Predicts 2017: Education Gets Personal

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Analyst(s): Kelly J. Calhoun Williams, Jan-Martin Lowendahl, Terri-Lynn B. Thayer, Glenda Morgan

New and evolving technologies are creating more and greater opportunities to personalize education. Changes in AI, VPAs, the use of blockchain for new kinds of educational credentials, SISs — each represents new ways for the CIO to help launch the age where education at last gets personal.

Key Findings

- Poor performance and declines in retention in higher education are driving the need for a more personalized, engaging student experience to maintain enrollment.
- The use of artificial intelligence (AI) technologies in the competitive world of academic research is changing what's possible. Virtual personal assistants (VPAs) will help find data that could not possibly be gathered by manual search.
- Changing demands on higher education and the consumerization of IT are influencing institutions' requirements for student information systems (SISs).
- The dawn of blockchain brings the potential for rapidly advancing changes in digital educational credentials, making them globally transferrable, trustworthy, durable and relevant to changing employer needs.

Recommendations

CIOs executing a digital strategy in education should:

- Use ideas from other industries (such as retail) that have successfully personalized the customer experience, and new methods such as design thinking, to begin redesigning the student environment to be engaging and compelling.
- Build a plan for how to increase research productivity with smart machine technology. A team sport approach is imperative — such as engaging researchers through a center of excellence — in order to define research areas that have the most to win (or lose).
- Develop your SIS modernization strategy by evaluating incumbent vendor roadmaps as well as new cloud offerings to determine whether you should pursue a refresh, renovate or replace strategy.
Experiment with blockchain for low-stakes badging (such as badging for lab assignments) to get comfortable before relying on it for higher-stakes credentials (such as full diplomas).

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Strategic Planning Assumptions

By 2021, more than 30% of institutions will be forced to execute on a personalization strategy to maintain student enrollment.

By 2021, the top 100 higher education institutions will have to adopt artificial intelligence technologies to stay competitive in research.

By 2020, one-quarter to one-third of higher education institutions will have committed to an SIS replacement project.

By 2021, 30% of higher education institutions in the U.S., the U.K. and Australia will be using a digital credentialing infrastructure powered by blockchain.

Analysis

What You Need to Know

New and evolving technologies are reaching into the education ecosystem, creating opportunities for bringing the personalization of education beyond the realm of the conceptual and into the world of reality in 2017 and beyond.

The more digital the education ecosystem gets, the more student, staff and faculty data is available to personalize and refine the student experience persona, and increase faculty and staff productivity — but only if CIOs apply the right technology.

Our Predicts 2017 report contains Strategic Planning Assumptions that spotlight several areas in which personalization is being advanced. These will be used to:
Enable artificial intelligence (AI) to rapidly advance progress in research institutions' work, utilizing virtual personal assistants (VPAs) to find and capture research in powerful new ways.

Develop personalization strategies designed to position the institution to create highly personalized, student-centric environments that mitigate losses in enrollment and retention.

Target next-generation student information systems (SISs) that can manage new models for student engagement, such as competency-based learning.

Utilize blockchain to create innovative and new methods of capturing digital credentialing and learning records that can follow a student for a lifetime.

These Strategic Planning Assumptions highlight the pace and purpose of these imperatives for education, through which CIOs will gain insight into several technologies that are shaping work for the next three to five years (and suggesting several implications for what is to come beyond that time frame).

CIOs who incorporate these into their strategic planning processes will help position their organizations for what’s next. The creation of more personal and more engaging student environments — and improving faculty productivity and impact — will be a key factor in differentiating institutions that will thrive compared with those that will continue a downward trend of student losses and shrinking enrollments.

Strategic Planning Assumptions

**Strategic Planning Assumption:** By 2021, more than 30% of institutions will be forced to execute on a personalization strategy to maintain student enrollment.

*Analysis by:* Glenda Morgan

**Key Findings:**

- Personalization refers to designing all aspects of student life, from recruitment through postgraduation engagement, in a unified, student-centric manner in order to provide services in a targeted, differentiated and yet integrated fashion.

- The growth in participation in higher education, combined with a decreased emphasis on personalization, has resulted in lower rates of achievement in the form of persistence, completion and alignment of student outcomes with workforce expectations.

- Many higher education institutions are also experiencing a decline in enrollment, which is putting financial pressure on them, given their reliance on tuition revenue.

