It’s Time for Learning to Go Back to School: Next-Generation Approaches Enrich the Student Experience

Major structural shifts in offline and online learning delivery will lead to integrated systems that enable adaptive and holistic higher-education learning environments that harness the capabilities of social, mobile, analytics and cloud – the SMAC Stack. ‘Digital footprints’ point the way for schools and, eventually, employers to discover learners’ competencies and interests and match them with their own offerings and talent needs.
Executive Summary

How students want to learn – and institutions need to teach – is undergoing a total digital transformation. Today’s higher education students demand more flexible, personalized models of learning that offer a higher return on investment and preparation for employment in the 21st century workplace. All stakeholders in the educational value chain stand to benefit from this overhaul; the more data that is collected and analyzed, the better synergy that can be created among students, educational institutions, areas of study, approaches to learning and employment opportunities.

The catalyst for the transformation is generational. Millennial students and their younger counterparts expect learning options that utilize the advanced technologies that they, as digital natives, use every day, as well as learning experiences that are tailored to their particular needs and objectives. Toward that end, institutions are employing social, mobile, analytics and cloud technologies (a.k.a., the SMAC Stack™) to develop the insights that lead to personalized and engaging learning experiences.

The transformation toward personalized and adaptive learning experiences will be achieved by collecting and applying analytics to the data surrounding students and other entities in the learning lifecycle. These digital footprints (what we call a Code Halo™) are generated by the online behaviors of and existing data about individuals, institutions, learning processes and devices. The meaning that can be derived in this data is a ripe source for understanding and even predicting student needs and optimally matching students with schools, learning models and employers.

Code Halo thinking will enrich every aspect of the learning lifecycle, from admissions to coursework to job placement and lifelong education.
IT'S TIME FOR LEARNING TO GO BACK TO SCHOOL: NEXT-GENERATION APPROACHES ENRICH THE STUDENT EXPERIENCE
Forces Driving the Transformation of Learning

Traditional educational models are at a crossroads. With less than half of full-time students at public four-year colleges and universities in the U.S. graduating within four years, the higher education learning landscape is in need of serious modernization, if not a full transformation.

Public spending on education is lower than it has been historically, as is parental satisfaction with cost, graduation rates and return on investment. With high unemployment levels among recent college grads, the perceived ROI for a traditional college education is under intense scrutiny. The value of higher education will remain an open question for the foreseeable future unless all stakeholders recognize that change is needed today. All roads to the future of work in the U.S. – and the developed world – pass through the education sector.

Indeed, the signposts of change are already visible, with new-breed educational providers entering the market with affordable and innovative learning solutions. For example, massive open online courses (MOOCs) address a growing customer segment looking for an enriched, cost-effective approach to learning. Of course, this is not just about earning a degree or certification but also about obtaining verifiable skills that lead to employment and higher pay.

Not only is technology altering core business processes, but the ways in which individuals use technology to learn are shifting, as well.

Evidence is also growing that adaptive learning models that are personalized to student needs are key to optimizing student performance. In one study, students who completed a course that matched their learning style spent significantly less time in the course and achieved, on average, the same grades as students who took a course that was mismatched with their learning styles or included all available learning content.

Even for traditional players, interacting with students today requires utilizing and managing more channels of interaction than ever before. The result of all these changes: Higher education business models – tuition and net revenue models, marketing, enrollment strategy, content distribution and engagement of alumni networks – are evolving drastically. Not only is technology altering core business processes, but the ways in which individuals use technology to learn are shifting, as well. Figure 1 (next page) illustrates the new higher education learning ecosystem.

Higher education is being disrupted by the intersection of several forces:

- **The new student mindset.** Millennial students want learning opportunities delivered via a wide range of channels – especially online – and they want more input into their own learning processes.

- **Leveraging the SMAC Stack.** Institutions are implementing SMAC technologies to deliver a learning experience that employs familiar technologies that students use in their everyday life. They are also using the SMAC Stack to capture, track and analyze Code Halos to obtain insight into the student’s needs, preferences and desires (see sidebar, page 6).

- **The advancement of adaptive learning.** Adaptive learning is personalized to the student’s abilities, interests, preferences and learning style.

- **The emergence of new learning delivery models.** This includes blended models (which mix online and classroom instruction) and flipped models (in which classroom lectures can be accessed virtually, such as through videos or online).
The Future of Learning

Schools will adapt themselves to new forms – self organized.

Learners will create individualized learning playlists, reflecting goals, interests.

