Strategic Data Use in Higher Education

Using Data to Improve Postsecondary Success

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Introduction

Like many other elements of the American economy, higher education is working to realize the potential of sophisticated data analytics to inform and transform how it operates. In August 2019, the Association for Institutional Research (AIR), EDUCAUSE (the association of campus information technology professionals), and the National Association of College and University Business Officers (NACUBO) released a joint statement with the provocative title "Analytics can save higher education. Really." Its purpose was to inspire a sense of urgency and provide direction for higher education leaders to harness data as a strategic organizational asset. The statement features the following rationale for investment in data analytics:

"We strongly believe that using data to better understand our students and our own operations paves the way to developing new, innovative approaches for improved student recruiting, better student outcomes, greater institutional efficiency and cost-containment, and much more."[1]

However, progress has been uneven, with some state higher education agencies, university and college systems, and individual institutions leading the way while many others struggle to adapt. Why?

The Strategic Data Project (SDP) at the Center for Education Policy Research at Harvard University has a ten-year track record of developing data capacity in state and local PK-12 agencies and organizations and interviewed 40 leaders and analysts at 29 institutions of higher education and postsecondary organizations to explore their data needs to understand why some colleges and university systems are excelling in using data and others have yet to fully realize the potential of their data to inform strategic decisions that transform student success in school and the workforce.

Our key finding is that the missing link is not in the technical infrastructure but in human capacity. If higher education is to take advantage of data analytics to improve student outcomes and increase organizational effectiveness, it will have to find better ways to attract, train, and retain strategic data professionals who can inform policy and practice.

We are not the first to find this gap. A 2012 report from EDUCAUSE and AIR confirms that the most important—and first—investment an organization should make is in the expertise and capacity of its staff:

"Many institutions view analytics as an expensive endeavor rather than as an investment. Much of the concern around affordability centers on the perceived need for expensive tools or data collection methods. What is needed most, however, is investment in analytics professionals who

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[1] See https://changewithanalytics.com/statement/.

can contribute to the entire process, from defining the key questions to developing data models to designing and delivering alerts, dashboards, recommendations, and reports."[2]

EDUCAUSE and AIR recommend that institutions deploy staff to develop a clear understanding of the institution's data needs before making any investments in software or other data infrastructure. Without such an understanding, institutions may waste time and money on implementing tools that are not aligned with their needs.

However, attracting and retaining staff with the necessary skills has been increasingly challenging as interest in data analytics continues to grow across many sectors of the American economy. In March 2019, the jobs site, Indeed, listed "data scientist" as one of its top 25 in-demand occupations for 2019, with a 78 percent increase in position postings from 2015 to 2018 and an average base salary in excess of $133,000.[3] Reports of data staff salaries in higher education, on the other hand, are considerably lower. According to the Chronicle of Higher Education, the national average salary for institutional researchers at two-year public institutions is $59,344. In 4-year public institutions, including highly selective public universities, research staff make an average of $68,000.[1] According to Higher Ed Jobs, the average institutional research analyst makes $60,028 and deputy heads of institutional research make $77,646.[2]

Considering these differences in earnings, it is difficult for state higher education agencies and less well-resourced colleges, such as many community colleges and minority-serving institutions (MSIs), to attract and retain qualified personnel in this type of competitive job market. Further, institutions located in more remote rural communities are at a particular disadvantage. One interviewee from a rural, minority-serving institution in the South explained these difficulties:

"There are two of us that are handling everything, and our hours are long. It's challenging because now we are moving in the right direction, but the skillsets are lacking. It's hard for... minority serving institutions to find [individuals with] those skillsets. To keep talent, you're going to have to be competitive with pay. It is very hard."

This paper describes what we have learned from candid discussions with postsecondary leaders, such as this one, and makes recommendations for how we might improve the use of data analytics in higher education through its most important asset – people.

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[2] Bichsel, J. Analytics in Higher Education: Benefits, Barriers, Progress, and Recommendations (Research Report). Louisville, CO: EDUCAUSE Center for Applied Research, August 2012, p3. Retrieved from http://www.educause.edu/ecar.

