Collect, Analyze, Act, Reflect: A framework for using learning analytics in teaching and learning design

Workshop

Adapted from ‘Building an evidence base for learning design through learning analytics’ workshop resource
Claire Donald, Cathy Gunn & Marion Blumenstein, CLeaR, The University of Auckland 2016

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Workshop outline

Data about learners and learning have always been valuable to teachers. Recent advances in learning technology have made data more accessible, but in some ways more complex to work with.

This workshop offers a simple framework to align the use of different types of data with the normal rhythms of teaching; i.e. planning / preparation, during teaching, and after a course ends. You are invited to review the framework and scenarios describing tertiary teachers’ use of learning analytics data for various purposes, and how they relate to your own teaching or learning design practice.

You can then use the framework to generate a learning analytics Action Plan with a set of questions, data collection points and analysis strategies, and milestones for action and reflection.

Learning analytics: ‘the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs’. ¹

Learning analytics scenarios

There are many uses for learning analytics in higher education. Four common ones are:

• To monitor student engagement
• To measure student achievement
• To improve student retention
• To inform course/activity design

The scenarios used in this workshop focus on the first two; i.e. on ways teachers can use learning analytics data to:

• Identify and support students who are not engaging, and
• Increase teachers’ understanding of student learning to boost achievement.

These scenarios have implications for student retention and course design, and are derived from case studies of emergent learning analytics practice in higher education.

¹ The Society of Learning Analytics Research (SoLAR).

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## Learning analytics sample scenarios

<table>
<thead>
<tr>
<th>Aim</th>
<th>Identify and support students at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>Learners struggle with course demands and drop out in the 1st year</td>
</tr>
<tr>
<td>Strategy</td>
<td>Monitor presence and progress online to identify students at risk</td>
</tr>
<tr>
<td>Data sources</td>
<td>LMS data plus qualitative feedback</td>
</tr>
<tr>
<td>Actionable insights</td>
<td>If students don’t log in, complete an early assignment or achieve a minimum level of performance, contact them to investigate the cause, e.g. by email or through teachers or student mentors.</td>
</tr>
<tr>
<td>Design implications</td>
<td>Set milestones early in a course so absence is visible</td>
</tr>
<tr>
<td>Caveats</td>
<td>Interpret data with caution – e.g. absence may not indicate risk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aim</th>
<th>Reveal student misconceptions and knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>High school passes build false confidence in subjects where rote learning and common misconceptions lead to failure later on</td>
</tr>
<tr>
<td>Strategy</td>
<td>Design early quizzes to find out what students know and expose misconceptions at the start of a course</td>
</tr>
<tr>
<td>Data sources</td>
<td>LMS or system data including a breakdown of correct and incorrect quiz responses, time on task, number of attempts and use of hints plus qualitative data (student feedback) to explain the trends</td>
</tr>
<tr>
<td>Actionable insights</td>
<td>Discuss outcomes with students, focus teaching on what they need to know, provide guidance towards effective study habits</td>
</tr>
<tr>
<td>Design implications</td>
<td>Include a carefully designed pre course or early weeks quiz and offer online tutorials to revisit content previously covered</td>
</tr>
<tr>
<td>Caveats</td>
<td>Analytics data shows trends but qualitative data is required to explain them</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aim</th>
<th>Analyze student free text responses to expose learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>Individual interactions between teachers and students are limited by class size so learning progress is difficult to monitor</td>
</tr>
<tr>
<td>Strategy</td>
<td>Analyze students’ written answers to understand their learning and trace it back to source in teaching materials</td>
</tr>
<tr>
<td>Data sources</td>
<td>Students’ written answers to questions about course concepts</td>
</tr>
<tr>
<td>Actionable insights</td>
<td>Levels of understanding are revealed in answers, which are analyzed for quality, completeness and relation to teaching materials. Teaching can be re-designed to reflect student needs</td>
</tr>
<tr>
<td>Design implications</td>
<td>Course materials can be (re) designed to promote effective learning</td>
</tr>
<tr>
<td>Caveats</td>
<td>Analysis tools and techniques can be complex for teachers</td>
</tr>
</tbody>
</table>

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Learning Analytics (LA) Action Plan

**Goal:** Generate a learning analytics action plan for an aspect of your teaching, with a set of **questions**, data collection and analysis **strategies**, and **plans** for action and reflection.

**Questions** that learning analytics may help answer:

1. What questions about your teaching or students’ learning do you think learning analytics data might help to answer?

   **Question/s:**

2. What do you already know about the situation / issue? What data / information do you already have?

   **Existing information:**

3. What do you want to achieve / do / change by using learning analytics?

   **Aim or objective:**

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4. In which of your courses or teaching activities do you want to use learning analytics?

5. Which of these broad areas do you want to investigate using LA?

- Student engagement
- Student achievement
- Student retention
- Course / activity design
- Students at risk
- Student use of resources
- Predicting student achievement
- Other - describe

6. What data / information do you already have or use, and what else do you need?

Additional data / information required:

7. How does the availability of the data you have identified align with the three phases of the LA-LD framework? Add this to the diagrams below.
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8. Is it easy for you to access the data you require?  Yes / No
   If no, what can you do, e.g. modify the design; identify who can help to access / work with data?

Add comments:
9. What must happen next, to generate actionable insights from the data?

Add comments:

10. Reflect on the plan and any additional factors that may be required for implementation, e.g. collaborate with people from different areas, new skills to learn or tools to acquire.

Add comments:
Construct a scenario for using Learning Analytics in your teaching

<table>
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<th>Course</th>
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<tbody>
<tr>
<td>Problem / Goal</td>
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<tr>
<td>Strategy</td>
<td></td>
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<tr>
<td>Data sources</td>
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<tr>
<td>Insights / action</td>
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Selected references on learning analytics and learning design


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