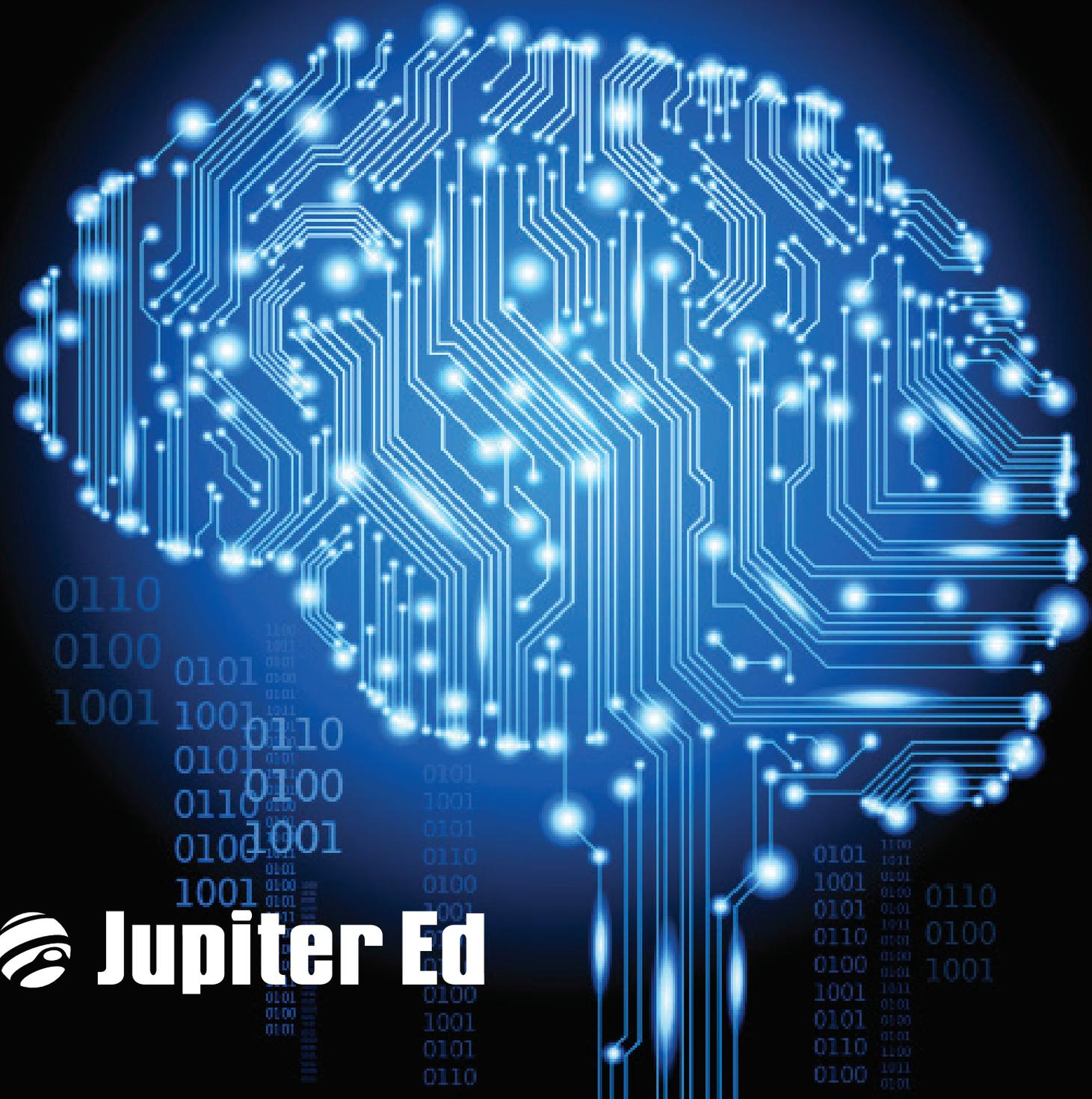


Learning Analytics in the Cloud

K12 Education White Paper



Jupiter Ed

When you hear “analytics” you might think of webmasters tracking visits to their site. But learning analytics combines this sort of data analysis with web based education tools, aiming to create a more integrated learning experience by using intelligent data, student performance and analysis models to find out how students learn and can improve in their learning experiences.

