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Designing for student facing learning analytics

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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

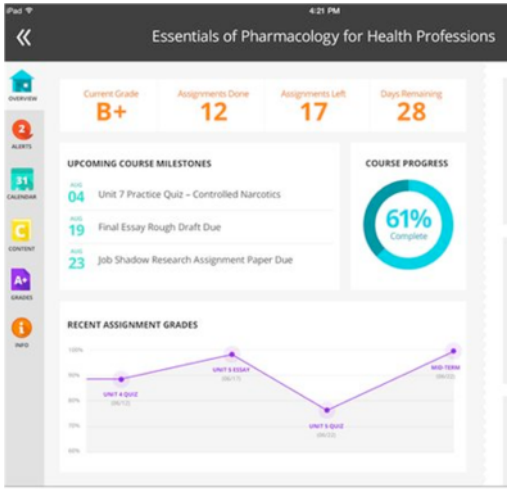
SoLAR definition

SOCIETY for LEARNING ANALYTICS RESEARCH

example: course signals at Purdue

Arnold, K. E., & Pistilli, M. D. (2012). Course signals at Purdue: Using learning analytics to increase student success. In Proceedings of the 2nd international conference on learning analytics and knowledge (pp. 267-270). ACM.

many systems now offering some form of LA

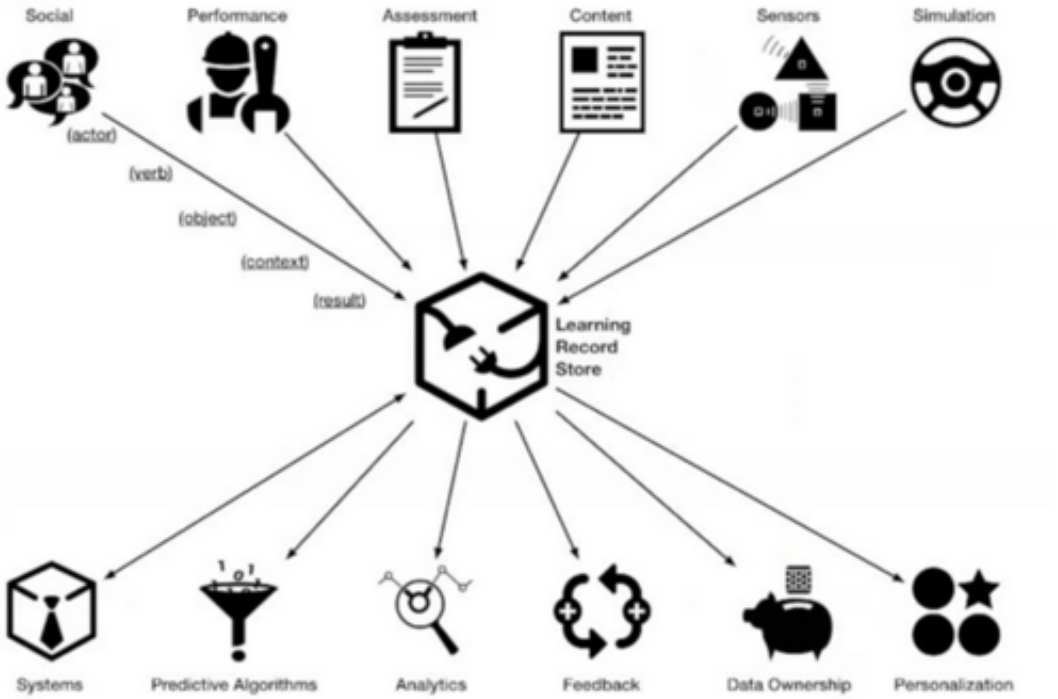


BUT is it any good?

where does learning happen?

but new data standards are emerging…

new possibilities!



http://mfeldstein.com/recommended-viewing-learning-analytics-webinar-on-caliper-and-xapi/


so a lot of data is coming to education!
but how can we use it effectively?

but data must be cooked with care!

- *are you capturing all of the relevant data?*
- *is what you are collecting even useful?*
- *or are you just collecting it because you can?*
- *and what metrics are you developing from your data?*

Bowker, G. C. (2005). Memory practices in the sciences (Vol. 205). Cambridge, MA: Mit Press.

the clicks to constructs problem

low level click steam data rarely yields significant insights

BUT a careful mapping to educational constructs can lead to far more useful outcomes

Gibson, A., Kitto, K., & Willis, J. (2014). A cognitive processing framework for learning analytics. In Proceedings of the Fourth International Conference on Learning Analytics And Knowledge (pp. 212-216). ACM.

http://www.celt.iastate.edu/teaching/effective-teaching-practices/revised-blooms-taxonomy

student facing LA

we should give students access to *rich* LA

In principle this should help to promote things like:

- *learning to learn*
- *metacognition and reflection*
- *interpretation and sensemaking*
- *data literacy*
- *lifelong learning*

And ethically… is it reasonable not to give students access to the data that they themselves generate?

but care is required…

what would a student do if:

- they were a first in family low SES type student and told in their first year maths class that they were failing?
- a dashboard showed them at the bottom of a leader board?
- … at the top?
- a social network tool showed them as the only student who was not connected to anyone else in class? … and they were suffering from anxiety and depression?

http://maxpixel.freegreatpicture.com/Worry-Angst-Fear-Anguish-Anxiety-Apprehension-802639

Staff Announcements

Student focus group: "Learner-facing learner analytics analysis of student perspectives"

14 November, 2017 (Staff)

Students are invited to participate next week in a student focus group as part of a national project (Learner-facing learner analytics analysis of student perspectives GU ref no: 2017/696) that is designed to explore the perceptions of students to learning analytics and the requirements for a potential student facing dashboard.

The aims of the project are too specifically:

- Identify the data / information institutions, can provide to students, to support their university studies.
- To determine how can learning analytics can most appropriately be visualized and presented to students.
- Identify the potential concerns students have about the collection and use of data.

Two focus groups will be conducted on **Tuesday, 21 November from 1-2.30pm** and **Thursday, 23 November 10.30am-12pm.** Other focus groups can be

Search announcements

Enter a keyword or a date to search all announcements.

