

# Finding Insight in an Ocean of Data

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How modern analytics solutions can help institutions optimize the educational experience

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## Summary

### Catalyst

Educational institutions are not short of data. At the same time, most are "insight poor." The challenge is to turn their data into reliable information that can be used to make sensible academic and business decisions. This report identifies how modern analytics solutions targeted at higher education can help institutions realize that promise.

### Ovum view

The move to become a data-driven organization is becoming a common objective as institutions recognize that, while they have substantial operational data, to date they have failed to use it to full strategic advantage.

This is particularly relevant in the higher education sector, where the ability to move from operational decisions within an annual planning horizon to longer-term strategic investments is requiring the increasingly complex integration of multiple data sets. This encompasses not only traditional financial, academic, and student metrics but also less structured inputs such as social media sentiment analysis, as well as political and demographic indicators, to make decisions that are "data informed."

Fortunately, there have been recent improvements in the capacity, functionality, and usability of powerful analytical solutions tailored to the needs of higher education, integrated with educational systems, and available via flexible as-a-service delivery mechanisms. These give institutions the opportunity to leverage internal and external data to address the key objectives of increasing student enrollment and retention, lifting all aspects of student success, and understanding and addressing new markets.

However, for many institutions, an impediment to becoming truly data-driven remains organizational culture. When initial data management initiatives have been implemented as little more than a technical "tools drop," with limited attention to culture, context, business processes, and user support, results have been underwhelming.

Institutions that foster a culture that views information as a key strategic resource underpinning decision-making will be well positioned to exploit new opportunities identified through their data.

### Key messages

- In recent years, several significant external trends have fundamentally changed the analytics capabilities that are cost-effectively available to institutions.
- Gaining effective insights from institutional data requires a culture that supports the sharing of contextual information, not just technological solutions.
- Converging multiple disconnected data sources into a "single source of truth" moves the debate on from the veracity of the data to addressing the underlying institutional challenge.
- Exploratory, visual, and insightful analytic capabilities allow educational domain experts to follow their intuition and stimulate new questions about patterns, meaning, and opportunities.
- Templated and guided solutions designed specifically for higher education substantially reduce the time, complexity, and risks associated with initiating a new analytics capability.

- Maintaining appropriate governance over data security and privacy requires an easy-to-administer roles-based access model that integrates with existing institutional frameworks and tool sets.

## Recommendations

### Recommendations for institutions

Institutions are no longer able to initiate multiyear technology development projects, with six to nine months now regarded as the maximum time frame in which tangible results must be delivered. The ability to rapidly leverage as-a-service deployment and produce engaging visual results is an opportunity to reaffirm the value of data.

Institutions should look to implement dynamic analytics solutions, manipulated by educational experts rather than data scientists, to reposition IT services as an enabler of strategy rather than simply a cost center and allow scarce technical resources to be redeployed to more productive activities other than data extraction and report development.

Institutions should deploy modern, mobile-native, as-a-service (cloud) based analytics offerings without major upfront costs that deliver relevant insight to the point of influence – delivering on the promise of "any device, anywhere, anytime" decision-making.

While user-friendly tools that can be deployed in weeks rather than months can assist on the journey, as analysis becomes more complex, it draws on data across organizational boundaries, so institutions will need to reinforce a culture of data-sharing and ensure an appropriate balance between data governance and effective data access.

### Recommendations for vendors

Traditionally, powerful analytics solutions have been complex and difficult to use. Vendors need to make analytics straightforward and accessible. One has only to think of the phenomenal success of the iPhone interface to understand the benefits of hiding complex functionality from most users.

We have seen plenty of examples in technology where, from the user point of view, less is more, and Ovum has highlighted the increasing importance of embedded analytics – where the capability is essentially invisible to end users because it is being accessed from within existing business management systems.