Learning analytics—a science that was originally leveraged by businesses to analyze commercial activities, identify spending trends, and predict consumer behavior—is on the rise for “Big Data” in K12. Education is embarking on this similar pursuit into data science with the aim of improving student retention and providing a high quality, personalized experience for learners. There is a national focus on the use of analytics in education as well. The U.S. Department of Education’s 2013 National Education Technology Plan envisions ways of using data from online learning systems to improve instruction as its model for 21st-century learning powered by technology. The plan encourages education institutions to begin using analytics to improve academic outcomes and increase student grades and retention.

Learning analytics focuses on applying tools for patterns and prediction. The ability to discern the pattern in the data and make sense of what is happening helps educators predict what should come next and take the appropriate action. Analytical solutions are giving teachers a closer look into the learning activities of their students in real-time, while districts are using data and analytics to inform their decision-making. In all of these scenarios, learning analytics make data an integral part of planning, designing and assessing learning experiences.

Learning analytics leverages student data to build better pedagogies, target at-risk student populations, and assess whether programs designed to improve retention have been effective and should be sustained. The goal of learning analytics as enabling teachers and schools to tailor educational opportunities to each student’s level of need and ability.

Learning and the Use of Analytics

It is fair to say that the core concept of analytics (or learning analytics) is not completely new to many educators and it has been in existence for several decades in education theory and practices. On one hand, good teaching practice has, for a long time, involved recording information with pen and paper for the analysis and reflection of this data to inform further action and interventions relating to individual pupils or classes; on the other hand, researchers in the educational data mining field have a long history for developing tools and techniques to make use of data to improve teaching and learning or education on the whole.

However, there is a gap between what technology promises to do and what people can do with existing data sources and tools in reality. Learning analytics is gaining visibility as converging technologies bolster anywhere, anytime mobile and online learning trends. It is only in recent years, due to the increasing use

of technology in education, that more and more personal information and detailed records on learning activities and assessment have become available in Virtual Learning Environments (VLEs) and other systems.

The development of new techniques and tools that lower the technical and cost barrier of undertaking such analysis makes it possible for educators to gain an insight from various data sources to achieve efficiency and effectiveness and improve students' performances. When students are learning online, there are multiple opportunities to exploit the power of technology for formative assessment. In the past, traditional approaches to answering these questions have involved student evaluation, the analysis of grades and attrition rates, and instructor perceptions, most often gathered at the end of a course. Consequently the evaluation and analysis of learning has suffered.

Learning analytics make data an integral part of planning, designing and assessing learning experiences by offering insight that informs and educates every tier of the educational process.

Important information can be gleaned from student work with online learning environments so teachers can make careful, calculated adjustments that keep learners motivated as they master concepts or encounter stumbling blocks. An online system can collect more detailed information about how students are learning than manual methods. As students work, the system can capture their inputs and collect evidence of their problem-solving sequences, knowledge, and strategy use, as reflected by the students inputs and answers, the number of attempts the student makes, and the time allocation across parts of the problem. Utilizing data from online learning and gradebook systems can help answer the following questions:

- How effective is the course?
- Is it meeting the needs of the students?
- How can the needs of learners be better supported?
- What interactions are effective?
- How can they be further improved?

As more teachers incorporate online learning into their curricula, it will become difficult to track an individual student's progress, much less an entire class, if not utilizing all-in-one solutions that include reporting capabilities. The need for all-in-one solutions such as Jupiter iO, that help schools drive education reform by integrating information from disparate systems into a solution that connects student data storage, content management and reporting for anywhere, anytime learning provide transparent personalized learning for students in real time, therefore helping schools make impactful decisions.

The Value of Real-Time Data

A key application of learning analytics is monitoring and predicting students' learning performance and spotting potential issues early so that interventions can be provided to identify students at risk of failing a course. A virtue of real time analytics is that it enables human tailoring of responses and provides teachers

with information relevant to student learning and performance and allows instant feedback that is crucial for improving learning. It assesses the gap between what students know and what they are expected to know and suggests where students should focus their time in order to improve performance. Learning analytic systems help the education institution answer questions such as:

- When are students ready to move on to the next topic?
- When are students falling behind in a course?
- When is a student at risk for not completing a course?
- What grade is a student likely to get without intervention?
- What is the best next course for a given student?
- Should a student be referred to a counselor for help?

