BENTLEY UNIVERSITY

Leveraging Data Analytics for Student Success

Lessons from Building an Analytics Program at Bentley University

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Executive Summary

Higher education institutions across the United States face an unprecedented convergence of challenges: a shrinking pool of college-aged students, persistent learning gaps from the COVID-19 pandemic, the destabilization of longstanding federal support structures, and the rising cost of attendance, which increases public skepticism about the value of higher education and challenges access for low-income learners. In this environment, student success is no longer simply a strategic priority—it is an institutional imperative.

One way in which Bentley University has responded to these pressures is by launching the Building a Data-Driven Student Success Ecosystem (BaSSE) initiative, a comprehensive analytics program designed to transform how the institution identifies, supports, and retains students. BaSSE integrates data from academic, advising, and engagement systems into a unified ecosystem, applies descriptive and predictive analytics to proactively surface early risk signals and design evidence-based interventions to close institutional performance gaps.

This paper tells the story of how BaSSE was built—from the strategic mandate that launched it, through the resource mobilization and governance work that made it possible, to the early wins that demonstrated its value. It distills four core lessons for institutions considering similar programs: start with data governance before dashboards, invest as much in data literacy as in technology, treat analytics as a cross-institutional initiative rather than a departmental project, and celebrate early wins to build the trust and transparency that sustain long-term adoption.

The paper is addressed to higher education leaders: provosts, CIOs, student success leaders, and institutional researchers, who are considering or are in the early stages of building analytics capabilities. Bentley's experience demonstrates that when analytics is approached as a cultural and institutional transformation rather than a technology deployment, it becomes a powerful tool for improving student outcomes for all kinds of learners and strengthening institutional resilience.

1. Introduction

1.1 Context and Motivation

Now more than ever, higher education institutions need to invest in student success data analytics. The challenges facing higher education have been mounting for years. Demographic shifts in the U.S. population—what Nathan Grawe has termed the "demographic cliff"—have decreased the total number of college-aged adults, intensifying competition to enroll and retain students (Grawe, 2018). Of those who do reach college age, a growing share are the first in their families to attend, requiring institutions to deploy different strategies to support persistence and graduation.

Additional pressures compound the challenge. Learning and developmental gaps that emerged during the COVID-19 pandemic continue to affect student readiness (Neuwirth, et al., 2020). Public confidence in the value of higher education has eroded amid rising costs. And shifting public policies and funding priorities also mean that higher education institutions must reimagine the economic models on which they have relied for decades.

1.2 Purpose and Scope

Within the current higher education context, student success has become the central challenge for institutions that are increasingly dependent on the tuition of a smaller, less uniformly prepared student population. This paper makes the case for data analytics as an imperative for student success, using Bentley University's experience launching the Building a Data-Driven Student Success Ecosystem (BaSSE) initiative as a detailed case study.

The paper is intended for leaders of higher education institutions—provosts, CIOs, directors of student success, and institutional researchers—who are considering or beginning to build their own analytics capabilities. It is not a technical manual or a policy brief. Rather, it offers a candid account of what it takes to move from aspiration to implementation: the strategic case, the resource requirements, the governance infrastructure, the cultural shifts, and the lessons learned along the way. Our goal is that Bentley's story will inform other institutions and their partners on how to see the value of investing in student success analytics and provide practical guidance on how to do it well.

2. The Case for Student Success Analytics at Bentley

2.1 Institutional Context

In 2024, the BaSSE project was launched to support students with timely, reliable, and actionable insight. As student needs have grown more complex and expectations for personalized, equitable support have increased, the university recognized that traditional reporting and case-by-case interventions were no longer sufficient. Supporting students effectively requires the ability to see patterns early, understand different student pathways, and act before challenges become barriers to success.

This need is embedded in Bentley's strategic plan, *Falcons Forward 2030*, which mandates that the university improve student outcomes and close institutional equity gaps while at the same time diversifying the student population. To meet these goals, faculty, advisors, and student support teams need clear visibility into where students may be struggling, and which interventions are making a difference. The BaSSE project directly advances this mandate by turning institutional data into insight that informs action and supports students at scale.

A Legacy of Business Excellence and Student Success

THE STUDENT PROFILE

36 UNDERGRADUATE DEGREE PROGRAMS

4,500+ UNDERGRADUATE STUDENTS

60% MALE | **40%** FEMALE

30% UNDERREPRESENTED MINORITIES (UG)

12% INTERNATIONAL (UG)

24% FIRST-GENERATION COLLEGE STUDENTS (UG)

21% PELL ELIGIBLE (UG)

80% Four-Year Grad Rate (UG)

88% Six-Year Grad Rate (UG)

93% First-Year Retention Rate (UG)

