

## 8

# The Impact of Academic Analytics

*Success isn't everything, but it makes a man stand straight.*

—Lillian Hellman

**W**e have looked at how institutions deploy and use their academic analytics. We have discussed the range of technologies they use and looked at advanced users of academic analytics. In this chapter, we examine how all these factors come together to benefit an institution. This chapter explores

- ◆ how academic analytics is impacting institutional measures of success,
- ◆ what impact the use of academic analytics has on outcomes in specific functional areas or processes,
- ◆ how an individual's decision making is supported by academic analytics, and
- ◆ whether any adverse outcomes result from implementing greater analytical capabilities.

At the conclusion of this chapter, we discuss which institutional, managerial, and technological factors appear most related to an institution's success with academic analytics.

## Outcomes: An Overview

This section looks at respondents' assessment of how academic analytics contributes to their institutions' success. We asked respondents to evaluate success in three categories:

- ◆ institutional outcomes,

## Key Findings

- ◆ Respondents report the most success using academic analytics to improve institutional decision making and to help meet strategic institutional objectives.
- ◆ Respondents report the least success leveraging academic analytics to reduce the presence of shadow systems.
- ◆ Within functional areas, respondents report the greatest success using academic analytics to improve results in student retention and enrollment management.
- ◆ Within functional areas respondents have had the least success leveraging academic analytics to improve their grants management results.
- ◆ Most respondents believe that staff skilled at using academic analytic applications make better decisions but do not receive additional opportunities for career advancement.
- ◆ Management factors such as effective training, leadership commitment, and staff analytical skills appear more related to achieving successful outcomes than institutional characteristics or an institution's choice of technology platform.

- ◆ outcomes by major function, and
- ◆ individual outcomes.

In addition, we asked respondents if their institutions recognized any adverse impacts

from their implementation of advanced analytics. We describe the results below.

### Institutional Outcomes

To assess how respondents are impacted by the use of academic analytics, we asked them to indicate their agreement with the following statements:

- ◆ My institution's academic analytics capability is helping to meet strategic objectives.
- ◆ The current academic analytics capability has significantly improved decision making at my institution.
- ◆ The current academic analytics capability has significantly reduced the presence of shadow systems at my institution.
- ◆ Academic analytics provides a competitive advantage to my institution.

We asked respondents to indicate their level of agreement with each statement. Table 8-1 lists the results.

Respondents agreed the most that academic analytics helps their institutions meet their strategic objectives. Respondents agreed the least that academic analytics was significantly reducing the presence of shadow systems on campus.

Priscilla Hancock, vice chancellor at the University of Alabama, shares her perspective on why academic analytics holds the promise of helping institutions to better meet their strategic objectives. "Institutions cannot succeed in environments where departments hold data and run reports for users. You cannot do what-if analysis in an environment

where there is a long turnaround time to get data. You need information right before your eyes when you're thinking."

Overall, respondents' mean level of agreement with three of the four statements was above neutral. Respondents disagreed, on average, only with the notion that academic analytics had significantly reduced their reliance on shadow systems.

The University of California at San Diego has found that reducing shadow systems takes time and a supportive culture. Assistant Vice Chancellor for Information Technology Elazar Harel explains, "You need a culture that encourages information sharing and collaboration. Then as tools get more powerful, departments become less inclined to use shadow systems."

### Functional Area/Business Process Outcomes

We asked respondents to assess their use of academic analytics in five functional areas: finance, human resources, grants management, student services, and advancement. In each area, we asked respondents to indicate their level of agreement that academic analytics improves their outcomes within the functional area. In finance, we asked respondents if their analytics improved the institution's financial results. In human resources, we asked if they were able to manage their workforce more productively. In grants management, we asked if respondents are able to obtain additional grant funding or manage their

**Table 8-1. Institutional Outcomes from the Use of Academic Analytics (N = 356)**

Impact of Academic Analytics	Mean	Std. Deviation
Helping to meet institutional strategic objectives	3.29	0.971
Significantly improved decision making at my institution	3.14	0.955
Significantly reduced the presence of shadow systems	2.83	1.186
Providing a competitive advantage to my institution	3.10	0.961

(1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)

grants more effectively. In the student area, we asked about the effectiveness of admissions results and student retention. Finally, we asked respondents if academic analytics helps to achieve improved fundraising results.

