European Commission

JRC SCIENCE FOR POLICY REPORT

Research Evidence on the Use of Learning Analytics

Implications for Education Policy

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2016

EUR 28294 EN

Joint Research Centre

Annex 1: Inventory of Tools, Practices and Policies

This section provides a three-part Inventory that brings together evidence of practical implementations of learning analytics and documents the state of the art. It covers:

- Tools
- Policy documents
- Practices.

The Inventory was developed using existing academic literature, policy documents, practitioner-generated reports (grey literature) and contributions from the learning analytics community. It provides a 'broad-but-shallow' collection of reference points.

The Inventory is also openly available online on the Cloudworks site at http://cloudworks.ac.uk/cloudscape/view/2959, where it can be extended or amended by researchers, practitioners and anyone with a knowledge of the field.

Each entry begins with a brief synopsis of the tool, practice or policy. Entries end with details of the items maturity and any evidence that it has proved useful in practice, as well as links to key resources and references that can be used to access more detailed information.

All entries include

- Inventory type – what the item is used or intended for
- Keywords – specialist terms are explained in the Glossary below

Entries relating to tools include

- Role of analytics – the different uses of analytics
- Data sources – where the data originate
- Learning – educational sector in which the tool is used
- Supply model – how the tool is accessed
- Origin – where the tool originated
- Ethics and privacy – details of these where available
- Language – the language used by the tool

Entries relating to policies include

- Document source – where the policy originated
- Geographical – region where the policy applies
- Relationships – areas covered by the policy

Entries related to practices include:

- Learning – educational sector to which the practice applies
- Geographical – where the practice is applied
- Pedagogic – theory of teaching and learning that underpins the practice
- Tools used – any relevant tools
- Design and implementation – how the practice developed and is applied

Tools: school level

1. ASSISTments

Synopsis	
ASSISTments is an intelligent tutoring system developed by Neal Heffernan and colleagues that is researched at Worcester Polytechnic Institute (WPI) in collaboration with a variety of universities and organisations in the United States. The core system was designed to give progressive hints to students who answer a question incorrectly, in order to simulate the type of instantaneous directed feedback a tutor would provide. From this platform there have been a variety of studies of the system focusing on how to use the student log data generated from the system effectively. For example, studies have been carried out to see how these data can influence parent engagement or predict performance on high stakes tests.	
Classification	
Inventory type:	learner support tool analytics for assessment
Role of analytics:	alerting visualisation prediction recommendation
Data sources:	uses own data
Keywords:	intelligent tutoring system
Tool in Context	
Learning:	secondary education
Supply model:	Privately hosted software
Origin:	Worcester Polytechnic Institute, United States of America
Ethics and privacy:	
Languages:	English
Maturity and Evidence of Utility	
ASSISTments has been used as a research platform from WPI in association with a variety of universities. It has been expanding in terms of adoption. Two hundred and sixteen counties in the United States used the system between 28 February and 28 April 2012.	
Further Information	
Tool provider's website: http://bit.ly/1SXSbbh Highlighted research: http://bit.ly/1X5TCne, http://bit.ly/1P97xWv Map of US districts that used ASSISTments in spring 2012: http://bit.ly/1X5TlRd	

2. Bettermarks

Synopsis	
The Bettermarks program supports mathematics teaching through the use of adapted content, connected with over 100 textbooks. Teachers can either assign online lessons to students or let the system assign them based on students' skill levels. As students complete lessons, Bettermarks analyses their performance and behaviours to detect gaps in knowledge, suggest lessons for improvement or provide additional challenges. The program also incorporates a teacher centre, where student performance data can be accessed. Teachers can access 'at-a-glance' reports on completion and pass rates across the module. Additionally, they may look at individual student results and progression. This system uses any web browser and does not require downloaded software.	
Classification	
Inventory type:	smart system
Role of analytics:	summarisation & description adaptation recommendation
Data sources:	uses own data
Keywords:	adaptive modelling
Tool in Context	
Learning:	school
Supply model:	self-hosted server software
Origin:	Bettermarks, Germany
Ethics and privacy:	Little information is available about the company's ethics and privacy policies. On their website, they state that 'login data and exercise data' are saved. They further explain that students' email addresses or real names are not required, and that no data are shared with third parties. However, no information is available about data storage methods.
Languages:	English, German, Dutch, Spanish
Maturity and Evidence of Utility	
Currently no information is available about examples of the program's use or effectiveness. Preliminary studies have suggested that students who use the system receive better marks than those who do not. However, this information was internally sourced (see link below) and has not been peer reviewed.	
Further Information	
Tool provider's website: http://bettermarks.com/ Interview with CEO: http://bit.ly/1P0Ia78 Result: http://bit.ly/1PWplBH Example of use: ● 'Success Stories' brochure: http://bit.ly/1QIkXuX	

3. Bingel

Synopsis	
Bingel is a Belgian-based online exercise platform for primary education. It is currently used by more than 70% of Dutch-speaking students, and has recently been introduced in Finland and Sweden. The platform includes over 3,500 course-related exercises in eight subjects, and is available for grade levels 1-6. Bingel is an adaptive platform that incorporates online exercises, and provides automatic corrections and real-time feedback to students. Teachers can use the platform in the classroom or assign students tasks to carry out at home, and the system can be used on PCs or tablets. Individual and personalised tasks can be assigned to each student, and the tool itself can generate personalised learning paths through the materials. The tasks adopt a gamified approach to learning.	
Classification	
Inventory type:	learning environment tool smart system
Role of analytics:	modeling adaptation
Data sources:	uses own data
Keywords:	adaptive learning gamified learning
Tool in Context	
Learning:	school
Supply model:	self-hosted server software
Origin:	Sanoma Group, Finland
Ethics and privacy:	Bingel has a privacy policy that explicitly outlines the use of student data. Data are stored on the platform only for the current school year and can be accessed by teachers. During the summer holidays, student data are permanently deleted.
Languages:	Dutch, Finnish, Swedish
Maturity and Evidence of Utility	
Bingel has been offered to schools for over five years, and is now used by a large percentage of Dutch-speaking schools in Belgium. However, there is no information available on its website in regards to evidence of learning gains. Thus, research-backed findings are needed to further demonstrate maturity and evidence of utility.	
Further Information	
Tool provider's website: http://www.bingelsite.be/ (In Dutch) Vendor website: https://sanoma.com/	

4. Cito LUVS

Synopsis	
LUVS is a tool for planning and tracking school-aged students' online educational activities. It is produced by Cito, a Dutch company which produces testing and examination services for primary and secondary education and is commissioned by the Dutch government. Examinations are available for all mandatory school subjects. The LUVS tool connects with currently existing school administration systems to aggregate student assessment results across subjects and grade levels. Within the LUVS dashboard, teachers and administrators can view and analyse test results on the individual student, classroom, school or district level. The tool is an additional add-on for schools already incorporating Cito testing services.	
Classification	
Inventory type:	Analytics for assessment
Role of analytics:	summarisation description
Data sources:	Uses own data
Keywords:	assessment academic performance performance
Tool in Context	
Learning:	school
Supply model:	self-hosted server software
Origin:	Cito, Netherlands
Ethics and privacy:	No information about ethics or privacy is available at this time
Languages:	Dutch
Maturity and Evidence of Utility	
No information is currently available on the Cito website in regards to evidence-based results of using their product. However, the product's main function is description and consolidation of data for teachers and administrators. In this context, the product is well used and appears stable.	
Further Information	
Tool provider's website: http://bit.ly/1wWo09J (in Dutch) Description of Cito's role in the Netherlands: http://bit.ly/1XfovHJ	

5. Civitas Learning

Synopsis	
Civitas Learning is a US-based company that works directly with higher education institutions to build bespoke data science and learning analytics tools that make use of currently available student data. Stated potential data sources include virtual learning environments, social media, card swipes, libraries and housing. Civitas Learning's Student Insights Platform aggregates student data and uses a variety of tools for analysis and visualisation. The Illume tool demonstrates historic and predictive student data for institutional leaders and student service providers. The Inspire for Faculty tool provides real-time analysis of student engagement and behaviours in specific modules, as well as data visualisation tools and predictive modelling. Similarly, the Inspire for Advisor tool visualises student performance and success across modules and predicts programme completion. Degree Map helps students and advisors make individual degree plans. Additionally, the Hoot.me tool helps teachers build module-specific Facebook Q&A sections. Finally, Civitas Learning provides a course-scheduling platform for module enrolment. Each of this wide variety of tools is individually developed with partnering institutions to fit their analytics needs, so platform uses and data sources vary widely. Civitas currently work with over 70 partnering institutions in the USA.	
Classification	
Inventory type:	smart system
Role of analytics:	alerting summary and description statistical inference prediction data visualisation
Data sources:	sources data from other systems: management information systems, virtual learning environment, social media, card swipe (varies by institution)
Keywords:	analytics, prediction, retention, student performance, visualisation
Tool in Context	
Learning:	post-compulsory
Supply model:	varies by institution
Origin:	Civitas Learning, United States of America
Ethics and privacy:	Civitas Learning builds platforms in partnership with subscribing universities. No specific ethics and privacy statement is listed on the Civitas Learning website, and policies may vary by institution.
Languages:	English
Maturity and Evidence of Utility	
Despite its wide use, relatively little empirical research has been conducted to test the effectiveness of Civitas platforms at partnering institutions. The research that does exist shows limited results. For instance, in a randomised control trial at University of Maryland University College, users of Civitas' Illume application outperformed non-users by just 3%. Thus, more rigorous, empirical evidence of the platform's maturity is suggested for the future.	
Further Information	
Tool provider's website: https://www.civitaslearning.com/ Civitas platform options: http://bit.ly/1ZN7xhP List of partnering institutions: http://bit.ly/1ZNbh2D Example(s) of use: ● Case study at University of Maryland University College: http://bit.ly/1lKdKxo ● Case study in three contexts: http://bit.ly/1PNqCes	

6. Cognitive Tutor software

Synopsis	
Cognitive Tutor is an intelligent tutoring software provided by the US company Carnegie Learning. This web-based software is mainly used to teach mathematics to 9-12 grade students. The software provides personalised learning activities and customised feedback for several prepared mathematics courses based on a domain, tutoring, and student skill models. Two learning analytics relevant components of this software are the 'Skillometer' and the teacher reports. The 'Skillometer' is a visual indicator of students' progress in mastering skills. It gives the student an indicator of skill mastery for each achievable skill of a learning unit. The level of mastery shown by the tool expresses a prediction about the ability to demonstrate this skill in future again. The data for this visualisation stem from the tracking of the interaction of the student with the software. Teachers are supported with several reports that are generated by the software. The class progress report shows the amount of active students on each unit. The class skill alert report shows for each skill the skill mastery level for each student. The student detailed report shows for each student the amount of mastered skills, time spent, amount of completed units, sections, and problems. The detail by section report shows information for each student on a unit-by-unit level. Another report shows aggregated data for each unit. The student skill alert report shows units of underperformance. The class assessment reports allow comparison of pre-test with post-test results by topic, or by problem on class level. The student assessment reports show pre-test and post-tests results by topic, or by problem on student level. These reports are intended to support teachers with their instructional decision-making.	
Classification	
Inventory type:	learning environment tool smart system learner support tool analytics for assessment
Role of analytics:	alerting summary and description visualisation prediction modelling adaptation
Data sources:	uses own data
Keywords:	adaptive, cognitive tutor, knowledge tracing
Tool in Context	
Learning:	school
Supply model:	desktop tool (Java Webstart application or browser based)
Origin:	Carnegie Learning, United States of America
Ethics and privacy:	The company provides a privacy policy.
Languages:	English
Maturity and Evidence of Utility	
Research on Cognitive Tutor dates back to the 1980s. The software was extensively trialled, for example, the Cognitive Tutor algebra 1 course was used by 2000 US schools in 2004. Furthermore, several scientific reviews have been published.	
Further Information	
Tool provider's website: https://www.carnegielearning.com/learning-solutions/software/cognitive-tutor History of Cognitive Tutor: http://ctat.pact.cs.cmu.edu/index.php?id=timeline	