ACADEMICS AND OUTCOMES

- A BUSINESS UNIVERSITY WITH STRONG FOCUS ON THE ARTS AND SCIENCES.
- FOUNDED IN 1917 AND LOCATED IN WALTHAM, MA

#1 2026 BEST REGIONAL UNIVERSITIES – NORTH
U.S. News and World Report

#1 2026 BEST CAREER SERVICES
The Princeton Review

#2 2026 MOST INNOVATIVE
U.S. News and World Report

98% BENTLEY CLASS OF 2025 HIRED OR IN GRAD SCHOOL

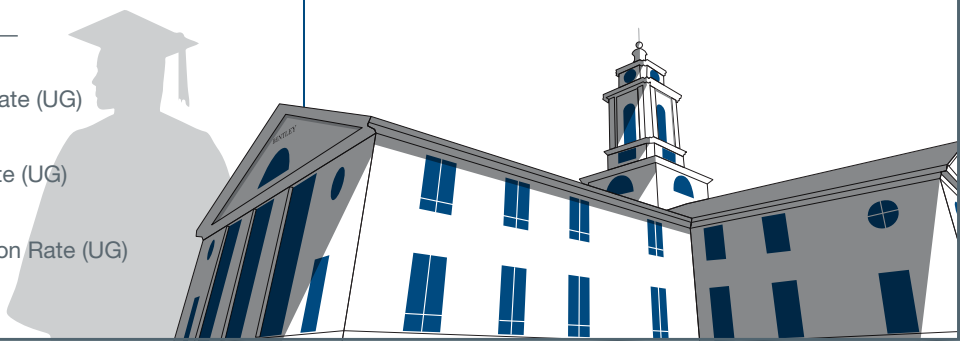

Figure 1. Infographic providing a high-level overview of Bentley University, its undergraduate student profile and career outcomes.

2.2 The Foundation: Leveraging Institutional Expertise and Strategic Investments

Bentley built BaSSE on the foundation of two institutional strengths: the enterprise-wide Data Analytics Program and the Office of Student Success.

Over the past five years, Bentley has made strategic investments in Data Analytics by establishing a new Data Engineering and Operations team and hiring project managers for enterprise-wide analytics and data governance programs. Through these programs and teams, the university has adopted Microsoft technologies of Azure and Power BI (Business Intelligence) to modernize its data environment and bring information from multiple systems into a unified cloud-based ecosystem. Simultaneously, Bentley strengthened data governance practices, establishing shared data definitions, quality standards, and stewardship responsibilities across departments. These efforts created a data environment and infrastructure that made BaSSE possible. To deploy BaSSE, the Data Engineering and Operations team developed scalable, secure data pipelines; the data analytics team delivered descriptive dashboards and analytics tools to ensure that institutional goals and student success needs were translated into clear analytic requirements; and data governance leadership ensured consistency, quality, and responsible use of data across the program.

The second strategic investment that made BaSSE possible was the recently established Office of Student Success. In 2022, Bentley created a new position of Associate Provost for Student Success and reorganized existing student support services under the new leadership. The Office of Student Success expanded its reach by creating a new Student Success Coaching team and by hiring a Data Scientist dedicated specifically to student success analytics. In addition to these strategic investments, the methodology of student success changed under this new structure to be decidedly data-driven and outcomes oriented. The Office of Student Success has made BaSSE possible by providing the goals for the project as well as business requirements and user testing. Most importantly, the Office of Student Success team turns the insights derived from BaSSE into actionable student interventions designed to close equity gaps and improve outcomes for all Bentley students.

2.3 Strategic Partners: Center for Analytics and Data Science and the User Experience Center

While enterprise-wide analytics and the Office of Student Success constituted the foundation on which BaSSE was built, the success of the project has been dependent on strategic partnerships with campus research centers. The first is the Center for Analytics and Data Science (CADS), run out of Bentley's Mathematical Sciences department. Through CADS, data science faculty consult with commercial and non-profit external partners to address their business and research needs and improve organizational performance. They also partner with data scientists at other academic and governmental institutions to create deeper analytical insights on specific topics, such as health care analytics and living standards. With its academic expertise in data science, CADS faculty are partnering with the BaSSE team to build an analytics model that predicts the likelihood of graduation for all undergraduate students.

Like CADS, Bentley's User Experience Center (UXC) has been applying the latest research in the fields of user experience, design, human factors, usability, marketing, and business to global commercial and non-profit projects for decades. UXC research experts design studies that enable their clients to create more innovative products, improve their stakeholders' user experience, streamline processes, enhance marketing strategies, and visualize data to drive decision-making. UXC has enabled BaSSE to apply best practices in user design and data visualization to project dashboards and ensure data analytics will be of maximum value to end users.

2.4 The Accelerator: Securing External Funding to Fast-Track Results

While internal resources were critical to the success of BaSSE, our ability to complete the project in two-and-a-half years was only made possible with the help of an anonymous external grant of $1M. The grant served as a catalyst, allowing the university to move quickly from planning to execution while maintaining focus on long-term sustainability. From the outset, BaSSE was designed with the expectation that capabilities developed during the grant period would transition into ongoing institutional operations, which they have.

Contracted Expertise. To complement internal talent and meet ambitious timelines, Bentley used grant funding to engage external contractors with specialized skills in data engineering, analytics, and dashboard development. External data consultants were brought on through Toptal to assist with data integration and BI development, and a contracted Business Analyst from Alchemy, Inc. supported Workday advanced analytics design. These experts, funded by the grant, accelerated development of BaSSE dashboards and filled critical skill gaps in Azure data engineering and Power BI. This hybrid model allowed Bentley to scale capacity where needed while retaining institutional ownership of the work and transferring knowledge back to internal staff.

Professional Development. Bentley used grant funding to invest in structured training that built institutional expertise in student success analytics. Through the California State University System's Student Success Analytics Certificate program, ten BaSSE team members received formal training in

data-driven student success strategies. In parallel, the BaSSE team engaged with EDUCAUSE by presenting their work at the 2025 EDUCAUSE conference and sending three team members through the EDUCAUSE Data Literacy Institute.

These experiences connected Bentley to a national community of practice that ignited new ideas, informed program design, and reinforced a focus on responsible, effective analytics.

