

THE ENGINE BEHIND WGU

*Configuration of a competency-based
information system*

AN EDUCATION CASE STUDY

Heather Staker
Senior Research Fellow



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EXECUTIVE SUMMARY

Western Governors University (WGU) has developed a strong name in the postsecondary education world not only because it delivers degree programs almost entirely online, but also because students earn credit solely based on demonstrating competency in their course of study. This nontraditional competency-based model has required WGU to piece together a unique data system to support its operations. WGU's information system therefore provides an important reference point about data system requirements for states looking to move away from a seat-time-based public K-12 school system to a competency-based one, where students advance by demonstrating mastery of academic skills.¹

An unconventional institution: domains, competencies, and objectives

WGU is unlike most online postsecondary education institutions. Its graduation requirements are based on demonstrating competency, not on earning credit hours. This model means that students earn their degrees as soon as they pass a series of high-stakes assessments. Competency-based education rewards students for what they know, not for how they learn it.

WGU's academic model revolves around domains, competencies, and objectives. Each WGU program specifies several domains of study, similar to a series of courses, which the student has to master to earn a degree from the program. To complete a domain, students must demonstrate mastery of specific skills and knowledge, called competencies. Each competency subdivides into a set of objectives—the building blocks of assessments. WGU provides students with multiple learning assets such as e-textbooks and videos to help them develop mastery. Students who already have gained competencies prior to beginning WGU can pass the assessment and then move on without spending more time on those skills.

WGU uses the third-party software product Banner, developed by SunGard Higher Education (HE), for its student registration system. But WGU cannot use Banner in the standard way because WGU's needs are anything but typical. For example, WGU needs a way to track the central feature of its program—delivering high-stakes assessments. In a traditional university, some of the key tasks of a student information system (SIS) are to create schedules and maintain attendance records. But at WGU, students have no class schedules and no specific course sequencing. All students must demonstrate all of the competencies within their domains of study, but they can tackle the competencies and corresponding assessments in whatever order they want.

Implementing Banner

Some of Banner's functionality requires little adjustment for WGU's needs, including collecting student demographic information, disbursing financial aid, and serving as the hub for the student-facing Luminis portal, from which students access courses of study. But WGU has had to retrofit Banner in several ways. For example, WGU uses Banner's SWATEST form, the template traditional universities use to track SAT scores and the like, to record assessment dates, versions, and results. WGU uses Banner's CAPP Compliance form to track each student's individual degree program, including the student's custom course sequencing and the appropriate assessment version to match the student's start date.

Weaving in other enterprise solutions

Other software supports the modified Banner student information system. These include discrete software systems that provide a range of functionality, including the following: delivering learning resources, facilitating virtual learning communities, managing assessments, providing student services, monitoring WGU's relationship with its students, and producing data-based management reports. **Figure 1** offers an overview of how the various software products fit together. The case study describes each of these software solutions in greater detail.

Growth strains the system

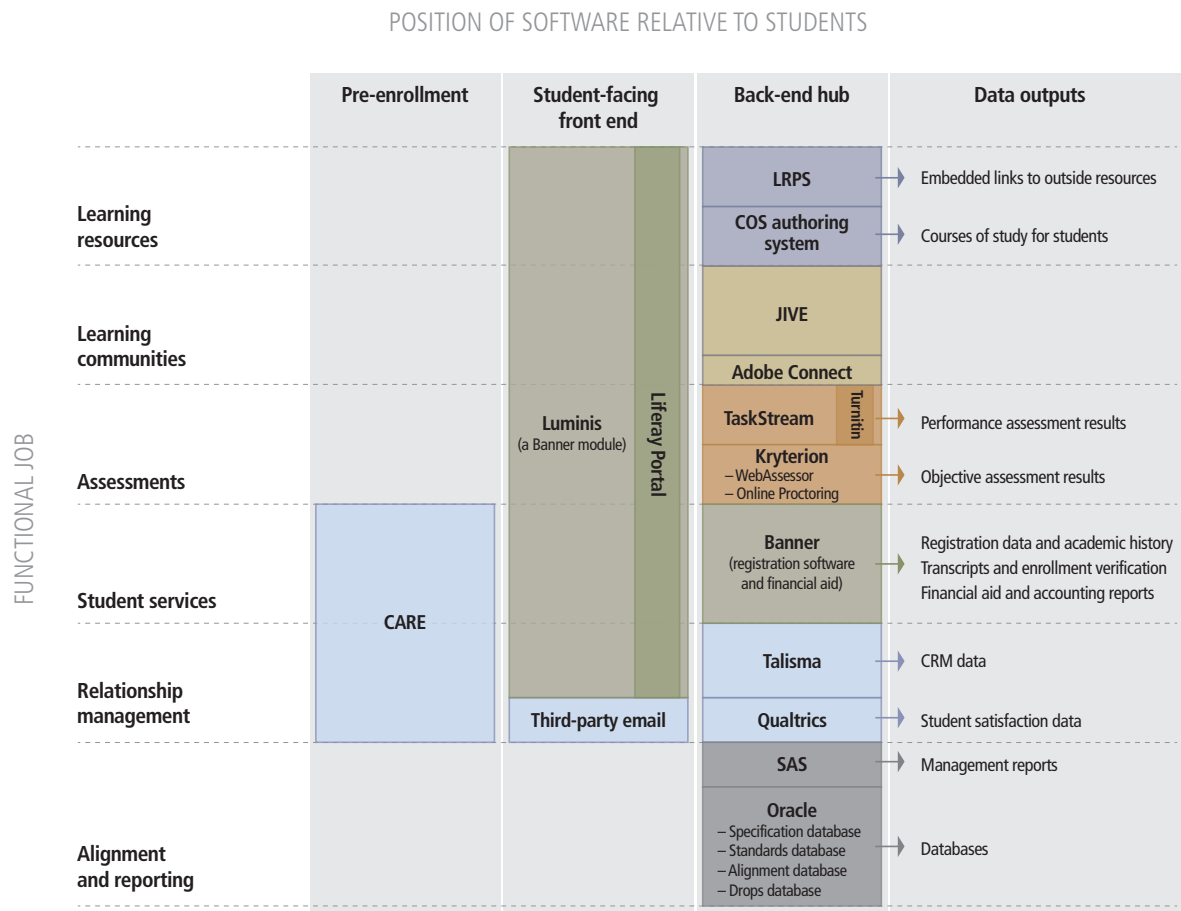
With more than 30,000 students today, WGU has found that even slight system inefficiency strains its operations. For example, Banner does not have dynamic, variable-length fields to codename assessments and programs. Traditional universities do not face the complicated problem of tracking which assessment version to use with each student's degree plan to prevent students from preparing for an old version of an assessment. The Banner codes make the expression of the thousands of assessment and program versions a complex challenge.

Furthermore, when students enroll in a program, their contract with WGU stipulates that they will demonstrate specific competencies in exchange for a degree. Administrators see the need for defining programs at the domain instead of competency level to give them the ability to modify competencies occasionally without needing to amend student contracts.

Reconfiguration and the new student experience project

In 2009 WGU embarked on an initiative to improve information system infrastructure, streamline data processes, and redo the user interface. The new design, scheduled to debut in June 2012,

Figure 1. WGU's system architecture with Banner at its hub



preserves Banner as the archive of student information. But it features WGU's own Program and Assessment Management System (PAMS) as the new central academic hub. The databases in Oracle will transfer to PAMS, and PAMS will take over degree planning. These changes will allow students to exert far more control over sequencing and managing their individual degree plans. The design also entails a new customer relationship management system, an updated student portal, and a system to define programs at the domain level instead of the competency level.

WGU leaders are optimistic about the plan. They believe WGU is on track to implement a system architecture that will accommodate WGU's 30-percent annual growth rate and competency-based, online model.

THE ENGINE BEHIND WGU

Configuration of a competency-based information system

Competency-based education has become a hot topic in K–12 education reform. This case study describes how a postsecondary institution, Western Governors University, retrofitted third-party data systems and developed in-house software to piece together an information system capable of managing its competency-based education model. The focus is not on issues particular to higher education. Rather, the intention is to study the student information system of a leading competency-based postsecondary institution to find parallels and application for organizations seeking to develop and implement their own competency-based models in K–12.

From its creation in 1995, the vision for Western Governors University (WGU) differed from that of most institutions of higher education. The concept for the university emerged in 1995 during a regional meeting of governors, including then-Utah Gov. Mike Leavitt, Colorado Gov. Roy Romer, and Wyoming Gov. Jim Geringer. The discussion turned to how to serve a rapidly growing population of adults needing higher education, despite limited public funding with which to pay for new buildings or additional faculty. The governors brainstormed the possibility of designing a university with the mission to expand access to higher education through an online degree program.

The school would have no classrooms, dorms, or face-to-face lectures. Instead, the idea was for students to access all of their learning at a distance and online.* Furthermore, it would do away with traditional notions of the academic calendar and credit hours. Students could begin their programs any day of the year and complete a degree program by passing a series of high-stakes tests and assignments. It would not impose attendance or participation requirements; it simply would require students to demonstrate mastery of specific domains of study to earn their degrees.