With real-time data school administrators can instantly compare schools, teachers, demographics, pre-tests, and control groups, and determine statistical significance. Utilizing reports to instantly compare students by school, gender, race/ethnicity, and other custom groups not only help provide efficiency for the busy teacher and administrator but also provide the real-time data for time sensitive, reformation. Tailoring education to the individual student to help teachers personalize learning is one of the greatest benefits of technology and big data. Utilizing real-time learning analytics can help educators identify underlying patterns in order to predict student outcomes such as dropping out, behavioral problems, needing extra help, or being capable of more demanding assignments. It can identify pedagogic approaches that seem most effective with particular students.

It is important to understand the value of a data-driven approach to education. Learning analytic reporting will contribute to informed decision making by making the data that has gone unseen and unnoticed more visible and therefore actionable, It will allow administrators to identify trends, pinpoint problem areas, and direct resources in an efficient manner. Analytical reports have the empirical weight needed to guide administrative and governing bodies as they target areas for improvement, allocate resources, and assess the effectiveness of academic programs. The use of learning analytics through all-in-one systems will increase learning, transparency, and accountability, and make it easier to evaluate trends within the educational institution. To gain value from analytical reporting practices, educators and administrators should:

- Develop a culture of using data for making instructional decisions.
- Involve IT departments in planning for data collection and use.
- Start with focused areas where data will help, show success, and then expand to new areas.
- Communicate with students and parents about where data come from and how the data are used.

Jupiter iO and Learning Analytics

Learning analytics including tracking student learning, providing early alerts and interventions to improve retention and operations are some examples of analytics applications. Below are examples of how Jupiter iO is being used as initiatives in education:

1. Adaptive testing, tracking and reporting: assess progress and focus on an individual student, class or defined groups, including progress summary, class goals report, progress report over multiple

grading periods, etc. By using the Jupiter iO analytical tools, parents can view the students learning progress and teachers can evaluate when to personalize learning for students in need of continued support in specific areas.

2. Analytics tools for early alert, intervention and collaboration: The Jupiter iO analytical tool has been developed to track students' academic performances by integrating the data collected from the gradebook, student information system and learning management system, allowing educators to assess the risk, initiate early interventions and support collaborative learning. Utilize the data collected from student information system, learning management system, and the gradebook for a specific course to track students' performances and identify at-risk students in real time,
3. Analytics projects for institutional efficiency and effectiveness: Education institutions can utilize analytics initiatives to measure operational performance, and improve the effectiveness of operations, including drop-out prevention, resource management, financial planning, for future budgetary decisions. For example, Jupiter iO integrates data to provide an overview of a student's level of engagement and performance within the classroom and is proactive in identifying students at risk of withdrawing to improve retention rate.

When LMS data are correlated with additional information gathered in other systems such as SIS and gradebook, a richer picture of student learning experience, instructor adoption and institutional usage can be generated. Jupiter iO helps educators by providing the tools necessary to make informed decisions and to support student success in a results-driven environment. Other reporting capabilities of Jupiter iO Analytics include:

- Grade Trends show a graph of whether each student's grade is going up or down, and by how much
- Histogram and median of grades in a class
- Histogram and median of scores on an assignment—in one or multiple classes
- Histogram and average of scores for a particular student on a particular objective
- Impact on Grade graphs show on which assignments a student did relatively well or poorly
- Class average for each objective
- Schoolwide average for each objective by grade level
- Discipline statistics, including before & after

Educators and administrators are expressing great excitement over the promises and possibilities of using analytics in education. Analytics will provide opportunities for educators to use data effectively, to bring real changes in teaching and learning and to transform the accountability, efficiency and relevance of education. Undoubtedly, with the growing adoption of technology in education and with better data gathering and analysis tools available, analytics will play a significant role in improving administration, research, teaching and learning, and resource provision in education.

To learn more about Jupiter iO Analytics and to get started contact us at: jupitered.com/contact.

Jupiter iO

Student Information System

Gradebook

Learning Management System

Learning Analytics



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