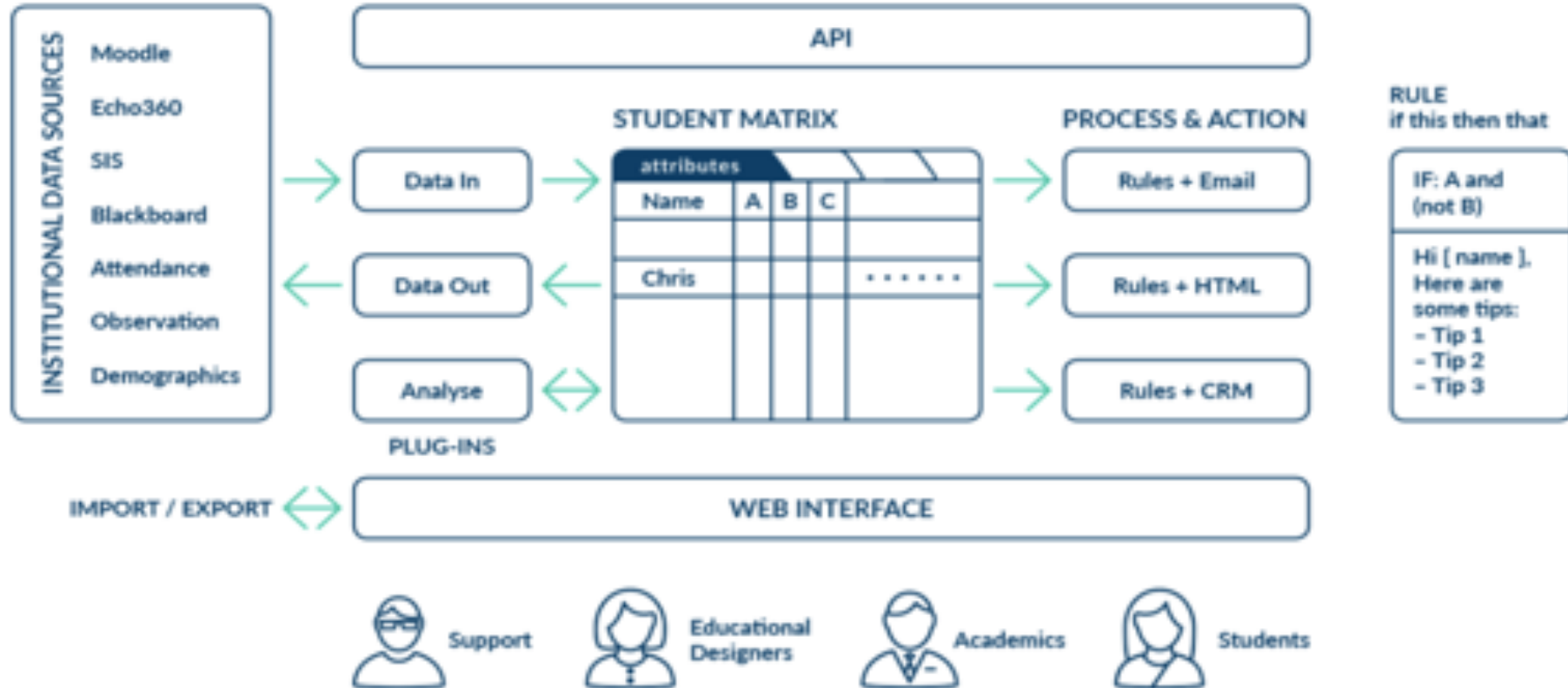
You seem to have had problems with one of the forces questions. Please have a look at HRW Chapter 3.2.2 where this case is discussed in more detail.

cond 5

Please don't forget that the our **third** homework assignment has been released already. This assignment will be due 11.00 pm Friday next week.

Kind regards,
Jurgen Schulte

scaling up via Australian national funding...



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Providing personalised,
timely support actions to
large student cohorts.