7. Conexus – Vokal

Synopsis	
Conexus is a Norwegian company with a number of products and services focused on the use of data for school-level education, professional development and management. The product known as Vokal compiles background, activity and assessment data from various sources. It provides analysis and reporting at individual and group level, as well as tools to support the evaluation and improvement of pedagogic practice. Data are gathered from a range of external sources – Conexus has worked with several publishers – and is combined with anonymised data from Statistics Norway, the student survey and national tests. Vokal also includes support for adaptivity; Knewton is used for progression analysis in individual subjects. Conexus emphasises, however, that its tools are intended to support pedagogic practice, and that Vokal is not an automated teaching system.	
Classification	
Inventory type:	learning environment tool smart system design and planning tool analytics for assessment
Role of analytics:	summarisation & description statistical inference visualisation modelling adaptation
Data sources:	uses data from statistical services, sources data from other system(s): management information systems, virtual learning environment, publisher online content, assessment systems
Keywords:	
Tool in Context	
Learning:	school
Supply model:	desktop tool/self-hosted server software/privately-hosted software/shared service model
Origin:	Conexus, Norway
Ethics and privacy:	
Languages:	
Maturity and Evidence of Utility	
Conexus state that Vokal is used in 75% of Norwegian primary schools.	
Further Information	
Tool provider's website: http://www.conexus.no/vokal/ (Norwegian language site) Tool provider's website: http://en.conexus.no (English language site, with less detail) Presentation by Yngve Lindvig (Conexus): http://bit.ly/Conexus-Lindvig Case study on data sharing by LACE Project (section 2.7): http://bit.ly/Conexus-LACE Gartner Vendors Report: http://bit.ly/Conexus-Gartner (subscription required to access report)	

8. FFT Aspire

Synopsis	
FFT, the Fischer Family Trust, is a UK non-profit organisation that provides services for UK-based education, such as the National Pupil Database for the Department for Education, and school analyses. The software FFT Aspire is a data analysis and reporting tool for schools. It provides several dashboards showing facets of school performance, such as past attainment, progression, attendance and future performance estimates. It targets several users groups, such as teachers, subject leaders, department heads, senior school leaders, advisors, local authorities and governors. The range of dashboards includes an overall school dashboard, a subject dashboard for department heads, subject leaders, and teachers, a governor dashboard (helping schools to share information with their governing bodies), a student explorer dashboard, a collaboration dashboard (to compare school performance with other schools), and a target-setting dashboard (school performance targets). Furthermore, the tool supports the creation of custom analyses and dashboards such as a three-year dashboard, a dashboard relating to children with special educational needs, and a dashboard of high attainers.	
Classification	
Inventory type:	design and planning tool
Role of analytics:	alerting summary and description visualisation prediction
Data sources:	uses data from statistical services, sources data from other system(s): management information systems
Keywords:	data analysis, reporting, future planning
Tool in Context	
Learning:	school/
Supply model:	shared service model
Origin:	Fischer Family Trust, UK
Ethics and privacy:	
Languages:	English
Maturity and Evidence of Utility	
FFT Education Ltd was established in 2001. FFT Aspire is the successor of FFT Live. Virtually all local authorities in England and Wales have a FFT Live subscription. Similar coverage is assumed for FFT Aspire. Example of use in England: http://bit.ly/1Ziwdzw	
Further Information	
Tool provider's website: https://fftaspire.org/ Example(s) of use: Case studies: https://fftaspire.org/help/casestudies About FFT: http://www.fft.org.uk/about-us/Fischer-Family-Trust.aspx Documentation: https://fftaspire.org/help/support https://www.youtube.com/channel/UC0HdON1oVddKt9ZEojI5VC	

9. itslearning

Synopsis	
Developed for K-12 classrooms, itslearning is a learning management system with functionality for course management and delivery, curriculum management, reporting and analytics. The reporting and analytics features incorporate functionality for standards mastery reporting (enabling teachers to see the percentage of students who have mastered each course standard), and a content recommendation engine that 'provides remediation and enrichment activities based on student performance against learning objectives'. This enables the identification of students who are struggling to meet learning objectives and assigns them activities for reinforcement. The itslearning recommendation engine can automate 'most' of the process of 'identification of students who are struggling to meet learning objectives and assign them activities for reinforcement'. The reporting features enable students, teachers, administrators, mentors and parents to view student aspects of students' progress via their personalised dashboard. Teachers and administrators can filter views of how classes have performed with respect to specific learning objectives by date, or by status (for example, to show only the students who have exceeded a particular learning objective). A parent dashboard enables parents to see their child's progress on tasks, grades and towards learning objectives, as well as their individual learning plans, behaviour and attendance.	
Classification	
Inventory type:	learning environment tool smart system learner support tool design and planning tool, analytics for assessment
Role of analytics:	summary and description recommendation
Data sources:	uses own data, uses data from statistical services, sources data from other system(s): management information systems, virtual learning environment, audio/video playback, assessment system, forums
Keywords:	reporting, recommendation system
Tool in Context	
Learning:	school (K-12)
Supply model:	self-hosted server software
Origin:	Itslearning, Norwa (started as a computer engineering project at Bergen University College in 1998)
Ethics and privacy:	Privacy matters have been considered in the software design and service provision: there is a privacy section in which administrators can edit settings.
Languages:	
Maturity and Evidence of Utility	
The itslearning platform was established in 1999, developing from a computer-engineering project at Bergen University College. It now has over 7 million active users. Tolgfors, B., & Öhman, M. (2015). The implications of assessment for learning in physical education and health. European Physical Education Review. doi: 10.1177/1356336x15595006'	
Further Information	
Aggregated learning objectives report: https://vimeo.com/118518649 Tool provider's website: http://www.itslearning.net/reporting-analytics Brief description of recommendation engine http://www.itslearning.co.uk/mobile-and-byod itslearning company background http://www.itslearning.net/our-story	

10. Metacog

Synopsis	
Metacog uses a content pool of interactive 'learning objects' to personalise content and pace for individual learners. Students are asked to complete a real-world task using the platform, and data are collected that relate to their usage behaviours, including click data, time stamps and correct/incorrect responses. The platform's API analyses student interactions in order to assess their understanding of the content. It is possible to use Metacog in collaboration with pre-existing resources. Students using Metacog have access to information about whether they have performed a task correctly. A leader board is also created so that students can compare their performance with peers. For teachers, the platform colour-codes performance as green, yellow or red to indicate understanding of the material on individual tasks or over time. The platform also helps teachers to group students based on their current understanding, in order to provide individualised assignments or additional resources. Teachers can additionally review which part of a task is proving to be a stumbling block for individual students or for the class as a whole. On an administrative or publisher level, the platform can be used on a macro scale to help determine where to invest additional resources by highlighting gaps in understanding across classrooms.	
Classification	
Inventory type:	smart system
Role of analytics:	summary and description visualisation adaptation
Data sources:	uses own data: student behaviours within the platform
Keywords:	adaptation, visualisation
Tool in Context	
Learning:	school
Supply model:	self-hosted server software
Origin:	Metacog; United States of America
Ethics and privacy:	The platform only collects data that is specified by the organisation using it. Individual organisations may choose to exclude information such as student identification. The company has a Student Privacy Pledge, which highlights that student data will be kept private and secure, and will not be shared with third parties.
Languages:	English
Maturity and Evidence of Utility	
Metacog's website does not currently share examples of the platform's use and no empirical studies of its utility have been found. Examples of practice and results are necessary to assess its maturity and evidence of utility.	
Further Information	
Tool provider's website: http://metacog.com/ Introductory White Paper: http://bit.ly/1R93rAm	

11. Schoolzilla

Synopsis	
Schoolzilla provides a data warehouse and associated data dashboard targeted at the K-12 US market. It provides 'connectors' that allow data to be integrated into the system through nightly updates from multiple sources such as assessment, behaviour, enrolment, grade, observation, and student information databases. Schoolzilla provides multiple views of these integrated data through a dashboard library. Representations for teachers, school leaders, school district leaders and system administrators are provided in the library, and system administrators may customise these using Tableau's data visualisation products. Teachers can use dashboards such as the 'Early warning signs' report to identify at-risk students. For example, this dashboard brings together data on attendance, behaviour and grades, and allows users to view data for schools as a whole, to compare schools (for district leaders) and to drill down to view data about individuals. System administrators can monitor the quality of the data within the system using dashboards that present the results of data audits including automatic checks for missing or malformed data.	
Classification	
Inventory type:	design and planning tool analytics for assessment
Role of analytics:	alerting summary and description visualisation
Data sources:	sources data from other system(s): management information systems, virtual learning environment, assessment system
Keywords:	data warehouse
Tool in Context	
Learning:	school (targeting the US K-12 market)
Supply model:	privately hosted software
Origin:	Aspire Public Schools: institutional project, United States of America
Ethics and privacy:	The Schoolzilla terms of service include paragraphs about intellectual property rights, confidentiality and privacy. These terms of service include a 'plain English' version of each section.
Languages:	English
Maturity and Evidence of Utility	
The basis of Schoolzilla was developed by staff at Aspire Public Schools, and used within the Aspire Schools group for three years before being spun off as a separate entity in 2013. As of January 2016, it was in use by 580 schools across the US: https://schoolzilla.com/infographic-2015-year-in-review/	
Further Information	
Tool provider's website: https://schoolzilla.com/ Example(s) of use: There are some reviews of Schoolzilla available, however some of these provide demonstrations of the system as opposed to views on use in practice: https://www.edsurge.com/product-reviews/schoolzilla/educator-reviews	

12. SNAPP

Synopsis	
The Social Networks Adapting Pedagogical Practice (SNAPP) tool performs real-time social network analysis and data visualisation of forum discussion activity on commercial and open source learning management systems. Reasons for using such a tool include the identification of isolated students, facilitator-centric network patterns, group malfunction, and users who bridge smaller networks. Some basic descriptive data are available about the users, including total number of posts, number of posts per user, post and reply frequencies by user, and who is interacting with whom. Research conducted with the tool includes: monitoring student networks, participant interaction over time, and assessing broad-based admissions.	
Classification	
Inventory type:	learner support tool design and planning tool analytics for assessment
Role of analytics:	statistical inference visualisation summary and description modelling
Data sources:	uses data from LMS discussion boards
Keywords:	social network analysis, visualisation
Tool in Context	
Learning:	post-secondary education
Supply model:	privately hosted software
Origin:	University of Wollongong, Australia
Ethics and privacy:	
Languages:	English
Maturity and Evidence of Utility	
The project includes both national and international partners. There have been many research studies conducted with the tool.	
Further Information	
Tool provider's website: http://www.snappvis.org/ Highlighted research – ten research publications related to SNAPP: http://bit.ly/1R9kXnS	

13. VitalSource CourseSmart

Synopsis	
CourseSmart Analytics are available to teachers whose institutions participate in an integration between the institution's LMS and CourseSmart's eTextbook. The integration is effected using IMS Global's Learning Tools Interoperability standard (LTI). CourseSmart's analytics dashboard presents a measurement of students' engagement with digital course materials. A centrepiece of this dashboard is the CourseSmart Engagement Index Technology™, a proprietary algorithm that evaluates standard usage data – such as number of pages read, number of times a student opened/interacted with the digital textbook, number of days the student used the textbook, time spent reading, number of highlights, number of bookmarks, and number of notes – and assimilates these data to provide an overall assessment of students' engagement with the material. The analytics are intended to give teachers insights into their students' engagement with and patterns of usage of e-books, with a view to enabling teachers make interventions based on this data. VitalSource acquired CourseSmart in early 2014, and press releases issued in October 2015 announced 'the upcoming re-launch of our analytics product'. However, there have been no further announcements.	
Classification	
Inventory type:	general analytics tool learning environment tool
Role of analytics:	Alerting summary and description visualisation
Data sources:	uses own data, sources data from other system(s): virtual learning environment,
Keywords:	e-book
Tool in Context	
Learning:	school, post-compulsory
Supply model:	self-hosted server software
Origin:	CourseSmart, United States of America
Ethics and privacy:	VitalSource has a Privacy & Cookies Policy
Languages:	English
Maturity and Evidence of Utility	
CourseSmart was founded in 2007 by a conglomeration of publishers. Beta testing of CourseSmart Analytics started in late 2012, and the first version was released in summer 2013. Junco & Clem (2015) carried out a study of 236 students using CourseSmart in the Spring 2013 semester. They found that CourseSmart Engagement Index 'was a significant predictor of course grades across disciplines, instructors, and course sections'. However, 'the number of days students spent reading was a more powerful predictor of course outcomes. This suggests that the calculated Engagement Index does not yet capture the important factors related to engagement with the textbook'. Juno & Clem conclude that the 'CourseSmart Engagement Index needs to be refined' and this may be happening.	
Further Information	
Tool provider's website: https://www.vitalsource.com Description by JISC consultant: http://analytics.jiscinvolve.org/wp/2014/10/06/more-sophisticated-learner-engagement-metrics-and-doing-something-with-them/ Descriptions from help material: Navigating the Analytics Dashboard, About Analytics Junco, R., & Clem, C. (2015). Predicting course outcomes with digital textbook usage data. *The Internet and Higher Education,* 27, 54-63. doi: 10.1016/j.iheduc.2015.06.001	

Tools: Higher Education

14. Degree Compass (Desire2Learn)

Synopsis

Course selection can prove challenging for students. Desire2Learn cites research by Complete College America, which found that students take 20% (on average) more classes than are needed to graduate. Providing help with course selection can therefore cut tuition costs. At-risk students who are not as likely to make it to graduation are potentially the population that is in the most need of support in decision making, in order to help increase retention and graduation rates at college.

