

## Data in Education An Implementation Guide

### Overview

The growth of data holds great promise for education. Data has the power to vastly improve education systems and transform the lives of students by providing deeper insights into educational trends, personalization of education, and optimization. However, despite the availability of data, very few institutions are currently equipped to learn from it. How can primary, secondary and post-secondary education leaders and practitioners make use of the data they are collecting, and how can this data help them improve student outcomes? How can data help their organizations become more effective?

This paper presents a brief guide on how education leaders can effectively leverage data to transform educational programs and improve student outcomes. The paper was informed by Amazon Web Services' (AWS) discussions with education leaders at Education World Forum in 2018. The paper showcases examples of how data transforms educational institutions around the world.

### Challenges

Countries vary widely in terms of where they are in their technology adoption and data strategies. Each country has its own educational systems, policies, laws and regulations governing data collection and sharing, as well as educational priorities. Leaders from across countries, however, struggle with personalizing education, assessing students, retention, and properly training their workforce, among other challenges.

### Four Steps to Success

One component of data transformation is technology. Commercial cloud computing services enable education ministers and institutions an unprecedented opportunity to greatly enhance educational outcomes, personalize learning, increase efficiency, and maximize their IT investments. Key steps include:

#### Step 1: Plan and Prioritize

Education leaders still struggle with understanding what data is being collected in their countries; what the value of that data is; and how they can leverage it in real-time to enhance learning and assessment. Since no two countries are the same, data solutions will look different for each country. The key is to define the goals and design a “working backwards” plan, mimicking Amazon’s approach to new product development which starts with the customer problem, outlines the solutions and how to get there. In this context, educators would outline the challenges and solutions to take to address those, the decisions to make, and the data needed to inform those decisions.

#### Step 2: Collect and Protect

Big data in education – large volumes of data produced from social media, online quizzes, adaptive learning tools, learning management systems, online discussions, among other sources – offers an incredible opportunity to personalize education for the individual learner. However, this data is not currently collected in a way that is centralized or well managed, inhibiting the ability to turn it into useful insights. With data collection comes the responsibility to protect student information. Cloud technology allows data to be collected, stored, and transferred according to the highest security and privacy standards.

#### Step 3: Analyze and Act

Through visualization tools, data analytics, data warehousing, and machine learning (ML) tools, educators can discover new insights about student achievement, effective teaching methods, and school efficiency, among others.

Access to this information empowers educational leaders, teachers, administrators, and parents to focus on improvement efforts.

#### Step 4: Evaluate

Data is great for making decisions; however, data alone is insufficient. It is important to test whether decisions made have the desired effect. After new technologies are implemented, educators should use data to determine the impact and make continuous adjustments as necessary.

#### Case Studies

##### Ivy Tech Community College, United States

**Ivy Tech Community College of Indiana**, the largest community college in the United States, wanted to better understand student engagement after enrollment. With close to two million student records at 23 campuses, Ivy Tech needed to scale its systems, and find new ways to store and analyze data on student performance.

Ivy Tech first required that vendors make their data interoperable to make it useful. They adopted an AWS cloud-based data warehouse service to perform predictive analytics and were able to quickly gain insights on students who were struggling. This enabled them to intervene sooner to provide support. With the information they received, they started proactive remediation with 16,000 students and have achieved the largest decrease in dropout rates as well as a drop in low test scores, indicating that more students were passing their classes. Educators can now predict with 83% accuracy which students are likely to fail those classes.

##### Santillana

**Santillana**, the largest education group in the Spanish and Portuguese-speaking world, is using ML to personalize learning and assessment for 28 million students. They use ML to teach students math and reading, as well as evaluate students and propose personalized training tracks. Santillana is now leveraging AWS technology to build a data lake to combine application information with exam results and country educational curriculum, to predict academic failure at least two years in advance.

#### Conclusion

Educators have barely begun to scratch the surface of what data analytics can do to improve their education systems. This guide offers education leaders – no matter where they are in their data analytics adoption journey – a guideline to consider as they seek to improve education.

#### About Amazon Web Services Institute

The AWS Institute engages global leaders who share an interest in solving some of the world's most pressing challenges using technology. The Institute brings together experts and decision makers from government, business, academia, and nonprofits for private roundtable discussions to explore innovative ideas transform the public sector.

#### About Amazon Web Services

For over 12 years, Amazon Web Services has been the world's most comprehensive and broadly adopted cloud platform. AWS offers over 125 fully featured services for compute, storage, databases, networking, analytics, ML and artificial intelligence, Internet of Things, mobile, security, hybrid, virtual and augmented reality, media, and application development, deployment, and management from 57 Availability Zones within 19 geographic regions and one Local Region around the world. To learn more about AWS, visit [aws.amazon.com](https://aws.amazon.com).