INSIGHTS REPORT

# Using Data to Understand Student Behavior

## Why engaged students are more likely to succeed

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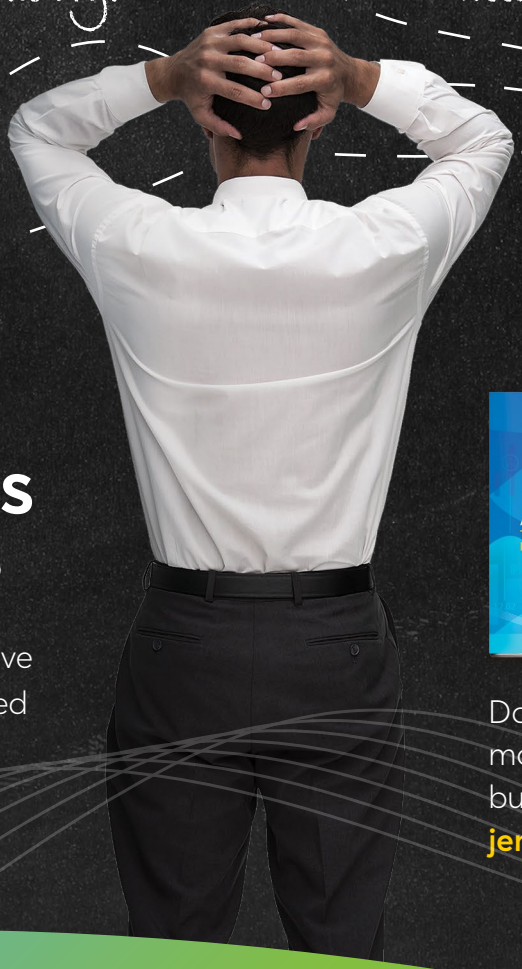

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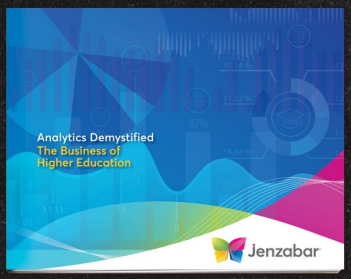


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TABLE OF CONTENTS

GETTY IMAGES

Cover photo:
Gannon U.'s "Find Your First-Year Team" program encourages students to take part in activities grouped around certain themes, to help them connect to other students. This student has joined the Outdoor Adventure group.

GANNON U.

# Using Data to Understand Student Behavior


4 Introduction

6 Collecting the Right Student Data

8 Using It Strategically

13 Recognizing the Pitfalls

14 Common Challenges

15 Conclusion


Contact CI@chronicle.com with questions or comments.

# INTRODUCTION

Colleges have always collected plenty of data about their students. But until the past decade or so, the analysis of that data often never made it to the right people in time. Reports from institutional-research offices could take weeks or months to arrive, and by that time, the students who might have benefited from the data collection had already left.

Now, new software and tech tools are giving colleges data that can help them respond more quickly. The first wave of Big Data analysis focused mostly on academic data and how it related to student retention. Georgia State University, for example, has sharply increased retention — and received plenty of news coverage along the way — by analyzing data on classroom performance early in students' careers. It then uses predictive analytics to steer students toward majors and programs where they can be most successful.

Now the next wave of data collection is gathering momentum. It focuses more on other kinds of student behavior and responses. Colleges are rushing to systematically track behavior that can help predict whether students will persist — or transfer or drop out — with questions like these:

Did you actually attend the required freshman orientation? Do your interactions with a virtual chatbot indicate that you might be depressed? Have you registered for the next semester? Does Wi-Fi-hotspot data indicate that you might be skipping class?

Getting answers to such questions in real time allows colleges to use emails and texts, or face-to-face sessions with advisers, to reach students at risk of withdrawing. Institutions can provide small cash gifts or scholarships to keep students enrolled, improve student engagement by connecting them to clubs and activities, or even set up a meeting with a mental-health counselor.