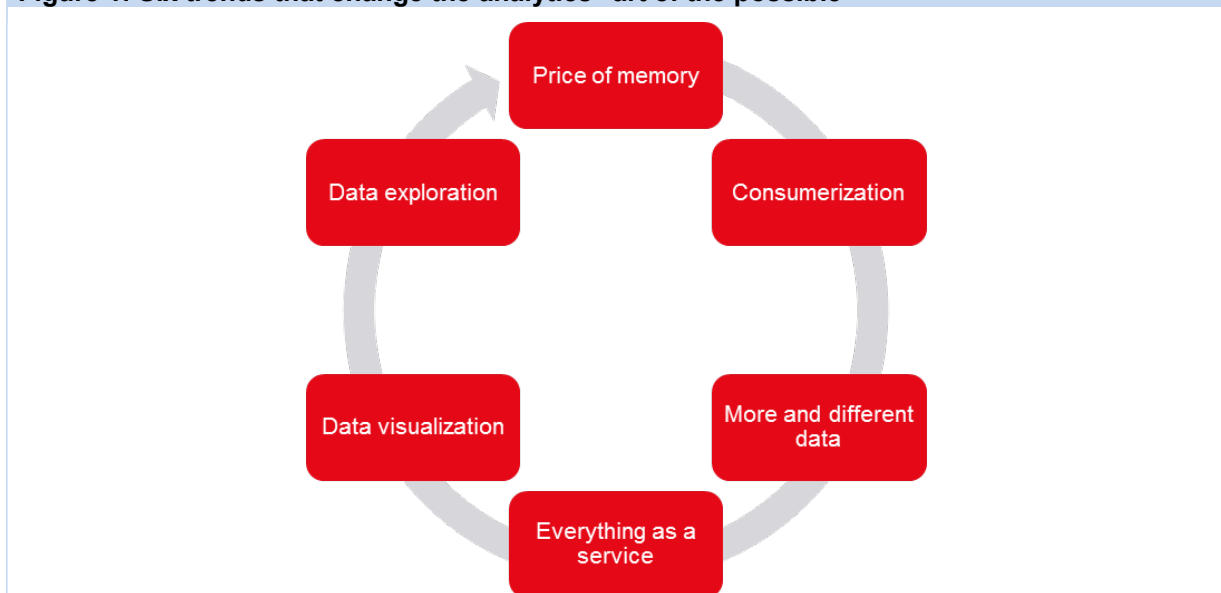
Vendors seeking success with analytics in higher education need to leverage existing sectoral expertise to deliver solutions that are specifically targeted, through the use of templates and guidance, at common institutional challenges. These solutions must also be well integrated with core systems and provide easier data integration than the traditional warehouse approach.

Intimate domain knowledge will also ensure that a vendor understands a "real" institution, as it endeavors to derive value from multiple disparate data sources, and can act as a true partner in integrating information to deliver meaningful analyses.

## The challenges facing institutions

Ovum has previously identified six macro trends that have significantly shifted the "art of the possible" for analytics in recent years (Figure 1).

**Figure 1: Six trends that change the analytics "art of the possible"**



Source: Ovum

With the six macro trends collectively changing the landscape in analytics, institutions have more options, more easily accessible than ever before, yet several challenges remain.

### A culture of academic sharing often contrasts with administrative data silos

Sharing data, information, and knowledge is a key tenet of the educational ethos, with academic sharing and collaboration commonly espoused as a critical factor for success in both undergraduate and postgraduate tuition and research. However, in many institutions, the open, sharing academic philosophy can be contrasted with an approach to administrative data that is closed, disconnected, and based on strongly defined and defended silos of information.

While these silos are commonly reinforced by the use of disparate and incompatible computer systems, it is important to understand that the systems often reflect an underlying culture of separation, rather than being the cause of it. For institutions to be able to benefit from the strategic and tactical analytical insights that can improve institutional decision-making, it is essential to both acknowledge and address the cultural barriers to information sharing that are present to a greater or lesser degree.

Five underlying concerns, which may be consciously or subconsciously expressed, commonly drive resistance to greater data sharing and integration (Figure 2).

**Figure 1: Constraints on data sharing**



Source: Ovum

### **1. Fear of misuse (real or imagined)**

We commonly hear concerns regarding the potential "misuse" of the data – summarized as the view that others will misrepresent the meaning of the data, with adverse consequences, and perhaps additional work, coming back to the data set owner.

### **2. Loss of power and influence**

It is a long-held truism that "knowledge is power," and many roles are defined by their ability to find critical information at the right time. This may not be explicitly stated but can drive an underlying anxiety on behalf of the individual. "What about my job?" is a powerful motivator.

### **3. Incentives that reinforce silos rather than the common good**

Performance parameters and incentives are often set up to reflect the delivery of departmental objectives, which may or may not align with wider organizational needs. Performance measures, recognition, and incentives need to reward the "greater good" – even when that may reduce the performance of an individual business area.

#### **4. End users have poor understanding of data-sharing rules**

There has been increasing focus on the responsibilities of organizations in all spheres to appropriately manage the confidentiality of the information they hold. While all institutions are subject to real legislative and regulatory requirements, organizational "mythologies" have often evolved around what those are. In some cases, a lack of understanding of the reality around data-sharing rules can lead to people not wanting to share in case of breaking misunderstood restrictions. Ensuring that the entire organization has a clear understanding of what is and is not permitted, and why, can help to tease out some of these misconceptions.

