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Analysis of Variables: Predicting Sophomore Persistence Using Logistic Regression Analysis at the University of South Florida

BY THOMAS E. MILLER AND CHARLENE H. HERREID

The Electronic FERPA: Access in the Digital Age

BY MARK MCCONAHA, KAREN HANSON, ANN WEST AND DEAN WOODBECK

Secondary School Course Grades and Success in College

BY A. MICHAEL WILLIFORD

College and University Middle Management and Institutional Strategy

BY SAM J. FUGAZZOTTO
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This is the fifth in a series of articles describing an attrition prediction and intervention project at the University of South Florida (USF) in Tampa. The project was originally presented in the 83(2) issue (Miller 2007). The statistical model for predicting attrition was described in the 83(3) issue (Miller and Herreid 2008). The methods and approaches for intervening with students at highest risk of attrition were discussed in the 84(3) issue (Miller and Tyree 2009). A second model, based upon the students who entered in 2007, was described in the 84(4) issue (Herreid and Miller 2009).

The work described in previous articles addressed predicting risk of freshman attrition. The two logistic regression models, based on the classes that had entered USF in 2006 and 2007, predict attrition between the beginning of the freshman year and the beginning of the sophomore year. The data that contributed to the model were the results of the administration of the College Student Expectations Questionnaire (CSXQ) combined with demographic and academic data collected by the University. The project described in this article produced a model for predicting the risk of attrition of individual students between the beginning of the sophomore year and the beginning of the junior year.
EARLIER FRESHMAN TO SOPHOMORE PREDICTIVE MODELS

Factors in the data set collected from the students who entered in 2006 that distinguished between dropouts and persisters in the first year of college and that became part of the attrition prediction formula were:

- High school grade point average (with a positive effect on persistence)
- Being Black versus being White (positive)
- Expecting to participate in student clubs and organizations (positive)
- Expecting to read many textbooks or assigned books (positive)
- Expecting to read many non-assigned books (negative)
- Expecting to work off campus (negative)

In the article in the 83(3) issue of College and University (Miller and Herreid 2008) we discussed these variables in detail. The reader is reminded that the variables have predictive value, but their relationship to persistence is not necessarily causal. The researchers were able to conduct an early test of the model and of the intervention program, the Mentoring Project. The model is intended to predict attrition between the start of the fall semester of the first year and the start of the fall semester of the second, or sophomore, year. However, the researchers reviewed data regarding fall-to-spring attrition to determine if there were results that showed the value or power of the model.

Those results, showing the attrition rate, fall-to-spring for the class beginning in the summer or fall of 2008:

<table>
<thead>
<tr>
<th>Group</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>All first time in college students</td>
<td>4.2</td>
<td>141 of 3,364</td>
</tr>
<tr>
<td>Students at 75 percent risk of attrition or higher</td>
<td>8.7</td>
<td>38 of 435</td>
</tr>
<tr>
<td>not mentored</td>
<td>12.3</td>
<td>17 of 138</td>
</tr>
<tr>
<td>mentored</td>
<td>7.1</td>
<td>21 of 297</td>
</tr>
</tbody>
</table>

These results seem to suggest that the model has some predictive value, and they also suggest that the Mentoring Program is having a positive effect in modifying risk. The Fall Semester will give a better understanding of the accuracy of the model, but the early signs are encouraging.

In 2007, the response rate from students was much better than the previous year, and the researchers had about 2,700 usable surveys with identifying information. The logistic regression application showed the following variables to have predictive merit, and they were included in the model:

- High school GPA (again, with a positive effect on predicting persistence)
- Being Asian vs. being White (positive)
- Being Black vs. being White (positive)
- Scoring higher on the SAT Combined measure (negative)
Expecting to use library and internet resources (positive)
Expecting to read many non-assigned books in college (negative)
Being enthusiastic about college (positive)
Believing that the university will emphasize developing aesthetic, expressive and creative qualities (negative)
Expecting to work off campus while in college (negative)

CONCERN FOR ATRITION AFTER SOPHOMORE YEAR

The sophomore year experience is the subject of some concern and has attracted attention at institutions of higher education. The National Resource Center for the First-Year Experience and Students in Transition at the University of South Carolina conducted a study in 2005 of 1,139 institutions to determine which institutions had initiatives that were specifically targeted to sophomore students (Cox and Tobolowsky 2005). Of the 582 respondents, 128 (33.5%) indicated that they had such programs and services. The initiatives described included special efforts in career planning, major choice, peer (or faculty and staff) mentoring, and so forth. At the time of the development of the sophomore predictive model, USF had no special programs or service targeted specifically to sophomore students.

Interest in persistence after the first year at USF is high, because officials are concerned about attrition taking place later in the student experience at USF. The class that began at the University in 2007 had a first-year persistence rate of over 85 percent. That compares very favorably to the experience of like institutions. In the preceding decade, first year persistence was always greater than 80 percent. However, it appears that some other phenomenon occurs later in the USF student experience, because the most recent four-year graduation rate reported to the Integrated Postsecondary Education Data System (IPEDS) is 21 percent for USF, and the six-year rate is 48 percent. The six-year rate in the years between 1999 and 2006 ranged from 43.5 percent to 49.2 percent. Clearly, there is reason to be concerned about student attrition after the sophomore year.