These ideas became the foundation for WGU, which was chartered in 1996, the year following the governors' meeting. With \$20 million in seed money from the governors of 18 states plus the territory of Guam, WGU incorporated as a private, nonprofit university in 1997. It set up headquarters in Salt Lake City and Denver and in 1999 accepted its first 30 students. That same year, Robert Mendenhall, a former general manager of IBM's K–12 division, stepped in as

* The two exceptions are that students in the nursing program must fulfill on-the-ground clinical requirements, and those in the education program must participate in demonstration teaching.

WGU's second president. He was to become instrumental in shaping the student experience that WGU has today.

An unconventional institution: domains, competencies, and objectives

WGU's model of instruction, called "competency-based learning," allows students to progress at an individual pace. Traditional models hold time constant and make learning variable. But competency-based learning flips this: learning is constant and time is variable. The model particularly suits students who have work and child obligations that make fixed-time schedules inconvenient. The group of governors intended WGU for this demographic—older students (mid-thirties on average) who needed flexible, personalized schedules. Competency-based learning often helps this demographic move more quickly through the courses because many students are working adults who already have gained competencies prior to beginning formal education at WGU. With competency-based learning, they can move forward without spending time on the competencies they have already mastered.

When they enroll at WGU, students sign up for a program in one of four colleges: business, health professions, information technology, and education. For example, a student might enroll in the College of Business, Bachelor of Science, Marketing Management program. This is similar to the enrollment process at a traditional university, except that in the latter, students usually do not need to declare a major until months into their programs.

Table 1. Number of competencies and objectives for domains of study in the Bachelor of Arts, Early Childhood Education program

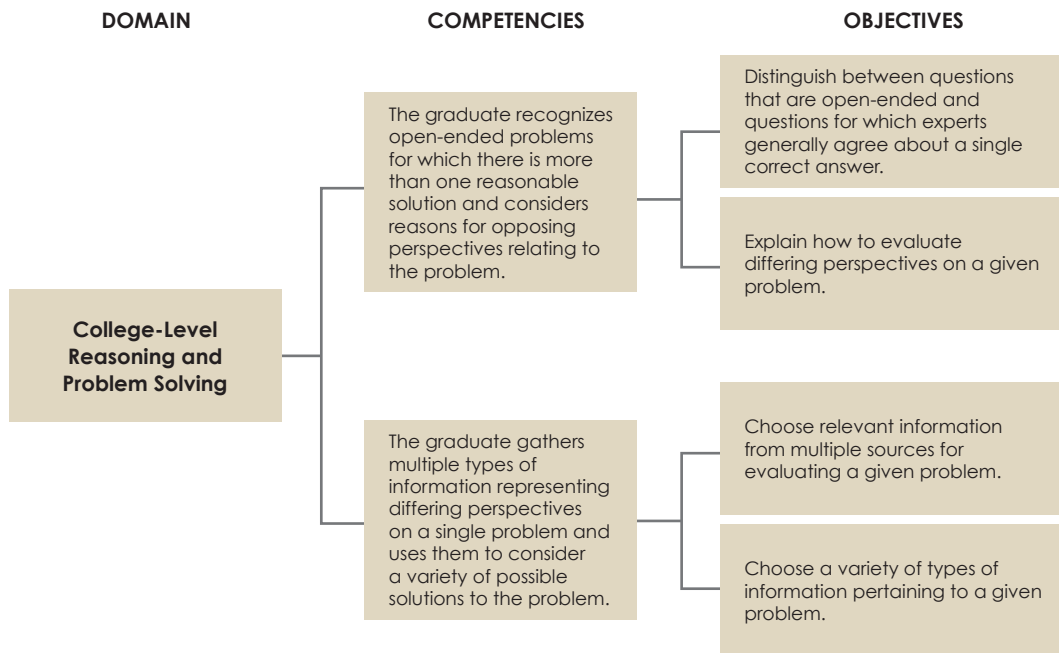
Domain	Number of competencies	Number of objectives
College-Level Reasoning and Problem Solving	5	25
Demonstration Teaching	17	93
Early Childhood Education	34	340
Effective Teaching Practices	31	104
Foundations	11	113
Foundations of Teaching	37	176
General Education Social Sciences	4	46
Interdisciplinary Studies	33	341
Language and Communication	10	25
Literature	9	106
Literature, Arts and the Humanities	6	70
Natural Science	6	78
Quantitative Literacy	8	70
Survey in U.S. and World History	9	0

Once enrolled, students do not think in terms of subjects, courses, and credit hours, as they do in a traditional school. Instead, their academic world revolves around domains, competencies, and objectives. Each WGU program specifies several domains of study, which the student has to master to earn a degree from the program. WGU defines a domain as the “cohesive organizational structure of a set of knowledge containing the activities, behaviors, experiences, attitudes and values that pertain to the set.” In effect, domains function like a series of courses.

To complete a domain, students must demonstrate mastery of a succession of skills, called competencies. Each competency subdivides into a set of objectives—the basic building blocks of assessments. Enrolling in a program of study at WGU means signing up to pass the assessments for all the competencies in the relevant domains. As an example, **Table 1** lists the 14 domain requirements in the Bachelor of Arts, Early Childhood Education program, along with the number of required competencies and objectives for each domain.

To offer a deeper look at a sample domain of study from the program above, **Figure 2** shows a specific competency and four of its associated objectives within the “College-Level Reasoning and Problem Solving” domain.

Figure 2. Sample domain of study, competencies, and objectives in the Bachelor of Arts, Early Childhood Education program



Students are not required to attend class to complete a domain. Instead, WGU provides students with online access to a course of study. In most cases, the course of study offers students access to a single learning resource that is aligned to the competencies. In other cases, the course of study aggregates multiple learning assets, such as e-textbooks and videos, to provide the learning resources necessary for students to develop competence. Students typically begin their studies by completing a pre-assessment that helps them gauge their level of competence and identifies gaps in their knowledge, skills, or abilities. They then use the course of study and learning resources to prepare for the final assessment. WGU weights each course of study depending on the complexity of the competencies that students must demonstrate. Most courses of study are equal to two or three competency units, but they can range from one competency unit to as many as twelve competency units. A competency unit is equivalent to a semester credit of learning at a traditional university.

Competency-based education rewards students for what they know, not for how they learn it. The university uses two forms of assessment to measure competency. The first is objective assessment, which requires students to demonstrate competencies through high-stakes, proctored examinations. The objective assessments measure knowledge of content, skills, and process (the “knowing” tests). They are 40 to 90 questions long with matching, multiple-choice, or similar exercises. A computer scores objective assessments and makes grades available online immediately.

The second form of assessment focuses on performance. Students must show complex behavior competencies through demonstrations, activities, or projects (the “doing” tests). Remote graders evaluate performance assessments against an analytic rubric. Attitudes and values are sometimes elements of the rubric and subject to evaluation. The graders guarantee a three-day turnaround window to report pass/fail grades along with detailed comments for the students. A passing grade is equivalent to a B or higher at a traditional university.*

Two types of faculty interact with students to provide direct support. The primary source of support is an individually assigned student mentor. These mentors communicate with students every week or two, usually over the phone. Students stay with their assigned mentors from the moment they start at WGU until graduation. The mentors provide basic academic assistance, encouragement, guidance, and help to access resources. Student mentors also play a critical role in helping each student stay on pace and make sufficient progress each term.

* WGU does not distinguish between an A and a B on transcripts. It uses a pass/fail designation because it views competency as a yes/no question.

A second set of faculty, the course mentors, help students master the content in the courses of study. Course mentors are subject-matter experts who engage with students primarily through phone and email to answer a specific question and to provide ongoing tutorial support. They facilitate online webinars to help courses come alive and address common issues.

Apart from the student and course mentors, WGU retains 300 adjunct faculty evaluators whose only job is to grade performance assessments.² Their expertise is in evaluation, not teaching. They have no contact with the students and have no knowledge of the appearance, race, or place of residence of any student. Likewise, the students and mentors have no contact with the evaluators. The idea is to make grading objective and based solely on the quality of the students' work.

Roughly two years after its start, WGU changed its policy about terms. Prior to the change, students could begin a degree program on any day of the year. In effect, this made WGU a “non-term” school; enrollment was completely fluid. The daily inflow of new students, however, became challenging for the university to administer, and WGU changed to a policy of six-month terms, with students having the option to begin a term on the first day of any month. This created a system of 12 start dates a year.

To enroll at WGU, students pay a flat rate of between \$2,890 and \$4,250 per six-month term, depending on the program. The “all-you-can-eat” approach means that for this flat payment, WGU allows students to take as many courses of study each term as they can handle. This tuition is one-sixth of the annual expense at a private four-year college on average and half as much as an online for-profit like the University of Phoenix.³ WGU does not have a one-size-fits-all academic calendar. Students can start a term on the first day of any month of the year. They take assessments whenever they feel they are ready.

If students do not pass the assessments for a course of study by the end of the six-month term, they get a “not passed” for that course on their transcript. The course automatically rolls over to the next term, but students—through their mentors—can override that rollover and postpone the course to a later term if they choose. One of the mentors' top responsibilities is to help students complete the enrolled courses within the six-month timeframe. Therefore, mentors continually review student progress and provide extra encouragement to those falling behind. Students feel motivated to complete a course on time not only because of the pass/not pass designation on their transcripts, but also because the terms of financial aid usually require that students make “satisfactory academic progress.”