Using information about other students' enrolments, this system provides recommendations as to which courses the students should take in order to complete their degree as well as which courses they are most likely to complete.

The Degree Compass application aims to increase student success by:

- Providing students with academic advice from the time they start school;
- Monitoring progress and offering on-going personalised course and degree path recommendations;
- Reducing time-to-degree with better course selection.

Classification	
Inventory type:	learning environment tool smart system learner support tool
Role of analytics:	statistical inference prediction modelling recommendation
Data sources:	uses own data
Keywords:	at-risk students, course selection
Tool in Context	
Learning:	post-secondary education
Supply model:	privately hosted software
Origin:	Desire2Learn, United States of America
Ethics and privacy:	
Languages:	English

Maturity and Evidence of Utility

Studies at Tennessee schools have shown that at-risk students who use this tool have earned higher grades. More than 90% of students who took a 4-star course as recommended by this system earned an A or B in the course.

Further Information

Press release giving details of Degree Compass: http://bit.ly/1PEQKMx

Detailed Educause overview of Degree Compass: http://bit.ly/1VUIMPz

Related research:

Denley, Tristan (2012), 'Austin Peay State University: Degree Compass' in Oblinger, Diana, (ed.) *Game Changers: Education and Information Technologies*. Educause, 2012.

15. Knewton

Synopsis	
Knewton is an adaptive learning software company that provides platforms for personalised education. The company was founded in 2008 and formed a partnership with Pearson Education in 2011. Over ten million students have used their adaptive learning platforms at the primary, secondary and university levels. Many programs are available at different educational levels, and Knewton often works with schools or universities to create custom platforms that fit institutional needs. From a student perspective, the program uses algorithms based on student performance and behaviours to suggest lessons via differentiated instruction, as well as to provide students with information about their progress. It incorporates immediate feedback, community collaborative forums and gamification to encourage participation. From an educator perspective, the program supports data summarisation and visualisation at the classroom or individual student level. Using a 'stop light' system, students are categorised for interventions as 'ahead of track,' 'on track,' 'off track' or 'very behind.'	
Classification	
Inventory type:	smart system
Role of analytics:	adaptation visualisation summary and description
Data sources:	uses own data
Keywords:	adaptive learning classification
Tool in Context	
Learning:	school, post-compulsory
Supply model:	self-hosted server software
Origin:	Knewton, United States of America
Ethics and privacy:	Little information is available about privacy and ethics. This is likely to vary by institution.
Languages:	English
Maturity and Evidence of Utility	
Knewton is perhaps the most established adaptive learning software, and partners with big names in the education world, such as Pearson Education and Houghton Mifflin Harcourt, and in the tech world, such as HP and Microsoft. Considering the vast number of students using their platforms, only a limited amount of evidence is promoted on the Knewton website at both the school and university level. For example, it is argued that an increase in retention was seen at Arizona University from 64% to 75%, however the student cohorts examined were of varying size and cohorts studied the courses in different academic years.	
Further Information	
Tool provider's website: http://www.knewton.com Platform summary white paper: http://knewt.ly/1rCMS61 Technical white paper: http://bit.ly/1XfovHJ	

16. Loop

Synopsis	
Loop is an open source analytics tool funded by the Australian Office for Learning and Teaching. The tool can be connected with Moodle or Blackboard to provide a tool for teachers to visualise student behaviours in their learning management system. The dashboard component displays student log data through the learning management site, such as class materials accessed, discussion forum activity, and assessment performance. These data can be viewed at the classroom or individual student level. At the same time, the tool incorporates information about the course structure and schedule within its visualisations. In this sense, the project aims to incorporate a 'pedagogical helper tool' to aid teachers in data interpretation that make sense in their specific context. In 2015, the tool was piloted with four courses run by three Australian universities, with hopes of a wide-scale release following soon.	
Classification	
Inventory type:	learning environment tool
Role of analytics:	visualising
Data sources:	Uses data from other systems: Moodle or Blackboard
Keywords:	visualisation learning management system
Tool in Context	
Learning:	post-compulsory
Supply model:	self-hosted server software
Origin:	collaborative project, Government funded, Australia
Ethics and privacy:	No information about ethics or privacy is available at this time
Languages:	English
Maturity and Evidence of Utility	
The Australian government funds this project, which is the product of collaboration between three universities and nine leading researchers. However, Loop is currently in an initial pilot stage, with four courses across three universities adopting the tool for one academic year in 2015. At the end of the year, a qualitative study with course instructors is planned, but no findings have yet been released. A full analysis of this initial pilot will be necessarily to confirm the tool's maturity and evidence of utility.	
Further Information	
Tool provider's website: http://bit.ly/24DaLfi Related papers: http://bit.ly/1O87cpZ http://bit.ly/1Nnnc7i Presentation of the tool: http://bit.ly/24EObQa	

17. Open Essayist

Synopsis	
Open Essayist, developed by The Open University, UK, is designed to provide automated reflective feedback to learners on draft essays. The underlying idea is to present a computer-based analysis of the most important parts and key words in the writing, so that learners can compare those to what they intended to convey, and adjust their writing in the light of that comparison. Learners upload their draft essay, and the system then generates a series of different views based on analysis of the text, including: the most prominent words and a graphical view of their distribution through the text; the key sentences in the text, with hints to aid reflection; and a graphical view of the structure of the essay. The tool is intended as a formative, developmental tool rather than for summative assessment.	
Classification	
Inventory type:	learner support tool analytics for assessment
Role of analytics:	summary and description visualisation
Data sources:	uses own data (learner uploads)
Keywords:	assessment, natural language processing, visualisation
Tool in Context	
Learning:	higher education
Supply model:	privately hosted software
Origin:	Open Essayist/SAFeSEA projects: collaborative project, OU, United Kingdom
Ethics and privacy:	Feedback is given direct to the individual learner, not shared or distributed to others.
Languages:	English
Maturity and Evidence of Utility	
The tool has been trialled successfully with Masters-level students, and the project team is currently looking for wider take-up.	
Further Information	
Project website: http://www.open.ac.uk/researchprojects/safesea/ Trials with Masters students: http://oro.open.ac.uk/42041/1/lak15_submission_46.pdf	

18. OU Analyse

Synopsis	
The Knowledge Media Institute (KMi) of The Open University, UK developed OU Analyse – software that predicts students at risk. OU Analyse builds upon two previous projects (Retain and the OU-Microsoft Research Cambridge project). OU Analyse uses machine-learning techniques to develop predictive models based on demographics and VLE usage data. The software provides a dashboard reporting the aggregated prediction value of several models for all students of a module. Furthermore, the tool discloses the reasoning that underlies its prediction. Currently, the institute is developing a tool that can recommend activities to students to improve their performance. Module chairs, module teams, and student support teams use the predictions of OU Analyse to contact and support students.	
Classification	
Inventory type:	learner support tool analytics for assessment
Role of analytics:	alerting summary and description visualisation prediction modelling recommendation
Data sources:	sources data from other system(s): management information systems, virtual learning environment, assessment system
Keywords:	prediction
Tool in Context	
Learning:	higher education
Supply model:	privately hosted software
Origin:	collaborative or institutional project, OU, United Kingdom
Ethics and privacy:	The Open University has set out ethical guidelines on the use of data for learning analytics.
Languages:	English
Maturity and Evidence of Utility	
OU Analyse's development was accompanied by several scientific pilot studies. The software is used across the university and received substantial coverage in the press.	
Further Information	
Tool provider's website: https://analyse.kmi.open.ac.uk Example(s) of use: http://www.laceproject.eu/publications/analysing-at-risk-students-at-open-university.pdf http://www.bbc.co.uk/news/technology-3367547 https://www.timeshighereducation.com/news/week-higher-education-%E2%80%93-30-july-2015 http://www.ft.com/cms/s/2/634624c6-312b-11e5-91ac-a5e17d9b4cff.html Rienties, Bart; Cross, Simon and Zdrahal, Zdenek (2016). Implementing a learning analytics intervention and evaluation framework: what works? In: Kei Daniel, Ben and Butson, Russell eds. *Big Data and Learning Analytics in Higher Education: Current Theory and Practice*. Heidelberg: Springer. Kuzilek, Jakub; Hlosta, Martin; Herrmannova, Drahomira; Zdrahal, Zdenek and Wolff, Annika (2015). OU Analyse: analysing at-risk students at The Open University. Learning Analytics Review, LAK15, pp. 1–16. See also LAEP Inventory records: • Ethical use of student data policy – The Open University • Tribal's Student Insights	

19. Student Success Plan

Synopsis	
Student Success Plan (SSP) is software to support case management of student support: counselling, coaching and pastoral care. It has lightweight data analytics, principally focused on the management and enhancement of student support services. It is being adopted to support action in relation to predictive analytics. SSP is designed to improve retention, academic performance, persistence, graduation rates and time to completion. Through counselling, web-based support systems and proactive intervention techniques, students are identified, supported and monitored. The software provides case management tools for handling staff, student, and student-services communications, action planning, planning academic choices, alerting, student self-assessment and progress monitoring. SSP is not a single 'out of the box' solution, but a set of configurable components adopting an open architecture so that they can be integrated into a variety of system landscapes. An Open Source Software edition is available, overseen by the Apereo Foundation.	
Classification	
Inventory type:	learner support tool design and planning tool
Role of analytics:	summary and description
Data sources:	uses own data, sources data from other system(s): management information systems
Keywords:	case management, open source
Tool in Context	
Learning:	post-compulsory
Supply model:	self-hosted server software privately hosted software
Origin:	Unicon: technology-enhanced learning vendor (open source) Previously Sinclair Community College: institutional project
Ethics and privacy:	Ethics and privacy matters were considered from an early stage; the software was developed in an educational setting around existing norms of professional practice in student support.
Languages:	English
Maturity and Evidence of Utility	
Student Success Plan was developed by Sinclair Community College (SCC), supported by grant funding, and has been in use for ten years. It has received 11 awards in the USA and is now adopted by Unicon, an Open Source Software development, hosting, and support services provider. According to Sinclair statistics from 2005 – 2011, students using SSP were five times more likely to graduate. For quarter-to-quarter retention rates (Fall '10 to Winter '11), transitioned SSP students (students who had completed the SSP process) had a 37% higher rate of retention than students who qualified for the programme but did not participate and a 26% higher rate of retention than students not designated 'at risk' [figures from Unicon web site].	
Further Information	
Tool provider's website: http://www.studentsuccessplan.org/ Unicon distribution and services for SSP: http://bit.ly/UniconSSP Apereo Foundation, the Open Source custodian of SSP: http://bit.ly/SSPApereo Example(s) of use: ● Educause review article describing rationale and development in SCC: http://bit.ly/SSP-2011 ● Gateway to College Network research and evaluation report: http://bit.ly/SSP-GTC See also LAEP Inventory record: ● Effective learning analytics pilots – Jisc	

20. Tribal's Student Insights

Synopsis	
Tribal, based in the UK, is a global provider of software solutions and specialises in products supporting the management of education. Tribal's Student Insights is a piece of software that is currently being developed to predict student performance and 'at-risk' students from data available in student information systems, including academic performance at entrance, demographics, and assessment results, as well as activity data, such as student interaction, VLE usage, and library usage. The software generates predictive models about a student's likelihood of passing a module. The software provides dashboards that present this information at student and module level. University educators and managers can use this information, for example, to provide individual student support, or to monitor modules with regard to their predicted performance.	
Classification	
Inventory type:	learner support tool analytics for assessment
Role of analytics:	alerting summary and description visualisation prediction modelling
Data sources:	management information systems, virtual learning environment, assessment system,
Keywords:	prediction
Tool in Context	
Learning:	higher education
Supply model:	shared service model
Origin:	Tribal, United Kingdom
Ethics and privacy:	
Languages:	English
Maturity and Evidence of Utility	
The software is under development. Tribal is working in collaboration with the University of Wolverhampton.	
Further Information	
Tool provider's website: http://www.tribalgroup.com/technology/sitsvision/Documents/Tribal%20Student%20Insight.pdf Example(s) of use: http://blog.tribalgroup.com/2014/11/24/understanding-your-students-and-strengthening-their-success http://blog.tribalgroup.com/2016/01/14/business-intelligence-reducing-costs-and-improving-productivity-by-effectively-analysing-data http://analytics.jiscinvolve.org/wp/2014/10/27/tribal-student-insight-an-interview-with-chris-ballard	