The workplace will evolve so rapidly that continuous career readiness will be the norm.

Diverse forms of credentials will reflect the many ways in which people learn.

Radical personalization will become the new norm.

Educators’ jobs will diversify as learning agents.

A variety of digital networks, platforms & content resources will boost learning.

Inception of rich data into learning tools will enable learning transformation.

Communities will take ownership of learning in new ways, blending with other activities.

Social innovation will help address resource constraints & other challenges.

New-Age Learning Ecosystem


Figure 1
Reinventing the Student Experience

Growing volumes of information are available across the digital landscape and learning lifecycle, including:

• **Public information** from social platforms, such as personal interests and hobbies (including musical tastes and trips taken). Social data imbues the learner with color and dimension, which drives new insights.

• **Data obtained through student interactions with online coursework**, including from learning management systems (LMS). This includes data such as last log-in and time spent on content; course progress and time spent on course modules; intra-student communications; and scores/teacher feedback. Such data can track student performance and whether intervention is needed.

• **Information from third-party and government sources**, including educational statistics (such as educational spending, institutional policies and rank, majors, infrastructure, campus life, etc.).

Institutions of higher learning can use this data to gain insight into student preferences and learning styles (see Figure 2, next page). By tracking, capturing and building upon the information gathered at every stage of the student lifecycle, educational institutions can create a “student persona,” which they can then use to provide tailored services that benefit the student at various stages of his or her educational and professional life (see Figure 3, page 8).
The Code Halo Effect in Higher Education

**Personal**
- 18 years old, in first year of college, pursuing an undergrad degree. Major undecided.
- Listens to Busted, McFly, JLo, Xtina tracks.
- Likes to travel and blog her experiences.

**Educational**
- Completed Grade 9 and 10 with AP in Mathematics and English.
- Completed high school with 3.6 GPA; SAT 1680.
- Scholarship awarded.

**Information**
- Last logged-in and time spent on content
- Course progress and time spent on course modules
- Intra-student communications
- Teacher scores/feedback
- Enrollment status

**Retail**
- Personalized marketing content
- Billing information
- Behavior records
- Events attended by prospective students
- Packages and other pricing options

**LMS**
- Social and Behavioral

**SIS**
- Student data/demographics
- Grades and transcripts
- Behavior records
- Scheduling/attendance
- Health and medical records
- Special education needs
- Fees records/calculation
- Student lifecycle details

**CRM**
- Personalized marketing content
- Billing information
- Behavior records
- Events attended by prospective students
- Packages and other pricing options

**Code Halo Analytics — Insights Generated**
- Learning style through LMS history, library track history, assessment scores, queries posted, scholarships applied for, financial aid, demographic data.
- Understanding of social patterns through blogs, discussion forums, tweets, posts, online book purchases.
- Entertainment patterns (interest around probability and trigonometry through online movies, games interacted with).
- Increased learner engagement through gamification patterns.
A New Role for Learning Management Systems

Even with the vast changes occurring in education, the LMS will remain central to educational institutions. In their current state, however, LMSs are used more as a tool for administrative efficiency, with teachers primarily using them to distribute course content, broadcast announcements, initiate discussions and send e-mail. The interactive learning component of the LMS does not customize the learning experience or promote the student’s everyday communication, productivity and collaborative abilities.

For students, these systems provide minimal adaption to learning styles, are constrained by institutional boundaries and don’t make use of insights from the student’s social activities or other third-party data sources to construct the student persona.

When LMSs interact with Code Halos, however, the learner’s experience can be enriched, from selecting the right college, to choosing a major, to identifying a mentor during school, to finding a job after graduation. In addition, next-generation LMSs will include an adaptive learning component that tailors learning objects to the individual learner.

Turning Code Halo Insights into Better Learning Experiences

**K-12 Experience Points**
- **Student engagement**: Engagement increases as courses adapt to student strengths.
- **Teacher empowerment**: Teachers can configure courses, identify gaps and provide differentiated instruction.
- **College and career readiness**: Students can be measured on college and career readiness based on Common Core and other standards.

**Higher Ed Experience Points**
- **College match**: Students can be mapped to schools based on skills and college or university offerings.
- **College/peers acquaintances**: Students can get to know peers at a more personal level.
- **Program/course help**: Students can get help deciding which courses will be most useful.
- **Student learning environment**: A learner profile can be developed for personalizing learning and career help.
- **Student risk/intervention**: Measures can be taken to increase retention and degree completion rates.