WGU sees its role as one of helping students certify to future employers that they have mastered a set of competencies. The average student completes a baccalaureate degree in just under 30 months, with a standard deviation of roughly 15 months. Some students with previous background in the domains can finish much faster. WGU's speediest graduate—a college dropout

who had worked for years as a bookkeeper—completed both a bachelor’s degree in marketing management and a master’s degree in marketing and strategy in 13 months start to finish.

Implementing a student information system

From its start, WGU needed a way to track student enrollment and progress. Stacey Ludwig, WGU’s associate provost of academic services, was first to manage student information for the infant university. In 1999 she began by using an Excel spreadsheet to organize schedules for the 30 original students, store their enrollment data, and document their progress.

But within a couple years, WGU had 30 enrollments each monthly term, and Ludwig needed a better student information system (SIS). She bought a Microsoft Access database how-to manual and, working remotely from an old Burger King office in Denver, built her own database on a Micron laptop. “I’m still terrified when I think that I took the complete student information system for the university home with me every night on that laptop!” Ludwig said.

By 2003, the school had 500 enrollments and had more than outgrown the simple database structure. It needed a full SIS to manage everything from creating student records and schedules to printing transcripts and managing financial aid. The information technology (IT) department considered several third-party vendors, including SunGard Higher Education (HE),* PeopleSoft,† and Datatel.‡ It ultimately decided, based on affordability, to license **SunGard HE’s Banner registration system**.

Roughly 30 percent of U.S. higher education institutions,§ and 1,100 institutions worldwide, currently use Banner for their suite of student information solutions. SunGard HE developed Banner in the early 1990s. Its core functionality is to provide administrative support for student services, financial aid, finance, human resources, and alumni relations. It also offers several optional plug-in modules, including student portals and customer relationship management software. SunGard HE’s other main administrative suite is PowerCAMPUS, which the company formulated for small and mid-size institutions.¶

* SunGard Data Systems is the parent company of SunGard Higher Education.

† Oracle Corporation acquired PeopleSoft, Inc. in 2005. Oracle continues to market the PeopleSoft name and product line.

‡ In August 2011 SunGard Higher Education and Datatel announced a definitive agreement to combine businesses and operate as one company.

§ There are roughly 4,200 accredited higher education institutions in the United States.

¶ On average, institutions with fewer than 3,000 full-time student enrollments use PowerCAMPUS, although some institutions that are much larger use it as well. Most institutions above this enrollment threshold use Banner, but the range is broad; some Banner customers have fewer than 1,000 full-time enrollees and others have several hundred thousand.

SunGard HE designed Banner to be relatively plug-and-play. In theory, school administrators have been able to apply its functionality directly to their data processing needs and quickly automate administrative processes. But at WGU, the initial Banner implementation was less straightforward. WGU's competency-based model required a one-of-a-kind strategy.

In 2003 SunGard HE sent consultants to help with the implementation. The consultants quickly discovered that they could not provide the standard treatment for the client because WGU's needs were anything but typical. SunGard HE had designed Banner for a traditional institution—one with a semester calendar, seasonal terms, and standard credit hours. WGU, with its anytime enrollment, assessment-driven courses, and domain architecture, was an exception. Rather than implementing Banner, the task ahead was to retrofit it for the singular model.

Some of Banner's functionality required no adjustment. Namely, Banner plugged straight into WGU's operations to become the repository for individual student records and demographic data. Banner automatically assigns each student a unique identification number, and all student records link to this number.

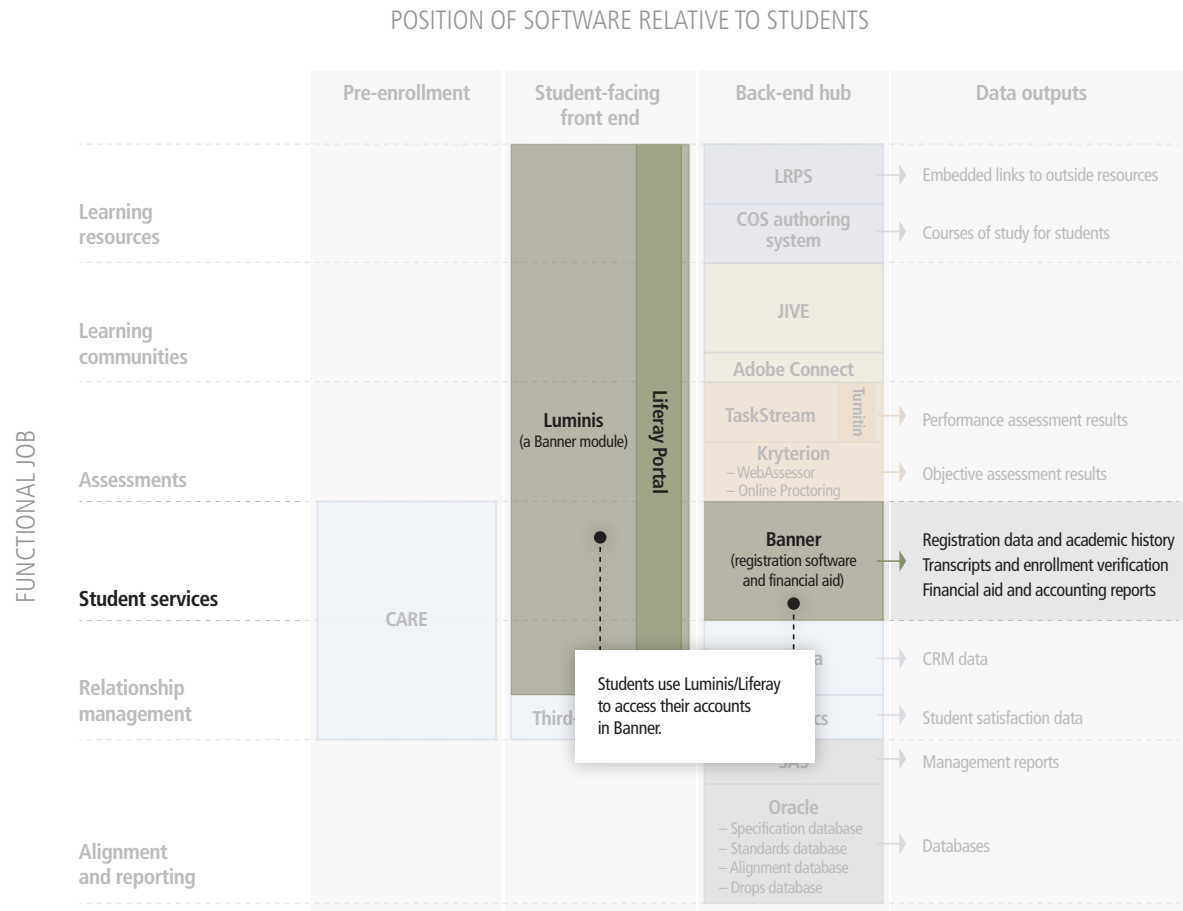
Also, Banner's financial aid plug-in module became the new system to disburse Title IV federal financial aid to students. This module streamlines WGU's process for verifying student eligibility for financial aid by tracking students' academic progress and completion of master promissory notes and then connecting to the accounting department to distribute money. **Figure 3** depicts where Banner and its financial aid module fit in the overall system architecture.

WGU wanted to be able to offer its students single sign-on access to the university at any time from anywhere. It needed a unified student portal where students could access their courses of study and all related learning resources, connect to WGU's social network, schedule and track assessments, and view student accounts. The University also wanted to be able to unify all communications with students through one gateway to create a cohesive experience and brand. **Banner's Luminis plug-in solution**, in combination with Liferay Inc.'s **Liferay Portal**, provided WGU with a ready solution for this student-facing front end.

The Liferay Portal is an open-source enterprise portal that provides a secure, unified access point in the form of a web-based user interface for WGU's students, administrators, and faculty. It aggregates information for WGU's community through application-specific "portlets." WGU set up the Liferay Portal to work in tandem with Banner's Luminis software. Luminis complements the Lifeway Portal by adapting the enterprise product to the specific needs of an academic environment. It adds to, extends, or overrides the baseline Liferay Portal framework to

* A portlet is an application used by a portal Web site to receive requests from clients and return information.

Figure 3. Banner and the Liferay Portal deliver student services and the front-end system



incorporate higher-education-specific content and applications. **Figure 3** situates Luminis and the Liferay Portal as the front-end platform from which students connect to the university.

As it migrated to the Banner system, WGU’s IT team found that using Banner to collect demographic information, disburse financial aid, and serve as the hub for the Luminis module was straightforward. But the rest of the Banner implementation was more challenging. The IT team needed to tweak Banner in several ways to squeeze its competency-based model into Banner’s format. Two retrofits were the most substantial.

First, WGU needed a way to track the central feature of its program—delivering high-stakes objective and performance assessments. In a traditional university, some of the key tasks of an SIS are to create class and teacher schedules and maintain records of absences and attendance. But at WGU, students and faculty have no class schedules. Students learn when and where they want. Furthermore, WGU has no specific course sequencing. All students must demonstrate all

of the competencies within their domains of study, but they can tackle the competencies—and corresponding assessments—in whatever order they want.