These approaches are bolstering retention at a broad range of universities. To be sure, some approaches need careful consideration before colleges dive in — some students, for example, have rebelled against the idea of being physically "tracked."

Yet the financial challenges for higher education in a new era of declining enrollment are likely to mount, driving colleges to data-driven retention strategies. At press time, the coronavirus pandemic had emerged as an additional factor, putting tremendous short-term pressure on college finances and raising the possibility of a longer-term shock if international student enrollment were to fall as expected. On top of that, now colleges increasingly must fend off poaching of their students by other institutions, as changes in the ethics code of the National Association for College Admission Counseling make it easier for colleges to try to lure away undergraduates who have never set foot

> "Not all institutions are very good about making data actionable and doing something with it. The real differentiator is, how good is your process for doing something with it?"


SOUTHERN UTAH U.

**Southern Utah U. has taken a number of steps to retain students and help them. Jamie Muhlestein and Gus Torgersen are student mentors in a peer-mentor program that reaches out to first-year students.**

on their campuses.

This report will examine how several institutions are using data to improve retention — and how some of the most successful aren't necessarily using the most sophisticated algorithms. The colleges making the biggest gains are those that have identified data points that make a difference, and have made an institutional commitment to use that information.

Most important, they're getting the findings to advisers, resident assistants, and other people who can make a difference.

"Not all institutions are very good about making data actionable and doing something with it," says Jared Tippets, vice president for student affairs at Southern Utah University. "The real differentiator is, how good is your process for doing something with it?"

# Collecting the Right Data

The type and amount of data that colleges track to improve retention are all over the map. But colleges that are successful are the ones that use the data while it is still fresh enough to make meaningful interventions.

At Gannon University, in Pennsylvania, data related to student engagement, academics, and finances are used to create a color-coded, multidimensional diagram, or glyph, for each student. The glyph turns a spreadsheet into a picture, giving the university's academic advisers a quick sense of which students need help.

The university, a Catholic institution with about 3,300 undergraduates, also crunches data to create its own model for predicting how likely students are to persist. The model found that students who don't complete a required summer-orientation program — and those who don't fill out a survey about their motivations, attitudes, and receptivity to campus assistance — are far less likely to persist. Their retention rate is 20 percent lower than that of their peers.

"We immediately work with those students to expose them to engagement opportunities," says Steven A. Mauro, vice president for academic administration.

Such students are strongly encouraged to join a two-day immersive experience known as "Find Your FYT" (First-Year Team) during their first week on campus. The groups, organized around themes like food, outdoor adventure, music, and writing, are intended to provide an immediate connection to campus for those most at risk of dropping out by connecting them to other students with similar interests.

Gannon's model also shows that commuter students are less likely to persist, as are those who have trouble paying tuition bills. Using the glyphs as indicators, the university's three academic advisers can alert resident assistants in the dormitories, or assistants in the commuter lounge, and have them reach out to students who are at risk.

"The glyphs allow us to respond very quickly," Mauro says. "In time, a student might present with risk factors, but that might be at a point where he or she is already planning to transfer, or has withdrawn from higher ed altogether. This has greatly improved our response time and the efficiency in terms of where we can focus our efforts."


As part of Gannon U.'s "Find Your First-Year Team" program, these students are volunteering at a community garden. The program encourages students to take part in activities grouped around certain themes, to help them connect to other students.

GANNON U.

# Using Data Strategically

At the U. of South Florida, staff and faculty members meet to discuss retention efforts, using a case-management model.


LAURA LYON, U OF SOUTH FLORIDA

At Bellarmine University, in Kentucky, the move toward using data to improve retention came after a sharp and unexpected drop in freshman-to-sophomore retention for the class that entered in fall 2016. The Catholic university uses hundreds of data points, but about 15 are most helpful in predicting which students are likely to be retained, says Drew Thiemann, director of institutional research and effectiveness. Bellarmine considers obvious factors like high-school GPA, financial need, and whether the student is first-generation, but also behavioral factors such as when the student applied, whether he or she missed orientation, and how often the student attends campus events.