- Lessons learned from other industries (such as retail) show the way for higher education institutions to adjust their processes and services in order to provide a more integrated and personalized student experience.
**Near-Term Flags:** By 2019, 10% of higher education institutions globally will be using methods inspired by other industries to analyze and transform the student experience to be more personalized and student-centric.

By 2019, 15% of higher education institutions globally will have designated an administrator to be responsible for designing and executing on a personalized student experience (for example, a vice provost or vice chancellor for the student experience).

**Market Implications:**

Many higher education institutions are facing enrollment challenges due to changing demographics. Lower birth rates mean that there are fewer college-age students available to fill seats at colleges and universities. This decline is coming at a time when universities worldwide are increasingly reliant on enrollment, and on tuition as a source of revenue. Declining enrollments mean that institutions will have to be especially appealing to attract new students in sufficient numbers in the increasingly competitive marketplace. A key way for universities to compete for the shrinking pool of potential students is by creating a highly personalized experience for the students. It will no longer be sufficient to simply offer a set of degrees and certificates. Instead, universities and colleges will offer a set of experiences and qualifications that is attuned to the needs of students, and students will receive a differentiated experience depending on their needs.

Developing this kind of student experience will require institutions to develop a personalization strategy and execute on it. This process will mean learning from other industries about how to understand the student journey through higher education, and then redesigning it in such a manner as to make it more student-centric and personalized, rather than bureaucratically organized around the divisions of the university in a "one size fits all" approach. This will mean more use of both quantitative and qualitative data to understand the student journey, and also the use of CRM systems to help integrate the different aspects of that experience and manage the handoffs from one section of the institution to another. Given that personalization is a process, not a single product, the market for personalization solutions will be diffuse.

Institutions that do not develop a personalized student experience strategy and approach will increasingly be at a disadvantage compared with other institutions, and will have difficulty attracting and retaining students in sufficient numbers to avoid large-scale cuts or program closures.

**Recommendations:**

Higher education CIOs:

- Look to other industries — especially, but not limited to, retail and banking — to learn how customer experiences have been understood and redesigned to be more personalized.
- Use methods such as design thinking, personas and journey maps to understand and then redesign your processes to be more personalized.
- Work to integrate data and information from disparate systems on campus so that it is possible to get a holistic view of student experience and progression.
Ensure that your IT and learning strategic plans include personalization as a focus; also, ensure that increasing personalization is a goal within adoption and implementation strategies for technologies such as CRM, SISs, analytics and machine learning.

Work with stakeholders on campus to develop student journey maps for key parts of the student experience in order to identify hurdles and blockages, and prioritize addressing these.

Related Research:

"Customer Experience Is the New Competitive Battlefield"

"How to Design Customer Experiences Using Persona-Driven Customer Journeys"

"Design Thinking Can Revolutionize Your Customer Experience Strategies"

"Hype Cycle for Education, 2016"

"Deakin University Uses Smart Machines to Innovate Student Engagement"

**Strategic Planning Assumption:** By 2021, the top 100 higher education institutions will have to adopt artificial intelligence technologies to stay competitive in research.

**Analysis by:** Jan-Martin Lowendahl

**Key Findings:**

- In research, the IBM Watson Discovery Advisor has aided a research team from the Baylor College of Medicine in analyzing more than 70,000 articles related to a protein (p53) that has been linked to many cancers, and in identifying six related proteins to target for new research — all in a matter of weeks. To put this in perspective, an average researcher in the field reads about 23 scientific papers per month. The average number of identifications of p53-related candidates has been one per year for the past 30 years.

- The number of academic research publications in some fields (such as science, technology and engineering) has long since exploded well beyond what one researcher can confidently keep up with — and, to add to the complexity, cross-pollination between research fields is an increasingly accepted strategy to come up with new ideas. The rapidly expanding demands on research in the fields of medicine and chemistry have added to the pressure to leverage technologies to speed up the time to solutions. We have moved from hypothesis-testing research to hypothesis-generating research, because machine-enhanced research is much better at identifying trends, correlations and so on than humans are — and it can do so in a fraction of the time.

- Products that use machine learning (such as Meta) to improve journal searching far beyond keyword search are finally entering the scene.

**Near-Term Flags:** By 2019, the majority of high-performing research teams will use a VPA with AI capabilities to identify must-read articles (especially accessing peripheral fields).
By 2019, at least five major pharmaceutical companies will use AI in their drug discovery strategies.