Thus, the task of scheduling and tracking assessments is mission critical. Banner offers no easy solution. After significant brainstorming, the IT department and SunGard HE consultants discovered that Banner’s SWATEST* form could offer a workaround. Universities traditionally use SWATEST to track student performance on standardized tests like the SAT and TOEFL. WGU technicians decided to retrofit the somewhat obscure form and use it for the central job of tracking the dates when student mentors refer students for an assessment, the dates when students schedule the assessments, and whether the students pass each assessment. The moment that a student clicks the “schedule now” button on a degree plan, the assessment is populated automatically to the SWATEST form for scheduling and tracking.

This arrangement has the added benefit of allowing WGU to avoid thinking in terms of sections and grades. In the typical Banner implementation, universities assign each student to sections of a course and then record final grades for each section in Banner’s academic history database. But WGU ignores these Banner functions. Instead, it uses SWATEST to record passes and fails on the long string of assessments required to graduate. At the end of each term, Banner looks to SWATEST for the final outcome of each assessment in that term and pushes the result to the academic history table to note the corresponding pass or fail grade.

WGU’s second Banner retrofit relates to creating each student’s degree program. Traditional universities use an SIS to track credit hours and academic progress. Students typically have extensive choice in selecting courses of study to earn a major. But WGU has no electives. All students have to master the same domains and competencies for any given program of study. Nonetheless, individual degree programs still vary significantly from student to student. Assessments change as faculty update or adjust them, so a student beginning a degree program in January 2012 might have a different list of required assessments from another student in the same degree program in May 2012. Furthermore, many programs have other requirements besides assessments. For example, students earning a B.A. in special education have to complete a supervised teaching practicum.

In addition, students have significant control over their programs, even if they cannot choose the courses themselves. Students work with their student mentors to choose the order in which they want to attempt courses of study and other course requirements. They decide how many

* Some in higher education refer to Banner’s naming system as “Bannereese.” Every Banner form has a non-English code name like this.

courses of study to sign up for each term, when they want to take assessments, and whether they need to take a break between terms.

WGU decided to use Banner's CAPP Compliance form to build and track individual degree programs. Registrars at traditional universities run a CAPP Compliance report to determine whether a student has earned the credits required to graduate. CAPP Compliance has all the built-in logic WGU needs to be able to repurpose it as a tool to create individual degree programs and track student progress toward fulfilling those requirements. It became the retrofitted template for this job.

Weaving in other enterprise solutions

During the Banner implementation and in the years that followed, WGU's executive team and IT department decided not to use many of Banner's features or plug-in modules and instead developed homegrown software. In addition, as its student enrollments and degree programs expanded and its need to accelerate internal processes grew, WGU's leaders wove in other enterprise solutions. Today, the system continues to operate with Banner at its hub to maintain student records, administer financial aid, and deliver the student portal. Surrounding this central system, several software solutions play supporting roles.

Alignment and reporting

Banner sits atop an **Oracle database management system**, which organizes and collects all the digital data necessary to run the WGU operation. The Oracle system manages WGU's Specification database—the repository for all the data that maps assessments to learning objectives, competencies, and domains. It specifies how to measure each competency. Janet Schnitz, associate provost of assessment, leads the massive effort of ensuring the assessment material is adequate and corresponds appropriately to competencies.

Oracle also manages WGU's Standards database, which maintains records of teacher licensing standards across the 50 states. A third database, the Alignment database, aligns these standards to objectives and competencies in WGU's Teacher College. The Teacher College houses 38 of the WGU's 58 degree programs. Alignment with state standards is critical to allow WGU

to maintain its NCATE accreditation^{*} and its ability to grant teaching licenses for its largest student population.

A fourth important database is the Drops database, which records why students withdraw or take term breaks from the university. A staff member from WGU's student services team personally calls all WGU dropouts to interview them about why they dropped and records the answers in the Drops database. The team uses these responses to improve services.

On top of the Oracle system, WGU uses **SAS business analytics software** to make sense of the hundreds of gigabytes of data the organization produces. To date, the Oracle system writes 30,000 new rows of data each month. It stores over 3 million total rows across 255 columns. SAS software allows WGU to draw this data from Oracle, match it to unique student identification numbers in Banner, and then produce any number of custom reports. James Schnitz, WGU's vice president of quality and institutional research, leads the task of creating daily reports to ensure the entirely online university is hitting its key performance indicators[†] and that no student falls through the cracks because of a system error. WGU managers across the organization rely on data reports for every major decision.

Figure 4 shows the position and function of WGU's alignment and reporting solutions within its system architecture.

Relationship management

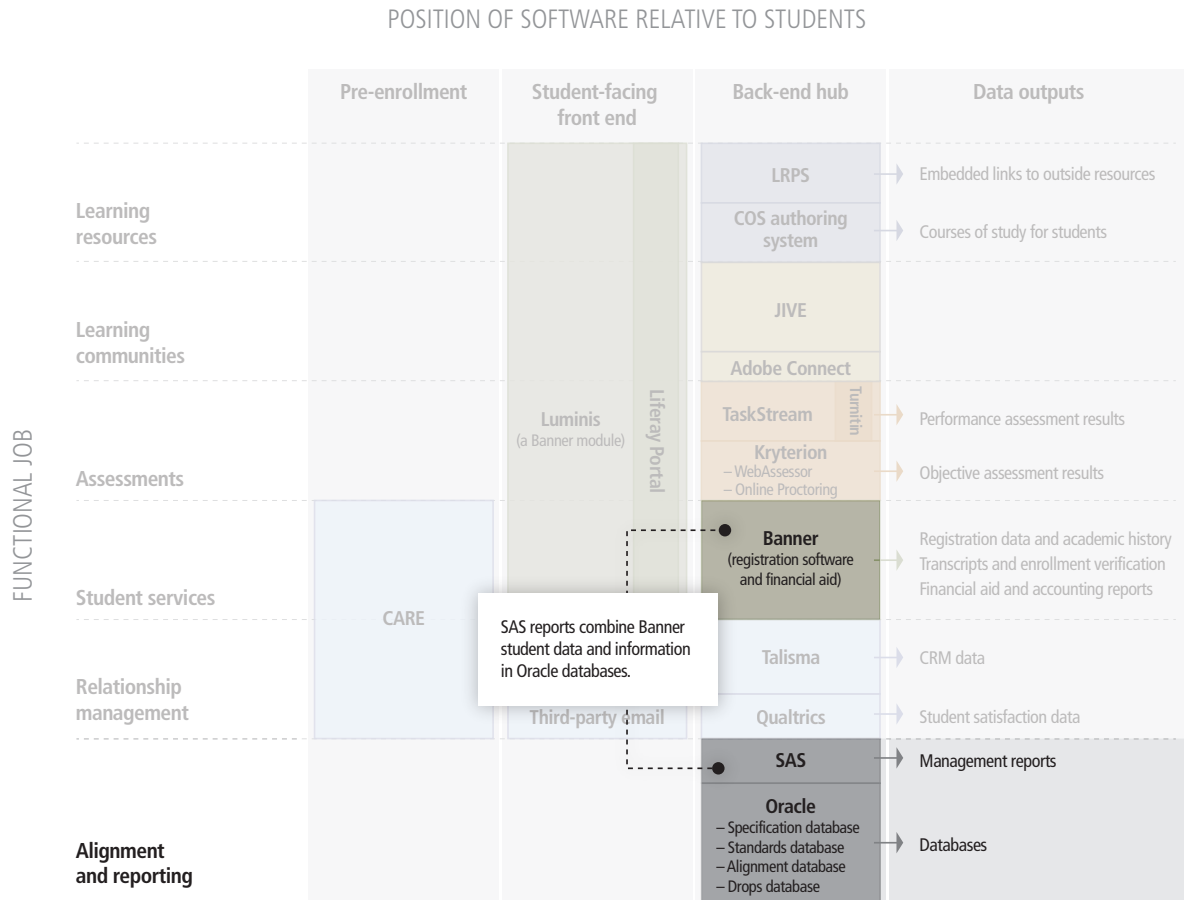
Like many organizations, WGU's success hinges on customer satisfaction. To ensure quality service, the University relies on carefully managing the communication between its personnel and its students. As the size of its operations grew, WGU needed a customer relationship management (CRM) system to log interactions between the university and its students and provide managers with transparency regarding the quality and quantity of communication between WGU personnel and the students whom they served.

The job of managing communications began before students even enrolled at WGU. Recruiters needed a way to track their interactions with prospective students, collaborate with each other, and identify marketing strategies that generated a successful pattern of enrollments. WGU decided to create its own **Contact, Advise, Recruit, Enroll (CARE) CRM software** to

^{*} National Council for Accreditation of Teacher Education (NCATE) is a specialized accrediting body for teacher preparation and is recognized by the U.S. Department of Education. It accredits colleges of education that produce over two-thirds of the nation's new teacher graduates annually. WGU was the first exclusively online university to receive NCATE accreditation for its degree programs that lead to teacher licensure.

[†] WGU's four key performance indicators are student retention rate, graduation rate, student satisfaction, and satisfactory progress.

