Learning analytics at the Open University and the UK: reviewing 6 years of implementation at scale

Webinar 11 June 2020
Figure 7: Learning Analytics Affiliation by County - ALL

Table 15: Learning Analytics Leading Author Profile

<table>
<thead>
<tr>
<th>Author / Institution Country</th>
<th>Cited</th>
<th>%</th>
<th>H</th>
<th>Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draschler, Hendrick NLD-The Open University</td>
<td>40</td>
<td>1.5</td>
<td>28</td>
<td>Educational Technologies, Learning Analytics, Recommender Systems, Medical Education, Self-Regulated Learning</td>
</tr>
<tr>
<td>Dawson, Shane U of South Australia</td>
<td>33</td>
<td>1.2</td>
<td>35</td>
<td>Learning Analytics, Social Network Analysis, Technology Enhanced Learning, Learning Design Education</td>
</tr>
<tr>
<td>Rientes, Bart GBR The Open University</td>
<td>32</td>
<td>1.2</td>
<td>27</td>
<td>Learning Analytics, Learning Design, Social Network Analysis, Computer-Supported Collaborative Learning</td>
</tr>
<tr>
<td>Kinshuk USA U of North Texas</td>
<td>31</td>
<td>1.1</td>
<td>46</td>
<td>Online learning, Mobile learning, Ubiquitous Learning, Cognitive Profiling, Adaptivity Information</td>
</tr>
<tr>
<td>Kloos, Carlos D ESP U of Carlos III Madrid</td>
<td>31</td>
<td>1.1</td>
<td>35</td>
<td>Digital Education, Technology-enhanced Learning, Educational Technology, MOOCs, eLearning</td>
</tr>
<tr>
<td>Munz-Merino, Pedro ESP U of Carlos III Madrid</td>
<td>31</td>
<td>1.1</td>
<td>21</td>
<td>Educational Data Mining, Learning Analytics, Gamification, Educational Technology</td>
</tr>
<tr>
<td>Gasevic, Dragan AUS Monash University</td>
<td>30</td>
<td>1.1</td>
<td>51</td>
<td>Learning Analytics, Self-regulated learning, Technology, Enhanced Learning, Collaborative Learning, Learning Technologies</td>
</tr>
<tr>
<td>Ebner, Martin AUT Graz University</td>
<td>28</td>
<td>1.0</td>
<td>35</td>
<td>E-learning, Open Educational Resources, Learning Analytics MOOC TEL</td>
</tr>
<tr>
<td>Ferguson, Rebecca GBR The Open University</td>
<td>28</td>
<td>1.0</td>
<td>24</td>
<td>Education, Learning Analytics, MOOCs, Distance Learning, Online learning</td>
</tr>
<tr>
<td>Verbert, Katrien BEL KU Leuven</td>
<td>26</td>
<td>1.0</td>
<td>31</td>
<td>HCI, Visualization user interfaces for recommender systems, Technology Enhanced Learning, Digital Humanities</td>
</tr>
<tr>
<td>Scheffel, Maren UK The Open University</td>
<td>25</td>
<td>1.0</td>
<td>14</td>
<td>Learning Analytics, Evaluation Self-Regulated Learning, Learning Design</td>
</tr>
<tr>
<td>Ogata, Hiroki JPN Kyoto University</td>
<td>24</td>
<td>.9</td>
<td>30</td>
<td>Educational Data Science, Learning Analytics, Mobile and Ubiquitous Learning</td>
</tr>
</tbody>
</table>

“In the UK the Open University (OU) is a world leader in the collection, intelligent analysis and use of large scale student analytics. It provides academic staff with systematic and high quality actionable analytics for student, academic and institutional benefit (Rienties, Nguyen, Holmes, Reedy, 2017). Rienties and Toetenel's, 2016 study (Rienties & Toetenel, 2016) identifies the importance of the linkage between LA outcomes, student satisfaction, retention and module learning design. These analytics are often provided through dashboards tailored for each of academics and students (Schwendimann et al., 2017).