#### **5. Aversion to change**

Humans are by nature resistant to change. Once processes and procedures are in place, all sorts of sensible, rational arguments can be identified to reinforce the status quo. Change is not always complex, but it is always hard, especially when daily operations are impacted.

With many, if not all, of the concerns identified above present to some degree, higher education institutions need to recognize the specific mix of cultural drivers that prevent sharing and collaboration in their context – and so develop specific strategies to address them.

Understanding that these issues are generally underpinned by personal experience, background, and feelings rather than logical and factual analysis will ensure that adequate consideration is given to the "people" side of analytic integration – rather than aiming to fix the issue with a "technological magic bullet."

### **Multiple systems with multiple data sets**

Amplifying the cultural challenges is the technical reality that in many cases core data sets are stored in disparate, disconnected systems with differing governance and management regimes. Although most institutions have an authoritative student information system (SIS) in place, these are often surrounded by a constellation of smaller systems – all servicing specific organizational functions. Even if the data governance of the SIS is well implemented, for those smaller systems it is far more variable.

Traditionally, many institutions have attempted to bring these data sets together through a large, monolithic data warehouse project, or through the development of multiple data connectors. While there have been some successes, in many cases the results of such initiatives have been somewhat disappointing compared with the initial high hopes and the significant costs involved. Such less-than-optimal outcomes have therefore acted to reduce enthusiasm for such large, long-timeframe developments.

### **Analyzing data is tough – and choice can be paralyzing**

Although choice is generally regarded as a good thing, there are situations in which too much choice can be paralyzing. Anyone who has attempted to select from 150 shades of white paint in a hardware store will understand this phenomenon, and many powerful software solutions suffer from the same impediment.

To provide a wide range of analytical capabilities, most high-powered analytics tools have traditionally been complex. While this is acceptable when used by expert data scientists, exposing that complexity to non-expert users can lead to an overwhelming number of options, choices, and decisions. The non-

expert user either spends more time learning and driving the tool than analyzing the data, passes the task off to often scarce data-analysis professionals, or reverts to the tried-and-trusted Excel spreadsheet approach – with all the negatives that implies for data governance and integrity.

## Students want their information shared – but only sometimes

Today's students are far more comfortable with online services and social media than their predecessors. It is somewhat of a cliché that they will routinely share large amounts of their personal information in public or semi-public spaces online. They also expect seamless interaction with their educational institution, demanding a "tell us once" experience, where personal information provided once is not requested again for a different aspect of their engagement.

This presents institutions with a challenging dilemma: personal and potentially sensitive information needs to be shared for a seamless experience to be delivered, but at the same time, legislated governance standards impose strict rules on what can be shared with whom. Not only are there serious penalties for noncompliance but the reputational damage we have seen associated with recent major disclosure events in various industries can be significant.

## Realizing the benefits of data analytics in higher education

### Nurture a culture of institution-wide information sharing

Having identified the importance of institutional culture to information sharing, institutions need to take a proactive approach to fostering the desired cultural change. Achieving this will require modeling by senior managers, coupled with incentives that recognize and reward cross-divisional sharing.

Ovum has seen many instances where individuals push back on sharing data by playing the "security card" (or the privacy card). This is not to imply that data governance, security, or privacy are unimportant – institutions have strong legal and moral imperatives to safeguard information appropriately – but rather to expressly recognize that security and/or privacy can be used as a "blocking" strategy to prevent change, and that management are advised to seek validation when such strategies are being used.

### Empower the educational domain experts

While analytics capabilities of different flavors have been available for years, until relatively recently the complexity of the products has required a significant ongoing investment in expensive data scientists to "drive" the solution. This not only embeds substantial costs into the analysis function but also slows things down, as each time a slightly different breakdown or report is required, the business user must go back to IT to request another output, generating a sense of frustration on both sides.

Modern analytics solutions have addressed this by developing a "visual" model – where end users can "drive" the analysis by using an intuitive, graphical interface. This has dual benefits of reducing the demands on scarce data-science resources while increasing the satisfaction of end users, who get the result they are looking for much more quickly because those business users generally have a much greater understanding of what the data means in terms of student outcomes and organizational success.

Ovum clients have reported that providing users with an easy-to-use, dynamic, and visual interface to organizational data stimulates a new type of thinking and prompts questions that would never have surfaced if the process were slowed down by the requirement for repetitive IT data extractions.

## Use templates and guidance to reduce "paralysis of choice"

Of course, many institutions will have experience of the downsides of end-user-driven information management programs. Many learned to their cost that providing unfettered user access to products such as SharePoint or Access often resulted in a "dog's breakfast" of disconnected and duplicative websites or poorly designed and mismanaged databases.