3 See http://blog.indeed.com/2019/03/14/best-jobs-2019/.

About the Strategic Data Project

SDP partners with state and local K-12 education agencies to build capacity for managing, analyzing, and communicating with data. SDP cultivates analytic talent through a two-year fellowship program, in-person and online trainings, and widely-accessible tools and resources.

The Harvard Center for Education Policy Research launched SDP in 2008 to meet a need for analytical capacity in state and local K-12 agencies. Reform-minded school superintendents were experimenting with new programs and policies, but lacked the capacity to evaluate those efforts or to make data-informed decisions. Further, the No Child Left Behind Act of 2001 mandated that states collect and report detailed data on student progress and achievement, but many state and local agencies lacked the capacity to make use of those data beyond basic accountability reporting.

Since 2008, SDP has collaborated with more than 125 school districts, charter management organizations, state education agencies, and nonprofits to sponsor more than 300 SDP Fellows. Fellows may already work at a partner agency, or SDP recruits and selects Fellows who are then placed at partner organizations. More than 300 SDP alumni work at K-12 agencies and organizations around the country, and most alumni continue to take advantage of the SDP professional network, trainings, and analytical resources.

Investigation of Higher Education Data Needs

After a decade of supporting data and analysis in PK-12 education, the leadership of the Strategic Data Project launched an effort to understand need for and state of analytical capacity within the higher education community. The motivating purpose of this investigation was to determine whether a Strategic Data Project-type program would be useful for higher education and, if so, how such a program should be structured to best meet the sector's needs.

With support from the U.S. Department of Education's Institute for Education Sciences, and in partnership with the State Higher Education Executive Officers Association (SHEEO), the SDP team conducted semi-structured interviews with 42 stakeholders in several key segments of American higher education about the need for enhanced analytical capacity in the sector. Those interviewed included SHEEO agency staff, representatives of four-year universities, community colleges, and minority-serving institutions (MSIs). We also interviewed representatives from organizations that assist institutions with producing analyses and developing analytical capacity, including student success initiatives, membership associations, and research centers. All interviewees were promised confidentiality, so findings, including any direct quotes, are presented without attribution.[4]

[4] See Appendix for the interview protocol.

Summary of Interviews Conducted

Category*	Interviewees
SHEEO Agencies and System Offices	5
Four-year Universities	10
Community Colleges	8
Minority-Serving Institutions (MSIs)	11
Student Success Initiatives, Associations, and Research Centers	8

*Several institutions fall into more than one category (e.g. some community colleges are also minority-serving institutions).

Findings: Analytical Capacity at Higher Education Institutions and Agencies

Previous Research

Traditionally, higher education agencies and institutions have primarily used data to generate descriptive statistics for compliance and accountability reporting. Today, the higher education sector faces an increasing need to use data strategically to better understand the student experience, to track institutional processes and outcomes, and to support decision-making at all levels. In recent years, several national organizations have documented the need to expand the analytical capacity of higher education:

- In a 2015 report, EDUCAUSE found that the primary motivations among its membership for investing in data analytics were to improve retention, strengthen students' course-level performance, and prove the value of higher education.[5]
- In the same year, the National Association of System Heads (NASH) conducted a detailed study of analytical capacity in public university systems and found that offices of institutional research are "at best unevenly positioned to support change."[6]
- In 2017, AIR, EDUCAUSE, and the National Association of Student Personnel Administrators (NASPA) surveyed their membership to better understand how

[5] Yanosky, R. with Arroway, P. *The Analytics Landscape in Higher Education, 2015*. Louisville, CO: ECAR, October 2015. Retrieved from https://library.educause.edu/-/media/files/library/2015/5/ers1504cl.pdf.
[6] Gagliardi, J. and Wellman, J. *Meeting Demands for Improvements in Public System Institutional Research*. Washington, DC: National Association of System Heads, February 2015. p. 4. Retrieved from http://nashonline.org/wp-content/uploads/2017/08/Assessing-and-Improving-the-IR-Function-in-Public-University-Systems.pdf

> institutions were using data analytics to support student success. The resulting report recommended increased collaboration among institutional research, student affairs, and information technology to better understand and promote student success.[7]

Informed by this work, we explicitly chose interviewees from across the spectrum of analytical capacity. We hypothesized that institutions with fewer resources, like community colleges, would be struggling relative to better resourced institutions. SDP finds that there is significant variation in analytical capacity in 2019, with some institutions and agencies having made substantial progress and others continuing to struggle.