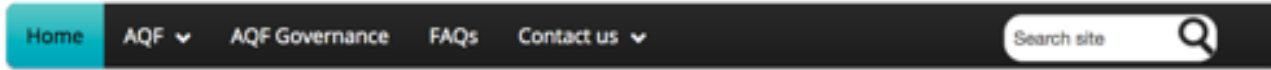
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<http://ontasklearning.org>

example 4: navigating workforce transition



qualifications frameworks are too broad



The AQF is currently undergoing a review. More information can be found on the **Department of Education and Training website**.

Australian
Qualifications
Framework



datasets exist that provide sophisticated mappings

The screenshot displays the ESCO website interface. At the top, there are links for 'Legal notice', 'Cookies', 'Contact', and 'Search on Europa', along with a language selector set to 'English (en)'. The main header features the European Commission logo and the ESCO title. Below this is a navigation bar with three main sections: 'ABOUT ESCO', 'CLASSIFICATION', and 'TOOLS & RESOURCES'. Under 'CLASSIFICATION', there are three sub-sections: 'Occupations', 'Skills/competences', and 'Qualifications'. The 'Occupations' section is currently selected. On the left, a search bar contains the text 'data scientist'. Below the search bar, a list of occupations is shown, with 'data scientist' at the top. The main content area on the right is titled 'data scientist' and includes a 'Description' section. The description states: 'Data scientists find and interpret rich data sources, manage large amounts of data, merge data sources, ensure consistency of data-sets, and create visualisations to aid in understanding data. They build mathematical models using data, present and communicate data insights and findings to specialists and scientists in their team and if required, to a non-expert audience, and'.

Legal notice | Cookies | Contact | Search on Europa English (en)

European Commission

ESCO

European Skills/Competences, qualifications and Occupations

European Commission > ESCO > Occupations

ABOUT ESCO CLASSIFICATION TOOLS & RESOURCES

Occupations Skills/competences Qualifications

data scientist

English (en)

data scientist

Description

Data scientists find and interpret rich data sources, manage large amounts of data, merge data sources, ensure consistency of data-sets, and create visualisations to aid in understanding data. They build mathematical models using data, present and communicate data insights and findings to specialists and scientists in their team and if required, to a non-expert audience, and

a prototype tool

UTS: Burning Glass

Kirsty ▾

Content Tagger/Similarity

Enter subject number(s) comma separated

Fetch Results

Occupations

Data Scientist	0.448
Data / Data Mining Analyst	0.4
Statistician	0.341
Database Architect	0.354
Data Engineer	0.381
IT Project Manager	0.359
Data Warehousing Specialist	0.348
UI / UX Designer / Developer	0.337
Financial Quantitative Analyst	0.339
Chief Information Officer / Director of Information Technology	0.33

Subject	Potential Skills
36100 Data Science for Innovation	teamwork / collaboration 0.98 random solving 0.98 decision making 0.98 data collection 0.98 data science 0.98 big data 0.98 creativity 0.98 data quality 0.87 teaching 0.86 cleaning 0.77 journalism 0.67 presentation skills 0.64 experiments 0.62 articulate 0.62 apache hadoop 0.61 organizational skills 0.43 big data analytics 0.39 system 0.38 communication skills 0.35 data mining 0.34 building effective relationships 0.33
36103 Statistical Thinking for Data Science	decision making 0.98 problem solving 0.98 statistics 0.98 data science 0.98 teamwork / collaboration 0.98 machine learning 0.97 data analysis 0.97 statistical analysis 0.97 data collection 0.97 teaching 0.97 law 0.97 literacy 0.97 critical thinking 0.97 predictive models 0.94 data visualization 0.93 project management 0.93 python 0.92 data visualization 0.92 communication skills 0.85 qualitative methods 0.84 ml 0.84
36106 Data, Algorithms and Meaning	machine learning 1.00 articulate 0.99 decision making 0.98 data mining 0.98 big data 0.98 microsoft excel 0.89 data science 0.89 decision trees 0.87 predictive models 0.86 apache hadoop 0.87 presentation skills 0.86 random forests 0.85 communication skills 0.73 ml 0.68 neural networks 0.68 experiments 0.69 natural language processing 0.68 big data analytics 0.66 critical thinking 0.65 metadata 0.63 written communication 0.64
36105 Leading Data Science Initiatives	articulate 0.99 problem solving 0.99 project management 0.99 planning 0.97 data management 0.97 team 0.96 leadership 0.95 scheduling 0.94 data science 0.94 writing 0.94 software engineering 0.89 business case analysis 0.84 performance management 0.79 systems development 0.79 agile development 0.78 teamwork / collaboration 0.87 teaching 0.86 program management 0.68 big data 0.65 building effective relationships 0.37 business intelligence 0.36