The sophomore year programs and services described by The National Resource Center for the First-Year Experience and Students in Transition seem to be sound educational practices and worthy of replication and development. However, as strategies to enhance student persistence, which is not likely their principle goal, they may be inefficient. Not all students are at risk of attrition, and the programs described seem to be targeted to all sophomore students. The appeal of the project described in this article is that the model identifies students who are at the greatest risk of attrition, based upon a broad data set composed of both pre-matriculation information and data that describes the real college-going experiences of students. The premise is that, like the theory behind the freshman prediction model, student decisions about college matriculation are complex and many factors are involved.

METHODOLOGY

Data for the study were obtained from university databases. Participants in the study were 3,998 new FTIC students who enrolled at the main campus of the University in fall 2006. Of these students, 58 percent were women, and 35 percent were minority. More than 90 percent of the new FTIC students were from Florida. Of the overall group, 70.8 percent returned to the University for the fall 2008 term (their third fall term).

Nearly all of the entering FTIC freshmen (98%) were aged eighteen or nineteen, so the analysis was restricted to this age group. American Indian/Alaskan Natives and people who indicated “Other” as their race were excluded from the analysis due to their small numbers. Therefore, it should not be assumed that results from this study will generalize to those groups.

The researchers employed logistic regression to develop the retention model. This is an appropriate form of analysis to use in the case of a dichotomous outcome variable (in this case, enrolled in fall 2008 or not enrolled). Logistic regression can accommodate both continuous and categorical independent variables, such as were used here. Independent variables used in the analysis appear in Table 1, on page 5.

RESULTS

The SAS procedure PROC LOGISTIC was run using set-wise inclusion of variables. Returning for the fall 2008 term (the students’ third fall term) was the dependent variable. Two blocks of independent variables were created such that Block One included pre-matriculation characteristics of the student population and Block Two included pre-ma-
triculation characteristics of the students and also variables from the students’ first year of attendance at the university.

Table 1 shows the two blocks of variables. Categorical pre-matriculation independent variables entered into the analysis as dummy variables were sex, race/ethnic group, major status, honors program status, summer program participation, athletic status, and residential status (resident vs. commuter). Non-linear relationships were observed between high school GPA and retention and SAT Combined score and retention. To reflect these relationships, dummy variables corresponding to membership in quartiles representing cumulative GPA and quartiles representing total hours earned were created and entered into the equation. A dummy variable for membership in a university college (such as Education or Engineering) and one representing residential status in the second fall term were also created and entered into the analysis.

The first step in the logistic regression analysis was to construct a model and then determine how well the overall model fit the data (Menard 2002). In contrast to linear regression, where parameters of the model are estimated using the least-squares method, logistic regression uses the maximum-likelihood method to estimate model param-

Table 1.
Independent Variables in the Analysis

<table>
<thead>
<tr>
<th>Block</th>
<th>Variable Name</th>
<th>Categorical/Continuous</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>Dummy-2 M,F</td>
<td>Reference: Male</td>
</tr>
<tr>
<td>1</td>
<td>Ethnic</td>
<td>Dummy-4 A,B,H,W</td>
<td>Reference: White</td>
</tr>
<tr>
<td>1</td>
<td>Major_code</td>
<td>Dummy-11 Top 10 majors + “Other”</td>
<td>Reference: “Other”</td>
</tr>
<tr>
<td>1</td>
<td>Honors Program</td>
<td>Dummy-2 yes or no</td>
<td>Reference: Yes</td>
</tr>
<tr>
<td>1</td>
<td>Summer Program</td>
<td>Dummy-2 yes or no</td>
<td>Reference: Yes (1)</td>
</tr>
<tr>
<td>1</td>
<td>Athlete</td>
<td>Dummy-2 0 or 1</td>
<td>Reference: Yes(1)</td>
</tr>
<tr>
<td>1</td>
<td>Residence status</td>
<td>Dummy-2 R or C</td>
<td>Reference: Residential</td>
</tr>
<tr>
<td>1</td>
<td>High School Quartile</td>
<td>Dummy-4 1 (0-2.95); 2 (2.96-3.56); 3 (3.57-3.91); 4 (3.92 and above)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SAT Combined (math &amp; verbal) Quartile</td>
<td>Dummy-4 1 (770-1030); 2 (1035-1090); 3 (1100-1185); 4 (1190 and above) (ACT scores converted)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Time elapsed between application and enrollment</td>
<td>Days</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Time elapsed between orientation and enrollment</td>
<td>Days</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GPA Quartile Beginning of Second Fall Term</td>
<td>Dummy-4 1 (0-2.61); 2 (2.62-3.03); 3 (3.04-3.40); 4 (3.41-4.00)</td>
<td>Reference: Quartile 4</td>
</tr>
<tr>
<td>2</td>
<td>Total Hours Quartile Beginning of Second Fall Term</td>
<td>Dummy-4 1 (0-28 hrs); 2 (29-33 hrs); 3 (34-41 hrs); 4 (42 hours and above)</td>
<td>Reference: Quartile 4</td>
</tr>
<tr>
<td>2</td>
<td>College Code Beginning of Second Fall Term</td>
<td>Dummy-9 1-8 small colleges; 2-Arts &amp; Sciences; 3-Engineering; 4-Undergraduate Studies; 5-Education; 6-Visual and Performing Arts; 7-Nursing; 8-SA; 9-Business</td>
<td>Reference: Business</td>
</tr>
<tr>
<td>2</td>
<td>Residence status Beginning of Second Fall Term</td>
<td>Dummy 2 R or C</td>
<td>Reference: Residential</td>
</tr>
</tbody>
</table>

1 Dummy variable values if created, Reference value if categorical
eters, including the coefficients associated with the independent variables (Pampel 2000). Log likelihood values (LL) can be used to determine how well the model fits the data. The change in log likelihood when the independent variables are included in the model compared to a model that excludes them is observed. Differences between the log likelihoods of each model multiplied by -2 (-2LL) can be interpreted as an \( X^2 \) statistic (Menard 2002). The \( X^2 \) value can be used along with the chi-square table with degrees of freedom equal to the number of independent variables to test the null hypothesis that all coefficients are equal to zero. This is similar to the use of the F-test in least-squares regression.