Interview Findings

Variations across Institutions

The interviews revealed variation in how institutions use data along several different dimensions:

- Types of analyses conducted

Access to analytics across organizational units and by personnel level

- Integration across various types of data (student, personnel, financial, etc.)

Types of Analyses Conducted

There is a wide range in the types of analyses that institutions and systems conduct, from producing mandatory reports to using data for decision-making at all levels of the organization. In some under-resourced institutions, sociology or statistics professors volunteer to conduct data analyses for compliance reporting in their spare time. One interviewee shared:

> This is a low-resource institution issue. They don't have an institutional research (IR) office, they have a faculty member in the math department that just so happens to be good with numbers, who provides reports here and there for the board and for the president.

At the other end of the spectrum, some institutions are able to use artificial intelligence to construct risk models that identify students most likely to drop out after the first term and to identify interventions most likely to keep them enrolled and on track.

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[7] Parnell, A.; Jones, D.; Wesaw, A. and Brooks, D. C. *Institutions' Use of Data and Analytics for Student Success: Results from a National Landscape Analysis*. Washington, DC: National Association of Student Personnel Administrators, Association for Institutional Research, and EDUCAUSE, 2018. Retrieved from https://www.naspa.org/images/uploads/main/DATA2018_DOWNLOAD.pdf.

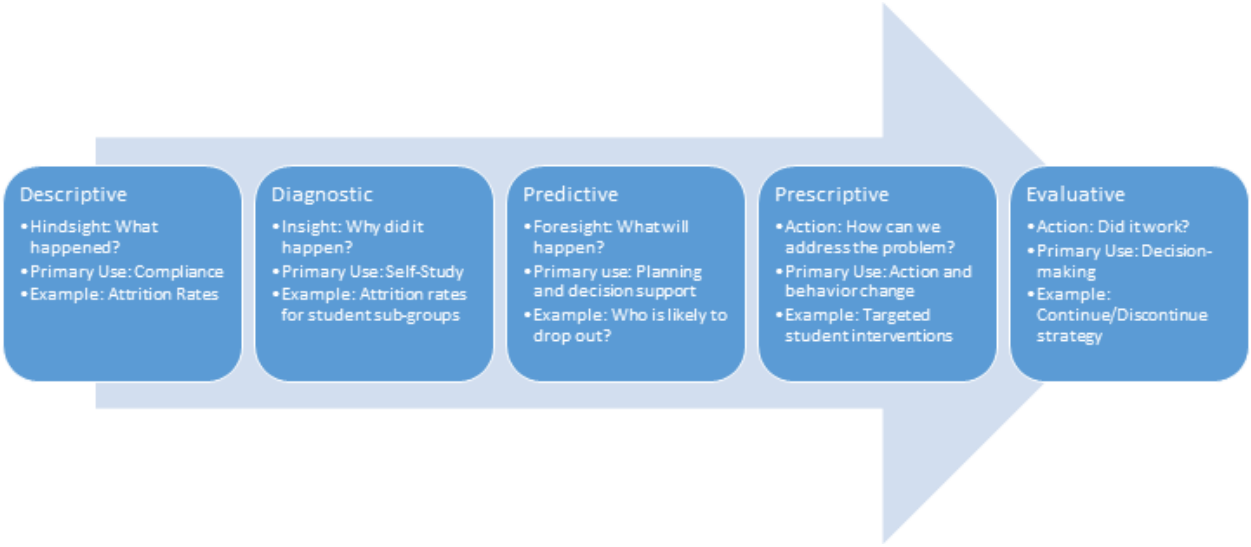
"We know a lot about our students, and we can actually develop a model that gives us an idea of the risk of student departure at the end of the first term...We can now push out information to the students automatically if we think they are at risk. For example, if your GPA drops or if you fail a course in the first term, you are very much at risk of not graduating and you are much more likely to drop out. Now, we can notify students right away. We can look at midterm grades. We can look at other predictors and say that you should go talk to your advisor right away. This is all artificial intelligence work, and this is an area that we have been thinking through."