Search

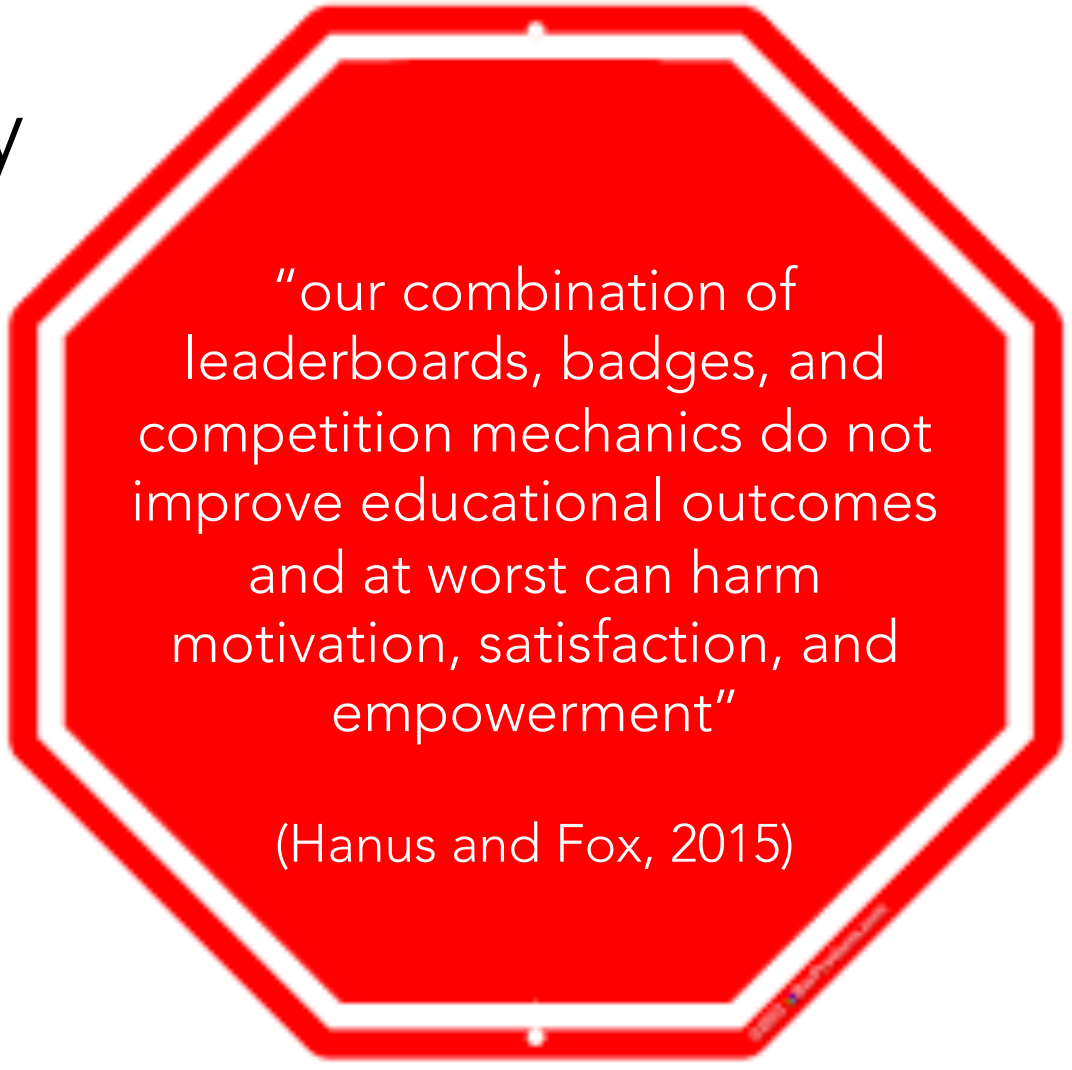
Other announcements

- Vice Chancellor's Messages
- Alerts

Submit a new announcement or event

Will this communication be for staff or students (or both)?

things can go very wrong with naïve approaches



Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study of intrinsic motivation, social comparison, satisfaction, effort, and academic performance. Computers & Education, 8, 152–161.

Khan, I., & Pardo, A. (2016). Data2U: Scalable real time student feedback in active learning environments. In Proceedings of the international conference on learning analytics and knowledge (pp. 249–253). Edinburgh, Scotland: ACM.

ID14-3821: ENABLING CONNECTED LEARNING VIA OPEN SOURCE ANALYTICS IN THE WILD: LEARNING ANALYTICS BEYOND THE LMS

This project is supported by the Australian Government's office for learning and teaching

QUEENSLAND UNIVERSITY OF TECHNOLOGY:
Kirsty Kitto (Lead Investigator), Mandy Lupton, John Banks, Dann Mallet, Peter Bruza

UNIVERSITY OF SOUTH AUSTRALIA
Shane Dawson, Dragan Gašević (Uni of Edinburgh)

UNIVERSITY OF TECHNOLOGY SYDNEY
Simon Buckingham Shum (and now Kirsty Kitto!)

UNIVERSITY OF SYDNEY
Abelardo Pardo

UNIVERSITY OF TEXAS (ARLINGTON)
George Siemens

Queensland University of Technology

University of South Australia

UTS UNIVERSITY OF TECHNOLOGY, SYDNEY

THE UNIVERSITY OF SYDNEY

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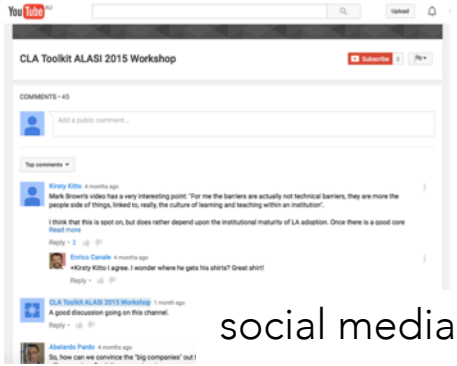
the connected learning analytics toolkit