21. X-Ray Analytics

Synopsis	
X-Ray Analytics is a predictive modeling tool, linked with Moodle and Moodlerooms, which was acquired by Blackboard in 2015. The dashboard provides teachers with visualisations of past behaviours in their learning management system at multiple levels: course, multiple course and intuitional. Its algorithms then make predictions about future performance and behaviours in order to identify 'at-risk' students who may be in need of an intervention. The tool also considers student engagement by analysing contributions to online collaborative tools, such as discussion forums, using social network analysis. Students can be identified as at risk depending on the time they have spent in the course, their grades and their discussion forum engagements. X-Ray Analytics uses a cloud-based model and analyses pre-existing data in the learning management system. The tool is expected to be available for all Blackboard courses in the near future.	
Classification	
Inventory type:	learning environment tool
Role of analytics:	visualisation summary and description alerting
Data sources:	sources data from other system(s): virtual learning environment
Keywords:	prediction predictive modeling social network analysis visualisaton
Tool in Context	
Learning:	post-compulsory
Supply model:	self-hosted server software
Origin:	Blackboard, United States of America
Ethics and privacy:	Data are stored via a cloud-based model. At present, no information is available that specifically addresses ethics or privacy.
Languages:	English
Maturity and Evidence of Utility	
X-Ray Analytics has been acquired by Blackboard, with plans to make the tool available to all users in the near future. There is little information available related to evidence of utility or results of use.	
Further Information	
Tool provider's website: http://bit.ly/1Npiu9d Blackboard press release: http://bit.ly/1L4fSst Informal account: http://bit.ly/1WXTRSF	

Tools: workplace learning

22. Skillaware

Synopsis	
Skillaware is a company based in Italy that designs learning environment software for workplace learning and training. The program is used with pre-existing company software or procedures to determine worker effectiveness and areas where training may be useful. Using a variety of tools, Skillaware captures user activities and behaviours within existing software. The SkillEditor function captures user behaviours and automatically suggests trainings to make workers' use of various forms of software more productive. The SkillAgent function provides suggestions for next steps in a task when a user appears to need assistance. In addition, the SkillAnalyzer tool allows company analysts to watch real-time user activity and provide data visualisation for management staff.	
Classification	
Inventory type:	learner support tool design and planning tool
Role of analytics:	alerting recommendation
Data sources:	uses own data, sources data from other systems (varies by user)
Keywords:	data visualisation, user modelling
Tool in Context	
Learning:	workplace
Supply model:	self-hosted server software
Origin:	Skillaware: analytics vendor
Ethics and privacy:	No explicit ethics or privacy policies can be found. However, the company works to provide programs for individual use within existing company practices, and ethics practices may vary between customers.
Languages:	English, Italian, German
Maturity and Evidence of Utility	
Preliminary analysis in the form of a conference paper supports the software's validity. However, there are relatively few case studies or examples of use of the software. More empirical evidence will be needed in the future to validate the tool's maturity and evidence of utility.	
Further Information	
Tool provider's website: http://skillaware.com/ Preliminary analysis: http://bit.ly/1OPqqxm White papers: http://skillaware.com/en/documents/	

23. WATCHME Project

Synopsis	
WATCHME is a European-funded project that uses learning analytics to improve workplace-based feedback and professional development. The acronym stands for Workplace-based e-Assessment Technology for Competency-based Higher Multi-professional Education. The project has built an electronic portfolio system, which can be used to provide trainees with visualisations and feedback on their development. Their dashboard incorporates data from multiple sources, including self-reporting, online activity data, and qualitative narratives. A particular type of data model is used to aggregate data and provide 'Just-in-Time' feedback to support continued learning. Members of the team of researchers on this project come from multi-disciplinary backgrounds, including areas such as human medicine, veterinary medicine, teacher training and information technology. A prototype of the tool has been developed and the project is currently testing usability.	
Classification	
Inventory type:	general analytics tool
Role of analytics:	summary and description visualisation
Data sources:	uses own data, sources data from other system(s): workplace training environments
Keywords:	bayesian network workplace learning
Tool in Context	
Learning:	workplace
Supply model:	This information is not provided on the project's website
Origin:	collaborative project: EU funded
Ethics and privacy:	No information about ethics and privacy is included on the project's website
Languages:	English
Maturity and Evidence of Utility	
The project is still in its testing phase and relatively little empirical evidence has been released on its usability and impact on workplace learning. The project is a large-scale collaboration with leading researchers in multiple disciplines, which gives weight to its academic rigour. Analysis of its use can be expected before the project ends in 2017.	
Further Information	
Tool provider's website: http://www.project-watchme.eu/ Project collaborators: http://bit.ly/1UBV1mM Project presentations and publications summaries of use: http://bit.ly/26WXkFM	

Tools: all levels, non-and informal learning, other

24. Claned

Synopsis	
Claned provides a learning environment that can be used for e-learning in subjects as diverse as medical education and dance education. Claned aims to provide tools that make the learning process visible for both students and teachers, thus implementing components of learning analytics. In the Claned environment, one can embed e-learning materials or upload videos, documents, and slideshows. The system provides automatic keywords and topics, and tracks everything that a learner does. It also provides analytics on the interactions between different learners, focused on collaboration. Claned provides data to teachers by looking for groups of students who act in similar ways, or have similar motivational patterns. The aim is to make the learning process visible to the teacher, so it is clear where supporting materials might be useful, or more support is needed on topics experienced as challenging. Claned also gives the data back to the learner, using a learning tracker tool. The next phase will be to use the data to provide suggestions for individualised learning paths, tailored to help individuals achieve their learning goals.	
Classification	
Inventory type:	learning environment tool smart system learner support tool analytics for assessment recommendation
Role of analytics:	Adaptation, description, visualisation
Data sources:	uses own data
Keywords:	Personalisation,
Tool in Context	
Learning:	School, training, informal
Supply model:	Privately hosted software
Origin:	technology-enhanced learning vendor, analytics vendor A start-up company with bases in Helsinki, Dubai, Singapore and London.
Ethics and privacy:	The website says “We respect individuals and the privacy of their information. We do not gather data on individuals nor is our technology designed to gather any.”
Languages:	
Maturity and Evidence of Utility	
Further Information	
White paper “- Sampling experiences to enhance learning process” http://www.claned.com/wp-content/uploads/SAMPLING-EXPERIENCES-TO-ENHANCE-LEARNING-PROCESS_170715.pdf http://www.claned.com/,	

25. Khan Academy analytics

Synopsis	
Khan Academy is a set of freely accessible online video-centric learning resources, principally focusing on declarative and procedural knowledge, covering a wide range of subjects at levels suitable for school-aged and adult learners. Learning analytics figure in three ways: as the engine for services offered by the Khan Academy through the web pages; as access to data for analytics processes undertaken by third parties; and as a means of continuous design enhancement. Khan Academy provides information to teachers/coaches on individual and class-level performance. This provides summary estimates of effort, engagement, and difficulty with the material. The learning materials are mapped to a set of skills, with various mastery levels for each; the teacher/coach can drill down to this level and use the information on progress or difficulty to recommend materials for follow-on or under-pinning skills, or to instigate an alternative learning activity (perhaps outside Khan Academy). Khan Academy provides a dashboard for learners and this shows progress against skills (as for the teacher/coach) and activity pattern in time and against different skills. Data access by third parties is via a web-standards-based API and gives differentiated access according to the data type. Video, playlist, topic/skill maps, and exercise data are open access. User-level activity and progress logs are secured, requiring login and authorisation.	
Classification	
Inventory type:	general analytics tool (access to the API), learner support tool, smart system
Role of analytics:	adaptation, description, modelling, recommendation, summarisation, visualisation
Data sources:	uses own data
Keywords:	adaptation, personalisation, student model
Tool in Context	
Learning:	Informal, post-compulsory, school, vocational education and training
Supply model:	privately hosted software: free access
Origin:	Khan Academy: non-profit, United States of America
Ethics and privacy:	Khan Academy is a Student Privacy Pledge signatory and has a public statement of privacy principles, including how data are collected, how it is used, retention, sharing, and user control. They make explicit reference to child users. https://studentprivacypledge.org/
Languages:	There are separate versions of the Khan Academy site in English, French, Norwegian, Portuguese, Spanish and Turkish. Content is available in over 30 languages
Maturity and Evidence of Utility	
The data-centred services offered by Khan Academy have continued to evolve with analytics on service usage being a significant source of evidence in the development. There are numerous examples of use worldwide.	
Further Information	
Tool provider's website: https://www.khanacademy.org/ Privacy policy: https://www.khanacademy.org/about/privacy-policy Case studies from the Khan Academy website: http://bit.ly/KhanCaseStudies (general) Implementations in schools: http://schools.khanacademy.org/	

26. Digital Assess – adaptive comparative judgement

Synopsis	
Digital Assess provides support for workflow around assessment of coursework or other evidence-based assessment scenarios. The system can be used for conventional assessor marking or for peer assessment. Learning analytics are used to drive a process known as adaptive comparative judgement, which increases the reliability of the assessment. Adaptive comparative judgement is a development of the assessment approach in which pairs of work by students are compared, using some defined dimensions of quality. Learning analytics drives the adaptive element by automatically determining which pairs to present to which individuals undertaking the assessment, in order to maximise the increase in the reliability of the grading in each round of comparison. Over several rounds of comparative judgement, reliability statistics are computed, as well as statistics that identifies student work that is problematic. The process can also support year-on-year standardisation. The method is particularly applicable to cases where a detailed marking scheme is ill-suited to the object of assessment – for example for creative subjects or 'soft skills' – or would be excessively time-consuming, or where peer assessment has a pedagogic role. Research undertaken by academics and high-stakes awarding bodies has demonstrated that adaptive comparative judgement is a reliable method, exceeding the inter-rater reliability typical of conventional essay marking.	
Classification	
Inventory type:	analytics for assessment
Role of analytics:	statistical inference adaptation
Data sources:	uses own data
Keywords:	adaptive comparative judgement, peer assessment
Tool in Context	
Learning:	school, vocational education and training, post-compulsory, informal
Supply model:	shared service model
Origin:	Digital Assess: technology-enhanced learning vendor
Ethics and privacy:	The Digital Assess system is designed to support secure high-stakes assessment. Peer assessment is undertaken anonymously, but any free-form assessment has some risk of re-identification.
Languages:	English
Maturity and Evidence of Utility	
The tool has been rigorously evaluated by an awarding body (responsible for high-stakes public assessment), and has been piloted at scale at the University of Edinburgh. In 2015, Digital Assess reported raising $3million in new investment.	
Further Information	
Tool provider's website: http://digitalassess.com Outline of adaptive comparative judgement component: http://bit.ly/DA-ACJ Story about new investment: http://bit.ly/DA-3m Example(s) of use: • Case study, adaptive comparative judgement at University of Edinburgh: http://bit.ly/DA-UoE • Report of an exploratory study undertaken by the Centre for Education Research and Policy of the Assessment and Qualifications Alliance (a UK awarding body): http://bit.ly/DA-AQA Research: Alastair Pollitt (2012): The Method of Adaptive Comparative Judgement, Assessment in Education: Principles, Policy & Practice, DOI:10.1080/0969594X.2012.665354	

27. Learning Analytics Processor

Synopsis	
The Learning Analytics Processor (LAP) is software to manage a learning analytics workflow. Typically, this type of workflow is referred to as a pipeline and consists of three distinct phases: input, model execution, and output. The pipeline is built using an open architecture that exposes output from the pipeline via a collection of web service APIs. The LAP is a general-purpose tool designed to meet the need for scaling up learning analytics from manually driven processes to automation of routine technical tasks. The essential purpose of the LAP is to streamline data pre-processing, predictive model use, and results post-processing to make this a more efficient and reliable process. It is configurable, not tied to particular data sources, and agnostic as to the way in which the results of the predictive model are used. Currently, LAP supports the Marist College Open Academic Analytics Initiative Early Alert and Risk Assessment model but development of additional models as well as feature and scalability enhancements are underway.	
Classification	
Inventory type:	general analytics tool
Role of analytics:	prediction modelling
Data sources:	LAP can use data from different sources
Keywords:	workflow, pipeline, predictive analytics, open source
Tool in Context	
Learning:	School, vocational education and training, post-compulsory, informal
Supply model:	desktop tool, self-hosted server software, privately-hosted software, shared service model
Origin:	OAAI Project (led by Marist College): collaborative project Unicon: technology-enhanced learning vendor (open source)
Ethics and privacy:	The original OAAI project was undertaken with ethical research oversight. Since the LAP is a system to automate an analytics pipeline, rather than being a user-facing application, the main concern is system security.
Languages:	Not applicable
Maturity and Evidence of Utility	
The LAP arose out of the Open Academic Analytics Initiative (OAAI), led by Marist College (USA), and was developed to automate the processing pipeline that OAAI demonstrated. It is currently work in progress, being one of the Apereo Foundation's incubation projects, and is under development by Unicon and Marist, having been selected in a competitive tendering process as a component for the Jisc Effective Learning Analytics pilots.	
Further Information	
Tool provider's website, Apereo Foundation, open source custodian: http://bit.ly/LAP-Apereo LAP and Open Learning Analytics, outline: http://bit.ly/LAP-OLA LAP features and technical architecture: http://bit.ly/LAP-Details Jayaprakash, S. M., Moody, E. W., Lauria, E. J. M., Regan, J. R., & Baron, J. D. (2014). Early alert of academically at-risk students: an open source analytics initiative. *Journal of Learning Analytics*, *1*(1), 6–47. [describes the Open Academic Analytics Initiative project] See also LAEP Inventory record: ● Effective learning analytics pilots – Jisc	