Indeed, institutions of all kinds vary in their capacity to do strategic analytic work.

The model below is based on one commonly used to describe the progression of sophistication in data use at any kind of organization.[8] It represents a continuum from retrospective reporting to data models that trigger targeted interventions. An additional category, "evaluative," has been added to characterize the need expressed by many interviewees to go beyond selecting targets and measure their effectiveness for scale. To identify examples of how this model applies to higher education, it is helpful to select an operational area. Admissions is an area that has made greater investments in data analytics than many others, so it is easy to identify examples from across this spectrum. Descriptive analyses report out at the end of the admission process on the number of students who enrolled and their characteristics. A diagnostic analysis would look at the yield rate (the percentage of admitted students who ultimately enrolled) for students with various types of characteristics to identify factors that are correlated with students choosing to enroll (e.g. size of financial aid award, competing institutions, academic and demographic profile). A predictive analysis would construct a data model based on past student behavior that predicts the enrollment decisions of students based on selected characteristics. Finally, a prescriptive analysis would use that model to determine actions the institutions can take to influence student behavior (e.g. financial aid awards, personalized communications). A similar example can be made with student attrition, as described in the model below.

Progression of Analytics in Higher Education

[8] Adapted from chart created by Gartner, Inc. See https://www.zdnet.com/article/data-to-analytics-to-ai-from-descriptive-to-predictive-analytics/.



Most organizations that we interviewed are in the "Diagnostic" or "Predictive" phases of this progression, and all leaders indicated that they would like to improve their analytic capacity. One interviewee explained:

"We haven't yet initiated a fully systematic way of providing data in a way that is readily available…What we have now is a lot of descriptive data about our students, about our workforce, but we don't yet have systematic analysis of the student life cycle, so we can describe how our students are doing. We can give you a profile of who are students are and how they are doing in their program, but we don't yet [know] what determines student progress and success."

Most expressed interest in there being support to either develop existing staff with the skills needed to execute these new types of analyses or to attract new talent to their organization.

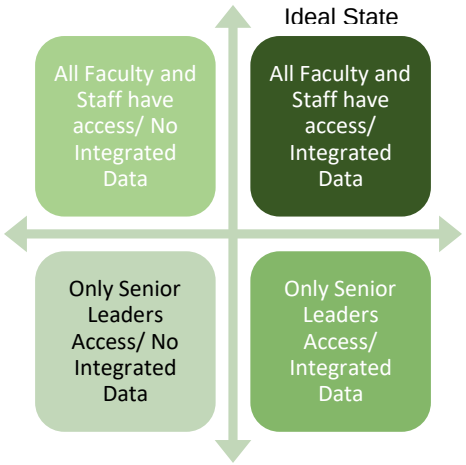
Access to Analytics

Because colleges and universities are such complex and multi-faceted organizations, it should come as no surprise that the level of analytical sophistication and depth of data use can vary widely within an institution or SHEEO agency. For example, a university may have invested in sophisticated data models in units that are responsible for meeting very specific and high-stakes targets (admissions and fundraising are the two most obvious examples) but may have lagged in making similar investments in other areas of operation (student progress towards graduation or long-term outcomes for students). Likewise, stakeholders shared that board members—who often come from the business world—may insist on having a sophisticated data dashboard to monitor the institution's operations, but faculty and front-line administrators may not have access to analytical tools and resources.

The figure below illustrates how access to, and use of, data analytics can vary across an institution and by personnel type. Even the most sophisticated institutions reported that they were still in the process of making data analytics accessible across the campus and to staff at all levels.

Even if the tools are available, institutions and agencies continue to work on training staff to use them effectively and on establishing a culture across the organization that values the use of data.