social media

Learning
Record Store

scraping

xAPI

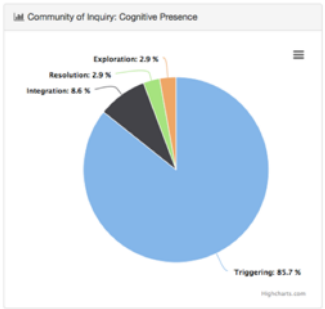
analysis

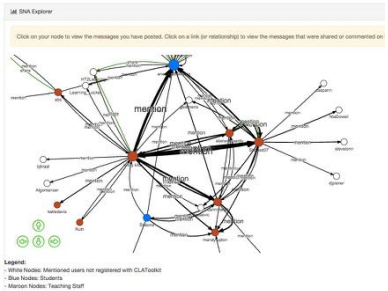
learning analytics

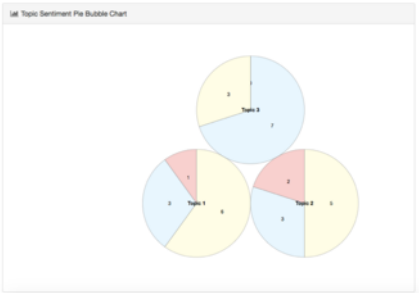
students

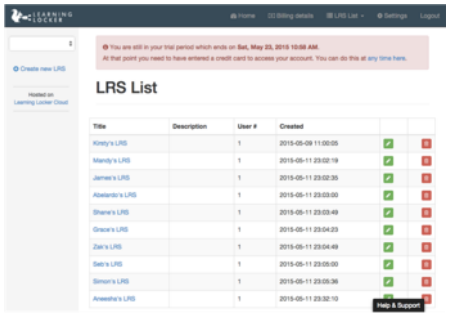
academics

admin & developers





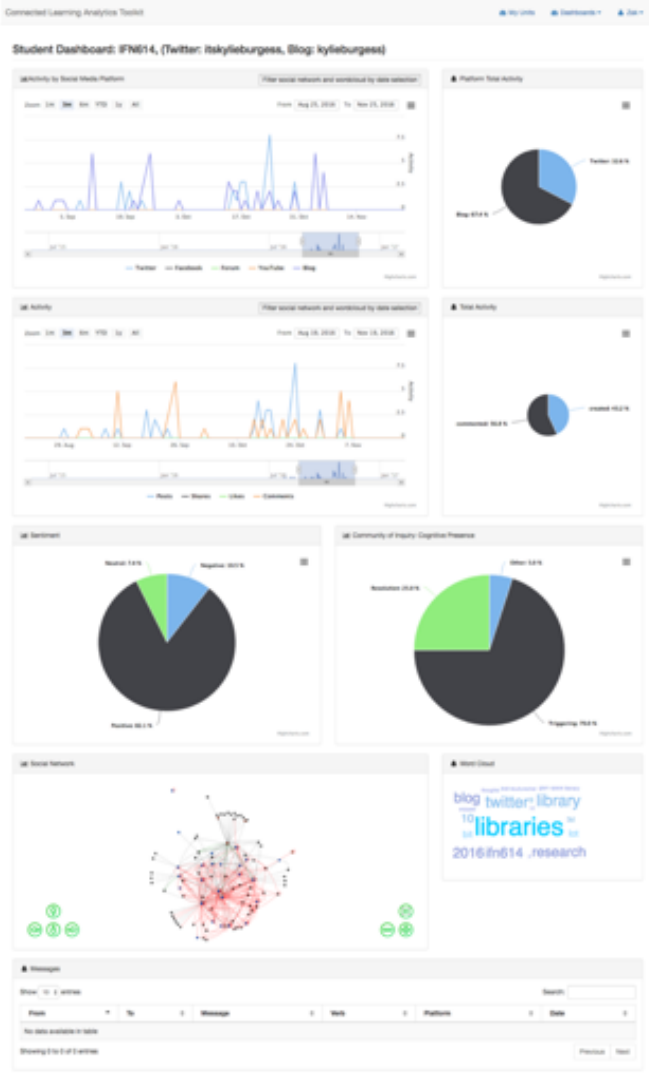


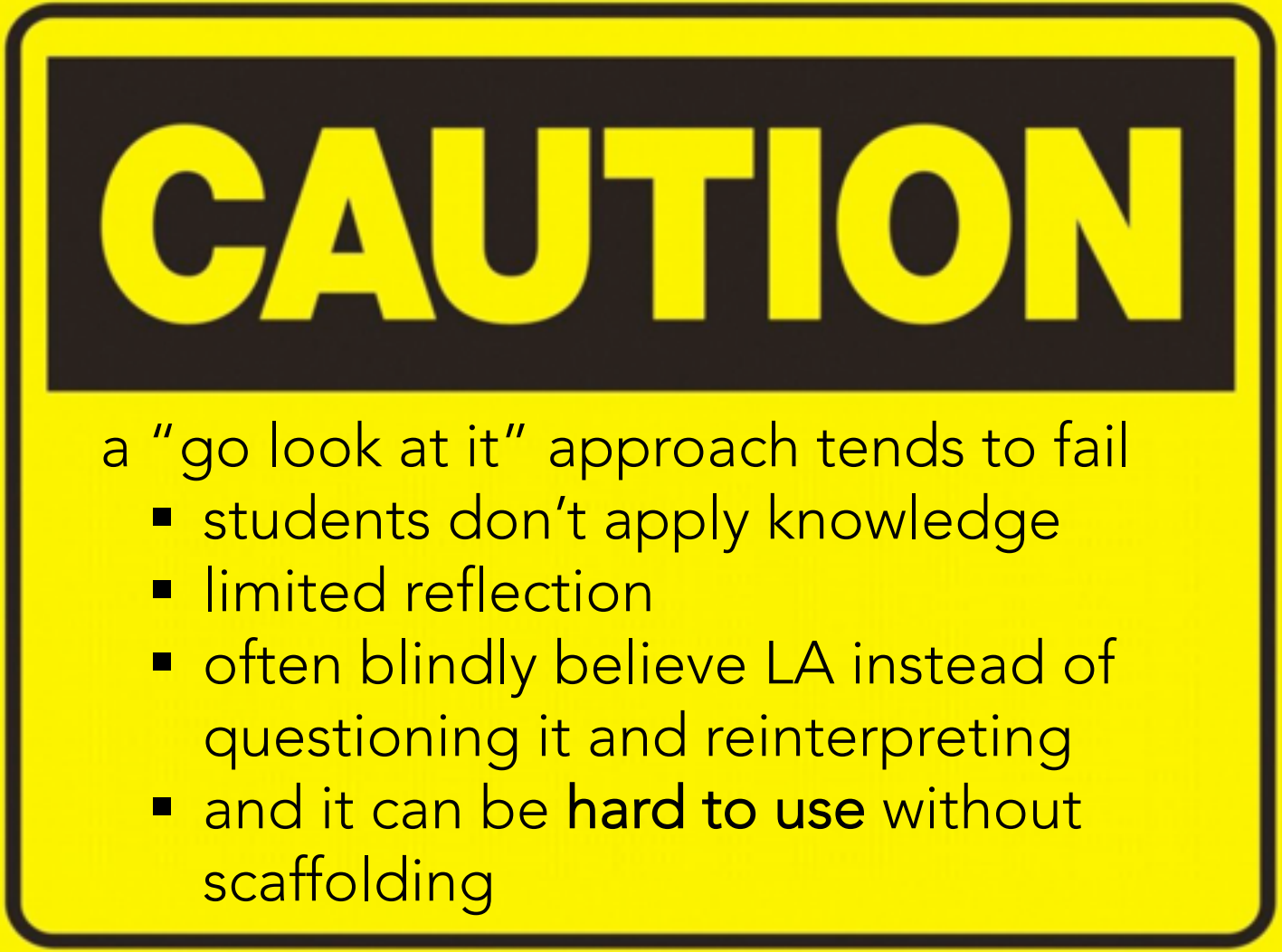


some details (CLA toolkit)

1. Has a philosophy of going to the students where they are actually learning (rather than expecting them to come to us)
2. Can currently access data from: wordpress blogs, twitter, youtube, facebook, trello, github, slack
3. Stores data in xAPI format (to ensure future interoperability)
4. Only retrieves data for specific learning activities and only if students sign up
5. And gives students access to their own analytics

Question: How can we give students access to rich LA that encourages metacognition and reflection?




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 without scaffolding

Learning designs for student facing LA

- authentic integration with assessment is necessary
- 3 learning design patterns are being used right now
  - do-analyse-change-reflect
  - active learning squared
  - Groupwork
- More will come in time! (Especially if you come to my workshop)

Kitto, K., Lupton, M., Davis, K., Waters, Z. (2017). Designing for Student Facing Learning Analytics, Australasian Journal of Educational Technology, 33(5), 152-168.

Kitto, K., Lupton, M., Davis, K., Waters, Z. (2016). Incorporating student-facing learning analytics into pedagogical practice. In S. Barker, S. Dawson, A. Pardo, & C. Colvin (Eds.), Show Me The Learning. Proceedings ASCILITE 2016 Adelaide, pp. 338-347.

do-analyse-change-reflect

Do: Students are instructed to participate in some sort of activity.

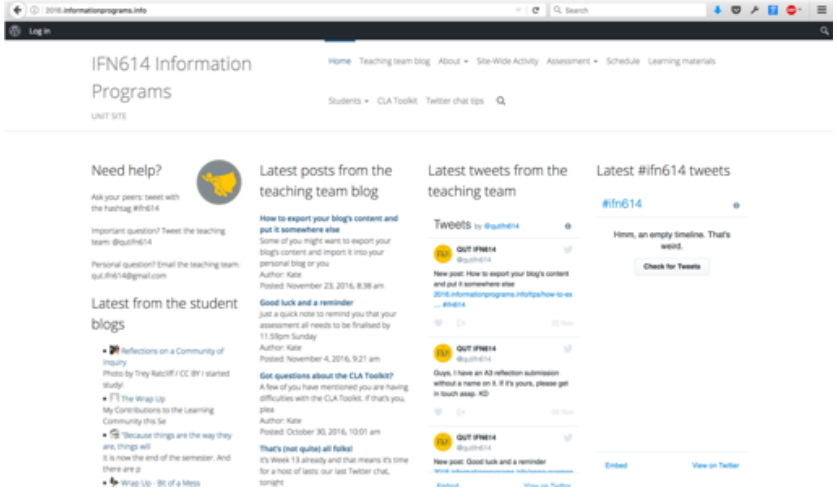
Analyse: Students are encouraged to consider LA dashboards that have data collected during the *do* phase.

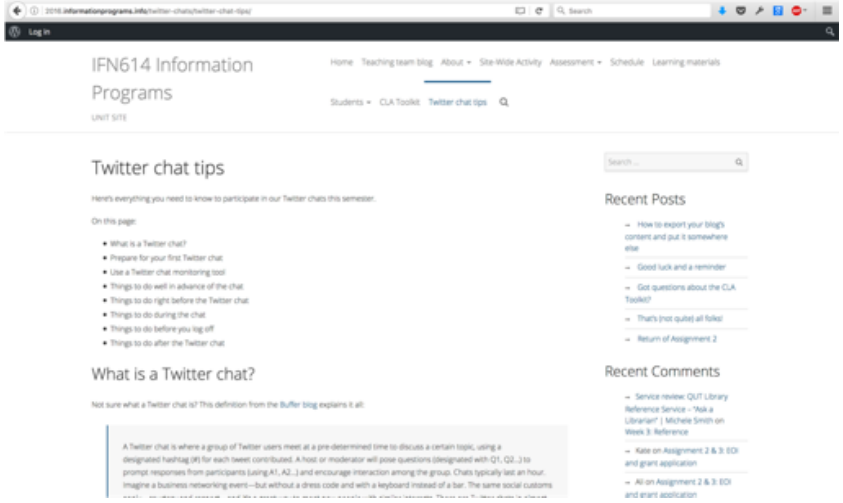
Change: Students encouraged to consider *changing* their behaviour as a result of the analytics that they see in the *analyse* phase.