**Market Implications:**

- Academic research is extremely competitive, and part of the game is the search for productivity-enhancing tools that give better research results faster and increase grant application success.

- In the commercial world of pharmaceutical companies, where increasing the scope and speed of drug discovery literally means billions of dollars, AI eventually will be a cost of entry. Companies such as twoXAR and Atomwise will be key vendors (if not assets) to acquire and build internal AI-based drug discovery platforms.

- At the very least, VPAs that search scientific journals will become necessary tools in a science researcher’s arsenal to ensure that they read the relevant journals, including those outside their immediate field of research. This digital information tool will likely be the library’s responsibility.

- There is government pressure for publishers to make their journals available in a different way (for example, in the name of public health). New business models may have to emerge that allow searches across several publishers’ repositories, and require payment only for the initial volume and any relevant articles. Perhaps the model would require payment per article the VPA finds (regardless of publisher). Perhaps the VPA vendor would be the aggregator of several publishers. The market will determine the models.

**Recommendations:**

Higher education CIOs:

- Build expertise around how to leverage AI, perhaps through a center of excellence. There, researchers can learn what AI can do for them and how much work is involved. AI tools need access to the right corpus of data for them to learn. It is not a quick solution for research productivity, and it requires deep collaboration between IT and the researchers.

- Collaborate with the library: (1) to find forms of engagement with publishers for interoperable journal repositories, including metadata; and (2) to integrate the right form of journal VPA into the researchers’ digital workplace.

- Track the many emerging vendors that are moving into the AI marketplace in order to follow not only technology development, but also pricing development. This will be a complex market with many cost-driving components (for example, access to data, curation of data and teaching the machine what to look for).

**Related Research:**

"Hype Cycle for Smart Machines, 2016"

"Hype Cycle for Human-Machine Interface, 2016"

"Hype Cycle for Education, 2016"
Replay Predictions

The replay prediction is a prediction from a previously published report that is so significant that it is being republished here.

**Strategic Planning Assumption:** By 2020, one-quarter to one-third of higher education institutions will have committed to an SIS replacement project.

**Analysis by:** Terri-Lynn Thayer

**Key Findings:**

- The number of higher education institutions looking to replace their SISs has risen dramatically lately, demonstrating the impact of changing market demands and significant new product options.

- The SIS vendor market has been stagnant for more than a decade, with few new entrants and slow-moving legacy products. Now, modern SaaS solutions are emerging from new and merged vendors, thereby pressuring legacy vendors to hasten legacy product evolution and/or build new systems.

- Higher education CIOs are under pressure to support nontraditional students, mobile and social functionality, and new business models, while also reducing the institutional burden to sustain their SISs.

**Market Implications:**

There have been several distinct trends in this market during the past year:

- New cloud solutions, which have been anticipated for years, have become available.

- Established/incumbent vendors are building new or significantly improved SISs in the cloud.

- Merger and acquisition activity, as well as ownership changes among key market players, has increased.

- International expansion of market players has increased and is expected to continue.

- Vendors will likely rapidly decrease investment in legacy on-premises solutions.
Justification:

CIOs specifically point to the already high and mounting costs of product maintenance for not only the SIS, but also the underlying infrastructure elements, which are attracting growing negative attention from campus leadership. CIOs also often tell us they are under pressure to contain or reduce these costs. Meanwhile, legacy SIS vendors have been slow to evolve SIS technology platforms, introduce support for new higher education business models (such as competency-based education), and provide the many functional enhancements demanded by students and faculty.

For all these reasons, Gartner predicts that, as new SISs become generally available, there will be a trend toward replacement of the legacy systems. While some of this activity may be migration to new offerings from the incumbent vendors, there will also be adoption of new vendor solutions. We expect the pace of these replacements to far exceed what they were just a few years ago.

In 2014, an EDUCAUSE spotlight report (based on data from the 2013 Core Data Service) reported the average age of SISs to be 13 years old, and that only 8% of respondents planned to replace their SISs in the next three years (through 2016). However, Gartner predicts that number to rise dramatically in the coming years. Based on a “show of hands” polling of hundreds of higher education CIOs and IT leaders attending the 2015 Gartner Symposium/ITxpo events in Orlando, Florida and Barcelona, Spain, and on "clicker based" polling of university financial officers at the fall 2015 Eastern Association of College and University Business Officers (EACUBO) conference, Gartner predicts that, by 2020, one-quarter to one-third of higher education institutions will have committed to an SIS replacement project.