Data Integration and Access Matrix



Access to Data Analytics

Integration Across Data Sources

A final area of variation among interviewees was the extent to which data are integrated across functional areas. For example, are data on student progression married to financial data to produce cost-benefit analyses for students and the school of various student success interventions? We found that discrete data – from discrete sources – are often displayed side-by-side in a dashboard for the Board or senior administrators. What happens less frequently is the integration of data into the same analysis, thereby limiting agencies' and institutions' capacity to improve institutional efficiency and effectiveness.

Common Themes

Despite the diversity along the three above dimensions represented by the interviewees, several consistent themes arose regarding staffing needs and analytical priorities.

Staffing Needs

Most interviewees expressed that it is challenging to attract and retain qualified staff. Though agencies and institutions outside of large metro areas experience the greatest difficulty, nearly all interviewees regardless of location face an inability to compete with employers who can afford to offer higher pay for data analysts.

"The challenge is that [institutions] don't have the resources to get highly skilled people to their campus, and if they do, they get poached quickly. Occasionally, they will get strong talent, but they are only there for [a short period of time]. "

As a result, many agencies and institutions turn to external consultants to meet at least some of their research and analysis needs. Interviewees reported that this reliance on consultants limits their ability to gain in-depth understanding of the value they can derive from their data. They also expressed that consultants often apply a one-size-fits-all analytic framework, and that having stronger in-house capabilities would result in more customized and helpful analyses. Finally, outsourcing analytic projects isn't likely to change the organizational culture of data use. "The relationships is often 'we can fill a hole you have,' rather than, 'we can help you build a mountain.'" Interviewees want mountain-builders.

Additionally, many interviewees that do have internal talent reported that while many of their staff have the technical skills for descriptive data work (e.g., cleaning and reporting), they lack necessary communication and leadership skills.

Leadership and communication skills that interviewees require, but have a hard time finding, include abilities to:

- listen carefully to stakeholder needs and, from that, craft system- or institution-specific studies that provide valuable insights into the questions that stakeholders are grappling with. "Technical people [need to be] leaders," one interviewee shared, "rather than coming to the leaders with raw data and asking what questions they have and what they'd like to learn."
- describe findings to non-technical audiences, verbally, visually, and in writing, in a clear and compelling fashion. One interviewee shared that a recent report on college completion was 100 pages long, much too long to identify actionable takeaways for readers. "[We need] someone who can be a bridge between administrators and decisionmakers and IT people."
- explain and generate excitement about using data with multiple audiences, such as senior leadership and faculty, in order to better serve students and meet other organizational priorities. "You can bring data to people, but it's hard to get people to use it or know how to talk about." One interviewee described an "Own Your Data" campaign to encourage institution-wide adoption and use for postsecondary completion as an exemplar.
- work collaboratively across a variety of organizational units to break down silos and integrate data to answer key questions. One interviewee described the need to integrate financial data into other common reports about enrollment and retention so that better cross-campus comparisons and decisions can be made by system-level leaders.

These "soft skills" enable analytic staff to translate findings to key stakeholders (from leaders to families) who are then more likely to use that data for strategic decision making.

Analytical Priorities

Interviewees were nearly unanimous in identifying these three analytical priorities:

STUDENT SUCCESS. As described in the 2015 EDUCAUSE report, interviewees want better ways to understand factors affecting student success. The most data-savvy agencies and institutions can track course-level student performance and attendance and can flag students if they start to veer off track. However, most respondents are not yet able to identify struggling students or to evaluate the efficacy of their various student success initiatives.

WORKFORCE CONNECTIONS. Agencies and institutions also seek to track students after graduation and into the workforce. Interviewees want to collect and analyze data on graduates' workforce experience to better understand needs in the labor market, evaluate the economic return on their various programs, and to assist in describing the value of earning a degree. Because there are fewer existing models for this type of research and many of the data sets on worker experiences and characteristics are new and unfamiliar, IHEs could use training in the use (and misuse) of these datasets and in creating reusable analytic frameworks that provide useful insights given the limitations of the data.

EQUITY. Finally, there was strong interest in using data analyses to improve equity of outcomes. Agencies and institutions seek to close gaps in student outcomes and must be able to make decisions about strategies to do so with the many aspects of student identity and life circumstances in mind.