**Professional Experience Points**
- **Job analysis**: Students/employees can align skills with current job role.
- **Career pathways**: Individuals can manage career progress, evaluate alternate career approaches, identify what is needed to supplement current skill sets.
- **Industry relationships**: Professionals can use their network as a career catalyst
- **Virtuous communication with alma mater**: Alumni can mentor/guide aspiring students to get a head start in pursuing their career paths.
Adaptive Learning and LMS

According to the Felder-Silverman learning style model (FSLSM), learners fall into three basic categories: active/reflective, sensing/intuitive and sequential/global. Under this model, courses can be broken down into elements such as exercises, examples, content objects and self-assessment.

The three different learning styles require content to be presented in different orders. For example, an active learner would prefer to learn by trying things and completing exercises and self-assessments at the beginning of the course module, followed by accessing content objects, with very few examples given. A reflective learner, on the other hand, prefers to learn by contemplating the material, so she would prefer content objects at the beginning of the course, with less focus on exercises. Figure 4 (next page) illustrates how learning style should inform the individual's unique learning path and type of content delivered.

Yet another dimension of learning style is content preference: audio, video or text, which can be deduced through a standard questionnaire. Based on these student inferences, institutions can design custom courses that suit individual needs.

In order to align with an adaptive learning style, future LMSs will need to be built on a Web Services framework from the ground up to ensure tight integration with many of the Web 2.0 tools that students already use. Also, adherence to emerging standards such as the IMS LTI framework will be critical to enabling data and app interoperability. The integration of these features will encourage students to remain within the purview of the LMS for the majority of their learning activities, enabling institutions to capture, measure and infer some of their strengths, weaknesses and preferences.
Different Strokes for Different Folks

Colliding Code Halos

Everyone in the learning value chain — educators, institutions, students and employers hungry for credentialed talent — can benefit from the insights gleaned from Code Halos. For instance:

- **Student Code Halos**: Students’ Code Halos can reveal insights based on their social media interactions, reading lists, interests, study habits, collaboration preferences, learning aptitudes, scholarships applied for/obtained, degrees and credentials earned, and the stage of their education or career path. These patterns can illuminate insights about the best subject area for the student, his motivations for learning and even her potential career path.

- **Educator Code Halos**: Code Halos can dramatically transform the role of professors and mentors in the learning process. Code Halo-based experiences can help students and professors connect with each other based on learning needs, the professor’s expertise, the pace of learning and necessary interventions wherever and whenever needed. The flexibility to reach mentors and teachers at any stage of the learning process increases student trust. Additionally, professors can enrich the learning experience by providing real-time feedback and necessary interventions during challenging moments in the learning journey.

- **Educational Product Code Halos**: The insights generated from the information surrounding learners, teachers and institutions are enabling smart system and course design, as well. Software manufacturers and institutions can use these insights to bring continuous innovations to course curricula, course design and the user experience.
• **Institutions’ Code Halos.** Schools’ Code Halos could include alumni networks, reputation information, location, graduation rates, vocational alignment and the quality/depth/breadth of the curriculum. For employers, Code Halo attributes such as location and volume/quality of demand are also applicable.

Institutions are already leveraging Code Halos to add value to their students’ learning journeys. For example, the Signals project at Purdue University utilizes the data collected from student information systems, LMSs and the grade book for a specific course to track students’ performance and identify at-risk students in real time.\(^{10}\)

The interplay of the stakeholders’ Code Halos will define the next generation of learning. For instance, something akin to Match.com from the world of online dating may best exemplify the power of the convergence of student, institution, educator and employer Code Halos (see Figure 5). When student Code Halos intersect with institutional Code Halos, for example, it can reveal best matches of students with schools. Educator Code Halos intersecting with employer Code Halos can pinpoint opportunities for collaboration. Student Code Halos connecting with employer Code Halos can show fruitful matches, just as when educator Code Halos intersect with institutional Code Halos.

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**Code Halo Thinking at Work**

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**Figure 5**
For example, if a student is 70% likely to pursue a career in applied mathematics, this insight can be matched with colleges that offer a strong math program, leading math professors, personalized course plans and connection to outside resources, such as academic groups of interest and industry experts. Or, assume that a student earns a degree in anthropology from a prestigious university. Based on her Code Halo, she presents strong traits indicating a fit with a particular company’s organizational theory and culture. This type of “code-meets-code” matching is potentially more powerful than traditional hiring and recruiting models.

A few institutions have begun leveraging the power of Code Halos, especially in their admissions function. Information including social media messages, campus-visit logs and student records are all input into the admissions software to predict the likelihood of students accepting an offer of admission.