If a significant model chi-square is observed, the next step is to evaluate the “contribution of each independent variable to the model by testing for its statistical significance and then examining the substantive significance of its effect on the dependent variables” (Menard 2002, p. 41). The Wald statistic, which has a chi-square distribution, can be used to test the null hypothesis that a coefficient is equal to zero. Unstandardized coefficients show the change in the dependent variable (or, rather, its logit) for every unit change in the independent variable. The unstandardized coefficients can also be used in an equation to predict the dependent variable for a new group of cases for which the independent variables are known but the dependent variable is not known.

A problem with the unstandardized coefficients is that they are presented in their natural units of measurement. The importance of one independent variable compared to another may be obscured by the size of the units used to measure each independent variable. Standardized regression coefficients indicate how many standard deviations the logit of the dependent variable changes as a result of a one standard deviation change in the independent variable. Thus, the standardized coefficients show the importance of each variable, controlling for all of the others, on the logit and may be used to compare the strength of the relationship between the dependent variable and different independent variables. Menard (2002) states that standardized coefficients produced in SAS are only partially standardized and recommends a formula to produce completely standardized coefficients (p. 53). This formula was used to produce the standardized coefficients reported here.

Examination of unstandardized and standardized coefficients, because they deal with logits, can still leave doubt about the relative impact of independent variables on the dependent variables in regression analysis. For this reason, the Delta-p statistic has come into use to more clearly display the effect that independent variables have on the outcome variable (Cabrera 1994). “Delta-p is the impact that each significant variable makes on the probability of retention, controlling for all other variables in the model” (Ronco and Cahill 2006). Delta-p can be calculated using a formula developed by Petersen (1985). For continuous variables in the model, Delta-p represents an estimate of the change in probability of the dependent variable based on a one-unit change in the independent variable. For categorical variables, Delta-p represents an estimate of the change in probability of the dependent variable compared to the reference value.

Diagnostics performed on the data prior to analysis included checks of tolerances in a regular regression analysis to determine if multicollinearity between variables was present and the Box-Tidwell test to confirm linearity in the logit. These procedures were carried out for both blocks of variables. Non-linearity in high school GPA and combined SAT scores was detected and these variables were transformed into dummy variables. Tolerances indicated no problems with multicollinearity in either block of variables.

**ANALYSIS OF BLOCK ONE**

(Pre-Matriculation Characteristics)

Model indicators for analysis of Block One variables appear in Table 2, on page 7. The overall retention rate for this group (\( N = 3,836 \)) from fall 1 to fall 3 was 71.7 percent. The value of -2LL for the analysis including Block One indicates that there was significantly better prediction of the dependent variable obtained when Block One variables were included in the model compared to a model that included no independent variables (-2LL = 349.0581 (df = 26), \( p < 0.0001 \)). Unstandardized coefficients and standardized coefficients for the Block One variables appear in Table 3. Delta-p values appear only for significant coefficients. The Delta-p values show that students scoring in the lowest High School GPA quartile (Quartile 1) were 33 percent less likely to be enrolled in the third fall term than students scoring in the highest quartile (Quartile 4).
Students scoring in the second quartile were 2.4 percent less likely to be enrolled in the third fall term, and students scoring in the third quartile were 18 percent less likely to be enrolled in their third fall term than students scoring in the highest quartile. Asian-Pacific Islander students were 6.5 percent more likely to be enrolled than White students and Black students showed an 11.4 percent higher retention rate than White students. Students scoring in the lowest SAT combined quartile (Quartile 1) were 12.6 percent more likely to be enrolled in their third fall term than students who scored in the highest quartile (Quartile 4). Students who had entered as Pre-Nursing majors showed a 15 percent lower retention rate than “other” majors and first-fall-term commuters showed a 4.3 percent lower retention rate than students who had lived on campus their first fall term. Time elapsed between application and enrollment and time elapsed between orientation and enrollment showed small positive relationships with retention.

**ANALYSIS OF BLOCK TWO**
*(PRE-MATRICULATION AND YEAR ONE PERFORMANCE DATA)*

Model indicators for analysis of Block Two variables appear in Table 2. The overall retention rate for this group (N = 3,151) from fall 2 to fall 3 was 85.6 percent. The value of -2LL for the analysis including Block Two indicates that there was significantly better prediction of the dependent variable obtained when Block Two variables were included in the model compared to a model that included no independent variables [-2LL = 453.8440 (df = 39), p < 0.0001].