Figure 4. Oracle and SAS provide alignment and reporting functionality



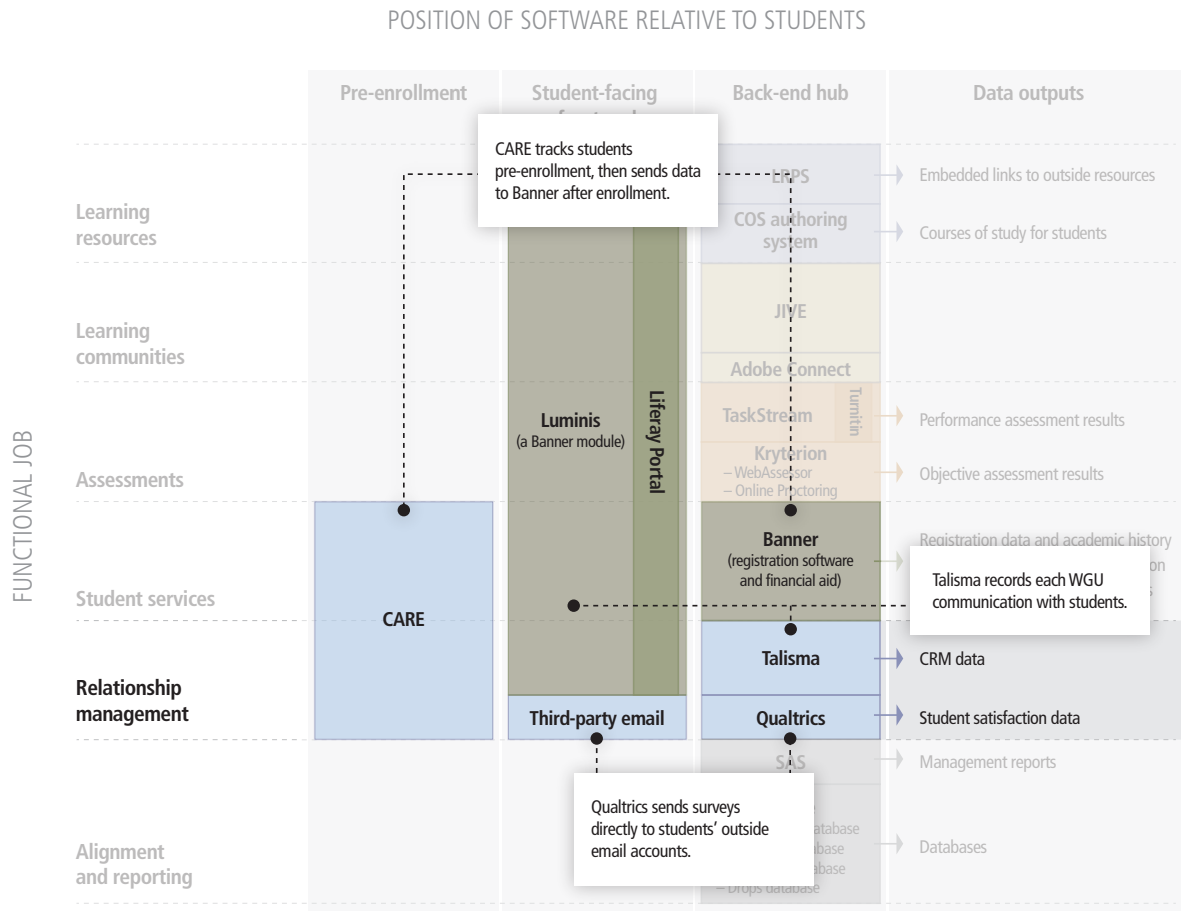
manage relationships with students prior to enrollment. CARE is limited in scope, but it helps WGU’s enrollment managers more efficiently recruit students to the school.

Once students matriculate, they move into the **Talisma CRM system**. Talisma helps WGU’s student services department maintain a comprehensive record of contact with students across all touch points, including phone calls, emails, web portals, and print materials. It is the repository for all mentors’ notes about students. It tracks every interaction the university has with its enrolled students to maximize the value of the relationships.

Qualtrics provides another tool to help measure WGU’s relationship with its students. WGU uses Qualtrics surveys to gather student satisfaction data. Qualtrics allows WGU to build, send, and analyze surveys of enrolled students to monitor their level of satisfaction with the school. It emails these surveys to students’ outside email accounts.

Figure 5 shows how WGU’s relationship management solutions integrate with other system architecture.

Figure 5. CARE, Talisma, and Qualtrics deliver customer relationship management



Learning communities

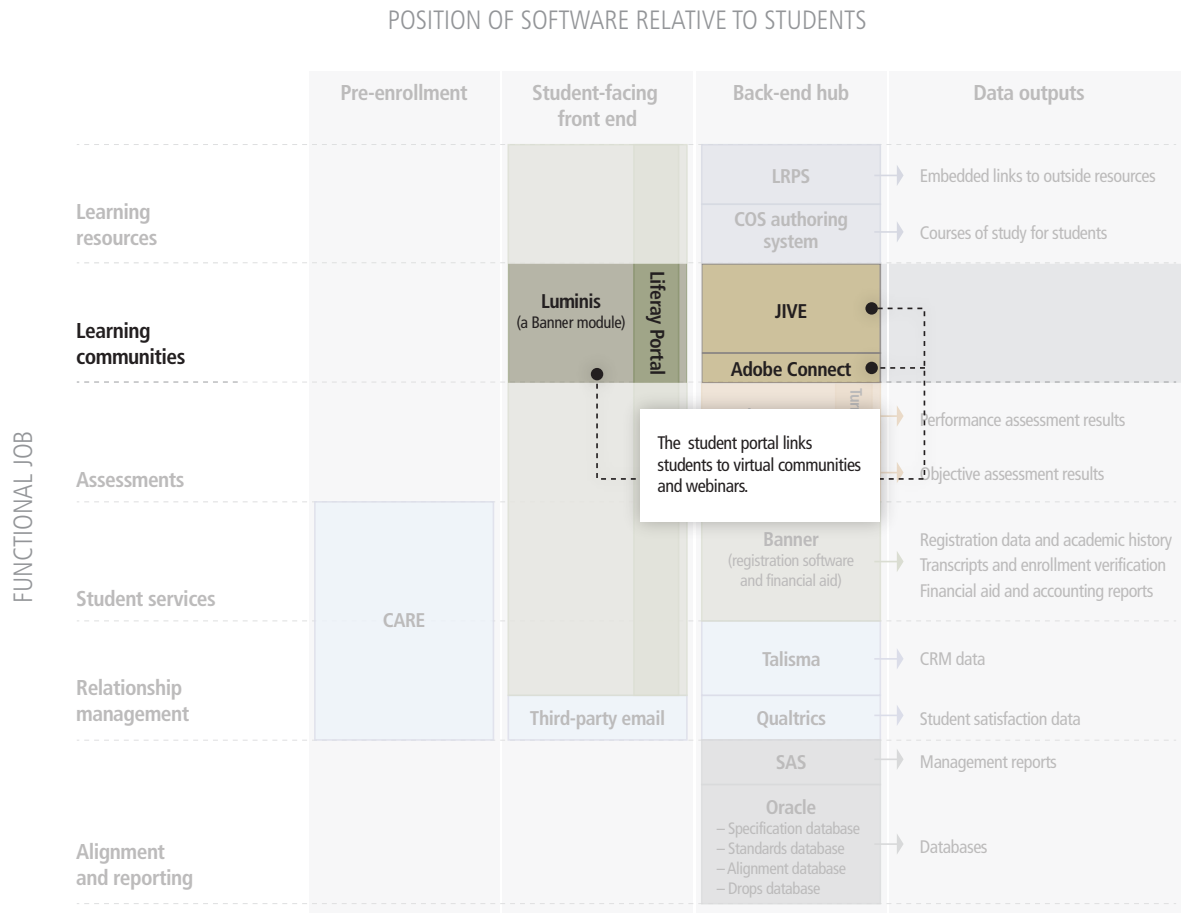
All students at WGU have the opportunity to participate in social networking and learning communities associated with their courses of study. WGU uses **JIVE social business software** to provide the structure for its student learning communities. The Luminis and Liferay student portal provides the entry point for students to access JIVE, from which point they can contribute to message boards and blogs, view if mentors are available to chat, and find announcements of upcoming webinars. WGU uses **Adobe Connect** to host the webinars themselves.

Figure 6 depicts WGU's tools to deliver learning communities.