Table 8-2 lists respondents' mean level of agreement with each statement. Respondents agreed most strongly that they had improved results in the student area. The mean level of agreement for improved enrollment results was the highest (3.43), followed by improved retention (3.16). The only other outcome with a mean above neutral was improved financial results (3.09). This seems consistent with our earlier observation that more respondents use their analytical capability to support finance or student services than other areas.

Respondents had the lowest mean level of agreement in grants management. Even among doctoral institutions, respondents on average did not agree that they had used academic analytics to improve results in the grants management area. The mean response among doctoral institutions to the statement that they had improved their ability to manage grants was 2.85. The mean response among doctoral institutions was even lower (2.55) for "improve ability to obtain grant funding."

Respondents also did not feel strongly that they were improving their results in either the human resource management or advance-

ment areas. Responses do differ by institution type. Private institutions had a significantly better assessment of their use of academic analytics in the advancement area than did public institutions. The mean response from private institutions to the statement "my institution has improved its fundraising results" was 3.29, compared with 2.66 for public institutions. As expected, institutional differences do matter in advancement. Private institutions seem more likely to create and use advanced analytics in the advancement area. It stands to reason that they would see a greater impact from the use of those tools.

### Individual Effectiveness

The final set of outcomes we assessed was how individual users benefit from academic analytics. Specifically, we were interested in respondents' assessment of how academic analytics users improve as decision makers. Also, we wanted to understand if staff skilled at using academic analytics fare better in their careers. Table 8-3 displays respondents' mean level of agreement with both metrics of individual effectiveness.

Respondents on average agree that individuals skilled at using their institution's analytical tools do make better decisions. However, they did not agree that they get more opportunities for advancement in

**Table 8-2. Improved Outcomes from Academic Analytics, by Function (N = 354)**

Outcome	Mean	Std. Deviation
Improved the institution's financial results	3.09	0.928
Managed its workforce more productively	2.78	0.928
Managed grants effectively	2.61	0.984
Improved ability to obtain grant funding	2.47	0.962
Improved admissions/enrollment management results	3.43	1.012
Improved fundraising results	2.93	1.087
Improved student retention results	3.16	0.952

(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

**Table 8-3. Use of Academic Analytics and Individual Effectiveness (N = 361)**

Statement	Mean	Std. Deviation
Users of academic analytics make better decisions than those who do not.	3.65	0.857
Staff members skilled at using academic analytics receive more opportunities for career advancement.	2.84	0.963

(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

their careers. This could indicate that higher education is not yet placing enough value on analytical skills in its workforce. Or, it could be indicative of the broader challenge that institutions face to create a career path for administrators.

Ted Bross, associate director of administrative information services at Princeton University, cautions that institutions cannot always predict who will become users of academic analytics. He observes that it is not always managers who become the most active users. "When we gave our training program class to departments, sometimes the managers were not interested in the analytical tools. They believed that they had staff to perform analysis. Conversely, some of the clerical staff who solely used to run precanned reports by putting in a parameter loved the new tools and liked to run their own reports and queries. It threw us completely for a loop."

We did note that among respondents whose leadership is committed to evidence-based decision making, staff skilled at analysis appear to have greater opportunities for advancement. As Table 8-4 illustrates, the highest mean agreement was among those respondents who agreed (3.13) or strongly agreed (2.90) that their leadership was committed to evidenced-based decision making.

The effectiveness of a respondent's training program also appears to be related to individual outcomes. As one would expect, institutions that felt they routinely offer strong training also believe that individual academic analytics users make better deci-

sions. Table 8-5 illustrates that as respondents' assessment of their training grows more positive, so does their assessment of users' decision-making capabilities.