Reflect: Students participate in a reflective process where they explain how they used the LA to make sense of their behaviour, and whether they decided to change as a result (and how).

does it work? … maybe

Unit	Semester	Aim/pattern	Linked to assessment	N=
IFN614 Information Programs	S2, 2015	Piquing students curiosity Examine, relabel classifier	No	S:12 AL:6
IAB260 Social Technologies	S1, 2016	Do-analyse-change-reflect	Yes	S:23 B:17
IFN614 Information Programs	S2, 2016	Do-analyse-change-reflect (predict, compare)	Yes	S:21 B:11





for example (Trial 3)

Do: blogging assignment was introduced in the first week of semester

Analyse: In week 2 students were introduced to the CoI model (Garrison et al., 2001) and were encouraged to sign up for the CLA toolkit (optional)

- a class provided an overview of the CoI model and the CLA toolkit
- 23/40 signed up (eventually)
- Students blogged about role and activity they were aiming for

Change: Students encouraged to think about how they were contributing to the community using data in the CLA toolkit dashboard and to change

Reflect: In week 14 students were required to critically evaluate their engagement with respect to their aims in week 2 (assessed!)

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

final blog post prompt for Trial 3

- What role did you want to play in the community this semester? Did you achieve that?
- How many comments did you make on your peers' posts
- Why did you comment as much as you did; what factors influenced the volume of your contributions?
- Did you need to modify your instinctive behaviour to engage the way you wanted to, or felt you should, engage?

Score	Level of analysis	N = 11
1	Included some /all graphs with no reference or analysis	1
2	Included some/all graphs, quantitative analysis relating activity to personality &/or interest	2
3	Included some/all graphs, quantitative analysis relating activity to personality &/or interest, basic analysis on activity in relation to week 2 aim	5
4	Included some/all graphs, referred back to week 2 aim, compared & contrasted, mentioned qualitative aspects	3

Out of 21 who signed up, 40 total!

A very strong reflection from most recent trial

In Week 2 I was very aspirational about the role I wanted to play; 'I would like my profile to be professional, respectful, organised, connected and visible. I aim to be an active participant within "reflection and critical discourse that is the core dynamic of a community of inquiry". I achieved my aim of being an active participant as I made over 75 comments on my peers' posts, averaging over 5 per week. **However I feel I did not participate fully in all 4 phases of the cognitive presence in the Practical [sic] Inquiry Model; triggering event, exploration, integration and resolution – despite having sentence openers taped next to my computer**! Triggering events and some exploration were met by sharing an interesting article relevant to a post I had read and also asking some questions, but I felt a lot of my posts were agreeing with and complimenting upon the erudite musings of my peers. I was definitely wary of confronting differing ideas and promoting a critical discourse. **This participation in all cognitive phases needs improving** so the sentence openers will remain up! [score=4]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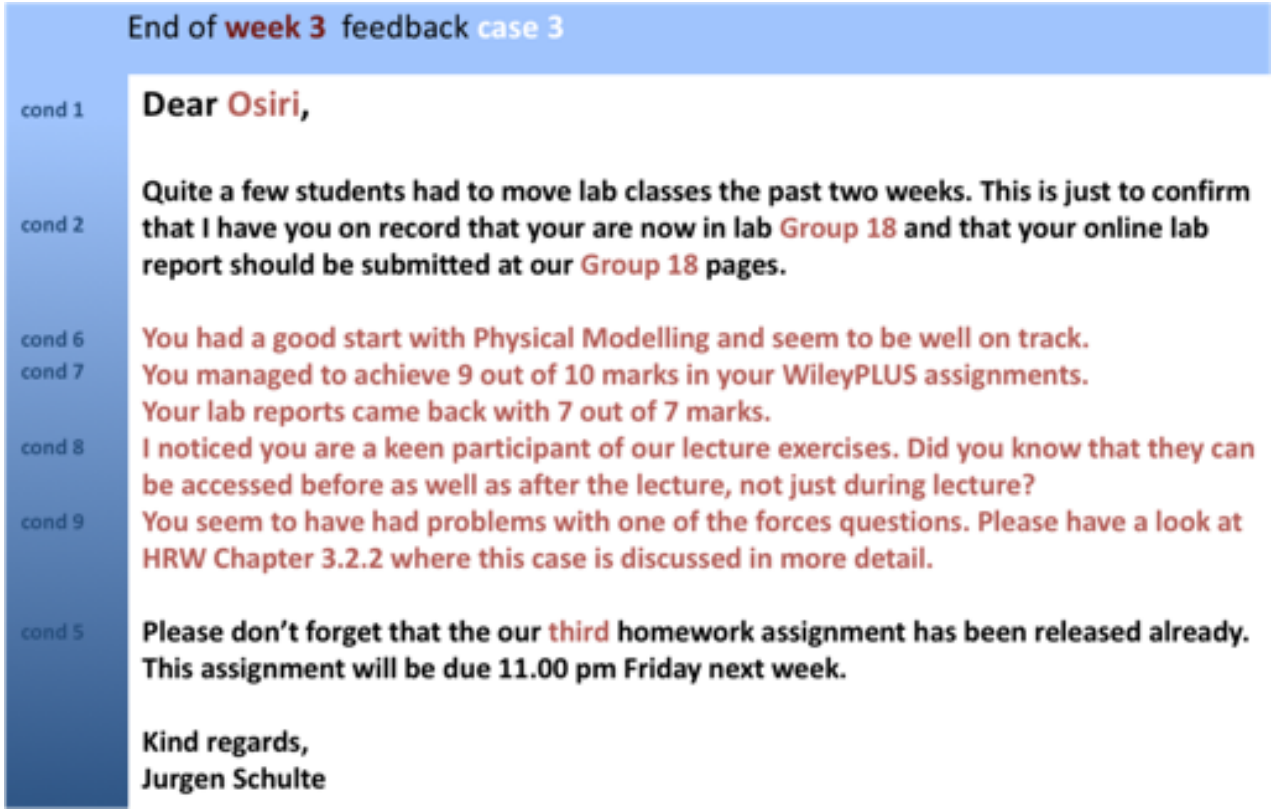
PERSONALISATION
IS NOT ABOUT
FIRST/LAST NAME.
IT'S ABOUT
RELEVANT
CONTENT.
Dan Jak
CATHERINEMONGINA
catherinemongina

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 your 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?