Using commercial software, Bellarmine runs analyses that categorize the incoming class into five groups based on their likelihood of persisting. The top group persists at 96 percent, the bottom at less than 60 percent. Thiemann was surprised to learn that students one might expect to find at the most risk — such as first-generation students — were instead sprinkled throughout the range.

"It helped us reconceptualize how we work," he says. "Do we need an office to work with first-generation students to the exclusion of others, or one that understands students holistically?"

The university is now designing interventions — including encouraging the use of tutors or peer advisers — for students as needed, with greater encouragement for those whom the software deems least likely to persist. Bellarmine has also moved to using only professional academic advisers for freshmen.

The changes have helped the university's freshman retention rate rebound to nearly 80 percent, in line with the long-term average, after dropping below 73 percent for the class that entered in 2016.

For the University of South Florida, improving retention is more than just a university ambition — it's one of the key factors that determine the level of financial support provided by the state.

For the past five years, the university has used both commercially available software and a homegrown model to evaluate student data in an effort to improve retention. While the software pulls in admissions and classroom data, the homegrown model relies more on surveys completed by students at orientation and during their first month on campus. Both programs pick up signs of student engagement — the commercial software, for example, can track student participation in online classroom discussions, while the university's homegrown model might detect how many hours per week a student intends to study, or whether the student intends to stick around long enough to graduate.

> "If the student is not engaged, there may be other factors that might lead the student to transfer out — such as not finding friends or loneliness or depression."

"We've been able to use that data to identify the student who is not engaged," says Paul Dosal, vice president for student success. "The student might have been doing well academically, but if the student is not engaged, there may be other factors that might lead the student to transfer out — such as not finding friends, or loneliness or depression."

The insights are shared with the university's Persistence Committee, a student-support group that meets regularly to resolve issues impeding student success.

The committee can intervene and even provide financial assistance if necessary. A typical grant is about $500; one student used it to pay for an eye exam and glasses.

The information also goes to a growing team of case managers — nonacademic advisers who function somewhat like a cross-departmental medical team and who help students overcome barriers to graduation.

The data is updated at least once a week, and the case managers try to find ways to connect with struggling students in a way that doesn't hint that they've been singled out for support by an algorithm.

"We've really trained our support team to intervene in ways that would do no harm to the student, like freaking them out," Dosal says. "We try to intervene through somebody who has already developed a relationship with the student. If we know a student is living on campus, we might get a resident assistant to knock on the door and see how the student is doing. It's nonintrusive, and designed to not be creepy — just a check-in."

The changes have increased South Florida's first-year retention rate to 91.5 percent, up from 88 percent in 2014. But Dosal is eager to gain even more insight into whether students are making connections at South Florida and will want to stick around. He hopes to soon begin using data like students' use of the library and student union, attendance at sporting events, and membership in clubs. The university is in "serious discussions," he says, about how to incorporate that data, either through another homegrown system or with the help of a software company.

"Half of the students we lose after the first year are in good academic standing, with a GPA higher than 3.0," Dosal says. "They didn't engage with the community; they didn't find a home. I would like to do a better job of retaining those students."

Some colleges boil down their data and their retention efforts to the simplest metric: Have students indicated they're returning by signing up for the next semester?

"It sounds simple, but the best way to keep students in school is to keep them in classes," says Richard D. Sluder, vice provost for student success at Middle Tennessee State University.

Priority registration at Middle Tennessee State begins in April, and on any given day thereafter, Sluder can look by class at the percentage of students who have registered and compare it to that in prior years. He can also call any of the university's academic advisers and ask: "How many students do you have? How many are enrolled for the fall? How many are not enrolled, and why?"