3. Building the Program

Launching BaSSE required deliberate coordination across teams with distinct responsibilities and expertise. Rather than treating this as a technology deployment, Bentley approached it as a phased institutional initiative built on three foundational pillars: defining clear goals and success metrics to guide the program's direction; establishing data governance standards to ensure that analytics outputs would be trusted and consistent; and investing in data literacy to ensure that staff and faculty could translate dashboard insights into meaningful action. The sections below describe how each of these pillars was built and why each proved essential to BaSSE's development.

3.1 Defining Project Goals and Success Metrics

The first step in starting BaSSE was to identify our goals and what student success metrics Bentley wanted to track. This was a combined effort between the Office of Student Success team, who articulated the vision and goals, and the IT team, who ensured goals were feasible within our data ecosystem and technological infrastructure.

BaSSE Goals

- **Centralize student data into a single ecosystem.** Reduce fragmentation and ensure that academic, advising, and engagement data can be viewed together in a consistent, trusted way.
- **Identify institutional performance gaps and design interventions to close them.** Understand where students encounter systemic barriers and support the design of targeted responses.
- **Predict academic success.** Leverage predictive analytics to identify patterns associated with academic risk and persistence, enabling earlier and more proactive support.
- **Measure the impact of student success interventions over time.** Evaluate what works, refining strategies, and scaling practices that meaningfully improve student outcomes.

Identifying Student Success Metrics

After defining the goals of BaSSE, the next step was to identify which student success metrics were most important to track. For this, Bentley drew on the university's strategic plan, Falcons Forward 2030, which identifies "Access and Opportunity" as one of its five focal areas. Given that Bentley is a private, Predominantly White Institution and majority male, the aim of "Access and Opportunity" is to diversify the undergraduate student population, which Bentley has done through recruitment and retention programs designed for women, first-generation college students, underrepresented minorities, and low-income students. It was therefore imperative that BaSSE analytics track academic outcomes for these distinct student populations and measure the impact of interventions designed to support these types of learners.

Next, the BaSSE focused on well-established measures such as first-year retention rates and graduation rates, credit completion rates, and early academic-performance signals such as the rate of D, F, and W (course withdrawal) grades. Other relevant metrics included academic program selection and not enrolling in consecutive terms—otherwise known as "stopping-out."With all this in mind, the team decided to create five descriptive dashboards to track these metrics across disaggregated student populations in a centralized, user-friendly way. BaSSE decided to create a predictive dashboard designed to increase graduation rates. The BaSSE integrated key data from sources like admissions, financial aid, and the student information system into the Azure ecosystem, then used Microsoft Power BI to create interactive dashboards to visualize the chosen metrics. Because student privacy was of utmost importance, the team established dashboard design principles that ensured end users would only ever see groups of 12 students or more, even when using multiple filters at once. Each dashboard was also designed in close collaboration with end users to ensure that the data presented is actionable and aligned with the questions practitioners need to answer. Together, these tools represent a shift from fragmented, ad hoc reporting to a unified analytics ecosystem.

DFW Grades Dashboard. This dashboard tracks rates of D, F, and course withdrawal (W) grades across academic subjects, courses, departments,

instructors, and student populations. It enables academic leaders to identify courses with persistently high DFW rates, examine patterns by student demographics and course characteristics, and design interventions to lower DFW rates where they are highest. The DFW dashboard was one of the first BaSSE products completed, and it has directly informed the math curriculum changes described below.

Undergraduate Program of Study Dashboard. This dashboard provides a comprehensive view of student enrollment across majors, minors, and concentrations. It allows academic departments and enrollment leaders to track declaration patterns, monitor program growth or contraction, and understand how students move between programs over time. By surfacing trends in program selection alongside academic performance data, the dashboard supports more informed curriculum planning and resource allocation.

Undergraduate Student Success Dashboard. Focused on retention and graduation outcomes, this dashboard tracks cohort-level persistence rates, time-to-degree patterns, and credit accumulation trajectories. It enables the Office of Student Success and academic leadership to monitor institutional progress against strategic retention and graduation targets, identify populations where outcomes lag, and evaluate whether interventions are closing gaps over time.

Stop-Out Dashboard. This dashboard identifies students who have interrupted their enrollment and tracks patterns in stop-out behavior, such as when students take a leave, which populations are most affected, and how many return. It supports targeted re-enrollment outreach and helps the institution understand the factors that contribute to enrollment breaks, informing both prevention and recovery strategies.

Academic Standing Dashboard. This tool monitors students' academic standing over time, including their transitions between good standing, concern, recovery, and separation. The dashboard tracks which student populations most often receive each standing and which most often return to good standing after being assigned to a different category. Standings of concern, recovery, and separation all come with unique interventions designed to help students return to good standing; the dashboard measures the degree to which those interventions are successful.

Predictive Model Dashboard for Graduation (in development). Building on the descriptive dashboards above, Bentley is finalizing a predictive model dashboard that estimates each student's likelihood of graduating within expected timeframes. The model draws on academic performance, curricular pathways, engagement indicators, and early signals such as course grades to generate risk scores that can guide **proactive** advising. This dashboard represents the next evolution of BaSSE's analytics capabilities—moving from describing what has happened to anticipating what may happen—and is expected to be a key tool for the Office of Student Success in upcoming terms.