Recommendation:

Higher education CIOs:

- Develop your SIS modernization strategy by evaluating incumbent vendor roadmaps as well as new cloud offerings to determine whether you should pursue a refresh, renovate or replace strategy.

Related Research:

"Market Guide for Higher Education Student Information Systems"

"IT Market Clock for Higher Education, 2016"

"Education Context: 'Cloud ERP: The Suite Shouldn't Always Win in Administrative ERP Strategies'"

Strategic Planning Assumption: By 2021, 30% of higher education institutions in the U.S., the U.K. and Australia will be using a digital credentialing infrastructure powered by blockchain.

Analysis by: Jan-Martin Lowendahl, Terri-Lynn Thayer
Key Findings:

- An increasing perception of a mismatch between traditional education output and employer needs is fueling a reinvention of credits.

- Proof of educational attainment, allowing more accurate evaluation of educational suitability for particular employment, is a fundamental challenge in the global economy, leading to an often costly process to establish trust between all involved parties. In a survey, 58% of employers reported having identified a lie on a resume.

- Learners are seeking greater control over their own credentials while expecting them to be more atomic, stackable and portable.

- Blockchain has emerged as a promising solution to make credentials globally accessible, trustworthy and durable.

- Education applications of blockchain are still in the very early stages, and require considerable IT and business skill to use and understand. However, several startups are seeking to make blockchain easier to use.

- Credentials are essentially a currency in the employment market, and should work well in a distributed ledger model based on blockchain, just as bitcoin has proved. However, issuing credentials using blockchain requires machine-readable credentials (such as open badges) that are also understood by learners as well as employers.

Near-Term Flags: By 2019, there will be at least one major headhunting service that is algorithm-based and uses digital credentials and blockchain.

By 2019, there will be at least one major merger or service integration between an adaptive learning provider and an AI provider.

Market Implications:

- Just verifying credentials is a relatively trivial use case (although a potentially useful one). Establishing a secure global ledger infrastructure can enable much more value — for students, educational establishments and employers. Sony Global Education represents an interesting use case for blockchain in which it foresees that employers will more highly value the detailed test results, not the final credential shared.³ In this scenario, a test taker/student can share the outcome of a test with one or several "evaluation organizations" that will assess and score according to their respective methodologies. In a world of algorithmic intelligence and AI, it is easy to see an ecosystem of independent testing services and evaluator services that can build a brand of objectivity that is separate from the educating institution, and can offer more flexible credentialing. This could be an emerging service equivalent of the practice of getting a "second opinion" in healthcare.

- Digital will increase the speed of everything, including job matching. Flipkart is partnering with Udacity for "interviewless hiring" as it looks to streamline its recruitment process and get a head
start on the competition for new talent.¹ Deals like this have the added benefit of enabling Udacity to promise a money-back guarantee if the student is not employed within six months.

- The combination of digital credentials (such as open badges and blockchain) opens up the education ecosystem to new software development and even algorithms, which can speed up and increase the accuracy of a match between a job seeker and an employer. However, there is at least one more step to take to speed up the education ecosystem even further. Employers issuing granular "requirement badges," prompting educational institutions to build courses that enable students to get matching "attainment badges," will enable a true feedback-based ecosystem (and will likely continue the expansion of interest in competency-based education).

- In spring 2016, the Institute for the Future (IFTF) and the Act Foundation teamed up to reimagine the future of learning, work and living. The result was Learning Is Earning 2026, a future in which learning is a currency (edublocks) traded by 1 billion people on a digital platform called a Ledger, which is based on blockchain.

- Students are getting involved: The Blockchain Education Network (BEN) is sponsoring student blockchain clubs on campuses in the U.S., Canada, the Netherlands and Italy with plans for global expansion. These clubs encourage student development of blockchain-based applications, and seek to propagate blockchain culture.

- The BadgeChain initiative is exploring the shift of the Open Badges specification to blockchain technology.

- Massachusetts Institute of Technology (MIT), Ecole Supérieure d'Ingénieurs Léonard de Vinci (ESILV) and Holberton School are examples of early adopters that use blockchain in this fashion.²

- Higher education markets (such as the U.S., the U.K. and Australia) that have significant international student populations will likely be early adopters of technologies such as blockchain in order to satisfy learner/earner demands for more control and portability of their credentials.