UTS: Burning Glass

Kirsty ▾

Content Tagger/Similarity

Enter subject number(s) comma separated

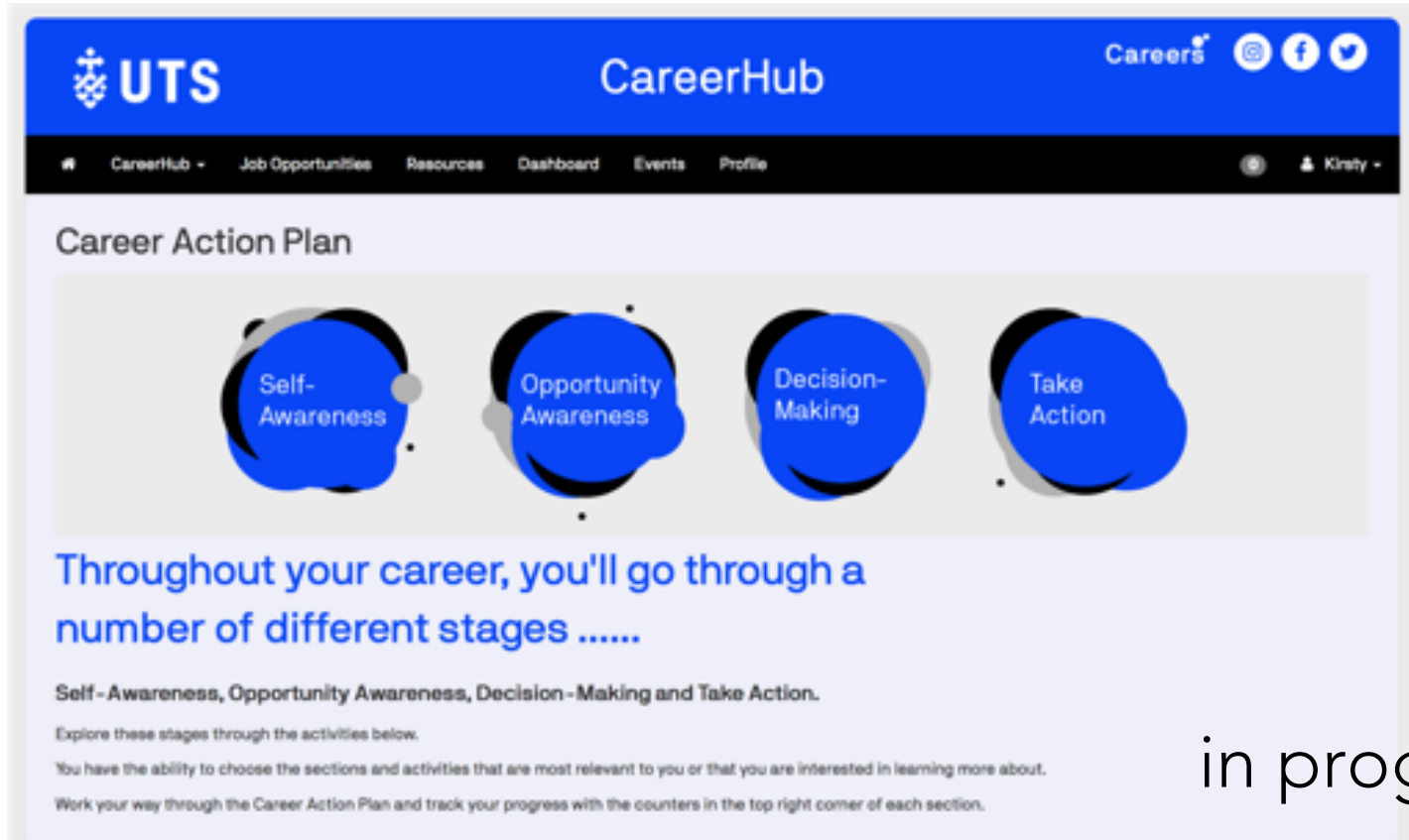
Fetch Results

Occupations

UI / UX Designer / Developer	0.448
Marketing Manager	0.407
Data / Data Mining Analyst	0.404
Data Scientist	0.394
Product Manager	0.381
Software Developer / Engineer	0.381
Market Research Analyst	0.387
Database Architect	0.381
Social Science Researcher	0.374
Natural Science Research Manager	0.375

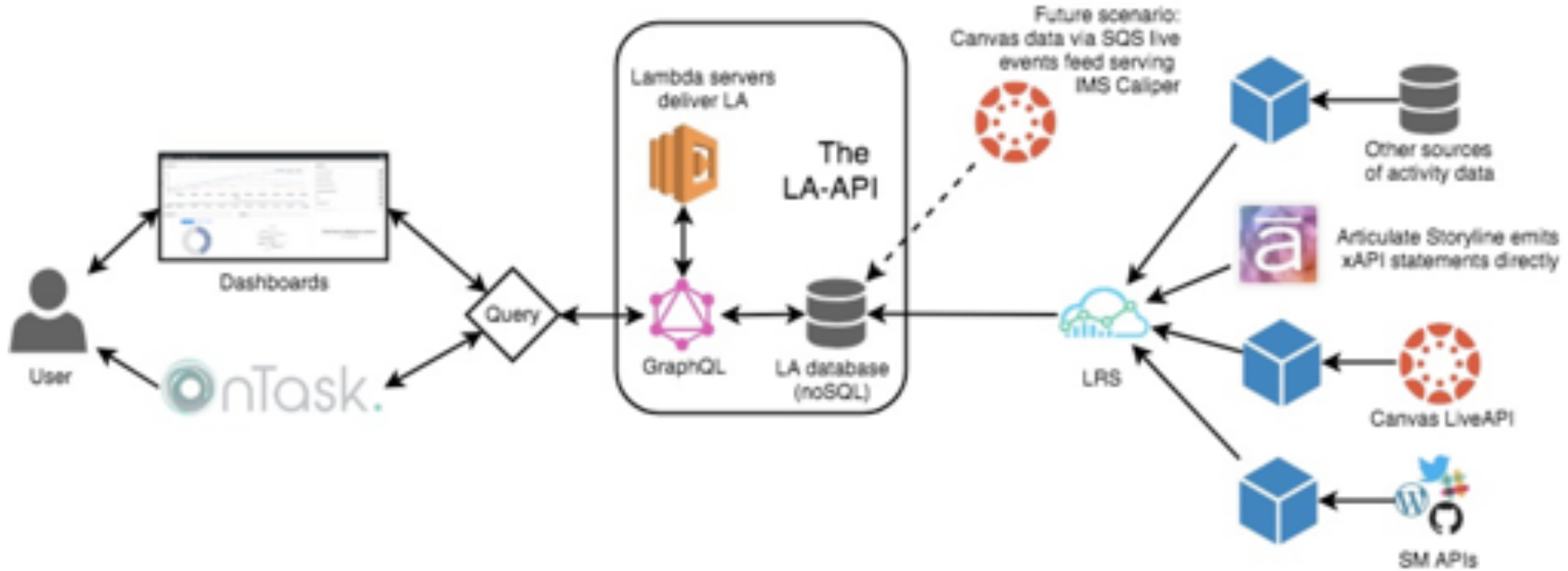
Subject	Potential Skills
81539 Impossibilities to Possibilities	teamwork / collaboration 0.97 creativity 0.98 teaching 0.98 building effective relationships 0.98 communication skills 0.48 experiments 0.34 meeting deadlines 0.26 microsoft office 0.17 problem solving 0.15 creative problem solving 0.15 detail oriented 0.15 microsoft excel 0.15 writing 0.09 project management 0.08 organizational skills 0.07 critical thinking 0.07 customer service 0.06 planning 0.06 microsoft powerpoint 0.06 multi-tasking 0.05 budgeting 0.04
81540 Technology, Methods and Creative Practice	creativity 0.99 decision making 0.97 articulate 0.98 teaching 0.98 data analysis 0.98 teamwork / collaboration 0.98 communication skills 0.94 data visualization 0.94 writing 0.94 visual presentation 0.94 presentation skills 0.94 critical thinking 0.94 microsoft office 0.94 literacy 0.92 key presentations skills 0.91 detail oriented 0.84 creative problem solving 0.81 building effective relationships 0.79 microsoft excel 0.79 microsoft powerpoint 0.69 qualitative research 0.64 project management 0.64
81538 Frame Innovation	articulate 1.00 decision making 0.99 troubleshooting technical issues 1.00 data analysis 1.00 technical assistance 1.00 value proposition 1.00 academic achievement 1.00 data warehousing 1.00 teaching 1.00 instructional design 1.00 whole creative suite 1.00 data visualization 1.00 creativity 1.00 creative problem solving 1.00 product design 1.00 content development 1.00 student learning outcomes 1.00 communication disorders 1.00 grant writing 1.00 fundraising 1.00 persuasion 1.00
94663 Navigating Entrepreneurial Ecosystems and Initiating Change	articulate 0.99 creativity 0.98 teamwork / collaboration 0.97 data analysis 0.87 teaching 0.86 communication skills 0.63 troubleshooting technical issues 0.68 writing 0.63 detail oriented 0.68 project management 0.62 microsoft office 0.13 customer service 0.13 organizational skills 0.10 written communication 0.09 verbal / oral communication 0.09 multi-tasking 0.09