As one would expect, within these areas of consensus, there were differences by agency and institution type and among institutions of the same type.

STUDENT SUCCESS. Many institutions want to understand what works to improve student outcomes and to marry that information with data on expenditures so that they can understand the costs and benefits of various interventions and initiatives. In contrast, some more sophisticated institutions already know what works for them and are now focused on change management processes to encourage all units to adopt proven practices and to use data to inform and monitor their success. There was also some interest among institutions (particularly community colleges) in better understanding the college readiness of students at local high schools so that the colleges could better serve those students when they arrive. Finally, there was a sub-group of institutions interested in better understanding student learning within and across courses.

WORKFORCE CONNECTIONS. Everyone interviewed is interested in workforce connections, but sometimes for different reasons. SHEEO agencies want to understand current and future needs for the state's workforce in order to inform statewide higher education policy and investments. SHEEO agencies use information about employment outcomes to inform program approval and review, to inform partnerships with workforce development agencies, and to develop consumer information resources. In addition, they are keenly interested in developing models that determine the relative value/return on investment of different types of credentials. Institutions want this information too, but for much more localized reasons. IHEs want to be able to track their graduates into the workforce to evaluate the value of their programs, to help

guide their students' decisions about courses of study, and, given the realities of the higher education sector, to improve marketing, alumni relations, and fundraising efforts.

EQUITY. All agencies and institutions see the importance of using data analyses to address persistent gaps in student outcomes along racial and socioeconomic lines. This priority is particularly pertinent to the mission of MSIs due to their histories of addressing educational equity. However, because MSIs may have demographically-homogeneous student bodies, standard disaggregation practices are not sufficient to address equity. Nuanced tools and measures are needed.

Additional Needs by Agency/Institution Type

In addition to the three consensus areas, agencies and institutions expressed a range of additional needs that varied according to organizational mission and resources.

In general, state higher education agencies seek to accelerate an internal shift from focusing primarily on mandatory reporting requirement to producing more sophisticated analyses that identify the types of interventions that improve student success and address educational equity concerns. For example, one state-level interviewee shared a need to understand the connections between financial decisions and student-success. "What's the choice architecture for how people decide whether or not to borrow and how much? What percent of the amount you're eligible to borrow do you actually borrow?" Interviewees emphasized that, in order to affect change, data analyses must be structured and communicated to enable a broad range of decision-makers to develop and implement data-informed strategies. Some state agencies noted that they need to better understand and use their states' longitudinal student data systems.

Traditionally under-resourced four-year institutions and community colleges also face challenges in strategic data use, though there is significant variation amongst these institutions. One community college administrator described the importance of data as the "first hurdle to move the needle on student success," and under-resourced institutions recognize that having staff with the right knowledge and skills is a necessary precondition to using data effectively, especially after outside contractors complete produce reports. Though many institutions struggle to attract and retain staff, less-resourced colleges face this challenge the most, often due to the lack of ready talent in their geography and their ability to compete with higher-paying jobs elsewhere. One interviewee described the challenge in his talent pool, saying. Better-resourced colleges often have staff with the requisite technical skills, but who lack leadership and communication skills or an understanding of the higher education context.

Community colleges have unique needs for strategic data analysis because they serve a highly diverse mix of students in programs that range from adult basic education to highly competitive technical programs. Community colleges also are tied to the K-12 sector in a more intimate way than most other colleges because they host significant numbers of high school students in dual-enrollment classes. As a result, they have a greater interest in analyses that span both sectors. Many interviewees shared a desire to collaborate in answering research questions with local K-12 partners. Given their mission to serve the local community, and the important focus at most community colleges on career programs, they have a particularly keen interest in understanding

the local labor market, both to gauge the community's needs and to determine how their graduates are faring.

Finally, MSIs are extremely diverse in resources and capacity, ranging from large research universities to small, geographically isolated public and private colleges. Though some MSIs have only basic data infrastructure (and still do some of their work on paper), most collect data effectively and convert it into descriptive reports. Like other institutions, many MSIs have limited resources and thus difficulty attracting talent. Like many other institutions, they also struggle to create an institutional culture in which data access and analysis are prevalent. One interviewee suggested that her college must "crawl before we walk."