Unstandardized coefficients and standardized coefficients appear in Table 3, on page 9. Delta-p values appear only for significant coefficients and show that students who scored in the lowest SAT combined quartile (Quartile 1) were 7.7 percent more likely to be enrolled in their third fall term than students who scored in highest quartile (Quartile 4). Time elapsed between application and enrollment showed a small positive relationship with retention to the third fall. Students who were in the lowest cumulative GPA quartile (Quartile 1) at the beginning of their second fall term were 30 percent less likely to be retained to their third fall term than students in the highest quartile (Quartile 4). No significant differences in retention between students in the middle two quartiles and the highest quartile were found. Students who were in the lowest cumulative hours quartile at the beginning of their second fall term (Quartile 1) were 18 percent less likely to be retained than students in the highest quartile (Quartile 4). No significant differences in retention between students in the middle two quartiles and the highest quartile were found. Students who were enrolled in the College of Nursing their second fall term were 20 percent less likely to be enrolled their third fall term than students enrolled in the College of Business and students enrolled in a college code indicating undeclared status in their second fall term were 26 percent less likely to be enrolled their third fall term than students enrolled in the College of Business.

**DISCUSSION**

**Predicting New Cases**

Focusing on the second analysis (Block Two variables), the factors identified as of predictive worth (with the direction of predicting persistence provided) that can be used to predict retention in new cases are:

---

**Table 1. Model Indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline p (%)</td>
<td>71.7</td>
<td>85.6</td>
</tr>
<tr>
<td>Model N</td>
<td>3,836</td>
<td>3,151</td>
</tr>
<tr>
<td>-2 Log L</td>
<td>4569.611</td>
<td>2598.337</td>
</tr>
<tr>
<td>Intercept Only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With Covariates</td>
<td>4220.553</td>
<td>2144.493</td>
</tr>
<tr>
<td>Likelihood Ratio Chi-square (df)</td>
<td>349.0581 (26)</td>
<td>453.8440 (39)</td>
</tr>
<tr>
<td>Adjusted Pseudo R²</td>
<td>0.1249</td>
<td>0.2389</td>
</tr>
<tr>
<td>Correctly Predicted (%)</td>
<td>72.3</td>
<td>86.6</td>
</tr>
</tbody>
</table>

1 p < 0.0001
2 Max rescaled R²
3 Predicted prob = 0.5
- Scoring in the lowest SAT Combined Quartile vs. the highest (+);
- Time elapsed between application and enrollment (+);
- Scoring in the lowest cumulative GPA quartile vs. the highest quartile after the first year (–);
- Scoring in the lowest total credit hours earned quartile vs. the highest quartile after the first year (–); and
- Membership in the College of Nursing or having an undeclared major after the first year (–).

For each new case the probability that the student will be retained can be derived from the following equation:

\[
\text{Logit}(Y) = 2.1257 + (0.8694)(\text{SAT Quartile 1}) + (0.2200)(\text{SAT Quartile 2}) + (0.1573)(\text{SAT Quartile 3}) + (0.0047)(\text{Teapp}) + (-1.4585)(\text{GPA FA 07 Quartile 1}) + (-0.2987)(\text{GPA FA 07 Quartile 2}) + (0.2864)(\text{GPA FA 07 Quartile 3}) + (0.0081)(\text{Collcode}1) + (-0.9746)(\text{Collcode}2) + (-0.4668)(\text{Collcode}3) + (-0.1682)(\text{Collcode}4) + (0.4638)(\text{Collcode}5) + (-0.9878)(\text{Collcode}6) + (-1.3770)(\text{Collcode}7) + (0.9878)(\text{Collcode}8) + (-1.3770)(\text{Collcode}9)
\]

The coefficients are taken from Table 3. The computer program produces odds from Logit(Y), and then applies a formula to the odds to yield a probability of persistence between 0 and 1 for each new case. The formula can be applied and new students sorted into “at-risk” and “not-at-risk” groups based on their probability of persistence. Groups may receive treatment as needed.

Briefly reviewing these factors, there are some matters of interest. First, that the combined SAT score has predictive value is intriguing, because that variable was not in the first-year persistence model for this group. It is in the second model that the researchers developed where SAT was included. That the factor has a negative relationship to persistence is of further interest. Also, it is intriguing that the time between application and enrollment is a predictor. That means that an act that is as much as two years old is useful in predicting sophomore attrition, when it was not of sufficient power to predict freshman persistence. The three post-matriculation variables make sense; grades and credit hours earned matter as does being enrolled in a highly restricted major or being undecided about major.

What is as interesting as what is included in the model is what is not. SAT combined scores are included, but high school grades are not. Resident status, surprisingly, is not in the model, and neither are any of the ethnicity predictors that were in either of the freshman persistence models. University officials believe that the summer programs are of special value because of their persistence effect, but that factor is not in the model. All of the preceding factors may have predictive worth, but some other factor is apparently consuming whatever variance each contributes, so they fail to make the model.

Intervention Strategies

The intervention plan for first-year students at risk of attrition, the Mentoring Program, is described in the 84(4) issue of College and University (Miller and Tyree 2009). The essence of that program is arranging contact from an administrator or staff member to the student at risk. The staff member attempts to engage the student in conversation about the USF experience and determine what aspects of that experience or other variables might contribute to a chance that the student might leave the institution. The researchers believe that an approach like that would be ineffective for sophomore students, because they have established patterns of contact with the institution and may see an attempt to engage them in a way similar to what the Mentoring Program intends as intrusive and unwelcome. What would seem to work best would be using the establish system of academic advising as the vehicle for addressing students at risk of dropping out, because those advisors have established reasons for interacting with the students in question.

At USF, academic advising for students is delivered in several different ways. Each of the colleges has a staff of academic advisors. Students enrolled in majors in the Colleges of Arts and Sciences, Behavioral and Community Sciences, Business, Education, Engineering, Nursing, and the Arts are served by a staff of advisors dedicated to students in the disciplines of the respective colleges in which they work. In addition, the Transitional Advising Center (TRAC) provides academic advising services to students who have not yet chosen a major. Further, selected students receive academic advising services from the following entities: the Honors College, the Freshman Summer Institute, Student Support Services, and the Academic Enrichment program in Intercollegiate Athletics. All of the previous academic advising units will be provided with a list of students, the number of which to be determined...
| Effect | Block 1 | | Block 2 |
|--------|---------|---|---|---|---|
|        | Unstandardized | Standardized | Delta P (%) | Unstandardized | Standardized | Delta P (%) |
| Intercept | 0.58280 | 2.12570 |
| High School GPA Quartile 1 | -1.41660<sup>1</sup> | -0.2517 | -33.000 | -0.04554 | -0.0074 |
| High School GPA Quartile 2 | -1.04010<sup>1</sup> | -0.1831 | -24.000 | -0.13540 | -0.0220 |
| High School GPA Quartile 3 | -0.78340<sup>1</sup> | -0.1388 | -18.000 | -0.35130 | -0.0583 |
| Gender F | -0.05420 | -0.0110 | -0.16240 | -0.0307 |
| Ethnic A | 0.33300<sup>2</sup> | 0.0361 | 6.500 | -0.01540 | -0.0016 |
| Ethnic B | 0.63030<sup>3</sup> | 0.0808 | 11.400 | 0.28940 | 0.0363 |
| Ethnic H | 0.06820 | 0.0103 | 0.14560 | 0.0204 |
| SAT Combined Quartile 1 | 0.72110<sup>1</sup> | 0.1249 | 12.600 | 0.86940<sup>1</sup> | 0.1421 | 7.700 |
| SAT Combined Quartile 2 | 0.19080 | 0.0339 | 0.03620 | 0.0055 |
| SAT Combined Quartile 3 | 0.07710 | 0.0140 | 0.15730 | 0.0264 |
| Major code 1 | 0.15780 | 0.0253 | 0.20230 | 0.0055 |
| Major code 2 | 0.07570 | 0.0114 | 0.03620 | 0.0156 |
| Major code 3 | 0.06330 | 0.0086 | 0.10860 | 0.0915 |
| Major code 4 | 0.07470 | 0.0088 | 0.72740 | 0.0028 |
| Major code 5 | -0.11290 | -0.0116 | 0.02550 | 0.0153 |
| Major code 6 | 0.24650 | 0.0207 | 0.16410 | 0.0056 |
| Major code 7 | -0.67180<sup>3</sup> | -0.0546 | -15.000 | 0.06970 | -0.0062 |
| Major code 8 | 0.19160 | 0.0145 | -0.08600 | 0.0316 |
| Major code 9 | 0.25480 | 0.0185 | 0.43260 | 0.0677 |
| Major code 10 | 0.19700 | 0.0123 | 0.98810 | 0.0558 |
| Honors No | 0.01900 | 0.0023 | 0.07980 | 0.0078 |
| Athletics_BA2 No | -0.21590 | -0.0220 | -0.07980 | -0.0078 |
| Residence Status-Commuter First Fall Term | -0.20060<sup>3</sup> | -0.0411 | -4.300 | -0.18360 | -0.0351 |
| Time Elapsed Since Orientation | 0.00465<sup>3</sup> | 0.0618 | 0.100 | 0.00210 | 0.0269 |
| Time Elapsed Since Application | 0.00451<sup>1</sup> | 0.1086 | 0.001 | -0.145850<sup>1</sup> | 0.0587 | -0.0463 |
| GPA Quartile 1 | -0.00940 | -0.1638 | -0.18360 | -0.0351 |
| GPA Quartile 2 | -0.07660 | -0.0364 | -0.22090 | -0.0147 |
| GPA Quartile 3 | -0.46680 | -0.0549 | -0.16820 | -0.0153 |
| Total Hours Quartile 1 | -0.28640 | -0.0466 | -0.97460<sup>1</sup> | -0.1638 | -18.000 |
| Total Hours Quartile 2 | 0.46380 | 0.0370 | -0.16550 | -0.0272 |
| Total Hours Quartile 3 | -0.22090 | -0.0364 | -0.16820 | -0.0153 |

<sup>1</sup>p ≤ 0.0001; <sup>2</sup>p < 0.05; <sup>3</sup>p < 0.005; <sup>4</sup>p < 0.01

**Table Continued on Next Page...**
by the respective units, of students at greatest risk of attrition. There are limited expectations for uniformity, because staffing circumstances vary, so the units will do what they can to intervene and provide students with necessary support and assistance.

**Conclusion and Next Steps**

Pre-matriculation characteristics were surprisingly useful in predicting 3rd year retention of FTIC students at this institution. In fact, some of the pre-matriculation characteristics seemed to be stronger predictors of second-year retention than first-year retention (Miller and Herreid 2008). An implication of these findings is that, at least at this institution, any first year intervention may also be acting to boost third year retention, rather than just second year retention, since they seem to be related to the same variables. This confers a particular importance to first-year retention interventions as they may have an unexpected level of impact on retention in later years. The power of pre-matriculation characteristics in predicting second year persistence also suggests that, at this institution, the characteristics of the student matter more because the size and scope of the institution make it hard for the University to adapt to the specific interests or needs of the student. In other words, there is a certain type of student, with certain characteristics, who will succeed at USF through the third year, and there is a type of student who will not.

With regard to first-year performance variables, some interesting relationships were found. Cumulative GPA after the first year was not important for predicting retention unless students were in the lowest quartile of performance. This was also true for total hours earned. Therefore, performance in the first year as demonstrated by grades and credits earned didn’t affect retention to the third fall term at this institution unless performance was remarkably poor. Students in the lowest cumulative GPA quartile after one year may be more likely to include those who will be asked to leave the university because of poor academic performance during their second year of attendance and therefore not be available to return for the third year. Accumulating a small number of credit hours after the first year may affect retention through some other means. When combined with second fall term variables, high school GPA was no longer a significant predictor of retention (although just barely so), but SAT Combined scores were still negatively associated with retention, at least for students scoring in the lowest quartile.

The research team will continue to refine the first-year prediction model. There was a very large portion of new students entering in 2008 who completed the CSXQ survey and provided indentifying information. More than 4,100 did so. That large group will allow the construction of a predictive model in which the researchers have great confidence. There will be the design of a new sophomore model next year, again, derived from survey participation by a larger group.

The most challenging new step will be the design of a model to predict risk of transfer student attrition. At USF the transfer student population is very large. Over the past several years the transfer population admitted has been over 11,000 students per year. The rate at which they persist is better than is the case for FTIC students, but their

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**Table 3.**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Block 1</th>
<th>Block 2</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized Coefficient</td>
<td>Standardized Coefficient</td>
</tr>
<tr>
<td>Collcode6</td>
<td>-0.33970</td>
<td>-0.0240</td>
</tr>
<tr>
<td>Collcode7</td>
<td>-0.98780</td>
<td>-0.0689</td>
</tr>
<tr>
<td>Collcode8</td>
<td>-1.37700</td>
<td>-0.0783</td>
</tr>
<tr>
<td>Residence status Com-muter Second Fall Term</td>
<td>-0.19470</td>
<td>-0.0322</td>
</tr>
</tbody>
</table>

*p ≤ 0.0001; *1p < 0.05; *2p < 0.005; *3p < 0.01*
count is so high, an improved rate might still result in a significant number of students leaving the University. The logistic regression analysis has proven to be very useful to the research team, and the team will continue to use it to identify students at risk in a timely fashion so as to allow thoughtful and effective interventions.

REFERENCES

About the Authors

THOMAS E. MILLER is an Associate Professor at the Tampa campus of the University of South Florida, where he has served since 2001. He previously worked in senior student affairs positions at the University of South Florida, Eckerd College, and Canisius College, and he also held positions at Indiana University, and at Shippensburg University. Miller holds a bachelor’s degree from Muhlenberg College and master’s and doctoral degrees from Indiana University.

CHARLENE HERREID is Director of Student Affairs, Planning, Evaluation and Assessment at University of South Florida. She previously served as Director of Institutional Research at Saint Leo University for nine years. She received her bachelor’s, master’s, and Ph.D. degrees in Psychology from the University of Miami (Florida).
On every college and university campus, common themes weave throughout identity and access management (IAM) and its relationship to FERPA. Institutions approach IAM differently as there is not a one-size-fits-all solution. Nevertheless, all face common elements. Over the past few years, a number of workshops, conferences, and webinars have focused on identity management; these have helped identify key issues facing registrars and their staffs.

Many believe the issues relating to the digital identification of individuals are a matter only for campus technology professionals. However, access to student record data in the student information system, in isolated department systems around campus, as well as in off-campus service partner databases clearly constitutes a registrar issue. Electronically, who gets access to what is an IAM issue that includes a combination of external mandates (e.g., laws), institutional policy, business process, and technology implementations that together enable and restrict the ability to use resources. Data and system stewards and technologists, among others, must link arms to do it right. Understanding why means understanding how digital identity affects much of what we do.

FERPA AND IDENTITY AND ACCESS MANAGEMENT

The Family Educational Rights and Privacy Act (FERPA) requires that institutions protect the privacy of student

This is the second article on “Identity and Access Management” that has appeared in recent issues of College and University Journal. The first article appeared in Vol. 84, No. 3.
educational records. This is of particular interest to student records professionals since they typically serve as the primary FERPA compliance officers.

When FERPA first was enacted, most educational records were maintained on paper (in file cabinets) and, later, in tightly controlled and closed data storage repositories (mainframes). Times have changed, and electronic student record systems now are available via the Internet; they rely on security measures to ensure that only legitimate users gain access to an individual’s academic record. Many of these security measures depend directly on the veracity of the IAM system. FERPA was updated in 2008 to take into account online access and digital records. Following are some of the issues raised by the 2008 FERPA update:

- Two-factor proofing when financial information is involved. The user must present two means of identification to gain access to the appropriate records.
- Developing methods for identity-proofing distance learners and other remote students. Although these individuals may never set foot on campus, we somehow must confirm that they are who they say they are.
- Complying with a requirement to deliver a PIN in person or by U.S. mail.
- Developing methods for authentication that do not involve widely available information (such as name, date of birth, or student ID number).
- Policies that take into account the student who wishes to opt out of the release of non-directory information.
- Policies that limit record access just to those with a legitimate educational interest.
- The use of digital signatures.

**Identity Management and Institutional Governance**

On many campuses, IAM systems went into production prior to the emergence of many complex policy issues. Governance and policy-making have lagged behind the dizzying pace of technology and its implementation. As a result, registrars and their technology partners have begun working to establish best practices and to address a number of these policy concerns. Much of the debate comes down to the tug-and-pull between data protection and privacy on the one hand and the need to provide access to resources and robust user experiences on the other.

For many institutions, a new or renewed look at governance means including data stewards—those responsible for student, financial, alumni, human resource, and other records—in the IAM policy-making process. Data stewards know of potential areas for leaks or misuse of data.

With the expansion of access to third-party materials and the outsourcing of various functions, the policy issues become increasingly complex. When outsourcing student e-mail, for example, FERPA still applies, as do other privacy laws and regulations. Colleges and universities need to pay particular attention to contracts and ensure that third-party providers agree to abide by the same policies and regulations that would apply if the services were provided internally.

One increasingly common way to provide information to outside vendors is to interact by using attributes—that is, information about an individual’s characteristics—rather than sending a specific identity. For example, an attribute may tell a vendor that the user is a student, but it does not necessarily divulge the student’s name or e-mail address. By passing an attribute that says “student” and nothing else, the user can access the resource but still maintain privacy.

As more complex applications are developed or outsourced, it is inevitable that colleges and universities will need to release some personally identifying information. This will require policies and processes that allow a student to approve or disapprove the release of these attributes and to stipulate how or if the data can be used if it is collected by the vendor.

Students quickly become accustomed to doing all of their business online. Will the university continue to provide account access for appropriate services (ordering transcripts, for example) once individuals leave the campus? In this scenario, the governance and operational considerations include:

- Role definition and definition of services offered to alumni.
- Questions about adding and removing services and support for password resets (assuming that those who seldom use their accounts will prove more likely to forget their passwords) or defining means by which new credentials can be issued.

**Identity Proofing**

How do we know that students are who they say they are? How do we know that the new admit who needs access to the portal but who has never been to campus is really the new admit? How do we know that the instructor about to enter final grades remotely from Paris is really the instructor? How do we know that the request for a transcript is truly authorized if the request is received via the Web?

All of these questions reflect the challenge we face in the electronic age. How do we prove the identities of our potential constituents? When awarding credentials to individuals, we need first to prove that they are the correct recipients. When providing online access to more sensitive services—such as financial and loan information—policies and federal laws (including FERPA) require stricter identity proofing, such as two picture IDs, before handing over the electronic credentials.

With traditional students attending our colleges and universities, we can require photo IDs and other acceptable methods of identification. But how do we identity-proof a distant learner who may never visit campus in person? And when do we identity-proof a student, given that services are offered much earlier in the student life cycle? Again, the key to a successful program is spending time to develop the necessary policies and procedures.
**ROLES AND SECURITY**

The ability to comply with the intent of FERPA to protect the student record must be balanced with faculty and staff’s need for legitimate access in order to fulfill their professional responsibilities. As our student record systems become more complex, access becomes more ubiquitous and the scale continues to grow. Likewise, the task of administering security in a reasonable manner continues to grow more complex.

Given that FERPA mandates access only by those with a legitimate educational interest, an institution cannot simply grant blanket access to all staff. Because of this, and because of the difficulty of making judgments about each individual staff or faculty member’s need for access, many campuses have turned to role-based access management: Access is granted not to any individual but rather to those who hold certain positions or roles; those roles become part of the IAM system.

Providing appropriate services and information to students as they progress through their academic careers also can be daunting. A student’s relationship with the institution changes over time. As it changes, the services rendered for them change as well. A well-crafted set of student attributes tied to the individual’s digital record can define a student’s role or place in the identity life cycle. A portal (or other application) can analyze these attributes and render services based upon the role. Ideally, as the student passes defined milestones (e.g., moving from apply to admit), the appropriate code or attribute is updated automatically. A dynamic suite of information and services is provided. Based on a student’s role and place in the cycle (see the graphic for a “student life cycle example” from Indiana University).

A thorough understanding of identity and access management at your campus, and of how it can be tied to defined roles, can ease the security and administrative burden. Having a single source of identity information, as opposed to multiple identity systems spread around the campus, will greatly simplify this process and ensure consistent application of institutional policy.

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www.aacrao.org/publications/catalog/sem.cfm
Perhaps the most important first step a campus can take is to devote time to develop the policies and procedures associated with roles and security. A governance process that involves stakeholders—including data stewards—typically will produce the best results. Time spent defining roles in as detailed a way as possible will pay off when it comes time for individuals to transition from one role to another.

One of the most complicated pieces of this process is accounting for those who have multiple simultaneous roles (for example, a staff member who is also taking classes). As much as possible, the role-based system should automate the process of adding and deleting assigned roles as people change responsibilities and their affiliation with the institution.

**MANAGING GUEST AND AFFILIATE ACCESS**

Most institutions provide guests (or what some term ‘affiliates’) with user IDs and passwords to access resources. For many, access to student services or access to student information may be necessary. Consider, for example, the faculty member from another institution who spends her sabbatical teaching courses on your campus and so needs access to the student information system, or students who attend your school as guests or as part of an exchange program and so need access to their accounts.