As discussed in Chapter 7 and reinforced later in this chapter, the analytical skills of staff appear to have an important relationship with an institution's use of academic analytics. If, as respondents indicated, the future will require more institutions to spend more money on more advanced analytical capabilities, similar investments will be needed in staff development.

Institutions will need to invest more in developing staff analytical skills and will need to work proactively to retain those staff having high levels of ability. At some institutions, this is beginning to happen. Nick Backsheider, associate executive director for educational technology and planning at Auburn University, reports that his institution has seen a shift in staff recognition. "People who previously were ignored have been recognized as important in a data-driven decision-making world."

### Adverse Impacts

It appears that improving the availability of information and analytical tools does help institutions improve outcomes. We also wondered if it creates any unintended, adverse consequences. Does widespread information access increase internal competition in an unhealthy manner? Does greater visibility into the impact of decisions make managers less decisive? Despite investments in enhancing

**Table 8-4. Staff Advancement Where Leadership Is Committed to Evidence-Based Decision Making (N = 364)**

		Opportunities for career advancement		
		N	Mean	Std. Deviation
<b>Evidence-based decisions</b>	Strongly disagree	14	2.00	1.109
	Disagree	48	2.71	0.874
	Neutral	99	2.55	0.860
	Agree	155	3.13	0.910
	Strongly agree	48	2.90	1.057

Q: My institution's leadership is committed to evidence based decision-making. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Q: Staff members who are skilled at using academic analytics receive more opportunities for career advancement. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

**Table 8-5. Effective Training and Better Decision Making for Academic Analytics Users**

		Better decision making		
		N	Mean	Std. Deviation
<b>User training</b>	Almost never	52	3.23	1.131
	Occasionally	91	3.49	0.887
	Sometimes	108	3.70	0.727
	Usually	88	3.85	0.617
	Almost always	21	4.19	0.928

Q: The institution has provided effective training to users of academic analytics. (1 = almost never, 2 = occasionally, 3 = sometimes, 4 = usually, 5 = almost always)

Q: Users of my institution's academic analytics make better decisions than those who do not. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

the capability to broaden data availability, are staffs still strongly resisting its distribution?

We asked respondents to indicate their level of agreement with a series of statements about potential adverse impacts from investments in academic analytics. Table 8-6 lists the mean response to each statement.

In general, respondents either slightly disagreed or were neutral to the idea that they were experiencing any adverse impacts. Most responses were clustered around slight disagreement or slight agreement with the

statement. In fact, the only statement for which the mean response indicated slight agreement was the statement that managers still make decisions primarily on instinct. Respondents, on average, disagreed that managers become less willing to make decisions or more competitive with one another for resources when information becomes more widespread.

For those experiencing resistance, patience and time may be their best ally. Bob Clapp, vice president of information technology at

**Table 8-6. Potential Adverse Impacts of Academic Analytics**

Statement	N	Mean	Std. Deviation
People at my institution have strongly resisted making data widely available.	364	2.77	1.024
Broader access to data makes managers less willing to make decisions.	364	2.32	0.818
Broader access to data only increases internal competition among units for resources.	362	2.41	0.861
Despite the availability of data, most managers still make decisions primarily on instinct.	364	3.13	0.921

(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Le Moyne College, reflects on his experience implementing academic analytics and reminds us that change rarely happens quickly. He said, "Nothing goes as fast as you want it. It's almost never the technology that slows you down; it is the people associated with it. At most institutions, the same people have been doing the same things for a very long time, so sometimes change can be difficult."

Interestingly, a manager's willingness to use data to make decisions appears to be related to how committed institutional leaders are to analytically driven decisions. Respondents with leadership committed to evidence-based decision making disagreed more strongly that their managers are instinctual decision makers. It seems, if leadership demands evidence-based decisions, that managers follow their example (or requirement). Table 8-7 illustrates respondents' mean agreement with their managers' reliance on instinct in comparison with their assessment of leadership's commitment to analytical decision making.

Conversely, the effectiveness of an institution's training does not appear to relate to the extent to which its managers rely on instinct. Finally, there appears to be no relationship between a respondent's belief that the availability of more data makes managers less decisive and either the effectiveness of training or leadership commitment.