To reduce the possibility of similar outcomes with organizational analytics, it is key to find a balance between stifling autocracy and anarchy. The use of templates and guided analytics journeys, specifically designed to address the requirements of higher education, can help those domain experts to explore the data sets without being overwhelmed by a plethora of irrelevant options.

The use of industry-specific guided analytics represents an evolutionary step toward what Ovum has characterized as the increasing prevalence of "embedded analytics" – where the analytical capability is made available to the end user within the business system without their explicit knowledge, or at least without the need to learn and use a different standalone tool set.

## Make decisions "on any device, anytime, anywhere"

Gone are the days when users could be expected to sit in front of a desktop PC for most of their working day. Having become accustomed to being able to access all types of consumer information services, from online banking to weather reports, via their smart device, users expect the same capabilities from their information management systems. Unfortunately, simply providing the same web-based front end designed for a desktop browser to every device and user does not cut it in terms of usability.

Deploying cloud-based, mobile-native solutions that are designed and optimized for smaller form-factor mobile devices with intermittent connectivity can ensure that institutional management decisions can be taken wherever and whenever it makes most organizational sense.

## Robust data governance requires easy administration

The need to ensure robust governance over user data has never been greater. Most jurisdictions have strong legal requirements to adequately protect personally identifiable information (PII), and even for institutions based in jurisdictions with lower legal requirements, the reputational impacts of personal data loss are severe.

As system complexity increases, particularly where multisystem data integrations are considered, compliance can only practically be achieved through a role-based security model. With access determined by institutional roles, the administrative overhead is minimized, as individual users inherit their access through role membership, rather than directly.

Of course, if the role access model exists in a vacuum then the result is yet another system to administer with limited technical resources, so the system must integrate with and leverage the institution's existing access control infrastructure. In most cases, this will be an LDAP-based directory service such as Microsoft's Active Directory, and, by driving onboarding/offboarding and permissions



control through the central authentication infrastructure, institutions can be confident that access controls are reliably implemented without a significant increased technical resource overhead.

## Use analytics to integrate data silos

As we have reiterated on multiple occasions, institutions are not short of data. In fact, they are often swimming in an ocean of data generated by a plethora of systems. The challenge is to harness that data to empower better decision-making in support of both student and organizational success.

A fundamental problem is that many institutions have relevant data spread across multiple business systems, held in different, often incompatible, formats. Although most mainstream SIS or FMIS will have a suite of built-in reports, these will generally follow the historical reporting approach, such as end-of-year financials or academic FTE, based on their specific information domain. Rarely will it be possible to easily gain insight across the entire organization's data universe – much less integrate external sources such as social media.

The difficulty encountered in using traditional tool sets to analyze data across multiple data sources is one of the underlying drivers of what is commonly referred to as "shadow IT." While extracting data to an Excel spreadsheet is a rational action from the point of view of the individual user, it creates a point-in-time copy that can soon diverge from the original. The net effect of multiple instances of slightly different data is that a large amount of organizational effort can be wasted simply discussing the accuracy of conflicting data.

Rather than initiate a time-consuming and expensive data-warehousing or data-connector strategy, many organizations are now adopting an approach of "integration through analytics." This makes use of the capabilities of modern analytics environments to join disparate data sources and produce insight from the consolidated output.

As well as being quicker and cheaper to implement than a traditional data warehouse, this has the further advantage of allowing the data to remain in the most appropriate location for operational or governance reasons and avoiding the need for, potentially conflicting, copies.

Such an approach still requires an understanding of the metadata descriptors for each information source, but these can be developed and "owned" by the relevant custodians, with federated coordination and governance.

## Using as-a-service (cloud) solutions is a "no regrets" opportunity

The increasing availability of highly powerful analytics capabilities, specifically designed for the higher education sector, and delivered through an as-a-service subscription model, dramatically lowers the resource hurdle to implementing a new system. The reduced time and cost of start-up effectively removes the need for both substantial capital upfront, and a dedicated, expensive, and long-running project.

With viable deployments possible within weeks, not months or years, the opportunity now exists to show managers what is possible – rather than simply talk about it. The greatest vindication of the "show me" approach is that Ovum clients report that within a few minutes, the discussion has turned to what the data means (and what should be done about it) rather than the costs and intricacies of the relevant technical tool.

## Appendix

### Further reading

*Using Analytics to Make Better Decisions in Government*, IT0007-000921 (December 2016)

*2017 Trends to Watch: Analytics*, IT0014-003163 (November 2016)

*2017 Trends to Watch: Education*, IT0008-000285 (November 2016)

"The higher education industry will enter a brave new world of analytics in 2016," IT0008-000252 (October 2015)

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