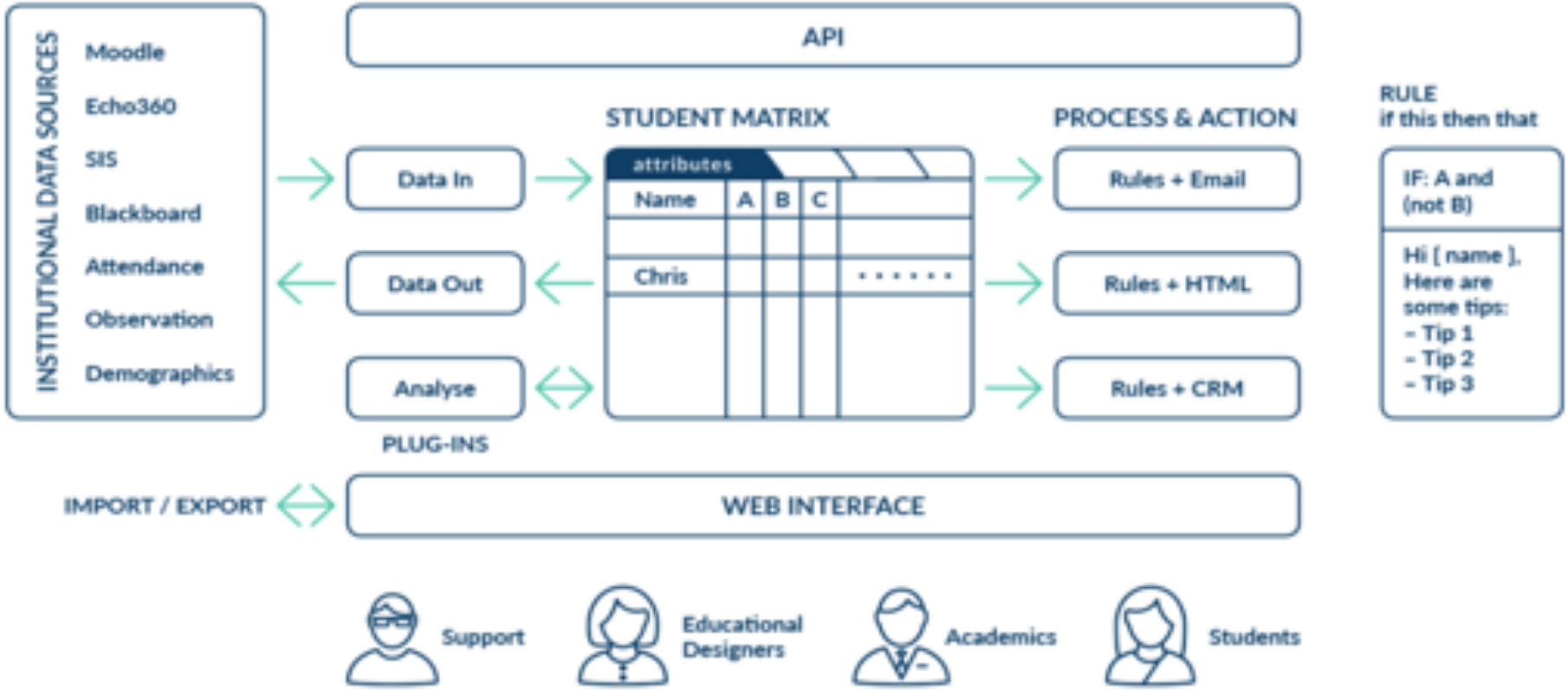
cond 9 You seem to have had problems with one of the forces questions. Please have a look at HRW Chapter 3.2.2 where this case is discussed in more detail.

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

to national funding…

Office for Learning & Teaching: http://OnTaskLearning.org




LAK 18
The 8th International
Learning Analytics & Knowledge Conference
SMC Conference & Function Centre, Sydney, NSW, Australia
March 5–9, 2018 #LAK18
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WELCOME TO LAK'18 – SYDNEY, AUSTRALIA
Welcome to the official web site for the 8th International Learning Analytics and Knowledge (LAK) Conference! This year's conference will be held at the SMC Conference & Function Centre in Sydney, Australia on March 5–9, 2018. The preparations for LAK18 are currently ongoing and we will be releasing information in the coming months.
Tweets
LAK18
Notifications for #lak18syd are now out. Register for early bird rates at latte-analytics.sydney.edu.au/conference-reg... before 9th January
Nov 23, 2017
LAK18 Retweeted
Rebecca Ferguson
If you would like to join the @lak18syd doctoral consortium, today is the deadline for applications
Nov 10, 2017

don't forget!

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Panel – solving a common problem

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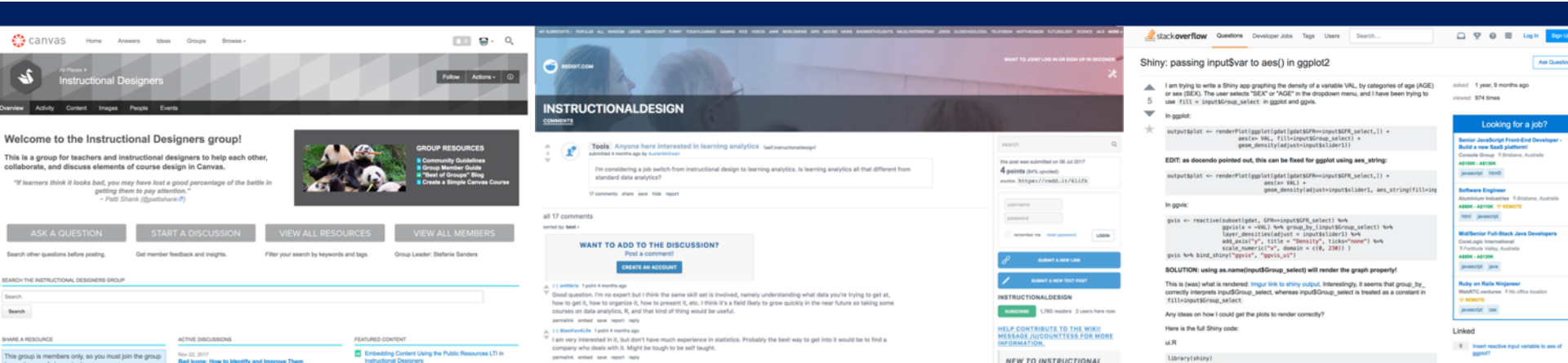
how can we improve discussion forums?

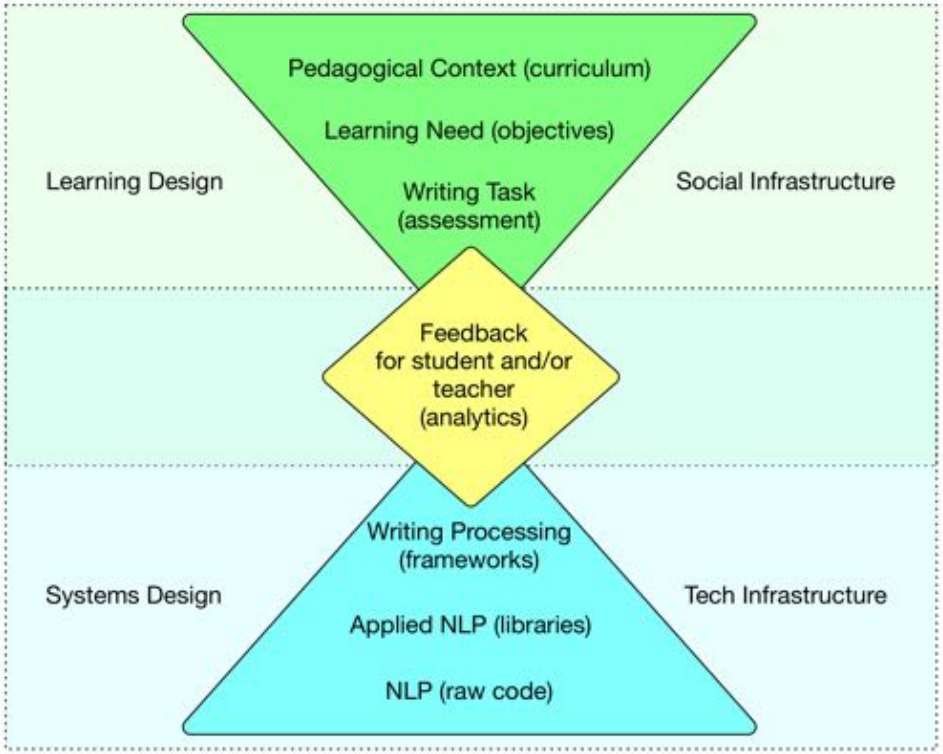
student discussion forums often lapse into naï□ve arguments or banal commentary…

how can we encourage students to develop their communication skills in this online format?