28. Realising an Applied Gaming Eco-system (RAGE)

Synopsis	
RAGE is a European-funded project coordinated by the Open University Netherlands, in collaboration with gaming industry professionals and universities in ten European countries. The project focuses on supporting development of 'applied' or 'serious' games through the use of pilot testing and analytics in real-world educational scenarios. The overall aim is to develop serious games more easily, more quickly and more cost-efficiently. Partnering members belong to an 'Ecosystem,' which is a designated social space for collaboration between partners at all levels: commercial, educational, policy, research, and others. The project provides centralised access to software, resources and data, as well as training for developers and educators. Unique to the project is its pilot testing phase, during which developed games can be used in real-world educational scenarios, then analysed for effectiveness using learning analytics and trace data.	
Classification	
Inventory type:	design and planning tool
Role of analytics:	summary and description
Data sources:	Uses data from other systems: various developed games
Keywords:	games games-based learning
Tool in Context	
Learning:	all levels
Supply model:	unknown
Origin:	Various technology-enhanced learning vendors
Ethics and privacy:	No information about ethics or privacy is available at this time
Languages:	Multiple
Maturity and Evidence of Utility	
RAGE is currently running pilot studies on 11 different games in various European countries. As the project is on-going, little evidence has yet been released on project outcomes. However, the large number of collaborations with researchers and industry professionals lends to the project's maturity and potential for success. The project has also established a business plan for continued work after the European funding has ended.	
Further Information	
Tool provider's website: http://rageproject.eu List of collaborators: http://rageproject.eu/project/partners/ List of pilot projects: http://rageproject.eu/project/pilots/ Dissemination materials and publications: http://rageproject.eu/downloads/	

Practices: institutional pilots

29. Arizona State University

Synopsis	
Arizona State University (ASU) partnered with private company Knewton Enterprises in 2011 to make use of the Knewton Math Readiness program for its online and blended mathematics modules. The program created **personalised learning paths for over 5,000 students registered on remedial mathematics modules**. Knewton's website highlights that the system, 'continually assesses their mathematical proficiency and adapts accordingly.' After adopting the system, Knewton states that ASU retention in the remedial mathematics programme increased from 64% to 75%. In 2015, ASU announced a partnership with Cengage Learning and Knewton Enterprises to create 'Active Adaptive' modules. These modules will use analytics similar to the Knewton Math Readiness programme, which adapts students' learning paths through the module according to their demonstrated proficiency. In combination, Cengage Learning will provide study tools to enhance resources such as note taking and collaboration with classmates.	
Classification	
Inventory type:	pilot
Keywords:	adaptive
Context of Practice	
Learning:	post-compulsory
Geographical:	national: USA
Pedagogic:	This institutional practice relies on adaptive content in remedial and entry-level modules, based on students' demonstrated proficiency.
Practical Matters	
Tools used:	Knewton Enterprises – adaptive learning paths software, Cengage Learning – online study tools
Design and implementation:	Relatively little information about the programme is provided on the Arizona State University website. However, informal press accounts highlight that the system was put into place in 2011 for remedial mathematics courses. Further partnerships with Knewton and Cengage Learning were announced in 2015 to develop more adaptive modules university wide. Informal accounts highlight some push back by university staff, due to the lack of pilot testing or consultation with staff prior to partnerships.
Maturity and Evidence of Utility	
Knewton-powered classrooms were rolled out to students without pilot testing. The Knewton website claims an increase in retention from 64% to 75%, however the student cohorts examined were of varying size – 2,419 students without Knewton program and 1,565 with the program – and cohorts were studied at ASU at different time points. Thus, a more robust randomised control trial would be useful to clarify results. An informal account on Inside Higher Ed highlights wide variation in retention rates between individual module sections. Thus, more quantitative and qualitative research are suggested.	
Further Information	
Overview of Knewton tool: http://knewt.ly/1WK4FCq Informal account: http://bit.ly/1ZYMI8s Case study: http://knewt.ly/1nJWsCl Cengage press release: http://bit.ly/1Nv8TXl	

30. Progress and Course Engagement (RioPACE) – Rio Salado College

Synopsis	
Rio Salado College is a community college located in Arizona in the USA, which has an online enrolment of over 40,000 students. The college introduced its Progress and Course Engagement (RioPACE) system across the university in 2010. The **system uses data modelling and predictive analytics to target interventions aimed at low-performing students**. The system analyses virtual learning environment (VLE) behaviours and compares students to previously successful students. Weekly warning labels are provided individually on a colour-coded traffic light system similar to that employed by Purdue's Course Signals. Teachers receive weekly reports on student progress and predicted completion, enabling them to target students for interventions if necessary. Students can also view their warning labels by accessing the RioPACE system within the VLE. Students with a yellow or red indicator are prompted to contact their module teacher for help getting back on track.	
Classification	
Inventory type:	pilot
Keywords:	prediction, predictive modelling, data mining, classification
Context of Practice	
Learning:	post-compulsory
Geographical:	national: USA
Pedagogic:	Rio Salado College is not explicit in its support of one pedagogic framework over another. This institutional practice emphasises the importance of teacher interventions.
Practical Matters	
Tools used:	RioPACE is a custom-built system that functions within the institution's VLE, RioLearn
Design and implementation:	RioPACE has been implemented institution-wide across all modules. The system was created by Rio Salado College. However, the college did collaborate with Purdue University and modelled its system on Purdue's Course Signals. The college also participates in the Gates-funded WCET project as part of the Predictive Analytics Reporting (PAR) Framework.
Maturity and Evidence of Utility	
Preliminary research appears to support the accuracy and validity of RioPACE's predictive modelling. However, little empirical research has been published or shared with regard to increases in retention as a result of the programme's adoption.	
Further Information	
Programme website: http://bit.ly/1nKnTvQ Interview with associate dean: http://bit.ly/1ZNxs8R Academic study: Smith, V., Lange, A., & Huston, D. (2012). Predictive modelling to forecast student outcomes and drive effective interventions in online community college courses. *Journal of Asynchronous Learning Networks, 16*(3), 51-61. See also LAEP Inventory records: • PAR Framework • Course Signals – Purdue University	

31. PredictED – Dublin City University

Synopsis	
Dublin City University (DCU) initiated a new learning analytics programme called PredictED in 2014 for ten modules. PredictED **analyses student behaviours in the Moodle virtual learning environment** (VLE), and compares them with previously successful students on the same module. Once a week, participating students receive an email with an updated prediction of whether they are likely to pass or fail the module. Those who appear to be struggling receive study suggestions and resources to support their study. The emails also contain information about how their VLE activity compared with that of their classmates during the previous week.	
Classification	
Inventory type:	pilot
Keywords:	predictive analytics, self-regulation
Context of Practice	
Learning:	post-compulsory
Geographical:	national: Ireland
Pedagogic:	The approach taken by PredictED has not been explicit in respect of pedagogy. The system focuses on student support through the use of predictive analytics. Use of the system is by students for self-regulation.
Practical Matters	
Tools used:	PredictED was developed by DCU's Insight Centre for Data Analytics. It functions within the university's VLE system, Moodle.
Design and implementation:	The programme is currently only available for a small number of modules. Students must opt in to participate. The system is designed for first-year students in their first term at the university. During the initial trial, around 75% of eligible students opted to participate.
Maturity and Evidence of Utility	
Informal accounts highlight that students who opted to participate in the PredictED trial had 3% higher scores than those who did not participate. However, this perceived improvement does not take into account self-selection bias or consider demographics of those who opted in versus those who did not. Thus, more rigorous testing of the system is needed to further determine the system's maturity and evidence of utility.	
Further Information	
Academic poster on use of data to predict which students are at risk: http://bit.ly/1SLPZ6A Informal accounts: http://bit.ly/1PSyk74, http://bit.ly/1UsIGhC	

32. Dunchurch Infant School

Synopsis
Dunchurch Infant School is an Early Years institution in the UK that teaches children from pre-school age through their first year of primary school. At the school, **observations of students' play and interactions within the classroom** are made and recorded, using the Development Matters system. Development Matters is non-statutory guidance, produced with support from the Department for Education, to support those working in early childhood education settings to implement the requirements of the Statutory Framework for the Early Foundation Stage. It includes guidelines for seven aspects of learning, which are further divided into seventeen subsections. Nearly 8,700 observations are recorded in the school in a given year, which has prompted the school to use learning analytics to help manage and interpret the large volumes of data on individual pupils. The school has a dedicated data analyst who collects observations and creates data visualisation charts for classroom teachers. Teachers can then use these reports as a snapshot of their pupils' strengths and weaknesses. The school claims that the percentage of students reaching 'a good level of development' has risen from 55% to 77% since adopting analytics.

Classification	
Inventory type:	pilot
Keywords:	data visualisation, observation
Context of Practice	
Learning:	school
Geographical:	national: UK
Pedagogic:	Dunchurch Infant School uses the Development Matters framework, produced by The British Association for Early Childhood Education.
Practical Matters	
Tools used:	The school previously used 2 Build a Profile, an app designed for recording observations. However, a dedicated staff member now develops visualisations in house.
Design and implementation:	This data visualisation and analytics system has been introduced school-wide in all classrooms. Over 75 pre-school children and nearly 60 first-year pupils are involved. The school has a dedicated staff member who collects data and creates visualisations for classroom teachers.

Maturity and Evidence of Utility
The school claims that the percentage of students reaching 'a good level of development' has risen from 55% to 77% since adopting analytics. Their school ratings have also improved since the adoption. No empirical evidence is currently available, although a detailed evaluation is planned.

Further Information
Dunchurch Infant School: http://dunchurchinfantschoolandnursery.co.uk/ Informal account of analytics at the school: http://bit.ly/1SiVU1o Development Matters: http://bit.ly/1nOID5s School inspection reports: http://bit.ly/1WNyQII

Practices: institutional at scale

33. Course Signals – Purdue University

Synopsis	
Course Signals is a predictive learning analytics system originally produced at Purdue University in the USA. The system uses student data to predict those who are at risk of not successfully completing a course. By **using predictive modelling of student data and activity in the learning management system (LMS), each student is assigned to a 'risk group**,' the colours of which are those of a traffic signal – red, yellow, or green. To use the system, a lecturer or tutor must manually run the model to receive students' 'signals', which they can then use to provide targeted feedback or additional resources to those at risk of low performance. Course Signals incorporates the use of intervention emails, which can be written by the teacher and sent to those in each risk group. Notifications can also be given in a student's LMS course page. Course Signals enables educators to give real-time feedback as early as the second week of class, and it can be used at multiple points during the term. In research published at LAK12, it was suggested that there was a 21% retention rate improvement at Purdue between students who took at least one course that used Course Signals, compared with those who did not. However, this has since been disputed.	
Classification	
Inventory type:	example at scale
Keywords:	predictive analytics, predictive modelling
Context of Practice	
Learning:	post-compulsory
Geographical:	national: United States of America
Pedagogic:	Purdue Course Signals is not explicitly aligned with a pedagogic framework.
Practical Matters	
Tools used:	Data used by Course Signals include student grades, demographic information, academic history, and use of the learning management system.
Design and implementation:	This system was produced at Purdue University in the USA. It uses student data from Blackboard, although no explicit connection between developers of Course Signals and Blackboard is described. As of 2012, over 2,300 students in more than 100 courses had used the system. At that time, it was suggested a further 20,000 students would gain access within the next 18 months. However, more current data has not been made available. At present, courses at Purdue are not required to use Course Signals, thus it has not been mobilised yet on an institution-wide scale. Lecturers may choose to adopt Course Signals within their own courses, but the project website suggests it is most effective for classes with over 50 students.
Maturity and Evidence of Utility	
Course Signal's effectiveness was highlighted in a paper presented at LAK12, claiming a 21% improvement in the retention rate of students who took at least one course that used the programme. However, criticisms have been made about the methods underlying these claims. As no follow-up studies have yet been published, it will be necessary to address these issues to demonstrate maturity and utility of the system.	
Further Information	
Informal accounts: http://bit.ly/22S5InZ, http://bit.ly/1Saf8aK Comparison of Course Signals and Blackboard Retention Center: http://bit.ly/1Rf95l0 Criticisms of claims http://bit.ly/22S2K2Q, http://bit.ly/1OGwsSd Academic study: Arnold, Kimberley E, & Pistilli, Matthew. (2012). Course Signals at Purdue: using learning analytics to increase student success. Paper presented at LAK12, Vancouver, Canada. See also LAEP Inventory record: Progress and Course Engagement (RioPACE) – Rio Salado College	

34. E^{2}Coach

Synopsis
High enrolment introductory courses **in science, technology, engineering and mathematics (STEM) at the University of Michigan (UoM) applied learning analytics to provide personalised messages to students**. In predicting student performance they found grade point average (GPA) in other courses to be the strongest predictor of success in a course. The university also asked students about their goals for the course and reason for taking the course as additional information to help tailor communications. In order to generate content, the project team interviewed faculty members about the advice they would give to students who had a variety of backgrounds, goals and circumstances. The team also surveyed students who had completed the course in order to gather information about a spectrum of learners and advice they had received about the courses. They interviewed students who performed better than expected and worse than expected in order to create student testimonials related to the courses. Using all of this information from students and faculty, they created a content bank designed to provide personalised advice for students with a variety of backgrounds, goals and circumstances. Users of E^{2}Coach out-performed non-users. Occasional users outperformed non-users by 0.15 letter grades, while frequent users out-performed non-users by 0.32 letter grades. At UoM the Third Century Initiative is investing 1.4 million US dollars to expand programmes including E^{2}Coach at the university.