By translating each priority metric into an interactive visual format, these dashboards enable continuous monitoring of student success metrics and make it easier for staff and faculty to spot trends or gaps over time. Critically, this emphasis on ongoing monitoring reflects a deliberate shift from lagging indicators—such as final graduation rates or end-of-term GPA, which confirm outcomes after the fact —toward leading indicators that enable proactive intervention while there is still time to alter a student's trajectory. For example, Figure 2 is an illustrative example of the use of the DFW Grades Dashboard. The dashboard enables academic leaders to identify high-DFW courses and target them for intervention. Overall, the BaSSE dashboards have helped the team identify where certain student groups struggle, and which factors are linked to lower success rates, guiding the design of targeted interventions to improve outcomes.

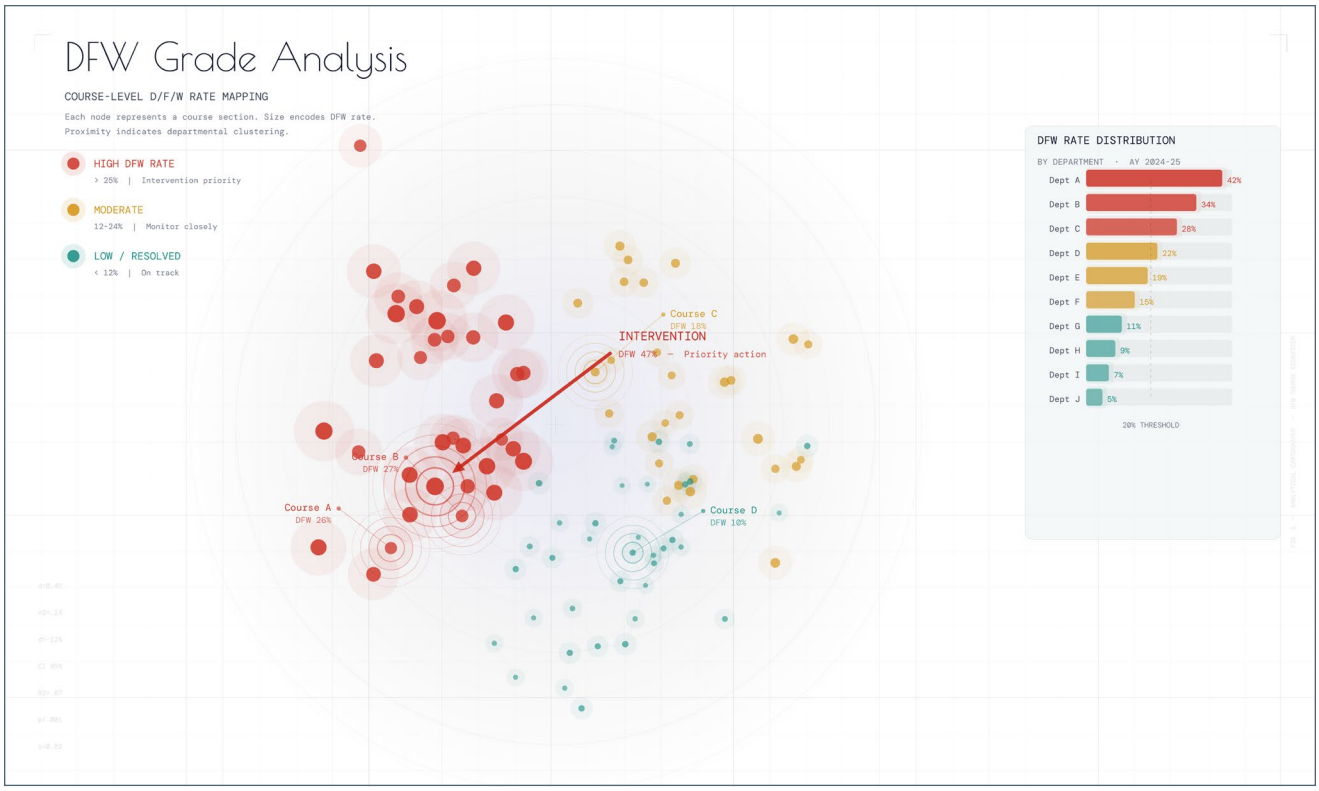

Figure 2. Illustrative example of the use of the DFW Grades Dashboard. Each node represents a course section, with size and color encoding DFW rate severity.

3.2 Applying Data Governance Foundations to BaSSE

Before BaSSE could deliver trusted analytics, Bentley needed to address longstanding challenges in its data environment. As part of the broader enterprise data analytics program, the university built a formal governance framework that became one of BaSSE's most important enablers.

Student Success Data Dictionary: Building on the Data Governance Framework

Working within Bentley's data governance framework, the BaSSE team established shared data standards and definitions for student success metrics. By agreeing on a common data language, Bentley eliminated longstanding inconsistencies that had previously slowed decision-making and undermined confidence in the data. Instead, BaSSE built analytics outputs on definitions that had been reviewed, agreed upon, and documented by key community stakeholders. Every BaSSE dashboard includes a link to Bentley's data dictionary where all student success terms and metrics are defined for users. As a result, dashboards and reports were easier to validate, explain, and adopt—reducing friction and accelerating buy-in from leaders across the institution. Figure 3 shows four phases of the BaSSE implementation: (1) building a data governance foundation, (2) mobilizing resources, (3) active launch and development, and (4) sustaining and scaling.