"Half of the students we lose after the first year are in good academic standing, with a GPA higher than 3.0. They didn't engage with the community; they didn't find a home."

About a quarter of students who start at four-year institutions eventually transfer. At Middle Tennessee State, Sluder wants advisers to know the reasons behind every student departure. Advisers reach students by text and email, and sometimes call to ask why students have not registered. One student may be moving on to a college that he or she had always wanted to attend; another may depart following an assault.

"Every student has an individual story, but knowing what those stories are — that's part of the process," Sluder says.

Middle Tennessee State has seen its freshman retention rate rise to 76 percent, up from 68 percent in 2014, when it began working with a consulting company that helps colleges with enrollment and reten-

KIM RAFF FOR THE CHRONICLE

**Jared Tippets, vice president for student affairs at Southern Utah U., meets with students. Five years ago, "We just weren't intentional about which students were struggling and going after them."**

tion. The university also hired 47 new academic advisers that year, at a cost of about $3 million.

The payoff: nearly $2.5 million in additional tuition revenue, and a near doubling (from 18 to 35 percent) in the proportion of students who graduate within four years, according to Sluder.

At Southern Utah University, the focus is on identifying students who fit the profile of previous students who have left early, and intervening to help them stick around.

When Southern Utah did a major study in 2016 to identify the top reasons why students leave the university, the list included finances, a lack of a sense of belonging, stress, and roommates.

The university conducts two surveys among incoming students, aimed at identifying whether any of the seven main reasons for leaving are likely to arise with them.

The first survey is administered at a mandatory orientation. "That data gives us a group of students that we focus on in the weeks prior to school starting, and in the first few weeks of the semester," says Tippets, the vice president for student affairs.

The second survey, administered about a month into the semester, focuses on students' experience so far on the campus.

"Through that process, we grab another group of students and go after them," Tippets says. "We have a robust peer-mentoring program — they call the students up and set up lunch meetings. Our academic advisers also get the list, with a note that these students in your cohort need some love and attention."

The university's freshman retention rate has jumped from 64 percent to 74 percent since it adopted those interventions in 2015.

"Five years ago we weren't doing any of this," Tippets says. "It wasn't that we as an institution were ignoring students. We just weren't intentional about which students were struggling and going after them."

Chatbots are another way for colleges to gain information that can lead to interventions that improve retention. They can send out reminders about tutoring appointments and deadlines undergraduates need to stay on top of.

Bethune-Cookman University uses a commercial chatbot named Ana, which in addition to sending nudges, seeks feedback from students about any concerns they may have and how they're feeling. The responses often provide insights that might affect retention, including responses related to academic matters, emotional issues, and financial-aid problems such as trouble completing the annual Fafsa.

Recently at the historically black university, when Ana texted students facing major tests to see how they were feeling, a freshman responded with a litany of complaints about her math class and living situation in a dormitory. The information goes to the institution but is also shared with a retention officer employed by the company who developed Ana. That retention officer investigated and shared information with the student about how she could seek help.

"Five years ago we weren't doing any of this. It wasn't that we as an institution were ignoring students. We just weren't intentional about which students were struggling and going after them."

Arletha McSwain, an education professor and executive director of global online partnerships at Bethune-Cookman, confirms that the follow-up on information gathered through Ana made a difference. After being notified, "we immediately reached out to the student and rallied around her. She is now performing much better academically and socially."

# Recognizing the Pitfalls

The most controversial way that student data is being used to improve retention is by actually tracking student movement around campus. Colleges can use the information for hints about classroom attendance, campus engagement, and even mental health.

Some companies use cellphone data to track student movements. By analyzing data from Wi-Fi hot spots and identifying which students have connected there, one company says it can predict with about 94-percent accuracy which students actually attended class that day.

The data can be helpful for colleges, especially when coupled with other information in hand. For example, first-generation students may be less likely than their peers to grasp the importance of attending class every day.