Learning resources

WGU does not author comprehensive online courses for its students. Instead, it identifies and licenses third-party content and resources that students can use to prepare for assessments. It uses two software tools to organize these resources into unified courses of study. First, its

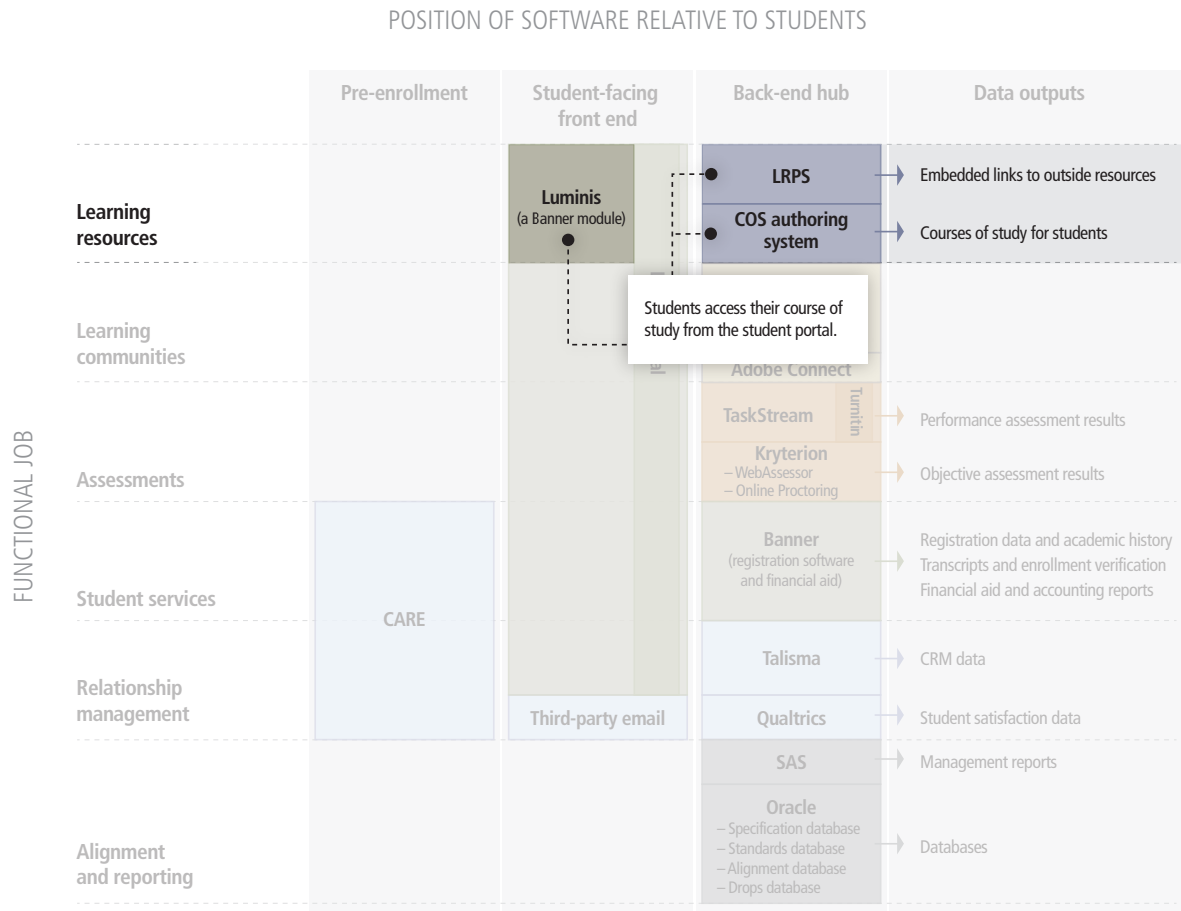
Figure 6. WGU's tools to facilitate virtual learning communities



team developed a web-based course-of-study (COS) authoring system. Course authors begin with an empty template with fill-in-the-blank fields to enter information about a domain. The authors' job is not to develop substantive content for the course of study. Instead, they write an introduction to the course of study, explain the required competencies, and provide context for the learning resources.

The links connect to learning resources that third parties have developed. At first, WGU pasted the website addresses associated with these links directly onto its course of study pages. But these made the pages messy and difficult for students to navigate. Eventually WGU developed a **Learning Resource Provisioning System (LRPS)** to serve as a repository for links to learning resources. The LRPS allows course authors to embed links to resources into courses of study seamlessly. It also provides single sign-on access to roughly 30 percent of the outside resources. For a large number of the remaining learning resources, students receive unique usernames and passwords or keycodes specific to each outside vendor's specifications. WGU is working to

Figure 7. Tools to deliver WGU's learning resources to students



eliminate this double sign-on burden and reduce the frequent problem of students forgetting one of the many passwords they might need within a given course of study.

Students access a course of study through the student portal. The course of study window becomes their learning space where they access JIVE communities, connect with course mentors, take pre-assessments, and access all of the learning resources for a course of study.

Figure 7 depicts the software tools that WGU uses to deliver learning resources.

Assessment

Two software solutions help WGU deliver its enormous assessment system. **TaskStream** facilitates the performance assessments. Before they discovered Task Stream, WGU administrators required students to mail in hard copies of their performance assessments. Students mailed in everything from written documents to CDs and dioramas, along with a signed statement of academic authenticity to pledge that the work was their own. WGU's mail room then mailed these final

projects to anonymous evaluators, who in turn wrote responses and mailed the projects back to WGU. Finally, WGU mailed the projects back to the students. If evaluators questioned the origins of a project, their only recourse was to talk with student mentors to try to assess if the submission was truly the student's handiwork.

TaskStream greatly simplifies this process. WGU has roughly 300 evaluators scattered throughout the United States. Using the TaskStream portal, students submit digital projects online in the form of documents or multimedia files. Anonymous evaluators visit the TaskStream platform to select student work to grade, view the analytic rubrics that are aligned to the competencies, and provide comments to the students. Students then have the opportunity to revise and resubmit assignments up to four times. This entire process takes place online using TaskStream. WGU uses **Turnitin software** to check for plagiarism.

Kryterion provides WGU's other important assessment-related systems. Whereas TaskStream facilitates performance assessments, Kryterion's **WebAssessor** product manages objective assessments. It provides a secure online testing platform that integrates item banking, test development, result management, and self-service reporting. Faculty members use it to link test items to course objectives and ensure that they have measured each competency in the domain. WebAssessor is essential to WGU's operations because of the huge number of test items necessary to deliver its program. Each competency has five to 35 learning objectives. Objective assessments require one test item per objective, but the school has to create three to seven versions of each item to allow students to retake assessments without encountering the same item twice. WebAssessor randomizes test items to certify that students get new items for each test retake. To date, WGU has over 800 assessments that it has to keep available to its students.

Kryterion also allows WGU to provide online proctoring of objective assessments through its **Online Proctoring (OLP)** solution. Before this innovation became available, students had to drive to a physical site to take proctored assessments. Some students had to drive up to 50 miles to get to a proctored site, often at the cost of missing work and finding childcare. Kryterion's OLP option has changed that. It allows students to take assessments from the road or at home. The sophisticated system identifies student identity through forensics. Side and front cameras record the students throughout their exams, and live proctors on the other end of the cameras monitor with full sight and sound of the testing environment. WGU has found that online proctoring is often more secure than some of the physical testing sites in terms of being able to monitor students one-on-one.

Kryterion's solutions allow WGU to deliver 10,000 objective assessments per month, whereas before it was strained to deliver 4,000 per month. Instead of waiting up to 10 weeks to take an assessment, students can take an exam within a few hours of scheduling it.

Figure 8. WGU's configuration of assessment software

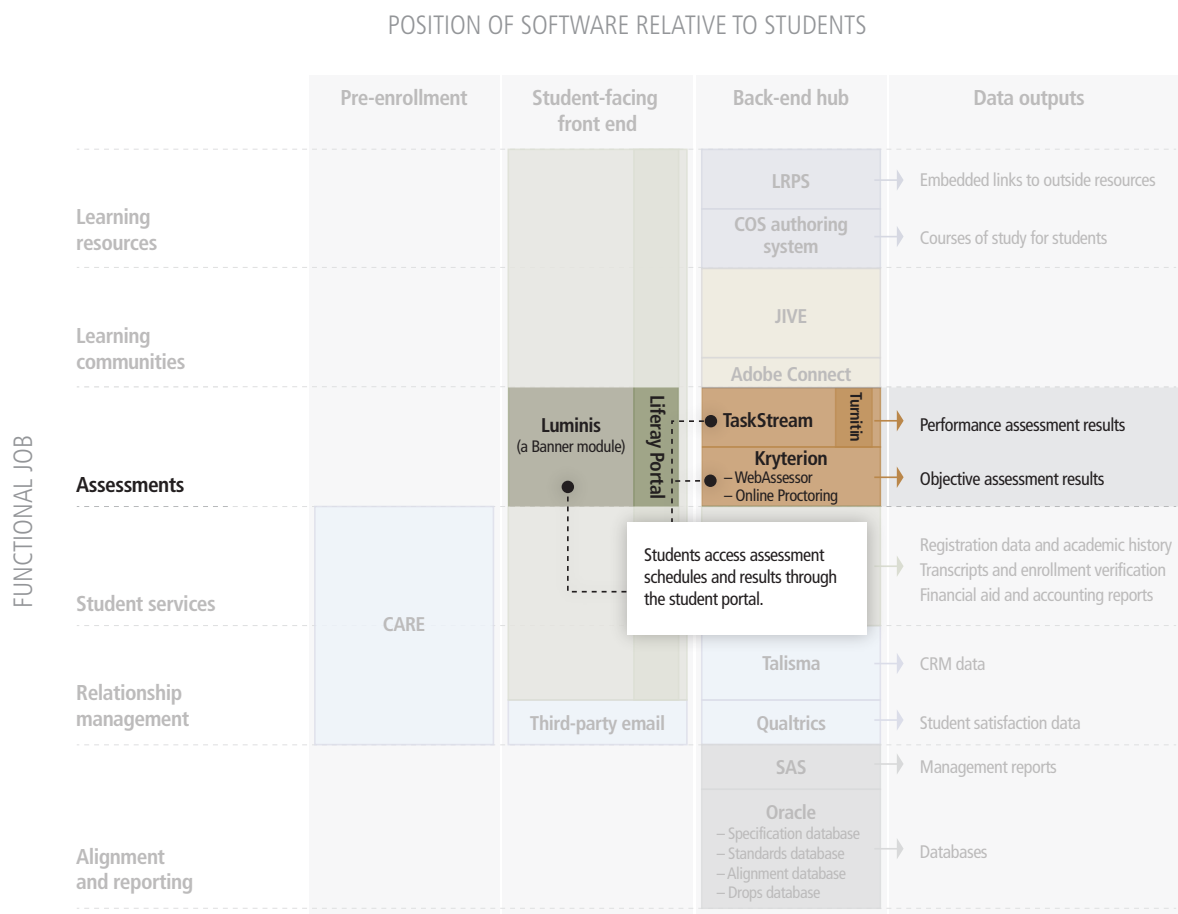


Figure 8 diagrams WGU's assessment software.