The OU’s world-class Analytics4Action initiative (Rienties, Boroowa, Cross, Farrington-Flint et al., 2016) supports the university-wide approach to LA. In particular, the initiative provided valuable insights into the identification of students and modules where interventions would be beneficial, analysing over 90 large-scale modules over a two-year period...

The deployment of LA establishes the need and opportunity for student and module interventions (Clow, 2012). The study concludes that the faster the feedback loop to students, the more effective the outcomes. This is often an iterative process allowing institutions to understand and address systematic issues.

Legal, ethical and moral considerations in the deployment of LA and interventions are key challenges to institutions. They include informed consent, transparency to students, the right to challenge the accuracy of data and resulting analyses and prior consent to intervention processes and their execution (Slade & Tait, 2019)"
Title/Abstract matches ""learning analytics"

Displaying results 1 to 20 of 265.
Refine search New search 1 2 3 4 5 6 7 8 9 10 11 Next
Order the results: by year (most recent first) Reorder

Export results as | ASCII Citation | Export |
RSS 1.0 | Atom | RSS 2.0 | S URL

Embed as feed


http://oro.open.ac.uk/
Leading global distance learning, delivering high-quality education to anyone, anywhere, anytime

Largest University in Europe

- 173,927 formal students
- 38% of part-time undergraduates taught by OU in UK

No formal entry requirements

- 33% enter with one A-level or less

55% of students are 'disadvantaged'

60% of new undergraduates are 25+

1,300 employers use OU learning solutions to develop workforce

1 in 8 Open University students has a disability (23,630)

3 in 4 Students are already in work

FTSE 100 have sponsored staff on OU courses in 2017/8
A special thanks to Vaclav Bayer, Avinash Boroowa, Shi-Min Chua, Simon Cross, Doug Clow, Chris Edwards, Rebecca Ferguson, Mark Gaved, Christothea Herodotou, Martin Hlosta, Wayne Holmes, Garron Hillaire, Simon Knight, Nai Li, Vicky Marsh, Kevin Mayles, Jenna Mittelmeier, Vicky Murphy, Mark Nichols, Quan Nguyen, Tom Olney, Lynda Prescott, John Richardson, Saman Rizvi, Jekaterina Rogaten, Matt Schencks, Mike Sharples, Dirk Tempelaar, Belinda Tynan, Lisette Toetenel, Thomas Ullmann, Denise Whitelock, Zdenek Zdrahal, and others...
What have I learned in six years at the OU

Change is slow, but can be enhanced with:

1. Clear senior management support
2. Bottom-up support from teachers and researchers who are willing to take a risk
3. Evidence-based research can gradually change perspectives and narratives
4. You quickly forget about the small/medium/large successes and fail to realise that you are making a real impact
5. Large-scale innovation takes substantial time and effort
6. It is all about people…
“Research on the relationship between learning design and learning analytics has also been a focus in European research in recent years. For example, in their research at the Open University UK, Toetenel and Rienties combine learning design and learning analytics where learning design provides context to empirical data about OU courses enabling the learning analytics to give insight into learning design decisions. This research is important as it attempts to close the virtuous cycle between learning design to improve courses and enhancing the quality of learning, something that has been lacking in the research literature. For example, they study the impact of learning design on pedagogical decision-making and on future course design, and the relationship between learning design and student behaviour and outcomes (Toetenel and Rienties 2016; Rienties and Toetenel 2016; Rienties et al. 2015).”