Leadership commitment to evidence-based decision making also appears to relate to the level of residual resistance respondents report to making data widely available. Respondents who report that their leadership is not committed to evidence-based decision making also report that they continue to face resistance to making data widely available. As Table 8-8 illustrates, the converse is also true.

## Effective Use of Academic Analytics

In our survey, we identified four overarching outcomes that institutions seek to achieve from their investment in academic analytics:

- ◆ help meet institutional strategic objectives,
- ◆ improve decision making,
- ◆ reduce the presence of shadow systems, and
- ◆ leverage analytics to create a competitive advantage.

As we discussed in the opening of this chapter, respondents in aggregate were in slight agreement that their academic analytics helps them to advance each of these objectives. The only exception was the ability of academic analytics to reduce the presence of shadow systems. Respondents did not agree as extensively that they were making progress on this objective.

**Table 8-7. Instinctual Decision Making and Leadership Commitment to Analytics (N = 364)**

		Instinctual decisions making		
		N	Mean	Std. Deviation
<b>Evidence-based decisions</b>	Strongly disagree	14	4.14	0.663
	Disagree	47	3.66	0.891
	Neutral	99	3.18	0.873
	Agree	156	2.94	0.844
	Strongly agree	48	2.79	0.944

Q: My institution's leadership is committed to evidence based decision-making. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Q: Despite the availability of data, most of our managers still make decisions primarily on instinct. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

**Table 8-8. Leadership Commitment and Resistance to Making Data Widely Available**

		Availability of data		
		N	Mean	Std. Deviation
<b>Evidence-based decisions</b>	Strongly disagree	14	3.93	0.917
	Disagree	48	3.40	0.939
	Neutral	99	2.82	0.973
	Agree	155	2.62	0.921
	Strongly agree	48	2.19	1.003

Q: My institution's leadership is committed to evidence based decision-making. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Q: People at my institution have strongly resisted making data widely available. (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

As noted, respondents do not agree with all four statements to the same degree. To help better understand these differences and to identify factors that appear most important to successful outcomes, we performed a series of regression analyses. Specifically, we looked for relationships between variables that describe a respondent's institutional profile, management climate, technology infrastructure, and application of advanced analytics and the outcomes they achieved. We discuss our findings below.

### Institutional Characteristics

We found no relationship between institutional characteristics and any of the four outcome variables. The institutional characteristics we evaluated include Carnegie class, institutional control (public versus private), enrollment, aggregate five-year spending on academic analytics, and the length of time the institution has had its academic analytics. None of these factors explain any significant differences in the outcomes that a respondent achieves with their academic analytics. So,

while looking at institutional differences can help us understand how an institution deploys its analytical capacity and where it seeks to become an advanced user, they do not appear related to a respondent’s degree of success.

### Management Climate

In the area of management climate, we examined five factors: the degree of turbulence in the institutional climate, the degree of centralization of management control, the level of staff skills in analysis, training effectiveness, and leadership commitment to evidence-based decision making. Several of these factors appear to have a strong relationship with a respondent’s success. Providing effective training, having staff skilled in analysis, and the presence of leadership committed to evidence-based decision making all have a positive relationship with successful institutional outcomes. Table 8-9 lists the primary and secondary factors of management climate that appear related to successful outcomes.

The importance of training and the strength of staff skills are two of the strongest variables in the entire study. Among institutions that reported great training success, a common theme was a methodical

approach. Joseph Sawasky, associate vice president at the University of Toledo, describes his institution’s experience. “Training was the ‘Ah-ha’ after the technology was implemented. We thought the tool was so intuitive when we deployed it that users would not require much training. But after a couple of years of deployment, we decided to take an instructional design approach: analyze the needs; talk to focus groups; design, develop, and implement the material; and evaluate it. The instructional design approach really paid off for us.”

Institutional climate was a secondary factor in determining a respondent’s success at using academic analytics to help meet institutional strategic objectives. Respondents with stable or dynamic environments had more success than those with turbulent or unstable climates. This mirrors findings in other ECAR studies that have confirmed that institutions with turbulent or unstable climates struggle to derive value from their technology investments.

### Technology

We also analyzed whether an institution’s choice of technology platform had a signifi-

**Table 8-9. Management Climate Factors and Successful Outcomes**

Outcome	Primary Factor(s)	Secondary Factor
<b>Meet institutional strategic objectives</b>	Effective training	Institutional environment stable or dynamic
	Staff skilled at analysis	
	Leadership commitment	
<b>Improve decision making</b>	Effective training	
	Staff skilled at analysis	
	Leadership commitment	
<b>Reduce presence of shadow systems</b>	Effective training	
	Staff skilled at analysis	
<b>Create competitive advantage</b>	Effective training	
	Staff skilled at analysis	

cant bearing on the outcomes they achieve. We examined each of the technology platforms defined in Chapter 5 to see if they explain any portion of a respondent's success with each of the four institutional outcome measures. We found relatively few significant relationships between technology platform and degree of success.

There does appear to be a positive correlation between the use of a data warehouse and meeting institutional strategic objectives. Respondents with a data warehouse reported more success at supporting their institution's ability to meet its strategic objectives than either respondents with data marts or respondents who report primarily from their transaction systems. Perhaps the institution-wide view a warehouse provides helps further the development and implementation of institutional strategic objectives. Comparatively, reporting from a data mart or transaction system may be effective at meeting unit objectives but less effective at supporting institutional objectives.

For reducing the presence of shadow systems, two technologies appear to make a more significant difference. Respondents who use executive dashboards have more success at eliminating shadow systems, as have those who report from an operational data store. Since dashboards deliver information to users in a form that is easy to understand and use, it stands to reason that they would lessen users' need for shadow systems.

North Shore Community College has had significant positive user feedback from its implementation of dashboards. Vice President for Administration and Finance Janice Forsstrom explains, "We have created a number of dashboard-type things for executive management. It displays registration data for credit and non-credit courses. Leadership looks at pie charts on a daily basis to monitor progress. You can look at any semester, credit, non-credit, online, and non-online

courses. People love this tool. A visual presentation of information where people do not have to create a report seems to be very popular and useful."

This convenience may influence users to discontinue their reliance on shadow systems for reporting. It is not clear why the use of an operational data store is more associated with reducing the use of shadow systems than any other technology.

We found no significant relationship between a respondent's technology platform and their perceived success at improving decision making or creating a competitive advantage from the use of analytics.

## Advanced Analytics Applications

Finally, we examined how an institution uses its analytical capability. Specifically, we looked at whether institutions with advanced applications such as alerts, predictive modeling, or scenario building report better institutional outcomes. We found some relationships between advanced uses of academic analytics and the four outcome areas. Foremost among these is the use of academic analytics to model decisions. Respondents who use their academic analytics to model strategic decisions report greater success with all four institutional outcome measures. Other advanced applications that appear related to improved outcomes are the use of analytics to forecast demand for courses and tailor recruiting strategies for individual students.

Table 8-10 lists the primary and secondary factors that appear related to reports of successful outcomes.

The strong association between a respondent's use of their analytical capability to model strategic decisions and improved decision making makes sense. This application of academic analytics seems fundamental to improving decision making, advancing

**Table 8-10. Uses of Academic Analytics and Successful Outcomes**

Outcome	Primary Factor(s)	Secondary Factor(s)
Meet institutional strategic objectives	Forecast demand for courses	Generate alerts for fundraising metrics
	Model strategic decisions	Monitor operational performance
Improve decision making	Model strategic decisions	Monitor operational performance
	Forecast demand for courses	
Reduce presence of shadow systems	Model strategic decisions	
	Tailor recruiting strategies for students	
Create competitive advantage	Model strategic decisions	Advanced use by the central budget office

strategic outcomes, and creating a competitive advantage.