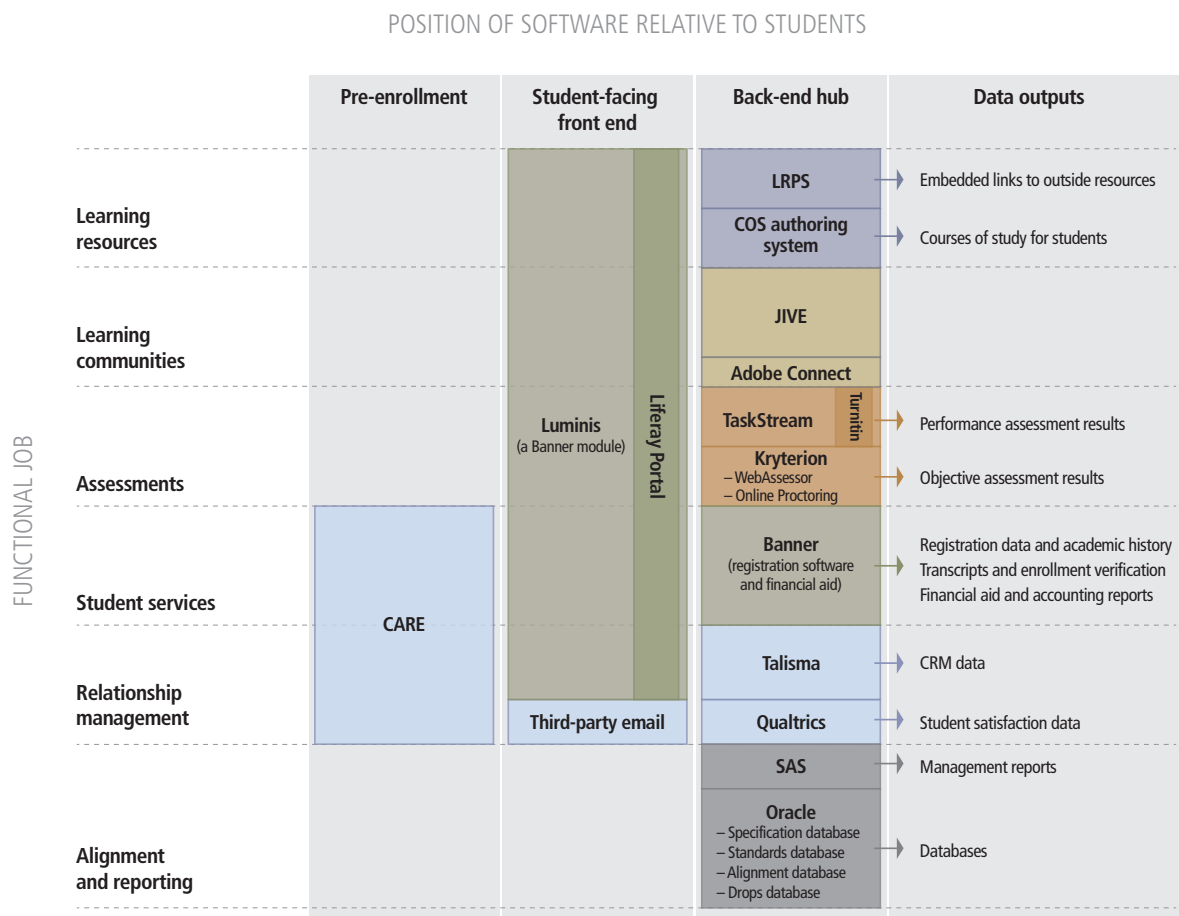
Figure 9 diagrams the complete picture of WGU's system architecture for delivering its competency-based online university, with Banner as its hub.

Growth strains the system

The Banner-centered system has served WGU well for almost a decade. But with over 30,000 students today and an average annual growth rate of roughly 30 percent for the past 5 years, WGU has found that even slight system inefficiency strains its operations.

For example, WGU uses Banner's CAPP Compliance form to build each student's degree program. The CAPP Compliance form allows for four characters to name each assessment. This works fine for traditional universities, which use CAPP Compliance to keep track of tests like the SAT. But WGU has to maintain 800 assessments at a time. It delivers 250 current and

Figure 9. WGU's system architecture with Banner at its hub



active assessments, but it also has to keep another 550 assessments available for students who had enrolled in earlier versions of a program. CAPP Compliance does not have the dynamic, variable-length fields that WGU needs to name all of its assessments. The four-character limit forces it to assign nonsensical code names to each assessment. It uses codes like “AXV1” and “LCV5” and relies on reference guides to remember the meaning of each code.

A similar problem confronts the naming of degree programs. Each program has several term-code versions, because the school is constantly changing and updating its competencies and assessments. Thus, a student beginning a Bachelor of Science in Mathematics program in February 2009 might have a program code such as BAMA 200902 (the catalog term “2009” signifies the year and “02” signifies February), whereas a student beginning a degree in the same program in May would have a program code such as BAMA 200905 (the “05” represented May). The change in the catalog term reflects the new version of the same program.

Traditional universities do not face this complicated versioning problem. Professors can change the syllabi, assignments, and exams for any given term without needing to rename the entire degree program. But at WGU, where the assessments *are* the degree programs and new terms start the first of each month, the school has to be precise about which specific assessments each student has to take to earn a degree. Otherwise, a student who has studied for a certain assessment or is preparing to retake a failed assessment would be unfairly penalized if WGU makes an assessment change midstream. Students in BAMA 200902 need to be able to complete that entire program as promised, even if students in BAMA 200905 are pursuing a slightly modified version.

The Banner codes make the expression of these thousands of degree programs a complex challenge. The constraints of the system mean that program names are nonsensical. For example, the code MSNNULMUG stands for “Masters in Nursing Leadership Management, Undergraduate Level.” WGU administrators rely on reference tables and a database to keep track of the meaning of each code and the equivalencies among versions. Furthermore, the IT department had to create a software program outside of Banner to produce transcripts that are intelligible to employers and other universities. The software translates codes like MSNNULMUG into recognizable program names. To make this work, administrators must hard code the new names into more traditional course-based language. With each minute change in domain or competency, administrators must go back to the system and ensure that all of the versioning, mapping, and correlation between WGU code and common course-based language are in place.

Each of these functions takes time. Administrators complain that they have to “push 20 buttons” to create a transcript. Changing an assessment or competency requires collaboration among numerous departments to ensure that the system has provided crosswalks to convey students from the old to the new version. When WGU was small and Banner was new, these extra keystrokes and crosswalks were trivial. But with 30,000 enrollments, WGU needs to streamline as many 20-button processes as possible.

Another problem is challenging WGU’s operations. WGU has always defined programs at the competency level. In other words, when students enroll in certain degree programs, they contract with WGU to master a series of specific competencies. For example, WGU’s enrollment contract for the Bachelor of Science, Information Technology program stipulates that students in the program will master a number of specific competencies, including the object-oriented language Java. The problem is that when WGU modifies competencies, it has to amend the contract with every implicated student. This is time consuming and costly.

Administrators see the need for defining programs at the domain level instead of competency level. In the example above, students in the Bachelor of Science, Information Technology program would contract with WGU to learn a computer programming language, but the contract would

not specify that the language must be Java. This would give WGU flexibility to version objectives, competencies, and assessments without impacting contracts with students.

Reconfiguration and the new student experience project

In 2009 President Mendenhall called upon his executive team to revamp the student experience at WGU. He wanted to improve the student retention rate, which was 67 percent at the time.* He also wanted to involve students more in the learning community and overhaul the student-facing aspects of the program. Mendenhall called for the new experience to debut by June 2012.

The “new student experience project,” as it became known, quickly turned into a discussion about IT strategy. The cross-functional project team appointed to oversee the new student experience determined that the best way to improve overall student and employee satisfaction at an online, competency-based institution was purely technical. The answer was to improve information system infrastructure, streamline data processes, and redo the user interface.

During 2011 the project team agreed to a rough design for the revamped information system. The design preserves Banner as the archive of student information and as the financial aid processor, but introduces an additional system, which the team has temporarily called the Program and Assessment Management System (PAMS). The primary purpose of PAMS is to allow students to design flexible degree plans. It will give students a planning environment where they can change the number of competency units they plan to undertake per term and reorder their course sequence. Currently students rely on mentors to make these adjustments for them and WGU tries to keep track of the changing degree plans using Banner’s CAPP Compliance form.