2.2 The SLeD architecture and system

<table>
<thead>
<tr>
<th>Type of activity</th>
<th>Assimilative</th>
<th>Finding and handling information</th>
<th>Communication</th>
<th>Productive</th>
<th>Experiential</th>
<th>Interactive/Adaptive</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of activity</td>
<td>Attending to information</td>
<td>Searching for and processing information</td>
<td>Discussing module related content with at least one other person (student or tutor)</td>
<td>Actively constructing an artefact</td>
<td>Applying learning in a real-world setting</td>
<td>Applying learning in a simulated setting</td>
<td>All forms of assessment, whether continuous, end of module, or formative (assessment for learning)</td>
</tr>
<tr>
<td>Examples of activity</td>
<td>Read, Watch, Listen, Think about, Access, Observe, Review, Study</td>
<td>List, Analyse, Collate, Plot, Find, Discover, Access, Use, Gather, Order, Classify, Select, Assess, Manipulate</td>
<td>Communicate, Debate, Discuss, Argue, Share, Report, Collaborate, Present, Describe, Question</td>
<td>Create, Build, Make, Design, Construct, Contribute, Complete, Produce, Write, Draw, Refine, Compose, Synthesise, Remix</td>
<td>Practice, Apply, Mimic, Experience, Explore, Investigate, Perform, Engage</td>
<td>Explore, Experiment, Trial, Improve, Model, Simulate</td>
<td>Write, Present, Report, Demonstrate, Critique</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Week</th>
<th>Assimilative</th>
<th>Finding and handling information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Design stages**

- Specification (REP03)
- Draft (D2)
- Final

**Copy and replace:**

- Workload tool → Initial
- Initial → Specification
- Workload tool → Specification
- Specification → Draft
- Workload tool → Draft
- Draft → Final
- Workload tool → Final

**Communication**: 1, Productive: 0.6, Experiential: 0, Interactive/Adaptive: 0.2, Assessment: 0.2

**Total hours**

- Avg: 12.16, StdDev: 6.28

**Table values:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Assimilative</th>
<th>Finding and handling information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Highlighted values:**

- Week 1: Assimilative 10, Finding and handling information 1.5
- Week 4: Assimilative 6.1, Finding and handling information 0.5
- Week 5: Assimilative 5.8, Finding and handling information 0.4
- Week 6: Assimilative 13.5, Finding and handling information 2.2
- Week 7: Assimilative 7.25, Finding and handling information 0.4
- Week 8: Assimilative 5.79, Finding and handling information 0.3
- Week 9: Assimilative 10.5, Finding and handling information 0.1
- Week 10: Assimilative 6.31, Finding and handling information 0.3
- Week 11: Assimilative 7.46, Finding and handling information 0.4
- Week 12: Assimilative 7.46, Finding and handling information 0.3
- Week 13: Assimilative 7.45, Finding and handling information 0.65
- Week 14: Assimilative 7.45, Finding and handling information 0.65
- Week 15: Assimilative 7.45, Finding and handling information 0.65

**Total hours**

- Week 1: 13.30
- Week 2: 15.40
- Week 3: 14.65
- Week 4: 10
- Week 5: 35.85
- Week 6: 23.15
- Week 7: 16.09
- Week 8: 16.16
- Week 9: 10.51
- Week 10: 18.76
- Week 11: 9.64
- Week 12: 15.09
- Week 13: 18.32
- Week 14: 12.09
- Week 15: 13.08
Merging big data sets

- Learning design data (>300 modules mapped)
- VLE data
  - >140 modules aggregated individual data weekly
  - >37 modules individual fine-grained data daily
- Student feedback data (>140)
- Academic Performance (>140)
- Predictive analytics data (>40)
- Data sets merged and cleaned
- 111,256 students undertook these modules
69% of what students are doing in a week is determined by us, teachers!


Activity Planner Categories

The Activity Planner categories represent different types of activities that students can engage with in the course of a module, each providing a distinct set of pedagogical benefits. Here you will find some explanations of each category and the type of activities that fall within it.

Assimilative

Attending to information

Students study and think about theories and concepts encountered in materials and resources, case studies, etc.

Often the first part of a learning cycle where students receive and begin to make sense of new information, before they then apply or test their new knowledge, or go on to reflect, review and communicate their understanding.