Coronavirus and Future Considerations

After the onset of the coronavirus pandemic, the research team returned to interviewees to learn more about how, if at all, the pandemic will shift their strategic questions, data collection, and analysis efforts. According to interviewees, the COVID-19 crisis highlighted the focus areas of student success and put more urgency around questions of workforce outcomes. Yet, institutions face a new subset of questions that they must answer to support students in attaining postsecondary success, from transfer to graduation to workforce.

Specifically, institutions are asking an array of new questions (not all of which have data available to answer them):

- How do we measure student risk aversion? Will moving online cause students to switch majors or change their course taking patterns?
- If institutions move more content online for the foreseeable future, which seems likely among interviewed institutions, how will that impact facilities and operations?
- Are course success rates the same? How do we measure student engagement online –at scale?
- How do we adjust our early warning indicators given these new instructional and economic realities?
- How effective is professional development for faculty transitioning to online instruction?
- How effective are counseling and other non-instructional supports for students in a virtual ecosystem? What do institutions need to know to support students online?
- What technology is needed to reach all students and how can we leverage that technology to keep students, particularly students who do not thrive online, on track?

While many selective and mid-tier institutions are concerned about enrollment, interviewees at 2-year institutions and less selective 4-years are facing a different set of challenges. After seeing a significant increase in online summer course-taking, one interviewee shared that her institution was "examining the successes over summer and leveraging that information to... keep [students] moving into the fall". Reflecting on dramatic increases in summer enrollment, a different interviewee asked how to measure, "the point at which we max out our capacity to serve."

Uncertainty about the economy is disrupting the use of old predictive models. One interviewee shared, "Unemployment tends to influence our enrollment patterns, especially at community

colleges, but this may be...different than the recession in 2008....We don't have the ability to verify...that trends are going to play out in the same way they did in previous cycles... [That] makes it very difficult to use our previous models and projections."

States and institutions are also grappling with a changing economy and the role that postsecondary institutions will play in supporting student success – in school and in the workforce. One interviewee shared, "When COVID first hit, we quickly deployed a survey on what our students might need. We wanted to make the promise that our students would always have access to food and technology. When students returned to remote learning, they had what they needed, and we set up an infrastructure to make sure that students got…computers and internet." Institutions are also needing to identify students with changing circumstances in order to provide them with emergency aid and financial resources.

Another concern was expressed around measuring credentials and degrees of value. One community college that prides itself on its partnerships with local businesses and high job placement rates shared that opportunities for employment are retracting and the data about available opportunities are less reliable. Institutions need strategic support to think about how to collect new workforce projections and use them to offer promising pathways. "We don't want students saddled with debt because they thought there were jobs at the end of their credentialing program. We need provide a realistic picture to current and future students."

Finally, data leaders are concerned about the future of data culture in their organizations. "We used to give more time to collect buy-in from the community. We are moving at a clip and people feel data are being used to support a preconceived notion, not an exploration." For example, data leaders need buy-in from faculty and counselors to reach students in need of support. One asked, "How do we get faculty, once used to delivering instruction in person, to deliver online and record grades early in the semester so that we can predict course dropout and failure?" Institutions expressed a need for a strong data culture so that they can fulfill the promise of evidence-informed strategic decision making in times of crisis.

Conclusion

In alignment with several recent national studies, we found significant variability in the capacity of higher education state agencies, systems, and institutions to use data to support student success. SDP also found consistent interest in developing staff capacity to make effective use of data to support decision-making in the key areas of student success, connections to the workforce, and educational equity. Interviewees emphasized that, while technical expertise is important, the skills they find most difficult to find and develop in staff are related to leadership and communication. As institutions transition from producing simple analyses in a dedicated research office to encouraging the investigation and use of data across the organization, the skills required in institutional research offices and analytic staff have expanded and changed. Higher education needs analysts with strong leadership skills who can drive organizational culture change toward more use of data and evidence in decision-making.

Appendix: Interview Protocol

Note: Interviews were semi-structured, so each interview subject was asked a subset of the questions that follow.