Furthermore, PAMS will provide students with a full, customized list of graduation requirements, including non-course requirements such as vaccinations, state-specific exams, and the like. Administrators believe PAMS will give students much more control over and visibility into their degree plans. It will also make versioning much easier.

To deliver this functionality, PAMS will replace Oracle as the repository for the Specification, Alignments, Standards, and Drops databases. Administrators will not have to connect Banner to these databases through the complicated process of mapping Banner codes to domains, competencies, and objectives. Instead, the PAMS system will house both the degree plans

* The 13-month retention in February 2009 was 67 percent. In other words, 67 percent of the students who started 13 months before had completed one year at WGU and begun a second year. As of January 2012, the 13-month retention rate climbed to 78 percent.

currently in Banner and the databases currently in Oracle. The complicated Banner codes for assessment and program names will become a thing of the past.

PAMS will use common course numbering and nomenclature. The school will still revolve around domains, competencies, and objectives, but the names for domains and sub-domains will translate directly to common course names (such as “English 101”) for the purpose of transcripts.

Apart from PAMS, the new design includes a migration in customer relationship management software from CARE and Talisma to Salesforce, which will help the various WGU departments share relevant information about students. Salesforce will also allow for the streamlining of several processes and improve documentation of all interactions with students. WGU’s goal is to set up a system that resolves 95 percent of all student issues in 24 hours.

The design calls for a true integration of Salesforce data and Qualtrics’s student satisfaction data with SAS. Currently, both Talisma and Qualtrics produce a string of data that SAS cannot read. WGU’s new system will create a bridge to enable full integration among the systems. This will allow managers to create reports that show how metrics related to customer relationship management correlate with student satisfaction levels and how those, in turn, correspond to the university’s key performance indicators like graduation rates.

The plan also includes an initiative to redesign the student portal to make it more attractive and navigable. WGU will continue to use Luminis and the Liferay Portal, but it will improve the user interface to allow for greater visual flexibility and graphical customization.

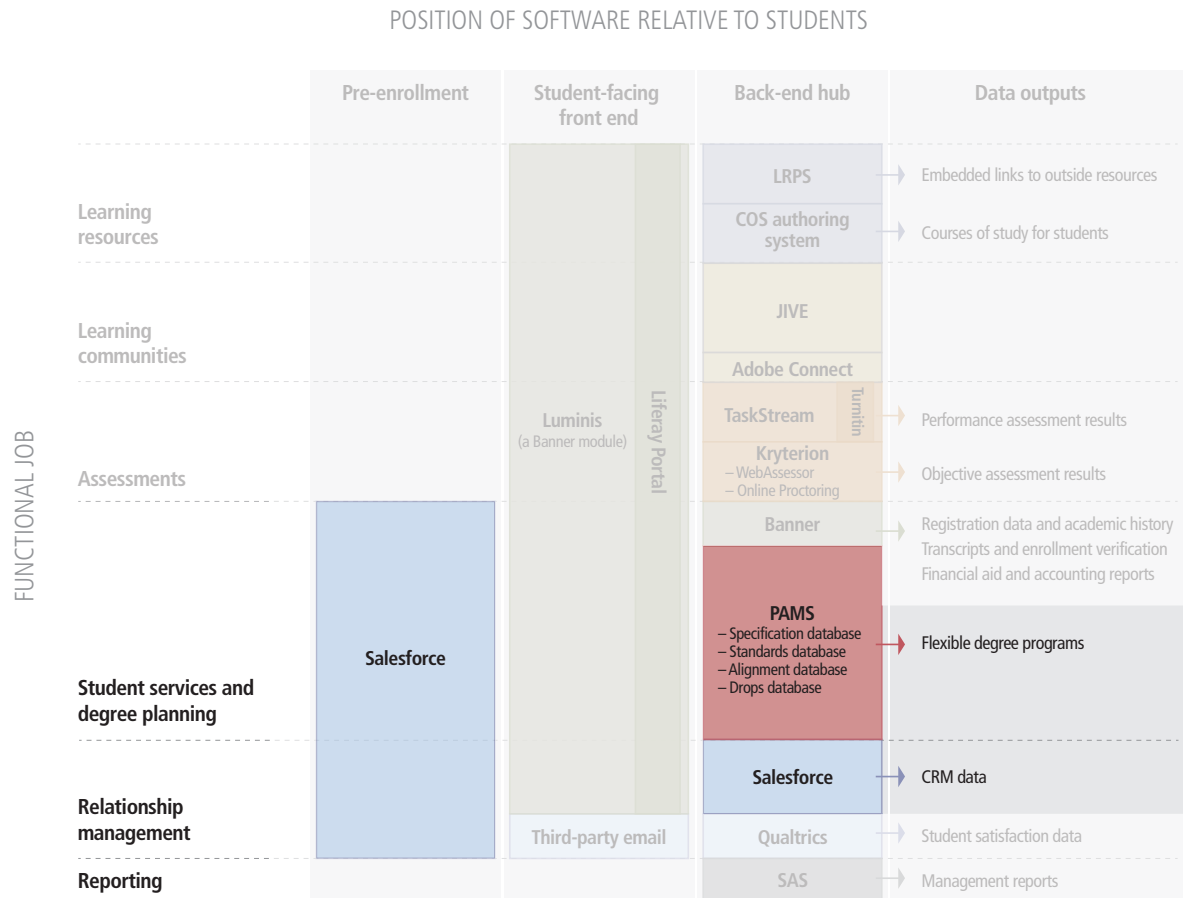
Finally, the new system defines programs at the domain level instead of competency level. This means that the school will not require students to change programs when versions of courses, assessments, or competencies occur in a program. The change will eliminate that disruption to the students and reduce the operational overhead required to create crosswalks and student services support to lead students from one version to the next.

Figure 10 shows WGU’s blueprint for its new system architecture.

The top concern among the project team is the migration plan from the Banner-centric system to the PAMS-centric system. The team faces the formidable challenge of transferring all the domains and programs from the old to the new system without students noticing any problems with quality of service. WGU has no term breaks; learning takes place 24 hours a day, 365 days a year. The migration has to feel seamless to the students.

The team is also focused on the shift from defining programs at the competency level to defining them at the domain level. WGU must redo its marketing materials to communicate the new orientation around domains, with standard course names, rather than around specific competencies. Faculty has to ensure that courses preserve equivalent rigor after the change to avoid unintentionally speeding up or slowing down student progress.

Figure 10. WGU's proposed PAMS-centric system architecture



Despite these challenges, the project team members are optimistic about the envisioned plan. They believe that they are on track to implement a system architecture that will accommodate WGU's 30 percent annual growth rate and competency-based, fully online model.

Notes

¹ To understand more about competency-based learning and why it is imperative for a student-centric, next-generation learning system, see the following: (1) Chris Sturgis, Susan Patrick, and Linda Pittenger, "It's Not a Matter of Time: Highlights from the 2011 Competency-Based Learning Summit," iNACOL, July 2011, http://www.inacol.org/research/docs/iNACOL_Its_Not_A_Matter_of_Time_full_report.pdf; (2) Susan Patrick and Chris Sturgis, "Cracking the Code: Synchronizing Policy and Practice for Performance-Based Learning," iNACOL, July 2011, http://www.inacol.org/research/docs/iNACOL_CrackingCode_full_report.pdf; (3) Chris Sturgis and Susan Patrick, "When Success is the Only Option: Designing Competency-based Pathways for Next Generation Learning," iNACOL, November 2010, http://www.inacol.org/research/docs/iNACOL_SuccessOnlyOptn.pdf; and (4) Chris Sturgis, Bob Rath, Ephraim Weisstein, and Susan Patrick, "Clearing the Path: Creating Innovation Space for Serving Over-Age, Under-Credited Students in Competency-Based Pathways," iNACOL, December 2010, <http://www.inacol.org/research/docs/ClearingthePathReportJan2011.pdf>.

- ² Jeffrey R. Young, “Professors Cede Grading Power to Outsiders—Even Computers,” *The Chronicle of Higher Education*, August 7, 2011, <https://chronicle.com/article/article-content/128528/> (accessed August 29, 2011).
- ³ Kathleen Kingsbury, “Go Western, Young Man,” *Time magazine*, November 13, 2008, <http://www.time.com/time/magazine/article/0,9171,1858876,00.html> (accessed August 30, 2011).

About Innosight Institute

Innosight Institute, founded in May 2007, is a 501(c)(3) not-for-profit think tank whose mission is to apply Harvard Business School Professor Clayton Christensen's theories of disruptive innovation to develop and promote solutions to the most vexing problems in the social sector.

About the author



HEATHER CLAYTON STAKER is a Senior Research Fellow for the Education Practice at Innosight Institute. She is the author of many publications, including the acclaimed report “The rise of K–12 blended learning: Profiles of emerging models,” and speaks regularly at education conferences and policy hearings around the country. Staker has experience as a strategy consultant for McKinsey & Company and as a member of the California State Board of Education. She graduated from Harvard College and Harvard Business School.

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