Student facing learning analytics

Kirsty Kitto
Connected Intelligence Centre
@KirstyKitto • kirsty.kitto@uts.edu.au
do you really have all the data?
who gets LA at your institution?
who gets LA at your institution?
we should give students access to rich LA

In principle this should help to promote:
- learning to learn more effectively
- metacognition and reflection
- interpretation and sensemaking
- data literacy

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

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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
the connected learning analytics toolkit

Learning Record Store

scraping → xAPI → analysis

social media

students

academics

learning analytics

admin & developers
data interoperability is essential in this project

https://www.adlnet.gov/xAPI
and will be essential for lifelong learning

Learning Record Store excerpt
14/6/2017:2202: Learner 133673 clicked http://w..
14/6/2017:2203: Learner 133673 tweeted “just fini..
14/6/2017:2203: Learner 133673 downloaded “fund
14/6/2017:2215: Learner 133673 completed surve
15/6/2017:1134: Learner 133673 completed Data
16/6/2017:1456: Learner 133673 clicked http://w..
16/6/2017:1806: Learner 133673 helped Learner 2
16/6/2017:2202: Learner 133673 clicked http://w..
16/6/2017:2235: Learner 133673 posted “why do ..
16/6/2017:2245: Learner 133673 thanked Learne
16/6/2017:2250: Learner 133673 opened UTS On
16/6/2017:2349: Learner 133673 completed UTS..
17/6/2017:0013: Learner 133673 clicked http://w..
17/6/2017:0033: Learner 133673 clicked http://w..
17/6/2017:1001: Learner 133673 attended class.

Constructs
- mindful
- reasoning
- agency
- Info seeking
- helpseeking

Creativity
1. 
2. 
3. 

Personal Learning Record Store (PLRS)
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
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?
groupwork dashboard
go try it!

A simple learning activity is available on Trello: goo.gl/2hE1JL

Make sure you follow the instructions!
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
linking LA with LD

- authentic integration with assessment is necessary
- student facing LA great for formative scenarios
- 3 learning design patterns are being used to do this
  - do-analyse-change-reflect
  - active learning squared
  - groupwork

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

Does it work? … maybe
Does it work? … maybe

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!)

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?

<table>
<thead>
<tr>
<th>Score</th>
<th>Level of analysis</th>
<th>N = 11</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Included some/all graphs with no reference or analysis</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Included some/all graphs, quantitative analysis relating activity to personality &amp;/or interest</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Included some/all graphs, quantitative analysis relating activity to personality &amp;/or interest, basic analysis on activity in relation to week 2 aim</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Included some/all graphs, referred back to week 2 aim, compared &amp; contrasted, mentioned qualitative aspects</td>
<td>3</td>
</tr>
</tbody>
</table>
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]
Here lies the issue...

- Even that (very strong) post failed to challenge the analytics
- This is highly problematic!
  - The CoI report uses (not very) accurate Machine Learning
  - Students were constantly told that it might not be correct and to challenge it
  - But they effectively forgot about this in their final blog post
  - The black box society is looming
Active Learning Squared

The student trains the classifier while it is training the student...
Active Learning Squared
Does it work?

<table>
<thead>
<tr>
<th>posts</th>
<th>class</th>
<th>agree</th>
<th>ToTut</th>
<th>ToClas</th>
<th>%ToM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8</td>
<td>8</td>
<td>0.125</td>
<td>1:56</td>
<td>3:18</td>
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<tr>
<td>B</td>
<td>10</td>
<td>10</td>
<td>0.333</td>
<td>0.58</td>
<td>0.55</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>5</td>
<td>0.200</td>
<td>2:06</td>
<td>2:07</td>
</tr>
<tr>
<td>D</td>
<td>19</td>
<td>19</td>
<td>0.181</td>
<td>1:47</td>
<td>4:06</td>
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<tr>
<td>E</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>1:22</td>
<td>0:49</td>
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<tr>
<td>F</td>
<td>18</td>
<td>18</td>
<td>0.050</td>
<td>5:12</td>
<td>4:42</td>
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<tr>
<td>Av</td>
<td>11</td>
<td>10.67</td>
<td>0.143</td>
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<td>2:40</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>class</th>
<th>agree</th>
<th>ToTut</th>
<th>ToClas</th>
<th>%ToM</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.153</td>
<td>0:20</td>
<td>3:56</td>
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<tr>
<td>B</td>
<td>10</td>
<td>0.400</td>
<td>2:31</td>
<td>2:10</td>
</tr>
<tr>
<td>C</td>
<td>13</td>
<td>0.428</td>
<td>3:44</td>
<td>8:35</td>
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<tr>
<td>D</td>
<td>10</td>
<td>0.500</td>
<td>0:45</td>
<td>2:07</td>
</tr>
<tr>
<td>E</td>
<td>8</td>
<td>0.375</td>
<td>3:47</td>
<td>2:04</td>
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<tr>
<td>F</td>
<td>3</td>
<td>0.333</td>
<td>0:29</td>
<td>0:19</td>
</tr>
<tr>
<td>G</td>
<td>35</td>
<td>0.114</td>
<td>3:04</td>
<td>5:02</td>
</tr>
<tr>
<td>H</td>
<td>2</td>
<td>0</td>
<td>1:26</td>
<td>0:45</td>
</tr>
<tr>
<td>I</td>
<td>12</td>
<td>0.333</td>
<td>5:01</td>
<td>5:43</td>
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<tr>
<td>J</td>
<td>8</td>
<td>0.250</td>
<td>6:36</td>
<td>3:40</td>
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<tr>
<td>K</td>
<td>19</td>
<td>0.450</td>
<td>3:08</td>
<td>7:02</td>
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<tr>
<td>L</td>
<td>6</td>
<td>0.167</td>
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<td>0.142</td>
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<tr>
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<td>0.259</td>
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<td>O</td>
<td>35</td>
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<td>P</td>
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<td>Q</td>
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<tr>
<td>R</td>
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<td>0.222</td>
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<tr>
<td>S</td>
<td>1</td>
<td>0</td>
<td>5:10</td>
<td>0:00</td>
</tr>
<tr>
<td>T</td>
<td>7</td>
<td>0</td>
<td>3:47</td>
<td>5:58</td>
</tr>
<tr>
<td>Av</td>
<td>12.61</td>
<td>0.254</td>
<td>2:32s</td>
<td>4:28</td>
</tr>
</tbody>
</table>

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 ($\kappa$) and as an percentage of agreement ($) for the two datasets.

<table>
<thead>
<tr>
<th>IRR ($\kappa$)</th>
<th>IRR (%)</th>
<th>EC-UnSM</th>
<th>EC-SM</th>
<th>NB</th>
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<tbody>
<tr>
<td>IS dataset</td>
<td>0.09</td>
<td>43.0</td>
<td>0.473</td>
<td>0.305</td>
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<tr>
<td>ALASI15</td>
<td>0.3</td>
<td>47.4</td>
<td>0.342</td>
<td>0.368</td>
</tr>
</tbody>
</table>

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
- Why not?
- No link to assessment (made the go look at it mistake again)
so what have we learned?

1. Sometimes the *last* thing you need is a better dashboard…
2. Thoughtful learning design and integration with assessment structure is essential
3. Teaching students to challenge the analytics that will be applied to them will become increasingly important

thankyou!