Classification	
Inventory type:	example at scale
Keywords:	adaptive
Context of Practice	
Learning:	post-compulsory
Geographical:	national: United States of America
Pedagogic:	personalisation
Practical Matters	
Tools used:	MTS – Michigan Tailoring System, Student Information System
Design and implementation:	A coaching team and a student information system feed information to the MTS in order to provide personalised and tailored advice to students on introductory STEM courses. The coaching team includes previous students, behaviour change experts and instructors.

Maturity and Evidence of Utility
The MTS System is a mature open source platform

Further Information
Educause report on E^{2}Coach: http://bit.ly/1VGzsPo Details of project grant from Next Generation Learning Challenges: http://bit.ly/1QXbrV0 Campus Technology blog post on topic: http://bit.ly/1KnulD0 University of Michigan Third Century Initiative: http://bit.ly/1NOCN9c Michigan Tailoring System: http://bit.ly/20DXb64

35. Georgia State University

Synopsis	
At Georgia State University (GSU), **predictive analytics** have been used **to tackle the achievement gap for low income and first-generation students**. The university found that students were dropped from courses due to non-payment even when they had high grade point averages (GPAs) and were close to graduation. GSU graduation rate went from 32% in 2003 to 54% in 2014. In the process, the university claimed it removed the achievement gap between students from minority backgrounds or lower socioeconomic status, and their peers who had higher graduation rates. GSU states that it achieved these results by systematically accumulating smaller victories. The university took a series of measures to assist students with costs that were preventing them from staying enrolled in the university. The university used as tutors existing students who were obliged to work for the university as part of their financial aid package. The university also helped students select courses based on predictions of likelihood that they would pass the course.	
Classification	
Inventory type:	example at scale
Keywords:	predictive analytics
Context of Practice	
Learning:	post-compulsory
Geographical:	national: United States of America
Pedagogic:	This institutional practice relies on information about course grades from historic students, students who are on work studies, and information about course fee payments.
Practical Matters	
Tools used:	GSU's Office of Institutional Research compiled data from multiple systems and created a comprehensive data warehouse.
Design and implementation:	By creating Panther Retention Grants, 200 students were given hundreds of dollars to remain enrolled in courses. When students were dropped from a course due to failure to pay course fees, the university examined their GPA and proximity to graduation, and funded those who were most likely to graduate. These grants resulted in many of the recipients going on to graduation. The university also tackled gate-keeper courses, introductory courses that were good indicators of success for a given major. If a student was performing poorly in a gate-keeper course in their major, the university would hire a student who had a work study agreement, and who had previously taken the course, to tutor the struggling student. The university also created an advice system using a database of 2.5 million grades from the past 10 years to advise current students about the courses they were likely to succeed in based on their current grades. The same system advises students on what their major could be and saw first-year undeclared majors drop by 40% over two years.
Maturity and Evidence of Utility	
The implementation has prompted congressional testimony in the USA. Gate-keeper courses have been researched at a variety of grade levels across primary, secondary, and post-compulsory education.	
Further Information	
Video of congressional hearing on this programme: http://bit.ly/1QE6y10 Report – Building a Pathway to Student Success at Georgia State University: http://bit.ly/20lQn0c University Innovation Alliance blog post on programme (2015) - http://bit.ly/1m9YGcO Bill & Melinda Gates Foundation Case Study of the programme: gates.ly/1P9nGey	

36. Nottingham Trent University Student Dashboard

Synopsis	
Nottingham Trent University (NTU) in the UK **has developed, trialled and deployed a Student Dashboard for all undergraduate students**. The system draws engagement data from a range of sources: library use, attendance, use of the online learning environment, ID card swipes in to university buildings, and academic grades. It uses these to generate a composite engagement score and displays this graphically, together with the average for everyone on the course, and gives a rating of high, good, average or low. Automatic alerts are sent to a student's tutor for triggers such as 'no engagement for a fortnight' or 'academic failure'. The primary users of a student's score are the student themselves and their tutors; the scores are also available to other tutors on the course, course administrators, and student support staff, but not to other students.	
Classification	
Inventory type:	example at scale
Keywords:	predictive analytics, visualisation
Context of Practice	
Learning:	higher education
Geographical:	National: United Kingdom
Pedagogic:	The student dashboard does not explicitly embed a particular pedagogical approach, but implicitly relies on measures of engagement being useful indicators of learning.
Practical Matters	
Tools used:	The system was developed with DTP SolutionPath's Predictive Analytics service.
Design and implementation:	A Student Engagement Manager led the dashboard development, drawing on input from other stakeholders, with an initial trial with a smaller group of students before being rolled out more widely.
Maturity and Evidence of Utility	
After pilot work in 2013/14 with 400 students, the system was made available to all students in September 2014, and enhanced further in 2015. The system won the Times Higher Education award in 2014 for Outstanding Support for Students.	
Further Information	
Current guide for students: http://bit.ly/1T2Ahnx Upgrade announcement to students: http://bit.ly/1T2AoQ3 Video lecture on the use of learning analytics to increase student engagement: https://vimeo.com/114081815	

Practices: national level

37. Ceibal

Synopsis	
Uruguay has adopted a 1:1 approach to its education system. After delivering laptops (or tablets) to its students and providing software such as an adaptive mathematics tutor, the country examined the impact that upgrading the internet connection had on completion rates of learning activities using the software. During the five-year project, the country delivered 450,000 XO laptops to students. As well as putting devices into the hands of students and teachers the **project implemented an intelligent tutor**. The goal was to remove the digital gap between students who had access to technology and those who did not. Some critics raised the point that this was a large investment to access technology and questioned whether more emphasis should have been placed on the pedagogy of effective use of technology. However, the project did take a systematic approach to deployment, taking into account distribution, Internet access, training, repair and disposal. Access to the Internet is considered to be a human right. Estimated cost of the project was put at £159 per student with an estimated on-going annual maintenance cost of £13 per student. During the five-year project the cost was under 5% of the national budget for education.	
Classification	
Inventory type:	example at scale
Keywords:	adaptive
Context of Practice	
Learning:	compulsory
Geographical:	national: Uruguay
Pedagogic:	formative evaluation, project based learning, personalization,
Practical Matters	
Tools used:	Plan Ceibal Information System, LMS Crea, PAM (adaptive math tutor), ZABBIX (infrastructure monitor), Data warehouse
Design and implementation:	A study was conducted to examine the impact of upgrading the internet connection on completion rates of learning activities on the software. The analysis used a random and stratified sample across two populations: Interior Urban (IU) and Montevideo Metropolitan Area (MMV). Upgrading the Internet connection for schools was associated with an order of magnitude of improvement in the use of the math tutor software in IU schools. The report described the IU as having an initial condition of a less favourable learning environment.
Maturity and Evidence of Utility	
The technology-based project has been running across the country for more than a decade and Ceibal is now making moves to integrate learning analytics within the system and to take a lead on the introduction of learning analytics across South America. http://bit.ly/1Ull7Wa	
Further Information	
Project overview: http://bit.ly/1nCa2XT Ceibal website (in Spanish): http://www.ceibal.edu.uy/ BBC account from 2009: http://bbc.in/1KTCIRy World Bank blog post on the project's next steps (2013) http://bit.ly/1PcRFAc Paper, 'How can Plan Ceibal land into the age of Big Data?': http://bit.ly/1nC1ujU	

38. Student retention and learning analytics: A snapshot of Australian practices and a framework for advancement

Synopsis	
The Australian government commissioned this **in-depth look at the state of learning analytics practices in the country in 2015**. Study 1 identified two categories of implementation: 1.) Universities focused on performance measurement and retention interventions 2.) Universities focused more deeply on learning as a pursuit of understanding, who viewed retention as an important proxy for student engagement This highlighted opposing views about the purpose of using learning analytics to support retention: as a tool for supporting university needs or as a tool for supporting the student academic and social experience. In this study, more universities belonged to Cluster 1 than Cluster 2. The report highlights that institutional learning analytics policies require more than technical readiness, as universities' views on the benefits of learning analytics are also important drivers. Study 2 highlighted important factors for success. The report concludes that most Australian universities are in the early stages of adopting successful learning analytics practices. It stresses that learning analytics form a complex system, which requires the development of six key areas: academic content, conceptualisation of the purpose for learning analytics, leadership, university strategy, stakeholder feedback, technology and an understanding of the specific university context.	
Classification	
Inventory type:	candidate for mainstreaming
Keywords:	implementation, performance measurement, retention
Context of Practice	
Learning:	post-compulsory
Geographical:	national: Australia
Pedagogic:	Some universities considered student retention by analysing student data to determine interventions that support success in retention. In these cases, retention was viewed as a final goal and a marker of success. Other universities viewed retention as one factor that influences success. In these cases, retention was important as a support to the final goal of student learning. The report highlighted that university leaders' conceptualisations of learning and the role of learning analytics helped shape the use of analytics.
Practical Matters	
Tools used:	This report did not examine specific tools used by universities and instead focused on the ways in which tools are adopted.
Design and implementation:	The report gives the following suggestions and considerations for designing and implementing meaningful learning analytics programmes: 1.) Senior institutional leaders' commitment and strategic plan 2.) Compatibility with existing university systems 3.) A platform that can easily and ethically share data 4.) Transparency of learning analytics operations and data 5.) User-friendly tools to provide feedback 6.) Coordination with educators to design appropriate learning analytics tools 7.) Empowerment of students to develop agency in their learning
Maturity and Evidence of Utility	
This report uses robust mixed methods to consider the state of the art of learning analytics in Australia. It also incorporates viewpoints of international experts. The report includes an in-depth description and full explanation of its methods. Although the report focuses on the Australian context, it is of interest to an international audience. This report looks more broadly at trends in the adoption of learning analytics across universities, which provides useful insights and tips for moving the field forward. However, a more in-depth analysis of specific institutional practices will be useful in the future.	
Further Information	
Student retention and learning analytics report: http://he-analytics.com/	

39. Denmark: User Portal Initiative

Synopsis	
The Danish Ministry of Education has recently released a national User Portal Initiative, which aims to develop a common learning management system and standardisation framework for exchanging data for all school-aged students in the country. The initiative aims to go live during the 2016-2017 academic year. These initiatives are in collaboration with several technology-enhanced learning vendors, with the common goal of allowing an integration of data nationwide that can be used to develop and inform local or district-wide initiatives. **By 2016, it is expected that all schools in Denmark** will adopt technology infrastructure to **begin the large-scale adoption of learning analytics**. The Ministry is involved in developing and supporting a wide range of resources and programs for schools. Several of these online portals consolidate and summarise resources and evidence of their utility, including EMU, SkoDa, and Materialeplatformen. The creation of common educational objectives, well-being objectives and national testing by the Ministry is also associated with a broader adoption of learning analytics tools and data sharing. Enrolment in secondary education takes place through a digital process called Accession, allowing for easy collection of student demographic data. Finally, a data warehouse that allows for comparisons of student data between institutions, districts or regions is available to the public.	
Classification	
Inventory type:	pilot
Keywords:	data sharing standardisation
Context of Practice	
Learning:	school
Geographical:	National: Denmark
Pedagogic:	The Ministry of Education will require in 2016 that all schools incorporate IT infrastructure to support these initiatives. Little information has been released about how this may change or disrupt current teaching practices.
Practical Matters	
Tools used:	The Ministry plans to collect data from local IT infrastructures at individual schools. National online testing will form a common practice across all schools.
Design and implementation:	The Ministry of Education in Denmark has initiated these practices, in collaboration with local schools through a pilot study conducted by Ramboll Management Consulting. A current challenge is the need to encourage institutions to adopt a 'data culture' and to prepare teachers and administrators through the development of digital competencies.
Maturity and Evidence of Utility	
As the project is in its initial pilot phases, it is too early to draw conclusions about maturity or evidence of use. However, in its development phase in 2014, an assessment of the potential of learning analytics use in schools was conducted by Ramboll Management Consulting and incorporated into the practice design.	
Further Information	
Press release (in Danish): http://bit.ly/1OaRrPa LACE summary: http://bit.ly/1YhwceJ Data warehouse (in Danish): https://www.uddannelsesstatistik.dk/	