**Justification:**

Blockchain, in general, is already within the Peak of Inflated Expectations and garnering a lot of interest. Blockchain in higher education has just started this journey, but there are already high expectations. Many of those expectations have strong potential due to the cultural fit between an open exostructure standard approach, such as blockchain, and the higher education preference for open source in general. This has been verified recently in efforts such as Blockcerts, which is supported by the MIT Media Lab (among others).

Regardless of the outcome, blockchain in higher education has valid use cases that must be monitored in the near term.

**Recommendations:**

Higher education CIOs:
Build a strategic understanding of the whole digital credential ecosystem that involves several technologies, such as blockchain and open badges. The complexity of this ecosystem of digital credentialing will require a secure and trustworthy exostructure (see Note 1).

Seek collaboration with academic stakeholders, and ensure that the digital credentialing effort is led by the registrar or a similar role, not by IT.

Start investigating and experimenting with blockchain in low-stakes badging (such as badges for lab assignments) to become comfortable with the technology, as well as its usability, before relying on it for high-stakes credentials (such as full diplomas). Remember that blockchain credentials effectively cannot be erased, only superseded, and that they are always fully auditable, so tread cautiously when experimenting in this area.

Develop proofs of concept to understand how to implement key features, such as time-bound professional certificates that need reauthorization, or even revocation of credentials.

Related Research:

"Reinventing Education Credentials Using Blockchain as a Possible Missing Link for the Open Badge Infrastructure"

"Hype Cycle for Education, 2016"

"Analytics, Assessment and Adaptive Learning Will Prepare You for the Algorithmic Education Evolution"

A Look Back

In response to your requests, we are taking a look back at a key prediction we missed in 2013.

Missed: 2013 Prediction — By 2016, 50% of K-12 management solutions will prescribe personal learning pathways that do not require teachers to assign instructional activities.

Although directionally correct, our prediction that today’s learning management solutions would already be prescribing "personal learning pathways" that do not require teachers to assign instructional activities is not yet here. Today’s adaptive learning platforms (and several products in production today, such as the IBM Watson Teacher Advisor) do have the capability to assess what students have learned, and to deliver content that corresponds to the needs identified. However, the full automation of these decision-making processes (prescriptive analytics) is still at the very nascent stages of capabilities in K-12 education. Teachers are still largely required to participate fully in the process of selecting the appropriate instructional activities to meet the needs of students, albeit potentially with a greater amount of help provided by digital assessment data, analytics and reporting to help guide them.

These capabilities will continue to expand, and the day when AI capabilities will assist in providing learning pathways that do not require teacher-directed assignments is coming. It will likely take just a few more years to be found in mainstream use.
Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Hype Cycle for Education, 2016"

"IT Market Clock for Higher Education, 2016"

"Reinventing Education Credentials Using Blockchain as a Possible Missing Link for the Open Badge Infrastructure"

"Market Guide for Higher Education Student Information Systems"

Evidence

1 See "Study Shows Promise in Automated Reasoning, Hypothesis Generation Over Complete Medical Literature," Baylor College of Medicine, and the ACM Digital Library published by the Association for Computing Machinery.

2 See "Adapting the Established SIS to Meet Higher Education's Increasingly Dynamic Needs," EDUCAUSE.


5 See "Reinventing Education Credentials Using Blockchain as a Possible Missing Link for the Open Badge Infrastructure."

Note 1 "Exostructure" Explained

In an increasingly networked world, competitive advantage depends on the rapid leverage of external services. The power of the education ecosystem comes from interoperability, not isolation. The need to focus on external interoperability — the exostructure — is an inevitable consequence of cloud and consumerization. The exostructure is necessary to leverage the full potential of the education ecosystem. The exostructure concept is about building an "exoskeleton" of services that support the institution from the outside rather than from the inside. The building blocks are standards such as eduPerson and Metadata for Learning Opportunities (MLO) that allow a freer flow of information between education ecosystem players. When done right, the exostructure approach enables institutions to leverage industry (and other) best-practice services from the cloud, rather than having to bring them inside the campus walls. The exostructure approach enables a much more flexible and agile IT service approach that can adapt to the seemingly inevitable disruption of the education ecosystem. This institutional shift of mindset from infrastructure to exostructure is a key to success in an increasingly dynamic and expanding education ecosystem (see "Gaining Competitive Advantage in the Education Ecosystem Requires Going Beyond Mere Infrastructure to Exostructure").
More on This Topic

This is part of an in-depth collection of research. See the collection:
