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Project Design, Terminology, and Methodology

When I examine myself and my methods of thought, I come close to the conclusion that the gift of fantasy has meant more to me than my talent for absorbing positive knowledge.
—Albert Einstein

This chapter presents an overview of the study's design and research methodology. We begin with a discussion of terminology, including definitions of key terms. Next, we review the scope of issues and questions that guided the study. Lastly, we present the quantitative and qualitative methods we used to gather data. Included is a profile of survey respondents.

Academic Analytics

The first challenge we faced in designing this study was what to call it. Our goal was to study the technological and managerial factors that impact how institutions gather, analyze, and use data. The corporate sector calls our topic *business intelligence.* Business intelligence is a broad category of applications and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions.[1] Other frequently used terms include data mining and competitive intelligence. We rejected these as either too jargon-like or inappropriate to describe how and why higher education uses information.

Other terms such as data warehousing, decision support systems, or simply reporting felt too limited in scope. Our goal was to study not just a particular technology (such as data warehousing) but rather the intersection of technology, application, and institutional culture and climate. Therefore, we needed a broader term. In our survey, we used *reporting, modeling, analysis, and decision support capability* as an all-encompassing set of terms to describe the scope of what we are studying. However, as a label, this is too cumbersome.

We finally arrived at the term *academic analytics* as the encompassing term for our topic. The label was first mentioned to us in a conversation with Karen Gage of WebCT, and we are grateful for her assistance. We feel it conveys the sentiment of what we were most interested in studying: how academic enterprises use information to support decision making. By using the term academic analytics, we are not implying that we are only interested in academic decisions. On the contrary, we are very interested in how institutions use data to make all sorts of financial and operational decisions. Nor are we suggesting that we are studying how faculty use data to perform research. That topic is beyond the scope of this research.

Study Framework

Our study of academic analytics looks at multiple dimensions of the issue. First, we examine what types of technology platforms

institutions are using to support academic analytics. How widespread is the use of data marts or data warehouses? Are institutions piecing together their own infrastructure or using reporting and analysis solutions provided by their ERP vendors? We asked survey respondents to identify which technologies they rely on primarily to support academic analytics, including

- enterprise data warehouses,
- single or multiple data marts,
- operational data stores, and
- transaction system reporting.

During our analysis, we confirmed our hypothesis that institutions use a combination of technologies to support academic analytics. In Chapter 5, we identify six levels of technology capability that institutions appear to use to support academic analytics.

Second, we look at institutions' application of academic analytics. How broadly have institutions deployed their capability? How actively is it used? Do some institutions or functions within institutions perform advanced analysis? To support this analysis, we defined five types of academic analytic applications:

- extraction and reporting of transaction-level data,
- analysis and monitoring of operational performance,
- what-if decision support,
- predictive modeling and simulation, and
- automatically triggered business process.

Throughout the study we review the prevalence of these applications and the impact they have on the institutions that employ them.

Finally, we were interested in understanding how culture and climate impact the use of academic analytics. Therefore, we collected data on institutions' management stability, commitment to evidence-based decision making, and the analytical skills of staff. We also looked at characteristics such as Carnegie class, enrollment, and institutional control, as well as the impact of external factors such as the regulatory environment and accreditation.

Methodology

The study uses information from more than 380 institutions collected primarily through a quantitative survey and augmented with qualitative interviews.

Quantitative Data

We designed and e-mailed a quantitative survey to 1,473 EDUCAUSE member institutions. Senior managers at more than 380 institutions completed the survey. Most respondents held the position of CIO or a comparable title indicating that they are their institution's senior IT leader. The survey can be found at the ECAR Web site, <http://www.educause.edu/SurveyInstruments/1004>. Appendix A identifies the institutions that responded to the survey. Survey data is confidential. No data from the quantitative survey is presented that could reveal the identity and specific responses of any participating institution.

We use means and standard deviations in this study. Means are arithmetic averages and measures of central tendency. Standard deviations are measures of dispersion or variability. This means that the larger the standard deviation, the more disagreement exists among respondents. We also did some comparisons of means and regressions analysis to determine the level of correlation among variables. We refer to these analyses but do not present the figures, for reasons of simplicity. Note also that percentages in some tables do not add up to 100 percent because of rounding.

Finally, we urge caution in interpreting these data because of the small number of institutions that reported being users of some technology platforms or advanced applications of academic analytics.

Qualitative Data

We supplemented our survey data with phone or in-person interviews of IT and functional unit leaders who are significantly involved in academic analytics. In all, we spoke with 27 individuals from 21 institutions and 2 corporations. We selected interview participants because they reported important characteristics in their survey responses. The respondents chosen indicated that they

- excelled at training staff to use academic analytics,
- have successfully deployed academic analytics broadly at their institution,
- reported high levels of satisfaction with the outcomes they achieve with academic analytics, or
- were advanced users of academic analytics in multiple functional areas.

These interviews enabled us to deepen our understanding of the factors driving institutions to invest in academic analytics. They provided insight into the factors that drive institutional success. They also offered interesting examples of how institutions are using academic analytics.

Characteristics of Survey Respondents

Figure 3-1 compares the distribution of the institutions that responded by their new Carnegie class, EDUCAUSE membership, and the universe of higher education institutions in the United States. The responding schools more closely mirror the EDUCAUSE membership than the national population of institutions.

A statistical analysis of the data's representation of Carnegie class and EDUCAUSE membership proved inconclusive. The findings do not support the conclusion that the institutions surveyed represent the population as a whole. Nor do they support the opposite conclusion that the respondents fail to represent the EDUCAUSE membership. Neither is a statistically significant conclusion.

The survey responses are weighted toward smaller institutions. Two-thirds (66.3 percent) of respondents are from institutions with student enrollments of 8,000 FTE or fewer. Figure 3-2 depicts the distribution of survey responses by student enrollment.

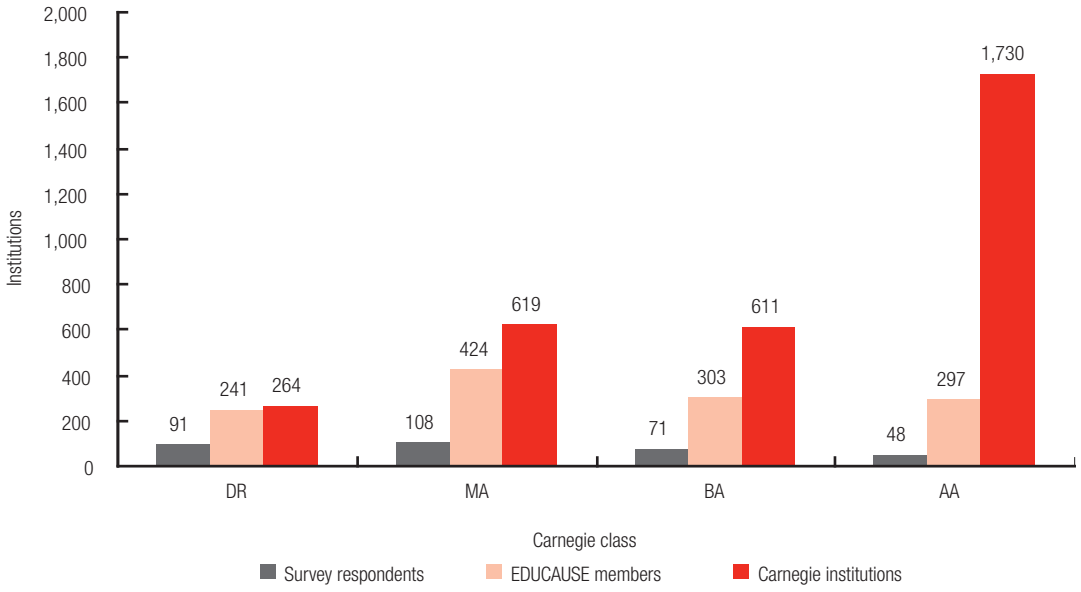
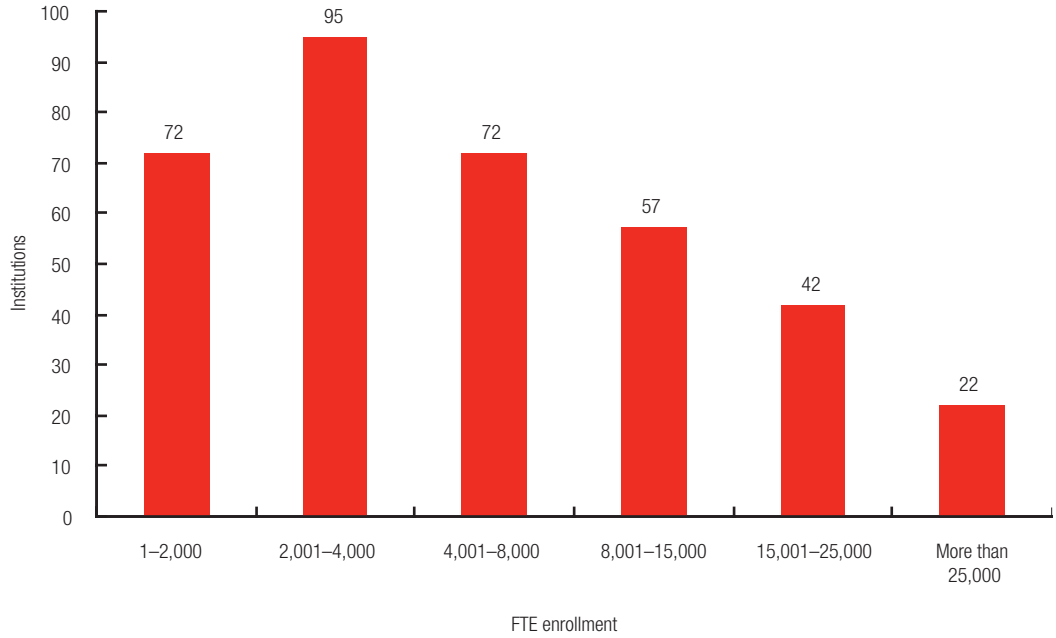


Figure 3-1. Survey Respondents by EDUCAUSE Membership and Carnegie Class

Figure 3-2. Student Enrollments at Institutions Surveyed



The vast majority of respondents were their institution's CIO (73.4 percent), and 97.6 percent worked within their institution's IT organization.

Respondents also represent a range of technology configurations, including some that use data warehouses, some with data marts, and many that use their transaction systems to support reporting and analysis. We discuss the respondents' technology profile more thoroughly in Chapter 5.

Endnote

1. This definition of business intelligence is taken from <http://www.whatis.com/>.