40. Norway: various initiatives at the national level

Synopsis
In Norway, a number of software tools deploying features of learning analytics are available through the commercial sector. For instance, Conexus (see description in 7), a Norwegian educational software company that was set up in 2000, provides learning analytics tools for data aggregation and visualisation. Conexus software also provides tools for assessment, adaptive learning and targeting interventions. Another example is *itslearning*[26] (see description in 9), a learning platform with analytics features, which was originally developed at Bergen University College in 1998. In early 2014, Norwegian largest textbook company Gyldendal[27] announced a partnership with the adaptive learning software company Knewton to design an adaptive learning textbook program for primary schools, called Multi Smart Øving[28], which also incorporates learning analytics tools. An important driver for such vendor and tool development is organised by IKT-Norge[29], an interest group for the Norwegian ICT industry. In order to support and guide the up-take with the issues around learning analytics, the Centre for ICT in Education (Senter for IKT i utdanningen), with a mandate to promote ICT in Norwegian schools, has organised workshops and drafted policy-oriented advice for schools. The Centre's **report on learning analytics (Laeringsanalyse)** by Morten Dahl provides an introduction to the subject, written in Norwegian. This gives examples of use within Norway and in a global context. The report identifies potential problems with learning analytics. These include lack of teacher training in the skills necessary to use analytics effectively; threats to privacy and information security; the complex learning analytics market in which there are currently no guidelines, national framework or infrastructure, and a lack of understanding of which data are relevant for promoting quality in learning. The report also deals with the privacy challenges associated with learning analytics and asks how far schools can proceed with recording, compiling and analysing data about students without coming into conflict with their right to privacy. In Norway, schools may only make use of personal data for learning analytics if they can identify a legally valid reason for that use. If personal data are used, schools will be responsible for assuring the quality of those data, for ensuring that they are used to support learning, and for ensuring that students, teachers and parents or guardians are able to access, correct and delete their data on demand. In 2015, the Ministry of Education and Research committed 25 million Norwegian kroner (approximately 2.7 million euros) to the establishment of a research centre on learning analytics. To determine the location of this new centre, the Ministry invited bid submissions. After a review process, the University of Bergen was selected as the host institution, and the centre was named the Centre for The Science of Learning and Technology (SLATE). The Ministry will contribute five million Norwegian Kroner (approximately 540,000 Euro) per year to the centre, and the University of Bergen will contribute additional research funding. Although the current contract for the centre is for five years, there is a possibility that it will be extended for an additional five. SLATE will have a broad scope, encompassing life-long learning and applying a multitude of research viewpoints and approaches. Learning Analytics are one element in SLATE´s activities. In 2016, several developments are on-going, especially focusing on enabling the underlying infrastructure: • Actions related to technical infrastructure and interoperability are being carried out in Norway. UNINETT, who develops and operates the Norwegian national research and education network, is rolling out a service platform, Dataporten (Norwegian for "data gate")[30], that connects data sources and end-user applications. This will eventually allow for better sharing of data also for the purpose of learning analytics. • Within *Standards Norway*[31], the national standards body of Norway, discussions have cantered around three projects: *Datasharing, vocabularies for activity descriptions,* and *Privacy and best practice guidelines*, all potential underlying enablers for applications such as learning analytics.

Classification	
Inventory type:	analysis of policy-related issues
Keywords:	Infrastructure, data protection, ethics, privacy

26 http://www.itslearning.net/
27 http://www.gyldendal.no/ (in Norwegian)
28 http://www.smartoving.no/ (in Norwegian)
29 https://www.ikt-norge.no/english/
30 https://www.uninett.no/en/service-platform-dataporten
31 https://www.standard.no/en/

Policy Context	
Learning:	kindergarten, primary, secondary, teacher training
Geographical:	National: Norway
Relationships:	
Maturity and Evidence of Utility	
Further Information	
ICT practice blog (in Norwegian): http://bit.ly/1PStxsi Location of policy document (in Norwegian): https://iktsenteret.no/ressurser/laeringsanalyse Centre website in English: http://bit.ly/1VHc2cH	

41. Effective learning analytics pilots – JISC

Synopsis	
Jisc, a UK not-for-profit organisation with a mission to develop the exploitation of digital technologies for education and research in universities and colleges, is in **the early stages of a national initiative to accelerate those institutions towards effective use of learning analytics** through: the development of advice and guidance, the establishment of a technical platform with free and charged services and integration with institutional systems, and the support of a series of pilots using the platform. Envisaged use includes: ● access by students to measures of their own levels of participation and indicators of disengagement or falling-behind, as an aid to self-regulation ● use by staff to trigger interventions as part of a student support process. The first set of pilots entered their Discovery Phase in autumn 2015. During this phase, institutions assess their readiness as a baseline for implementation planning.	
Classification	
Inventory type:	pilot
Keywords:	predictive analytics, self-regulation, student support
Context of Practice	
Learning:	post-compulsory
Geographical:	national: UK
Pedagogic:	The emphasis of the technical system and tools is on student support rather than on teaching and learning. In this respect, the implicit approach is mainstream in that the emphasis is on monitoring engagement and performance and using predictive analytics to prompt appropriate staff to the possible need for an intervention. Use by students for self-regulation is in scope but is of secondary importance.
Practical Matters	
Tools used:	Tribal Student Insight – learning analytics processor and staff dashboard Unicon Learning Analytics processor and open dashboard Learning Locker (HT2) – storage of activity records using xAPI Student Success Plan – for managing alerts and interventions A bespoke student app and a student consent service are also being developed.
Design and implementation:	A workshop in September 2014 formed part of the co-design process. This workshop identified and prioritised three actions: the development of a solution with a particular funding model, a code of practice covering ethical, privacy, and legal matters; and support for a peer network. During a two-year pilot phase, Jisc anticipates that between 20 and 40 institutions will complete the Discovery Phase.
Maturity and Evidence of Utility	
Findings from the first tranche of pilots are not yet available. The overall approach taken by Jisc is illustrative of a co-design approach involving stakeholders from across UK universities and colleges. This employs technical architecture which offers choice to institutions, and a multi-stranded approach to accelerating institutions towards adoption of learning analytics	
Further Information	
Informal account of Jisc Effective Learning Analytics challenge: http://analytics.jiscinvolve.org/ Discovery Phase of the pilots: http://bit.ly/JiscDiscovery Overview of tools available: http://bit.ly/JiscTools Background on the technical system architecture, 'Developing an open architecture for learning analytics' paper http://bit.ly/JiscEUNIS-Paper, slides http://bit.ly/JiscEUNIS-Slides (EUNIS Congress 2015) See also LAEP Inventory records: ● Code of practice for learning analytics ● Student success plan	

42. Code of practice for learning analytics – Jisc

Synopsis	
This code of practice was developed to help universities and colleges to develop effective approaches to a variety of issues relating to the practice of learning analytics. It is a concise document that would be suitable for development of local strategies and policies. Rather than providing a prescriptive code of practice, the approach taken is to clarify a set of principles that can be operationalised according to the policies and practices already in place in universities and colleges. The topics covered are, as described by the authors: 1. **Responsibility** – allocating responsibility for the data and processes of learning analytics within an institution 2. **Transparency and Consent** – being open about all aspects of the use of learning analytics, and ensuring students provide meaningful consent 3. **Privacy** – ensuring individual rights are protected and compliance with data protection legislation 4. **Validity** – making sure that algorithms, metrics and processes are valid 5. **Access** – giving students access to their data and analytics 6. **Enabling positive interventions** – handling interventions based on analytics appropriately 7. **Minimising adverse impacts** – avoiding the various pitfalls that can arise 8. **Stewardship of data** – handling data appropriately The Code was developed for use in the United Kingdom, and refers to some national law, but most aspects are generally applicable, drawing particularly on thinking from North America, Europe, and Australia. It is published under a Creative Commons Licence.	
Classification	
Inventory type:	good practice advice
Document source:	Jisc, a UK Charity (non-profit)
Keywords:	responsibility, transparency, consent, privacy, validity, ethics
Policy Context	
Learning:	post-compulsory
Geographical:	national: UK
Relationships:	The Code of Practice is not formally linked to other policy initiatives but forms part of a systematic programme of initiatives being undertaken by Jisc to assist universities and colleges in the UK in the implementation of learning analytics. The Code relates to existing policies on privacy and recent work by The Open University to develop its policy on the Ethical use of Student Data for Learning Analytics.
Maturity and Evidence of Utility	
Representatives, with diverse roles, from the UK higher and further education sectors were consulted, and they identified the need for a code of practice as a prerequisite for effective implementations of learning analytics. Following a series of open publications and expert workshops, including a literature review of recent work on ethics and legal matters and a workshop meeting, a draft code of practice was developed and made openly available for comment. A steering group with members drawn from the National Union of Students and UK universities and colleges had oversight of the development process.	
Further Information	
Location of policy document: http://bit.ly/JiscCoP Ethics and legal issues literature review: http://bit.ly/JiscLitReview Taxonomy of ethical, legal and logistical issues (draft issues and workshop report): http://bit.ly/JiscTaxonomy See also LAEP Inventory records: Ethical use of student data policy – The Open University Effective learning analytics pilots – Jisc	

43. PAR Framework

Synopsis	
The Predictive Analytics Reporting (PAR) Framework is a non-profit provider of **analytics-as-a-service** to a range of types of higher education institution in the USA (two- and four-year courses of study, public and private, traditional and non-traditional institutions). It **undertakes benchmarking, prediction and work to understand the signs of risk versus progress to completion**. In addition to prediction, an aim of PAR is to support the identification of good practice in student retention through data analysis, shared models and benchmarking across institutions. The PAR Framework motivations are two-fold: a) that there is a cost saving in having a central analytics service with highly skilled staff, covering multiple aspects of expertise from data science to policy and higher education practice; b) cross-institutional benchmark studies provide valuable information on effective strategies to promote achievement, engagement and progress, which a single-institution analytics activity would be unable to reveal.	
Classification	
Inventory type:	candidate for mainstreaming
Keywords:	predictive analytics, analytics as a service
Context of Practice	
Learning:	post-compulsory
Geographical:	national: USA
Pedagogic:	The PAR Framework is not explicit in supporting any pedagogic practice.
Practical Matters	
Tools used:	Exchange of data and results between the member institutions and PAR uses files produced according to a set of Common Data Definitions, which are published under a Creative Commons licence.
Design and implementation:	PAR is a membership organisation in which each member institution contributes its data to a central database and receives the results of student-level analysis on its own data. PAR maintains a team including data scientists and researchers. Benchmark data are available to all member institutions. Governance is member-led. Each member institution is required to follow its normal institutional approval process for human subject research (ethics committee or institutional review board) and the PAR team all have certification in human subject research.
Maturity and Evidence of Utility	
PAR is essentially already mainstream in that numerous higher education institutions in the United States are member institutions, but it is classified here as a candidate for mainstreaming as the model has yet to be replicated in other geographical regions. PAR is now an independent non-profit organisation but it has evolved over a number of years, having been a service managed by the WICHE Cooperative for Educational Technologies (WCET) non-profit organisation until late 2014, with funding from the Bill and Melinda Gates Foundation, at which point 16 institutions were part of the collaborative venture. Previously, PAR had been a smaller-scale pilot project. By autumn 2015, 33 campuses were participating in the collaboration. A 2012 academic paper deals with the PAR Framework proof of concept study and its initial findings. files.eric.ed.gov/fulltext/EJ982674.pdf	
Further Information	
Overview of the PAR Framework: http://www.parframework.org/about-par/overview/	

Practices and policies on the ethical use of LA

44. Ethical use of student data policy – The Open University

Synopsis

The Open University (UK) policy documents relating to the **ethical use of student data** include both a formal policy and guidance documents. The aim of the policy documents is to set out how the University intends that student data should be used to inform the delivery of student support in ways which conform to the University's charter principle to 'treat each other with dignity and respect'.

The policy, which covers use of data for both student-level interventions and institutional-level strategies and processes, but not use for academic research, is based on eight principles, which are:

1. Learning analytics is an ethical practice that should align with core organisational principles, such as open entry to undergraduate level study.
2. The OU has a responsibility to all stakeholders to use and extract meaning from student data for the benefit of students where feasible.
3. Students should not be wholly defined by their visible data or our interpretation of that data.
4. The purpose and the boundaries regarding the use of learning analytics should be well defined and visible.
5. The University is transparent regarding data collection, and will provide students with the opportunity to update their own data and consent agreements at regular intervals.
6. Students should be engaged as active agents in the implementation of learning analytics (e.g. informed consent, personalised learning paths, interventions).
7. Modelling and interventions based on analysis of data should be sound and free from bias.
8. Adoption of learning analytics within the OU requires broad acceptance of the values and benefits (organisational culture) and the development of appropriate skills across the organisation.