HERO IMAGES, ALAMY

## Common Challenges of Using Student Data

### Expecting technology to be a cure-all, without investing in people and process

The technology to support students is advancing rapidly, often more quickly than colleges can keep up. Investments are needed not only in new tools, but in training and efforts to update processes.

### Finding correlations, not causation

Some colleges are encouraging students to use the gym after finding that those who do so are more likely to be retained. But such data could be meaningless unless information has been collected for a long time, and gym usage has been isolated from other factors, such as working while attending college.

### PR and privacy problems — will students view you as "Big Brother"?

As Virginia Commonwealth University experienced, tracking students using cellphone data or by other technology can be controversial. Such efforts need to be communicated clearly and often to students, explaining the goal of the program and why it will ultimately benefit them.

### The cost of technology — can this be done in-house instead?

Middle Tennessee State has used a commercial product since 2014 and isn't about to give it up, despite the $181,000 annual fee. But cost can be an obstacle.

"People are inclined to do it in-house," says Richard D. Sluder, vice provost for student success. "Sustaining it is a whole other thing. Product evolution is something they're continually focused on. What they provide today is completely different from what they launched for us in 2014."

Colleges with the hot-spot attendance data could send small nudges to students via text or emails, with links to graphs that illustrate how big a difference classroom attendance makes in whether a student succeeds or fails. And by tracking students who only show up in their dormitories or cafeterias, the system can help identify undergraduates who need assistance. Academic advisers and others can scan the data and then reach out to students, potentially offering the right support before it's too late.

Such efforts are controversial because some students view them as an invasion of privacy. Virginia Commonwealth University recently abandoned a pilot program using tracking data after 60 percent of the targeted students refused to participate.

The tracking technologies are of interest to longtime data users, like South Florida's Dosal and Middle Tennessee State's Sluder. But the cost and the newness of the technology remain obstacles — not to mention the kind of campus uproar that Virginia Commonwealth experienced.

"I didn't mind being a beta tester in the early days," Sluder says. "But these days, I like to have some maturity in my technology."

# CONCLUSION

Using data to improve retention can seem overwhelming for some colleges. First you have to decide what metrics are most important. Then you need to assemble a team to carry out interventions. But the first challenge doesn't have to be complicated, and the second one doesn't have to be expensive.

As for what data to gather, consultants and college administrators say the right path is to find a handful of meaningful metrics and pay close attention to them. At Middle Tennessee State, most of the university's retention gains are derived from one variable: Has the student registered for the next semester?

"People who are doing this stuff right are using simple things to make a difference," says Sluder, the vice provost. Middle Tennessee State's retention progress was greatly aided by hiring 47 advisers in a single year. But other colleges are posting big retention gains with smaller investments. Gannon has only three professional advisers, so it pushes most of the personal discussions with students down to resident assistants.

"We tell the RAs, 'This might be a student that would be worth checking into,'" says Mauro, the vice president for academic administration. "We want them to just have a general conversation and see how the student is doing. That way they can get a sense of whether the student is feeling happy or whether there was some distance."

In the past five years, Southern Utah has nearly doubled its staff of academic advisers — from 16 to 28 — but it also relies on a team of 20 to 30 peer advisers, who make $8.50 an hour or less.

"The way we approached it was by showing the return on investment we were getting," says Tippets, the vice president for student affairs. "We believe our peer mentors are highly influential in determining our students' retention rate. You don't have to retain many students for their ongoing tuition to cover the cost of a peer mentor."

It's crucial to have someone leading the effort who can sell other administrators — and the advising staff — on the benefits of using technology and data to improve retention.

Sluder recently gave a conference talk about how Middle Tennessee State uses data to hold on to more students. Afterward, a colleague from another university came up and raved about its first-class technology and analytics. The problem? No one knew there how to put them to use.

"Somebody has to own this and drive it down into action," Sluder says, "and be responsible for getting the work done."


MTSU

**At Middle Tennessee State U., advisers use data to help identify students' needs.**

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