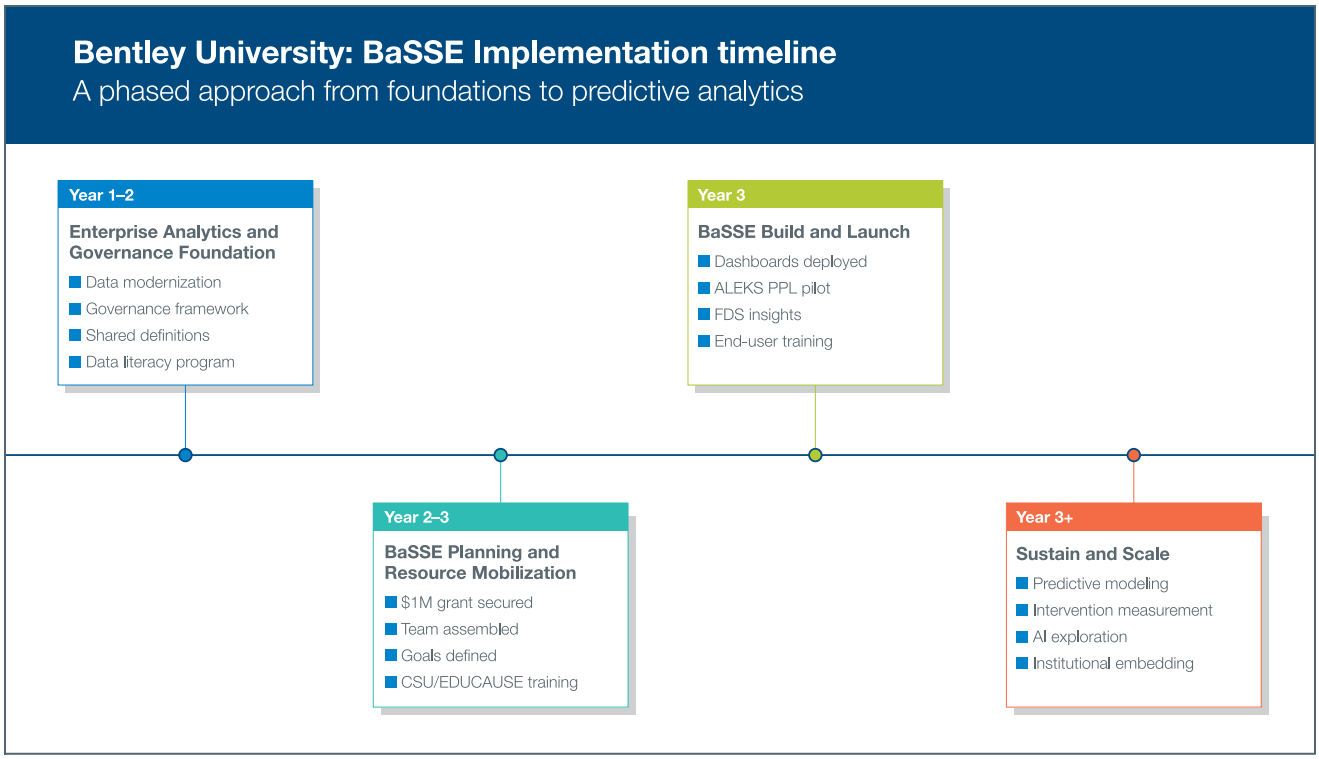

Figure 3. BaSSE Implementation Timeline. Note: Timeline is illustrative. Phases overlap and iterate. Governance and literacy work is continuous across all phases.

3.3 Turning Data into Action: Building a Culture of Data Literacy

The campus community represents an ecosystem of varying functions, roles, backgrounds, and skills, which presented both opportunities and challenges for launching a student success analytics program. Early conversations with faculty and staff revealed that data literacy levels varied significantly across campus, with uneven capacities to work with data, interpret findings, or translate insights into action plans. While some individuals expressed enthusiasm for analytics and saw it as a strategic priority, others brought well-founded concerns about data context, expanded access, and ethical use. These mixed attitudes were compounded by siloed and inconsistent data storage systems, which limited access to integrated student information and undermined confidence in data reports.

The BaSSE recognized immediately that analytics alone would not fulfill the goals of the project; rather, data literacy was imperative to the project's success. The BaSSE therefore created a workstream that built out a three-part data literacy curriculum that is required for faculty and staff to complete prior to receiving access to any student success dashboard. The modules of this curriculum consist of:

Data Governance: Designed and delivered by the Project Manager of Bentley's Data Governance Program, this on-demand training educates users

on data governance policies at Bentley University, familiarizes them with core concepts of the program such as “data owners” and “data stewards,” explains how to use the data dictionary and how to request and acquire access to specific reports.

Power BI Navigation: Designed and delivered by Bentley’s Associate Director of Data Analytics and Insights, this on-demand training introduces Microsoft’s Power BI technology to users, teaching them how to navigate through different pages within a dashboard, apply filters, identify when data has been refreshed, understand which student demographics are represented in each graphic, and even ask questions to Power BI’s embedded AI agent, CoPilot.

From Data to Action: Designed and delivered by Bentley’s Associate Provost for Student Success and Student Success Data Scientist, this in-person training introduces users to a five-step framework through which to turn data insights into actionable plans to improve student success outcomes. Users practice asking business questions , finding answers to those questions through the dashboard, brainstorming how they could apply their findings to their area of influence, identifying the outcomes they hope to achieve, and planning how to measure success.

All three modules are highly interactive with built-in knowledge checks to ensure users retain information and can apply it later. Completion of all three modules is required before access to student success dashboards is granted.