Context

1. How important are data analysis and targeted research to inform policymaking and accountability to your organization? Do you conduct analysis primarily to meet reporting requirements or are data used to inform decision-making? Can you provide an example of how analysis informs decision-making at your institution/agency?
2. What topics have you studied in the last year, and what is on your docket for 2019-20?
3. What types of institutional data do you regularly collect, analyze, and report on? What types of data would you like to collect and analyze that you do not now? What are the obstacles to accessing the data you seek?
4. Does your state have an active longitudinal data system? Which agencies contribute data? What is your organization's role in managing that system? How do you use it? Are there challenges in using your state's LDS?
5. What is the scope of your data collection and analysis activities? How many institutions and/or students do you track?
6. Do you collect unit record data or do institutions only provide aggregate records?
7. What national data systems and/or studies do you contribute to and/or use for analysis (e.g. National Student Clearinghouse, IPEDS, etc.)
8. Do concerns about student data privacy or security impact your organization's ability to do needed analysis? If so, how does your organization handle these challenges?
9. Are you able to access data from other agencies (specifically, K12 and workforce)? If not, what are the barriers?
10. How important is ease of understanding and using data for your organization and/or its constituents? Who are the primary clients? Are the data used primarily by trained analysts or by lay people who aren't well versed in managing complex data sets?

Staffing

1. What is your current staffing for data collection, analysis, reporting, and research?
2. Would you say that you currently are staffed to do 1) the minimum reporting that is required, 2) required reporting plus high-priority additional analyses, or 3) a comprehensive program of data collection, strategic analysis, and policy research?
3. Are you constrained in meeting your goals for providing better information for policy makers and system leaders because you lack sufficient staff capacity? Is this primarily due to funding limitations or because you can't find and/or retain staff with the requisite skills?
4. Do staffing constraints limit your ability to take full advantage of your longitudinal data system? If so, what kind of staffing do you need (e.g. technical/programmers, data analysts, others)?
5. What work would you like to do that you cannot perform due to capacity constraints?

6. What skills are your staff typically lacking when they come in? What skills are relatively easy for you to find?
7. Assuming that you can't always find candidates with every skill on your wish list, which are the most important: 1) technical skills (understanding of statistics and research methods, familiarity with statistical software packages, facility at manipulating large and complex data sets, etc.), 2) general understanding of higher education, 3) specialized understanding of an area within higher education (e.g. financial aid, institutional finances, student success), 4) oral and written communication skills, 5) IT/programming skills, or 6) something else?
8. If you find it difficult to find and/or retain staff with the skills you need, what do you see as the primary problem? Are there just not enough people who have the expertise you seek? Do you lose qualified candidates to other employers who can offer more attractive positions or competitive salaries? If so, what type of organizations are your primary competitors for talent?

Strategic Data Project

1. Based on what we've shared about how the Strategic Data Project works with K-12 state and district agencies and nonprofit organizations, do you think a similar fellowship program and professional network focused on issues in higher education would be an attractive option for your agency/organization?
2. Do you have employees who you might want to nominate for a fellowship? Would you be interested in hosting a new fellow?
3. What kind of professional development do you offer to your analytical staff?
4. Would you be interested in partnering with your state K12 agencies to each send a fellow that would work on projects collaboratively that are of interest to both sectors?
5. Based on everything we've discussed, what do you see as the most essential knowledge or skills that a fellowship program for higher education analysts should help its fellows to acquire? If you were designing the curriculum, what would you make sure is included?
6. What else do you think we should know that we haven't asked you about?

COVID-19 Supplement Interview Protocol

1. What are the most pressing challenges that your institution is currently facing as a result of COVID-19?
2. To what extent is the university using data to drive its response to corona-related challenges (e.g., drops in enrollment predictions)?
3. What new questions will you need to answer with data? New analytic priorities?
4. Do you plan on using any national data systems or studies? From your perspective, are there any particular national or state-level datasets that might be useful?
5. Is your institution currently under a hiring freeze? Do you need data capacity?
6. What else do you think we should know that we have not asked you about?