Guidance documents expand upon the policy, to summarise the principles for staff, and to provide answers to the 'frequently asked questions' of students about how data about them is used in practice.

Classification

Inventory type:	adoption implementation advice analysis of policy-related issues formal policies good practice advice strategy-level white paper
Document source:	The Open University: UK higher education establishment
Keywords:	ethics, data protection, privacy, student support

Policy Context

Learning:	post-compulsory
Geographical:	national: UK
Relationships:	The policy is explicitly linked to The Open University Student Charter and to policy and legal requirements for data protection.

Maturity and Evidence of Utility

The policy is a relatively new creation, having been adopted in September 2014. It is, however, underpinned by: a series of peer-reviewed scholarly works combining original formulations of the problem space and review of existing related practice in higher education; and consultation with key institutional stakeholders. It is not yet fully integrated into daily practice such as registration.

Further Information

Location of policy document: http://bit.ly/OU-LAPolicy (comprises the formal policy and informative guidance)

Slade, Sharon and Prinsloo, Paul (2014). Student perspectives on the use of their data: between intrusion, surveillance and care. In: *Challenges for Research into Open & Distance Learning: Doing Things Better – Doing Better Things*, pp. 291–300 http://oro.open.ac.uk/41229/

45. Learning analytics: a guide for students' unions – NUS

Synopsis	
The UK's National Union of Students (NUS) has compiled a brief **good practice guide for student unions** within the UK. The start of the guide defines learning analytics as 'using the increasing potential of data insight to improve students' learning.' The guide goes on to highlight the types of data that universities may use, such as virtual learning environment behaviours, use of books or assessment marks. Next, potential benefits of adopting learning analytics are discussed, such as avoiding drop-outs and reducing demotivation. The remainder of the document focuses on risks associated with learning analytics, and considerations for student unions in schools that use student data. The risks highlighted include: privacy, data sharing with third parties, consent, and formative versus summative data. The document also links to JISC's Code of Practice and contact information for help from NUS.	
Classification	
Inventory type:	good practice advice adoption/implementation advice
Document source:	Educational establishment: NUS
Keywords:	ethics student unions
Policy Context	
Learning:	post-compulsory
Geographical:	National: UK
Relationships:	This document was created by the NUS specifically to inform student unions of their rights and areas of concern. It also explicitly links with JISC's Code of Practice, which was created in consultation with NUS.
Maturity and Evidence of Utility	
This good practice document is relatively short, but is an excellent summary for those new to learning analytics. It is also one of the few policy documents available that are explicitly written from a student perspective and address students as agents in the process of adopting learning analytics. Its connection with the more formal JISC Code of Practice document also lends to its maturity and evidence of utility.	
Further Information	
Location of policy document: http://bit.ly/1X2j13W JISC Code of Practice: http://bit.ly/1T8zbrC See also LAEP Inventory records: • JISC Code of Practice	

46. Evaluation of policy frameworks for addressing ethical considerations in learning analytics

Synopsis	
This LAK13 conference paper **analyses policy frameworks from two large distance education universities**, The Open University in the UK and the University of South Africa. The paper reports that although a great deal of data was collected from and about students by the institutions, learning analytics were not explicitly addressed within the policies of either institution at the time of writing. Both institutions' policy frameworks were focused on national and international legislative issues around intellectual property, data privacy and data protection. The review highlights the irregularity of learning analytics where the institution is the only stakeholder with decision-making power, determining the scope, definition and use of educational data without the input of other stakeholders – specifically students. It is clear from the existing policy frameworks of both institutions that the definition and scope, harvesting and analysis of data are imbalanced and non-transparent affairs. This research indicates that some higher education institutions' policy frameworks may no longer be sufficient to address the ethical issues in realising the potential of learning analytics.	
Classification	
Inventory type:	analysis of policy-related issues
Document source:	LAK13 Proceedings of the Third International Conference on Learning Analytics and Knowledge, educational establishment
Keywords:	data protection, ethics, privacy
Policy Context	
Learning:	post-compulsory
Geographical:	International: UK, South Africa
Relationships:	This analysis relates to policy documents of The Open University in the UK and the University of South Africa, dated in or before 2013.
Maturity and Evidence of Utility	
The analysis discusses issues that are pertinent for any university that is using or wishes to use learning analytics, but that has not considered the potential policy implications. It considers issues arising from two different educational contexts so findings should be applicable to institutions operating in either of the contexts and potentially beyond these.	
Further Information	
Location of policy document: http://oro.open.ac.uk/36934/ Slade, Sharon and Prinsloo, Paul (2013). Learning analytics: ethical issues and dilemmas. *American Behavioral Scientist*, 57(10) pp. 1509–1528 http://oro.open.ac.uk/36594/ See also LAEP Inventory records: Ethical use of student data policy – The Open University	

Practices: interest groups and networks

47. Further education learning technology action group: FELTAG

Synopsis	
FELTAG, the Further Education Learning Technology Action Group, includes members from across the further education system, including learning providers, accreditation and funding bodies, and industry. The group has as its goal 'Create the conditions for the agile evolution of the FE system, support employers and drive economic growth' and believes that 'Government cannot and should not provide all the answers. Ownership by the FE sector'. The group emphasises putting people ahead of the technology and investing in teachers and administrators. One suggestion offered by the group is to **build an innovation network to enable staff to drive digital innovations.**	
Classification	
Inventory type:	example at scale
Keywords:	further education
Context of Practice	
Learning:	post-compulsory
Geographical:	national: UK
Pedagogic:	There is a focus on empowering learners and engaging them actively.
Practical Matters	
Design and implementation:	**FELTAG recommendations:** ● Learners should be empowered as digital leaders, increase their influence in providers' learning strategy, become more aware of assistive technology, and be prepared to demonstrate online skills. ● Employers should participate in further education curricula development and scale up best practices, offer leading-edge apprenticeships, encourage providers to use collaborative MOOCs, and consider how small and medium enterprises can build the digital capability of staff. ● Skill providers should assess organisations' use of technology, accredit learning technology, have regional support centres play a role in further education, and teach the teachers how to design their own learning materials. In terms of investment, regulation, and funding, the group outlines efforts that need to be made in order to keep up with the pace of technology. It identifies that infrastructure concerns such as broadband need to be taken into account, and suggested that publicly funded programmes in 2015/16 should have mandated a 10% wholly-online component, increasing to 50% in the following year. Funding should encourage 'learning presence' not 'physical attendance'.
Maturity and Evidence of Utility	
This work involved a variety of key stakeholders and examined the challenge from a comprehensive perspective illustrating the roles of different types of organisations in producing improved learning.	
Further Information	
FELTAG coalition: http://feltag.org.uk/feltag-coalition/ FELTAG report: http://bit.ly/1SVsbgt	

48. Learning Analytics Community Exchange (LACE)

Synopsis	
The Learning Analytics Community Exchange is a European-funded project in the 7th Framework Programme, which involves nine partners from across Europe. LACE partners are passionate about the opportunities afforded by current and future views of learning analytics (LA) and educational data mining (EDM) but are also concerned about missed opportunities and failing to realise value. The 30-month project aims to integrate communities working on LA and EDM from schools, workplace and universities by sharing effective solutions to real problems. The LACE project **brings together existing key European players in the field of learning analytics and EDM** who are committed to building communities of practice and sharing emerging best practice in order to make progress towards four objectives. Objective 1 – Promote knowledge creation and exchange Objective 2 – Increase the evidence base Objective 3 – Contribute to the definition of future directions Objective 4 – Build consensus on interoperability and data sharing	
Classification	
Inventory type:	network
Keywords:	research network, research collaboration
Context of Practice	
Learning:	school, post-compulsory, workplace
Geographical:	international
Pedagogic:	The focus of LACE is on analytics to deal with questions of interest to an educator, trainer or reflective learner. These include questions directed towards improving effectiveness or efficiency with regard to teaching and learning, developing assessment with greater relevance and other forms of pedagogically driven decision making.
Practical Matters	
Tools used:	The LACE project has developed tools for use by the learning analytics community, including a framework of quality indicators for learning analytics, the DELICATE checklist for a trusted implementation of learning analytics, and the LACE Evidence Hub, which provides access to research evidence.
Design and implementation:	LACE has engaged with learners, educators, organisations and policymakers across Europe. It has organised many events, including a successful series of workshops on ethics and privacy in learning analytics (EP4LA)
Maturity and Evidence of Utility	
LACE was a 30-month project, which ran from January 2014 until June 2016. Its tools and resources remain available online.	
Further Information	
LACE project website: http://www.laceproject.eu/ DELICATE checklist: http://bit.ly/1XT2iNO LACE YouTube channel, containing video interviews with international experts: https://www.youtube.com/user/LaceprojectEu LACE Review papers: http://www.laceproject.eu/learning-analytics-review/	

49. Society for Learning Analytics Research (SoLAR)

Synopsis	
The Society for Learning Analytics Research (SoLAR) is an inter-disciplinary **network of leading international researchers** who are exploring the role and impact of analytics on teaching, learning, training and development. SoLAR has been active in organising the International Conference on Learning Analytics & Knowledge (LAK) and the Learning Analytics Summer Institute (LASI), launching multiple initiatives to support collaborative and open research around learning analytics, promoting the publication and dissemination of learning analytics research, and advising and consulting with state, provincial and national governments. SoLAR priorities to advance the field of learning analytics globally are: • Foster the highest standards of academic research into learning analytics • Promote the development of open educational resources in learning analytics • Raise awareness of learning analytics amongst policy and decision-makers in educational institutions and governments • Create opportunities for the diverse stakeholders in learning analytics to communicate, collaborate and debate. These stakeholders include academic researchers, product developers, educators, students, institutional administrators and government policy analysts.	
Classification	
Inventory type:	example at scale
Keywords:	network, organisation, society
Context of Practice	
Learning:	All levels
Geographical:	international
Pedagogic:	various
Practical Matters	
Tools used:	SoLAR makes use of a range of technologies to support international communication. These include Google Groups, the use of EasyChair to manage conference submissions, and Zoom for executive meetings.
Design and implementation:	The Info Hub on the SoLAR website brings together learning analytics resources and reports from the field. SoLAR also provides a dataset of research literature, which can be used to test computational methods of analysis
Maturity and Evidence of Utility	
SoLAR was founded in 2011. In 2016, its annual conference attracted 460 participants.	
Further Information	
SoLAR website: https://solaresearch.org SoLAR Info Hub: https://solaresearch.org/core/ LAK Dataset: https://solaresearch.org/initiatives/dataset/	

50. Spanish Network of Learning Analytics (SNOLA)

Synopsis	
SNOLA (Spanish Network of Learning Analytics) is a collaborative community that is building **practice for learning analytics researchers in Spain**. The primary aim of SNOLA is to share resources and findings among members through online depositories, webinars and events. The project also encourages collaboration between members on learning-analytics-related projects. One prominent example is ATHENA-I (translation from Spanish: Application of analysis techniques and adaptation of the educational process in the Cloud for the provision of Interoperable Learning Spaces), which analyses the effects of new technologies, such as learning management systems and MOOCs, within schools. Other collaborations include a learning analytics extension for Khan Academy and edX, and MakeWorld, a digital program for science, technology, engineering and mathematics. SNOLA currently has around 75 members based in a variety of universities and businesses across Spain.	
Classification	
Inventory type:	example at scale
Keywords:	research network research collaboration
Context of Practice	
Learning:	All levels
Geographical:	National: Spain
Pedagogic:	SNOLA members come from a wide variety of research backgrounds, so it is not possible to highlight one specific pedagogic framework that applies to the entire network
Practical Matters	
Tools used:	Different members make use of different tools.
Design and implementation:	The Spanish Ministry of Economy and Competitiveness (MINECO) called for 'networks of excellence' of scientific research and SNOLA was formed in response to this call. In 2015, SNOLA was designated as an accepted 'network of excellence' by the government. At present, any Spanish researcher can join SNOLA by completing an online form.
Maturity and Evidence of Utility	
Although a relatively new collaborative research group, SNOLA has already provided an important boost to learning analytics research in Spain. In 2015, a Learning Analytics Summer Institute (LASI) was hosted in at the University of Deusto, in collaboration with SNOLA members, and another LASI is planned for 2016. In 2016, a well-received webinar was held by SNOLA members, entitled 'Applying Quantitative Techniques for Analysis of Educational Data.' Several collaborative projects between partners are already underway.	
Further Information	
Group website: http://snola.deusto.es/ Zotero group: https://www.zotero.org/groups/snola LASI Bilbao 2016: http://lasi16.snola.es/	