Stanford University, through its Facebook/mobile app, uses an “enrollment intelligence” algorithm to predict students who are more likely to enroll by analyzing their social and behavioral data patterns. Denver University predicts interest in enrollment by analyzing the student’s online and social media behaviors, such as number of friends or conversations the student participates in.

Code Halos can also help institutions focus their communication and create deeper, more engaging relationships with prospective students. This process begins before the learner ever attends a university, as well as after graduation, from admissions to employment.

Looking Ahead
As new technologies raise expectations across nearly every aspect of our lives, the learning ecosystem needs a radical overhaul, powered by SMAC Stack technologies. But what will success look like? Increased four-year graduation rates and higher pay for graduates? What about lifelong learning? How best to prepare young minds for the future workplace they will enter? What behaviors, creativity and emotional intelligence skills will be required for success? What will work look like in the next few years? All these questions need to be addressed in the way we confront, challenge and change our current learning ecosystems. If these issues are addressed thoughtfully, that change can occur without causing chaos to the education system as we know it.

Code Halos provide the lens through which to imagine aligning students, educators, institutions of higher learning and potential employers. Improving the student experience and increasing their value in the future is essential to ensuring that these efforts are a success.

To take the first steps, institutions should:

- Revisit their student lifecycle to identify specific touchpoints where they can leverage Code Halos to transform the student experience.
- Identify programs and courses that can be redesigned for adaptive learning.
- Identify one or more hypotheses that can be put to the test with analytics tools; obtain insights that can drive student recruitment, retention and persistence.

At a time when many are questioning the value of “business as usual” for higher education, there has never been a better moment to rethink the art of the possible. It’s time to go back to school and re-think, reset and unlock the immense potential of the learning paradigm for the success and prosperity of our society, nation and the world.
Footnotes


6 A massive open online course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. For more information, see http://www.educause.edu/library/massive-open-online-course-mooc.


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About the Authors

Venkat Srinivasan is Cognizant’s Education Practice Lead. He has over 20 years of experience in business strategy, innovation and operations in the education industry. Venkat’s areas of interest and research include higher education, online learning, student retention analytics and emerging technology disruptions for schools and universities. He earned an M.B.A. in global business from Georgia Tech. Venkat can be reached at Venkatraman.Srinivasan2@cognizant.com.

Robert Hoyle Brown is an Associate Vice-President in Cognizant’s Center for the Future of Work, and drives strategy and market outreach for the Business Process Services Practice. He is also a regular contributor to futureofwork.com, “Signals from the Future of Work.” Prior to joining Cognizant, he was Managing Vice-President of the Business and Applications Services team at Gartner, and as a research analyst, he was a recognized subject matter expert in BPO, cloud services/ BPaaS and HR services. He also held roles at Hewlett-Packard and G2 Research, a boutique outsourcing research firm in Silicon Valley. He holds a bachelor of arts degree from the University of California at Berkeley and, prior to his graduation, attended the London School of Economics as a Hansard Scholar. He can be reached at Robert.H.Brown@cognizant.com | LinkedIn: http://www.linkedin.com/pub/robert-brown/1/855/a47.

Meenu Sharma is an Associate Director with Cognizant’s Center for the Future of Work (CFoW). With over 14 years of experience, Meenu currently works with CFoW leadership to advance its strategic research agenda. Prior to this role, she led strategy and successful implementation of enterprise 2.0 and knowledge management for organizations across multiple industries. Her interest areas include SMAC technologies, consumerization of IT and the Future of Work. Meenu earned her Ph.D. in knowledge management from Punjabi University, India. She can be reached at Meenu.Sharma@cognizant.com.

Joydeep Sinha is the Consulting Lead for Cognizant’s Education Practice. He has seven years of professional experience and is responsible for developing the company’s consulting capabilities in the education domain across sectors such as higher education, assessment, training and digital publishing. Joydeep has also worked with leading education publishers and new media organizations across various geographies, including the U.S., UK, Singapore, China and the Middle East. Joydeep received his M.B.A. from the SP Jain School of Global Management. He can be reached at Joydeep.Sinha@cognizant.com.

Sumit Prakash is a Consultant in Cognizant’s Education Practice. He has more than four years of professional experience encompassing education publishing, LMSs, assessments and assessment bodies, education standards and the mobile applications domain. Sumit received his M.B.A. degree from the Indian Institute of Management, Indore. He can be reached at Sumit.Prakash3@cognizant.com.
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