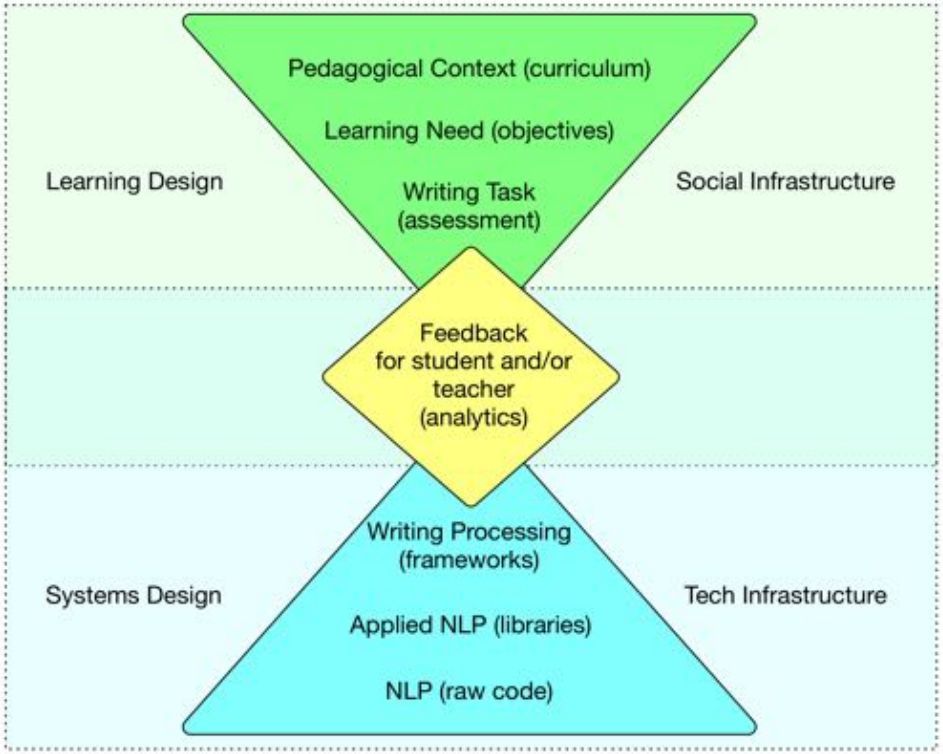
The Writing Analytics Approach

- View the issue not as solely an analytics problem
- Joint pedagogic and computational approach
- Socio-technical solution



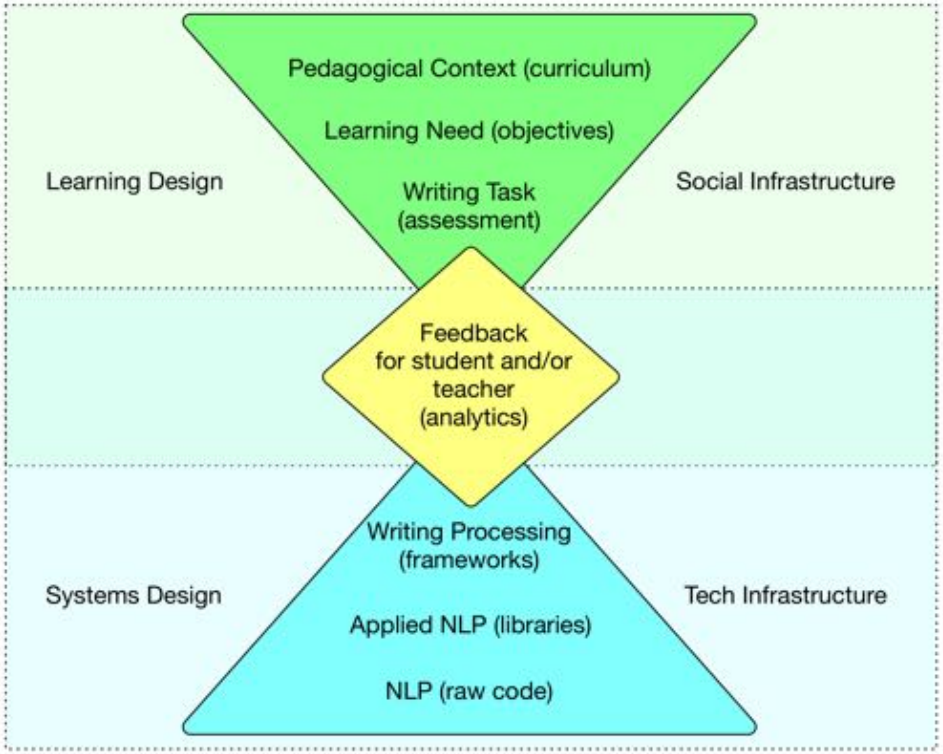
Formative feedback – learning value

- Providing individual feedback to each contributor on their discourse
- The extent to which desirable language is used
- The extent to which undesirable language is not used



What to look for?

- simplistic or throw-away statements
- me-too statements
- Conflict
- Agreement
- statements describing problems
- statements positing solutions
- identifications of self change



An example…

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 feeling 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					

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AWA Feedback | TAP Output

General feedback on your writing:

- Your document does not appear to have a good balance of the key sentence level features that AWA expects to find in reflective writing. These are represented as coloured icons located at the beginning of sentences. In reflective writing, AWA does not expect to have very few of one type of sentence feature together with a large quantity of another. Check this against your assessment rubric or with one of your subject tutors as you may be missing a key element of good reflective writing.
- Your document appears to have a number of words that AWA does not recognise. Try using word processing software to locate the specific mistakes, correct your document, and try submitting it again to AWA.

JIM's Business communications reflection

Effective dialogue is essential not only in an organisational environment, but within my day-to-day lifes. Communication starts with the self. ● **By becoming aware of my learned cultural viewpoints and limitations, I can ascertain how to overcome them.** ▲ **I must understand my own biases, why I have them, and how this impacts my environment and the way I collectively work.** ● The reflective essay has illustrated disconnects between the communication theories I learned and wrote about in assignment one and the group dynamics, communication culture and my own personal limitations and dialogue flaws within the group essay development. ● **Not only have the theories informed my educational development, but also the issues discovered during the group case study have informed my professional environment.** There are many obstacles to becoming an effective and authentic communicator in the 21st century including time and physical locations, yet through self-reflection & personal knowledge of my limitations & bias, I am able to navigate obstacles in order to pursue authentic dialogue.

The group assignment was an important project to not only collectively formulate a communication case study

Feedback


active learning squared

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

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

current state of the art uses machine learning to classify discussion forum text using this construct

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 looked at 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 CoI Metrix and LIWC features, together with a set of custom features developed to capture discussion content, we developed a random forest classification system that achieved 70.3% 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 insights 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

LAK '16, April 25 - 29, 2016, Edinburgh, United Kingdom

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DOI: http://dx.doi.org/10.1145/2883851.2883950

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, 23] 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, 34, 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 contexts of their use"*[p18]. In the case of the study presented in this paper, contexts 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.

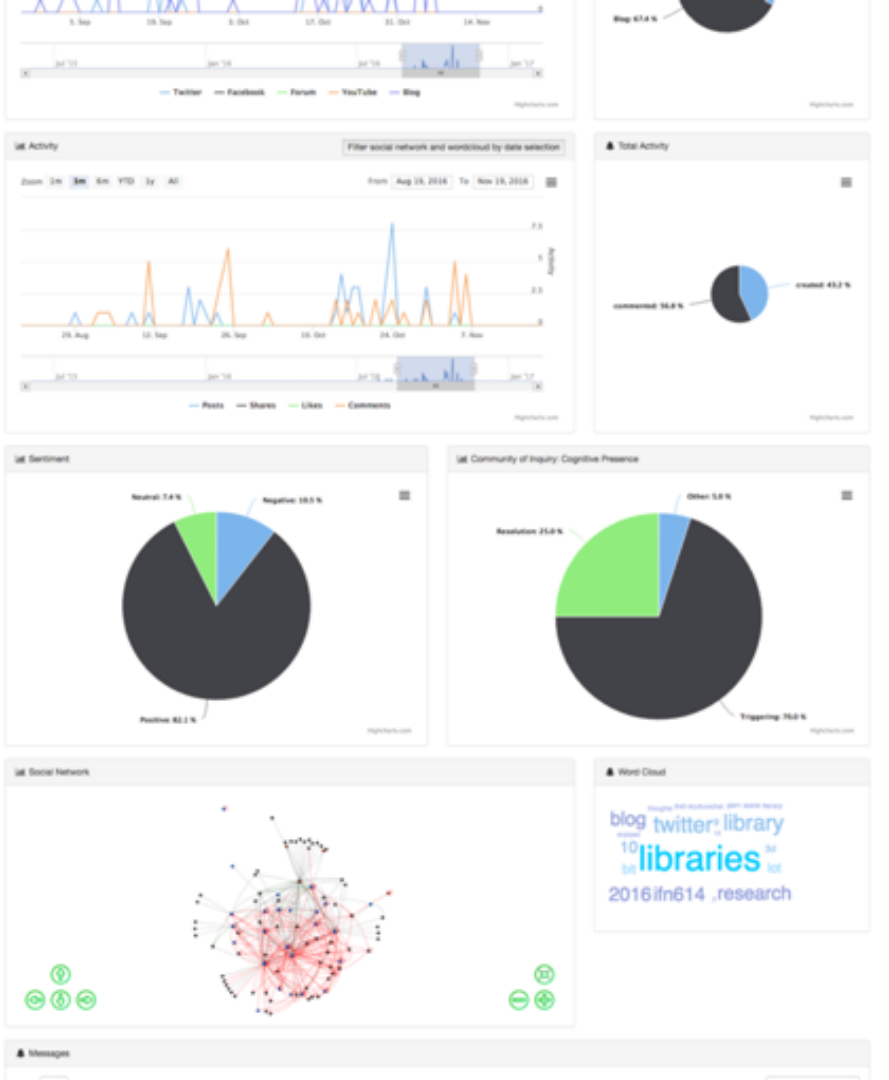
In the domain of educational research, QCA of student discussion data have been mainly used for the retrospection and research after the courses are over without an impact on the courses' learning outcomes [53]. In the field of content analytics [38] – which focuses on building analytical models based 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 McKlin [44] and Corich et al. [11] on automation of the CoI coding schemes, which served

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.

but contextuality…

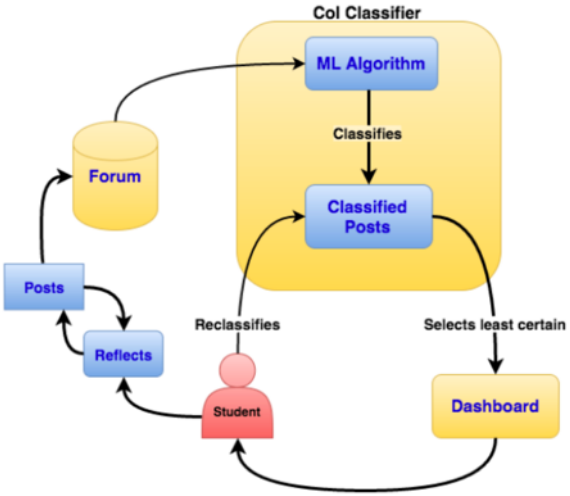
- training data sets are rarely shared in education
- and cohorts change – a lot!
- the CoI report uses (not very) accurate Machine Learning
- need to be able to rapidly train classifiers for new cohorts

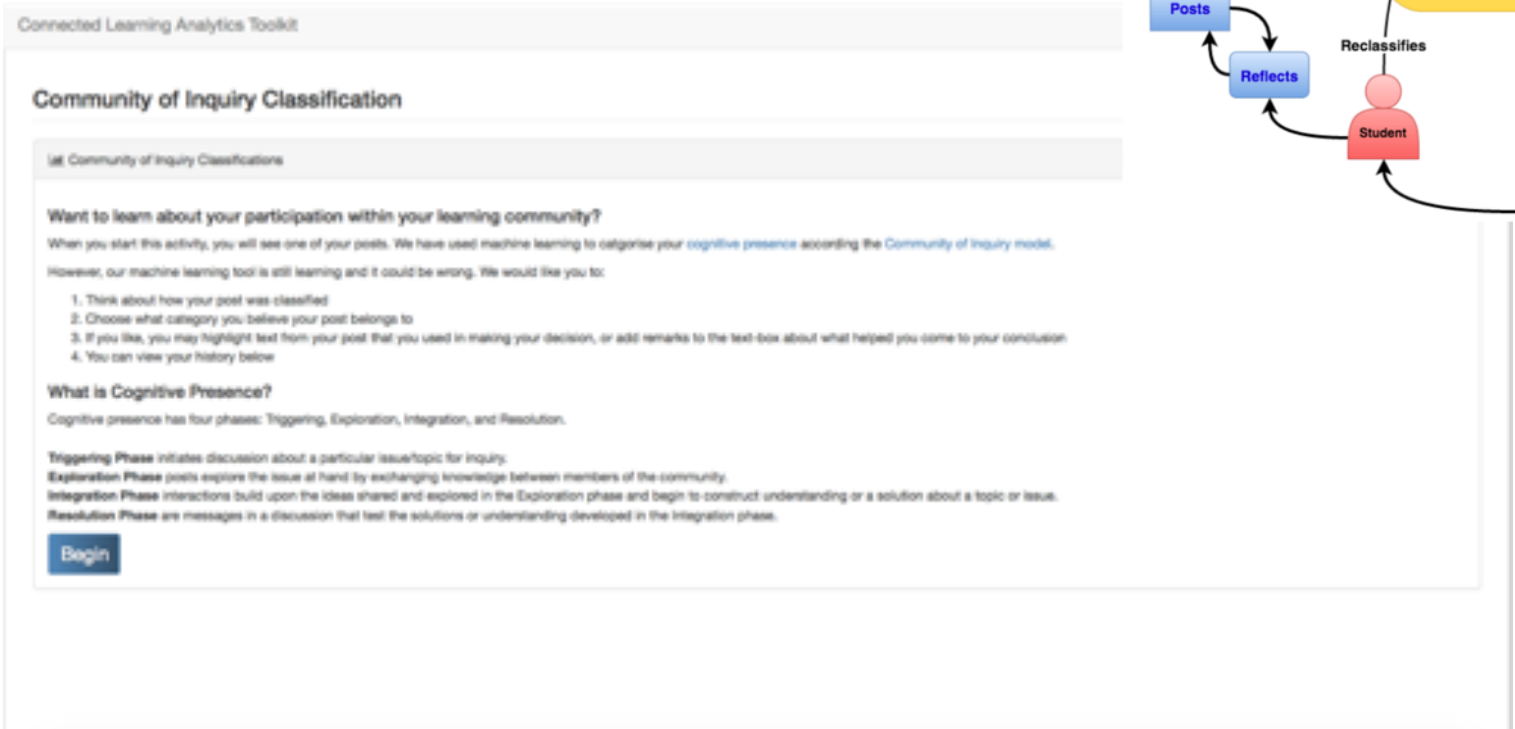
- does this provide a new teachable moment?



Active Learning Squared

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





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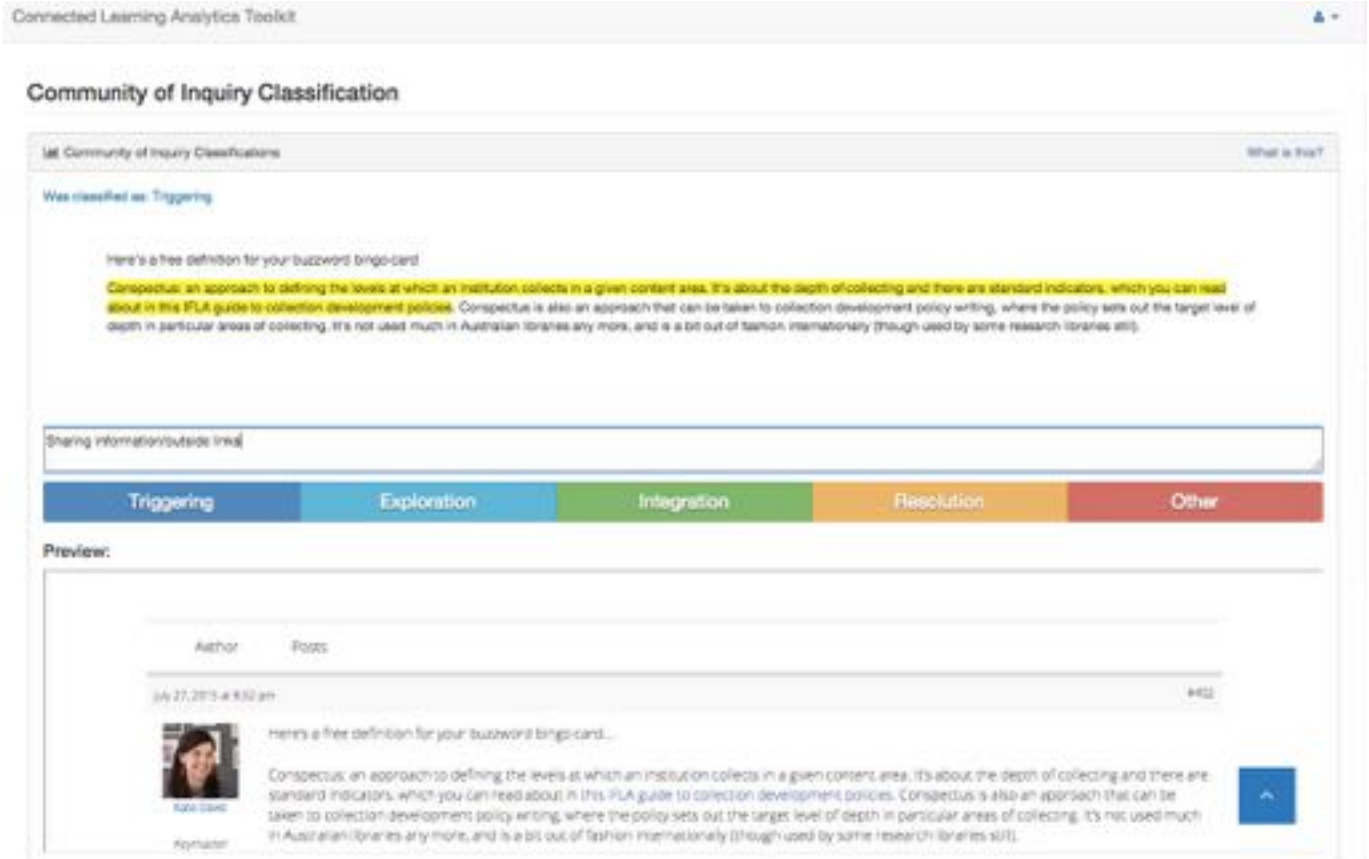


Does it work?

	posts	class	agree	ToTut	ToClas	%ToM
A	8	8	0.125	1:56	3:18	0:28
B	10	10	0.333	0:58	0:55	0:06
C	7	5	0.200	2:06	2:07	0:32
D	19	19	0.181	1:47	4:06	0:12
E	4	4	0	1:22	0:49	0:16
F	18	18	0.050	5:12	4:42	0:17
Av	11	10.67	0.143	2:13	2:40	0:19

Table 3: Key performance indicators for each IS student attempting the AL^2 task.

	IRR (κ)	IRR (%)	EC-UnSM	EC-SM	NB
IS dataset	0.09	43.0	0.473	0.305	0.302
ALASI15	0.3	47.4	0.342	0.368	0.078

Table 1: Accuracy of the three different classifiers investigated in this work for the IS and ALASI15 datasets. IRR between the two expert coders is also given, both as a kappa value (κ) and as an percentage of agreement (%) for the two datasets.

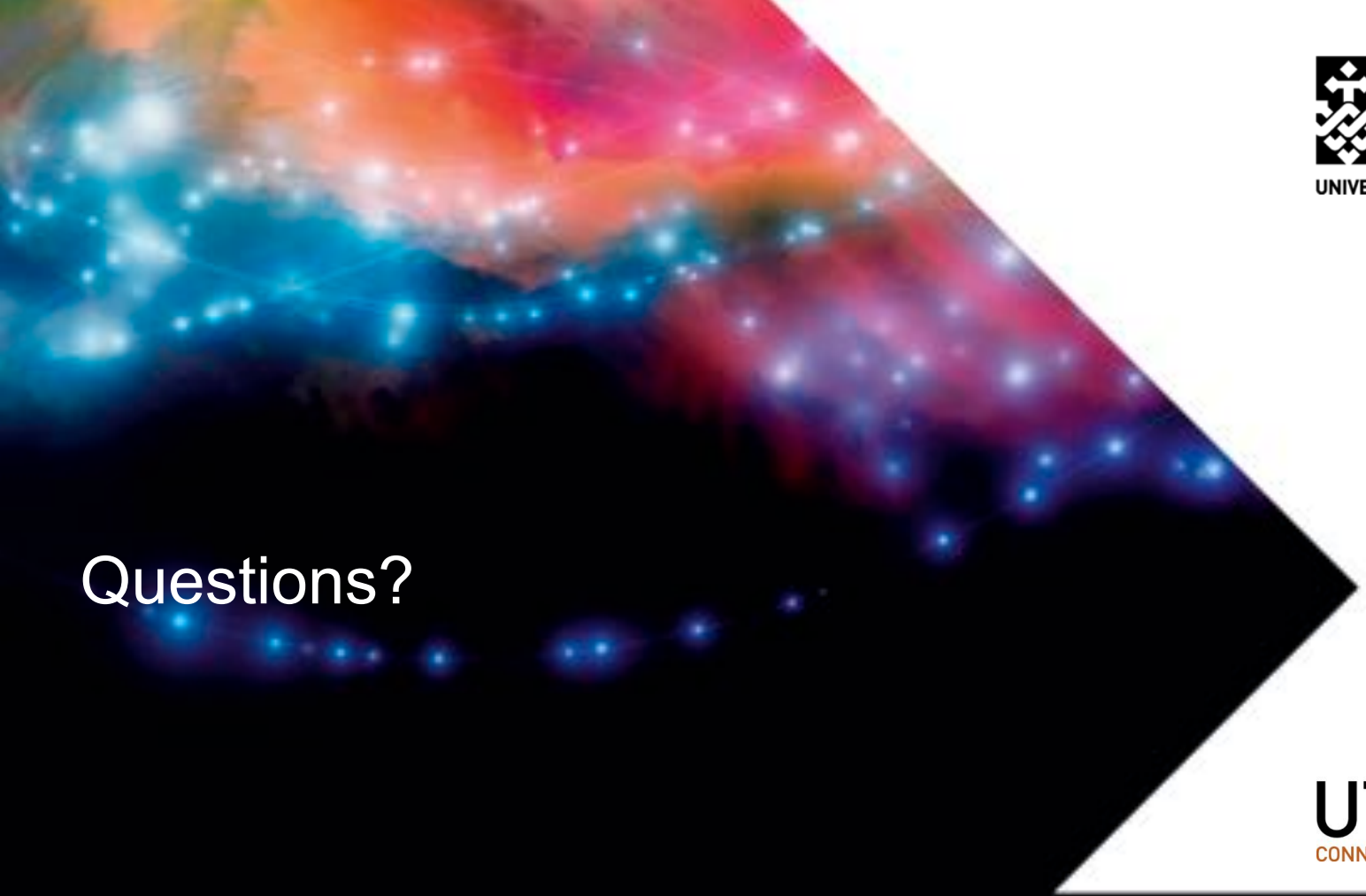
	class	agree	ToTut	ToClas	%ToM
A	13	0.153	0:20	3:56	0:18
B	10	0.400	2:31	2:10	0:13
C	13	0.428	3:44	8:35	0:40
D	10	0.500	0:45	2:07	0:13
E	8	0.375	3:47	2:04	0:16
F	3	0.333	0:29	0:19	0:17
G	35	0.114	3:04	5:02	0:09
H	2	0	1:26	0:45	0:45
I	12	0.333	5:01	5:43	0:29
J	8	0.250	6:36	3:40	0:28
K	19	0.450	3:08	7:02	0:22
L	6	0.167	0:21	2:17	0:46
M	7	0.142	1:55	4:59	0:43
N	27	0.259	1:31	9:38	0:21
O	35	0.228	1:51	2:58	0:05
P	15	0.400	0:20	5:12	0:21
Q	6	0.333	4:22	5:22	0:54
R	27	0.222	0:35	11:38	0:39
S	1	0	5:10	0:00	0:00
T	7	0	3:47	5:58	0:51
Av	12.61	0.254	2:32s	4:28	0:25

Table 4: Key performance indicators for each ALASI15 participant attempting the AL^2 task.

only Trial 1?
why did it not run with Trial 3?

- it did
- no students used it
- no link to assessment
  (made the go look at it mistake again)

watch this space ;)



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Questions?

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