Three other advanced applications of analytics also appear related to successful outcomes. Each involves the use of advanced analytics within an individual functional area. Respondents who use academic analytics to tailor recruiting strategies or to create alerts tied to fundraising metrics report greater success at reducing the presence of shadow systems and meeting institutional objectives, respectively. Similarly, institutions with budget offices that use analytics for what-if analysis and modeling report more success at leveraging their analytical capacity to create competitive advantage.

It is not altogether clear why these three particular applications appear to have a significant correlation with successful outcomes and others do not. It is possible that the use of alerts in advancement brings about improved fundraising results, which in turn furthers strategic outcomes. However, it is not clear why this would be a more important relationship than, for instance, leveraging alerts in finance or student retention. It could be that all three factors are mirroring the results from using analytics to model strategic decisions (which we have already observed to be a significant factor).

## Strongest Overall Relationships

The preceding section discussed the relative importance of key drivers in four different categories. Here we discuss the factors that appear to have the strongest relationship with successful outcomes regardless of category. Using regression analysis, we evaluated all factors that appear to have a significant relationship with the four successful outcomes. From this analysis, we were able to identify seven variables that appear most significant to successful outcomes:

- ◆ a technology platform that includes a data warehouse,
- ◆ use of academic analytics to model strategic decisions,
- ◆ use of academic analytics to forecast demand for courses,
- ◆ effective training,
- ◆ administrative staff skilled at analysis,
- ◆ leadership committed to evidence-based decision making, and
- ◆ use of academic analytics to tailor student recruiting strategies.

Each of these variables has a significant relationship with at least one of the four measures of institutional outcomes. In addition, four of the variables have a significant

relationship with at least three of the success metrics. The four variables are

- ◆ effective training (related to all four success metrics),
- ◆ administrative staff skilled at analysis (related to all four success metrics),
- ◆ leadership committed to evidence-based decision making (related to three success metrics), and
- ◆ use of analytics to tailor recruiting strategies (related to three success metrics).

These four variables appear to be most important to a respondent's reported success with academic analytics.

## Summary

For academic analytics, just as in many other technology discussions, the technology itself is a relatively small part of the story. Management factors play a more significant role in an institution's successful use of academic analytics than does the choice of technologies supporting it. Effective training, having staff skilled at analysis, and a leadership commitment to using data are all more significant to success.

This is not to say that technology is unimportant. It provides a valuable infrastructure on which to build analytical applications. Institutions with more extensive technology platforms (including, for example, a data warehouse, OLAP, and ETL) do report greater satisfaction with their ability to move information around the institution in a timely manner and with tools that are easy to use. Ideally, an institution would be able to bring together advanced technology and advanced staff capability. However, if one must choose, it appears that emphasis should be placed on building staff analytical skills and knowledge of the data.

As with other technology investments, institutions would be wise to align their

technology infrastructure with leadership's commitment to using it. Institutions without leadership committed to using data in decision making will find it difficult to have managers at any level resist the temptation to make instinctual decisions. Regardless of the technology's sophistication, managers will continue to "follow their gut."

Ironically, the barrier to widespread adoption of sophisticated academic analytics may turn out to be not the technology's cost but rather the cost to recruit, develop, and retain staff with the necessary analytic skills. Unless all future managers come to their positions with greater skills, institutions will be forced to either develop these skills in house or place dedicated analysts in major administrative units. Jerome Waldren, CIO at Salisbury University, predicts that the latter will come to pass. He foresees a future in which power will reside in relatively few administrative staff skilled at analysis. "I think that casual use (of academic analytics) will grow even more, but what will happen is that the level of expertise to use these tools will not be as high," Waldren told us. "Key functional staff in units—superusers—are going to have the power even more than before."

If Waldren's vision of the future comes to pass, it will be an ironic ending to many of the changes brought about by process redesign. Reengineering projects changed process to eliminate the need for "process navigators." Process navigators were typically veteran administrative staff who understood the informal processes of the institution. Without a navigator as their agent, faculty, students, and staff found it difficult to transact routine business. Academic analytics may now give rise to the "information navigator," without whom sophisticated access to information is impossible.