Guiding Principles: In addition to the data literacy curriculum, BaSSE recognized the degree to which data can be misinterpreted or manipulated to suit users’ particular motivations and inherent biases. The BaSSE decided to address these concerns by designing guiding principles to remind users of their responsibility to interpret data ethically and as subjectively as possible. The guiding principles remind users that they are expected to adopt a student-centered and growth mindset approach to their interpretation and use of data, that they must resist stereotyping groups of people based on trends they see in the data, and that they have a responsibility to turn data into action that drives change.

4. Outcomes and Impact

While BaSSE is still in its early stages, several concrete outcomes demonstrate that the program is already improving the student experience and realizing program goals. This section highlights initial results and the broader institutional shifts that BaSSE has catalyzed.

4.1 Early Wins and Measurable Results

Improving Math Placement with ALEKS PPL. One of BaSSE's first achievements came from insights provided by the DFW dashboard. The data revealed that some of the highest DFW rates in the undergraduate curriculum came from 100-level math courses, which are most typically taken by first-year students. Having identified this institutional performance gap, the Office of Student Success partnered with Bentley's Mathematical Sciences department to hypothesize why this was happening and how to design an intervention to address the problem. The data showed that within the high DFW rate, more students were withdrawing from 100-level math courses than receiving grades of D or F in them. The hypothesis thus became: are students not placing into the math course most appropriate for their skill level? To test this hypothesis, Bentley implemented a new math placement tool.

In August 2025, Bentley implemented ALEKS PPL (McGraw Hill) for incoming first-year students. The online assessment identifies each student's math proficiency and provides individualized learning modules to address gaps before enrollment. Implementation was a university-wide effort: IT and the Registrar's office integrated the system into technology and curriculum platforms; the Office of Student Success and the math department set prerequisite scores for course placement; Enrollment Management and New Student Orientation supported communications; and all teams helped students understand and meet the new requirement.

By September 2025, the data revealed a significant number of incoming students were underprepared for Bentley's standard 100-level math curriculum. The Registrar and math faculty took swift action, shifting to a significantly higher proportion of lab sections—which feature additional class time—to give students more access to faculty and more time to master concepts. Weekly accountability sessions were established and staffed by math faculty and student peer tutors. The math department also developed a new version of an existing math course specifically designed for students who struggled to meet the minimum ALEKS PPL qualifying score. This new version covers the same learning objectives as the traditional course but with substantial additional time to review core concepts in a "just in time" structure. Students completed developmental and traditional math topics in a single semester at the same cost.

Initial results confirm the positive impact of this intervention and point to the validity of the hypothesis that inaccurate course placement contributed to high DFW rates in 100-level math classes. As a result of this intervention, the DFW grades in 100-level math courses for students entering the university in September 2025 decreased by 55.7% compared to DFW grades of first-year students entering in September 2024 who took the same classes. This example validates the student success methodology Bentley has created and applied through the BaSSE project, which is: 1) identify an institutional equity gap; 2) collaborate with campus partners to design

and implement an intervention to close that gap; 3) measure the impact of that intervention; 4) adjust university curricula and/or policies as needed.

Falcon Discovery Seminar (FDS) as a Success Predictor. A second early insight emerged from analysis of the Falcon Discovery Seminar (FDS), a course all Bentley undergraduates take in their first semester. The course itself was designed to be an intervention that drives student success by increasing first-year retention and preparing students to succeed in the rest of the undergraduate curriculum. Historical data analysis revealed a striking pattern: students who earned a D or F in FDS were substantially more likely to encounter academic difficulties later in their college career. Because FDS occurs in a student's first semester, it provides an early signal well before cumulative GPA (Grade Point Average) or credit totals would reveal an issue.

Based on this finding, Bentley is in the process of adjusting advising protocols so that any first-year student earning a D or F in FDS is flagged for proactive outreach. Rather than waiting for further evidence of struggle, advisors and student success coaches will now reach out early in the student's second semester, offering academic skills workshops, coaching in time management, and study strategy support. The FDS grade is also being tested as an input variable in Bentley's first predictive risk model.

4.2 Institutional Shifts

Beyond specific interventions and dashboard visualizations, BaSSE has begun to reshape how Bentley makes decisions, how departments collaborate, and how the institution relates to its own data. These shifts, while harder to quantify than metrics like DFW rates, may prove to be the program's most durable legacy.

Data-first decision-making. Across the institution, conversations about student success increasingly begin with a shared look at the data rather than anecdotal impressions or inherited assumptions. The shift is visible in how problems are identified and how responses take shape. When BaSSE's DFW dashboard revealed that 100-level math courses had among the highest DFW rates on campus, the conversation that followed was unlike what would have occurred even two years earlier. Quick piloting of the ALEKS PPL placement system substantially lowered DFW rates in those courses. While there is still much to learn, Bentley appears to be off to a very strong start in building an environment that more methodically supports students' success. This represents a fundamental change in institutional habits. Decisions that were once shaped primarily by experience and intuition are now grounded in evidence—not replacing professional judgment but sharpening it. The result has been faster consensus, more focused discussions, and a greater willingness to act on findings even when they challenge longstanding practices.

New questions the campus can now ask. BaSSE has not only answered existing questions, but it has also enabled entirely new ones. With integrated data across the student lifecycle, leaders and practitioners can now explore questions that were previously impossible or prohibitively difficult to investigate: Which student populations are most affected by stopping-out, and at what point in the academic journey? Do students who change majors early perform differently from those who change later? Does the undergraduate core curriculum sufficiently prepare students to succeed in their specialized programs of study and if so, is this universally true for all student subpopulations or just

some? The dashboards have become generative tools, prompting new lines of inquiry that feed back into program design, advising strategy, institutional research, and resource allocation.