Read, Watch, Listen, Think about, Access, Observe, Review, Consider, Study

Finding and Handling information

Searching for and processing information

Students are actively and critically engaged in gathering and manipulating information.
Predictive analytics and professional development


VLE trail: successful student

VLE opens

Start

Pass

Fail

No submit

TMA-1

time
### VLE trail: student who did not submit

<table>
<thead>
<tr>
<th>Time</th>
<th>VLE Opens</th>
<th>Start</th>
<th>F</th>
<th>FS</th>
<th>N</th>
<th>O</th>
<th>OF</th>
<th>OFS</th>
<th>OR</th>
<th>ORF</th>
<th>ORFS</th>
<th>ORS</th>
<th>OS</th>
<th>R</th>
<th>RF</th>
<th>RFS</th>
<th>RS</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td>FS</td>
<td>N</td>
<td>O</td>
<td>OF</td>
<td>OFS</td>
<td>OR</td>
<td>ORF</td>
<td>ORFS</td>
<td>ORS</td>
<td>OS</td>
<td>R</td>
<td>RF</td>
<td>RFS</td>
<td>RS</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td>FS</td>
<td>N</td>
<td>O</td>
<td>OF</td>
<td>OFS</td>
<td>OR</td>
<td>ORF</td>
<td>ORFS</td>
<td>ORS</td>
<td>OS</td>
<td>R</td>
<td>RF</td>
<td>RFS</td>
<td>RS</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td>FS</td>
<td>N</td>
<td>O</td>
<td>OF</td>
<td>OFS</td>
<td>OR</td>
<td>ORF</td>
<td>ORFS</td>
<td>ORS</td>
<td>OS</td>
<td>R</td>
<td>RF</td>
<td>RFS</td>
<td>RS</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td>FS</td>
<td>N</td>
<td>O</td>
<td>OF</td>
<td>OFS</td>
<td>OR</td>
<td>ORF</td>
<td>ORFS</td>
<td>ORS</td>
<td>OS</td>
<td>R</td>
<td>RF</td>
<td>RFS</td>
<td>RS</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td>FS</td>
<td>N</td>
<td>O</td>
<td>OF</td>
<td>OFS</td>
<td>OR</td>
<td>ORF</td>
<td>ORFS</td>
<td>ORS</td>
<td>OS</td>
<td>R</td>
<td>RF</td>
<td>RFS</td>
<td>RS</td>
<td>S</td>
</tr>
</tbody>
</table>

- **Pass**: Student passes the assignment.
- **Fail**: Student fails the assignment.
- **No submit**: Student does not submit the assignment.
- **TMA-1**: Time Management Assignment 1.
Probabilistic model: all students
OU Analyse demo http://analyse.kmi.open.ac.uk
Fig. 2. OUA adoption by teachers during the last 4 academic years.

Amongst the factors shown to be critical to the scalable PLA implementation were:
Faculty's engagement with OUA, teachers as “champions”, evidence generation and dissemination, digital literacy, and conceptions about teaching online.

Student Facing Analytics

Study recommender

Visit Block 1 Part 4: Geography is history
Visit Block 1 Part 6: Wireless communications and mobile computing
Consider participating in Sense surgery
Visit Sense Programming Guide: Sessions 3,5 (online version)
What do practitioners want and where should distance learning institutions be going?
STUDENT SUCCESS ANALYTICS

ORGANISATIONAL CAPABILITIES

What have I learned in six years at the OU

Change is slow, but can be enhanced with:

1. Clear senior management support
2. Bottom-up support from teachers and researchers who are willing to take a risk
3. Evidence-based research can gradually change perspectives and narratives
4. You quickly forget about the small/medium/large successes and fail to realise that you are making a real impact
5. Large-scale innovation takes substantial time and effort
6. It is all about people…
Further reflections

1. What about the ethics?
2. What about professional development?
3. Are we optimising the record player?
T: drBartRienties
E: bart.rienties@open.ac.uk
W: www.bartrienties.nl
W: https://www.organdonation.nhs.uk/
W: https://www.sportentransplantatie.nl/