so can we use this to help people identify new opportunities when they are **returning** to university?




in progress!


but that requires an ecosystem of tools!



data interoperability and portability are essential in a lifetime of learning!

An aerial photograph of the Great Wall of China as it snakes across a rugged, mountainous landscape. The wall, constructed from light-colored stone and brick, follows the crest of a long, brownish mountain ridge. In the foreground, a prominent watchtower with multiple battlements stands out. The surrounding terrain is covered in dry, brown vegetation, and the sky above is a clear, bright blue. The overall scene conveys a sense of vastness and historical grandeur.

learning to
learn is a long
and winding
road

A wide-angle photograph of a massive, rugged mountain range. The mountains are covered in sparse, dry vegetation, appearing in shades of brown and tan. The peaks are sharp and jagged, with deep shadows in the valleys. In the distance, a small cluster of buildings, likely a village, is visible in a valley. The sky is a clear, pale blue. The overall scene conveys a sense of isolation and the scale of the natural world.

one that is fraught
with peril if we are
too naive!

in summary

what I have learned... and often wish that EdTech would too:

- learning happens everywhere – so we need to *enable* that
- learning happens over a lifetime – so over many systems!
- we must establish the *type* of learning we are hoping to enable
- we must focus on solving actual problems!
- data interoperability and portability are essential!
- technology alone is never enough

Questions?