Normalized cross-departmental collaboration. What began as an intentional design choice—co-sponsorship between IT and the Office of Student Success—has evolved into a normalized way of working. IT and the Office of Student Success now co-present to institutional leadership, a visible signal that analytics is a shared capability rather than a departmental product. This shift from push to pull—from the analytics team distributing insights to the campus community seeking them out—is one of the strongest indicators that through BaSSE, analytics is becoming increasingly embedded into the institutional culture.

Leadership engagement. Senior leaders have increasingly incorporated BaSSE data into strategic planning, resource allocation, and governance conversations. Student success metrics now appear in presentations to Bentley's Board of Trustees and in discussions about institutional priorities, moving analytics from an operational tool to a strategic asset. This visibility has reinforced the message that data-informed student support is not a temporary initiative but a core institutional capability and one that not only warrants continued investment and attention but can contribute to the university's stability during a time of increasing external pressures and disruptions.

5. Lessons Learned

Over the course of building BaSSE, Bentley identified several key lessons that were crucial to the program's success. These insights highlight that technology alone was not the solution; people, process, and culture had to lead the way.

5.1 Start with Data Governance, Not Dashboards

One of the key lessons was that establishing data governance is the prerequisite to any successful analytics project. It was tempting to dive straight into building dashboards and reports, but doing so without a strong governance foundation could lead to what might be called "dashboards without decisions;" in other words, analytics built on data with inconsistent definitions that no one fully trusted. In the early days, different departments had their own numbers and metrics that did not reconcile, undermining confidence in any new tool.

Clear governance also helped build trust in how sensitive student data would be used. By the time BaSSE introduced new analytics, there was a shared understanding that data would be handled responsibly and with appropriate safeguards. The lesson was straightforward: effective analytics initiatives start with the plumbing, not the paint. Tackling data foundations first, focusing on people and processes before tools, set the stage for everything that followed.

5.2 To Build Trust, Invest as Much in Data Literacy as in Technology

Bentley invested heavily in modernizing its data infrastructure but learned that those investments needed to be matched with an equal investment in people. Technology alone does not make an institution data-driven; the community must be brought along through training, communication, and support.

In practice, this meant implementing a comprehensive data literacy curriculum as part of the BaSSE rollout. Applying grant funding to put BaSSE team members through various professional development trainings was critical. These trainings equipped them with the knowledge and skills needed to build a curriculum that included best practices and was also tailored to the specific needs of Bentley's campus community.

This cultural groundwork has made BaSSE successful. As people learn how to use the dashboards and see that training is available, skepticism gives way to support. Data literacy has built efficiency and trust: when people understand the data, they use it more effectively and regularly. Bentley learned to budget time and money for people, not just for software. Nurturing a data-informed culture has turned out to be as essential as the technical work—if not more so—in realizing BaSSE's goals.

5.3 Cross-Unit Collaboration Is Essential

No single department can tackle student success analytics alone. BaSSE has embraced true cross-functional collaboration, with contributions and buy-in from Academic Affairs, IT, Enrollment Management, and beyond. The initiative was co-sponsored by the Office of Student Success and IT, and this partnership model proved invaluable.

The Executive Director of Data Engineering and Operations and the Associate Provost for Student Success have worked hand-in-hand and communicated jointly to stakeholders, sending a clear message that data-driven student success is an institutional priority, not just an IT project or a Student Success initiative. A BaSSE Advisory Board with representatives from multiple divisions, including faculty and students, provided input and championed the effort.

Bentley's advice for institutions starting similar work: establish a cross-functional governance structure and involve key stakeholders from day one. When people see their input reflected in the outcome, they are more likely to support and use it. The mantra that emerged was "collaboration over control."

5.4 Celebrate Early Wins to Build Transparency and Trust

Large data projects take time to show results, but Bentley learned the importance of identifying and publicizing early wins to build momentum and trust. The ALEKS PPL implementation and the FDS predictor discovery (described in Section 4) served as powerful proof points. By being transparent about what the analytics revealed, and the actions taken in response, Bentley established credibility that helped sustain the project through its more complex phases.

The approach was deliberate: in department meetings and campus communications, the team highlighted specific examples of data-driven action and credited contributors across departments. This transparency helped skeptics become supporters, showing concretely that BaSSE was not producing reports for their own sake but driving real improvements for students. It set a precedent: when the BaSSE pointed to data showing a problem or opportunity, people knew it would be translated into a beneficial change. Each win created a virtuous cycle, with more offices bringing questions and ideas to the analytics team.

6. Challenges and Limitations

Transparency about what has worked also requires honesty about what has been difficult. Several challenges shaped BaSSE's trajectory and remain relevant as the program matures.

Data quality and integration. Despite significant progress in governance and standardization, integrating data across systems (such as the Student Information System, admissions Customer Relationship Management system, academic advising platforms, and surveys) remains an ongoing effort. Legacy data present quality issues, inconsistent historical definitions, and the complexity of mapping student records across platforms, all of which has required more time and resources than initially anticipated.

Staffing and sustainability. BaSSE benefited from dedicated grant funding that enabled focused capacity during the launch phase. As the grant period concludes, the university faces the challenge of transitioning grant-funded roles and contracted expertise into sustained institutional operations. Maintaining momentum requires continued investment in both technical and student-facing staff.

Adoption and change management. While training and early wins built significant trust, adoption has not been uniform across campus. Some areas have embraced analytics-driven decision-making more quickly than others, and sustaining engagement requires ongoing communication, support, and responsiveness to user feedback.

7. Implications and Future Directions

7.1 The Road Ahead at Bentley

As BaSSE moves beyond its initial launch, several priorities shape the next phase. The university is expanding predictive modeling capabilities to identify at-risk students earlier and with greater precision. Plans are underway to integrate additional data sources, including engagement and co-curricular data, to build a more complete picture of the student experience. Bentley is also refining its approach to measuring the impact of specific interventions, creating feedback loops that allow the institution to evaluate what works and scale effective practices.

Longer term, Bentley is exploring the ethical integration of AI to make analytics more accessible and actionable. When used carefully, AI can help synthesize information, highlight early signals, and reduce the time staff spend navigating across systems. But the university's approach remains grounded in the belief that student success work is fundamentally human. AI is being explored to support advisors, faculty, and staff, not to replace their judgment or direct interactions with students. Transparency, ethics, and clarity about how insights are generated will remain central as these tools evolve.

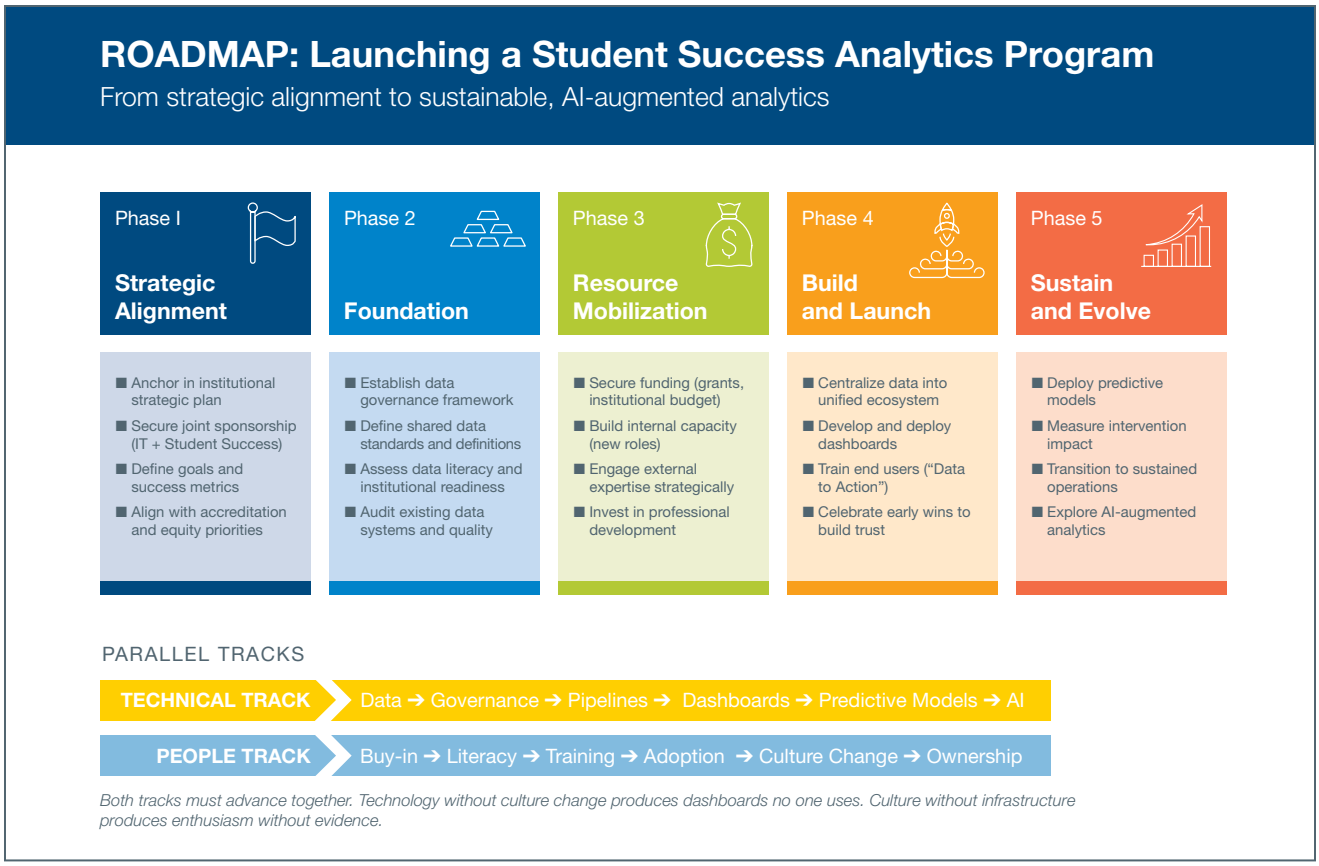

Figure 4. Roadmap for Building a Student Success Analytics Program: Integrating Parallel Technical and People Tracks

7.2 Defending Higher Education as a Public Good

Ultimately, BaSSE represents more than an analytics program. It reflects a shift toward a more connected, evidence-informed way of supporting students, grounded in strong governance, shared responsibility, and continuous learning. As higher education faces ongoing uncertainty and change, institutions that align data, people, and purpose will be best positioned to respond.

Bentley's experience suggests that when analytics is approached thoughtfully and used in service of students, it becomes more than a technical capability—it becomes a way to reimagine the educational enterprise to support better decisions, stronger outcomes, and a more equitable student experience. In our industry's collective pursuit to defend higher education as a public good, that way of working is not optional. It is essential.

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