How do you manage these exceptions? Some institutions combine such needs with role-based access, which may ease any future provisioning/de-provisioning decisions. Using the concept of a “federated” identity (see below) to manage this access would eliminate part of the potential operational problem by allowing guest faculty and staff to gain access via their home-campus credentials.

**USER CONVENIENCE VS. SECURITY CONCERNS**

Managing IAM systems has become more complex, with an increasing number of services available and an expansion of the number of groups having access to such services. Because of the scope of services and the sheer numbers of individuals with access, user convenience and IT workload issues share a need for simplification and self-service options while still maintaining—or enhancing—network and data security.

Single sign-on (SSO) provides the ultimate in user convenience, allowing the use of one set of credentials to access all services to which an individual has access. SSO can work both internally for on-campus applications and, when a campus is a member of a federation, with third-party service providers. Some applications require additional security measures, which may dictate another factor of authentication. In this case, a campus might use a “reduced sign-on” approach and implement SSO along with a second authentication mechanism to adequately protect resources with heightened sensitivity. If the commonly used credentials were compromised, the perpetrator still would be locked out of the higher security applications.

An identity federation is a group of organizations that agrees to policies and procedures related to the exchange of information. These trust agreements allow the use of a university’s IAM structure rather than having the third-party provider create a separate set of user accounts that require frequent data feeds to keep current. Federating also eliminates the development of multiple solutions to resolve the passing of identity attributes to each hosted (perhaps proprietary) third-party service. The use of SSO and federations enhances security by greatly diminishing the potential for data spills.

Self-service password resets also provide user convenience, allowing individuals to deal immediately with forgotten passwords while relieving the IT help desk of a significant burden. Self-service has inherent security concerns, depending on the identity proofing and security required when setting up an account. Some universities now require users to set up a series of personal knowledge security questions/answers when the account is established.

Convenience would dictate that users would only need to reset a password on their own initiative. However, security officers may require password changes at certain time intervals (e.g., every 60 days). They also may favor passphrases (think of a sentence) as opposed to a traditional one-word password. There is a move to have university IAM procedures more closely match those of financial institutions, particularly when individuals can access student financial information online.

Identity and security concerns extend to student and faculty/staff identity cards, which have become much more than the photo IDs of years past. Such cards can serve as debit cards, cash cards, building access cards, and more. Lost cards or compromised PINs raise significant security concerns.
# Table 1. IDM Resources Listing, by Subject Matter

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
<th>URL</th>
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<tbody>
<tr>
<td><strong>General</strong></td>
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<tr>
<td>CAMP: Delivering, Sourcing, and Securing Services throughout the Student Identity Life Cycle</td>
<td>Workshop proceedings</td>
<td><a href="http://net.educause.edu/camp091">http://net.educause.edu/camp091</a></td>
</tr>
<tr>
<td>A Few Things You Should Know About Identity Management</td>
<td>Ensuring privacy of student data is at the core of a registrar’s mission. This document discusses why registrars should care about well-run identity services and why they should be involved in the governance of an identity and access management system.</td>
<td><a href="www.aacrao.org/identity/articles/A_Few_Things.pdf">www.aacrao.org/identity/articles/A_Few_Things.pdf</a></td>
</tr>
<tr>
<td>EDUCAUSE Resource Center</td>
<td>Investigating identity management resources and case studies? Try searching the EDUCAUSE Resource Center that contains white papers, podcasts, and slide decks.</td>
<td><a href="www.educause.edu/resource">www.educause.edu/resource</a></td>
</tr>
<tr>
<td>AACRAO Identity Management E-mail Discussion List</td>
<td>If you are interested in these issues and in exchanging information with other student records professionals and policy makers, please consider joining the AACRAO identity management list at <a href="mailto:idmgmt@lists.aacrao.org">idmgmt@lists.aacrao.org</a></td>
<td></td>
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<tr>
<td><strong>FERPA</strong></td>
<td></td>
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<tr>
<td>FERPA, Privacy and Identity Management</td>
<td>Beth Cate, an attorney for Indiana University, presented on the new FERPA regulations as well as other legislation that affects IAM systems directly and indirectly. She also presented information on state data and privacy legislation and out-of-state/country distance education students.</td>
<td><a href="www.educause.edu/Resources/FERPA:PrivacyandIdentityManagement/16374">www.educause.edu/Resources/FERPA:PrivacyandIdentityManagement/16374</a></td>
</tr>
<tr>
<td><strong>Institutional Governance</strong></td>
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<tr>
<td>Governance and the Student Life Cycle: Who Gets to Say Who Has a Say?</td>
<td>The summary notes from this panel presentation provide an overview of several governance case studies.</td>
<td><a href="www.educause.edu/Resources/GovernmentandtheStudentLifeCycle/163748">www.educause.edu/Resources/GovernmentandtheStudentLifeCycle/163748</a></td>
</tr>
<tr>
<td>Panel discussion delivered February 6, 2009 at CAMP: Delivering, Sourcing, and Securing Services throughout the Student Identity Life Cycle Workshop, Tempe, AZ.</td>
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<tr>
<td>University of Southern California Identity and Access Management</td>
<td>Brendan Bellina discussed USC’s identity and access management system and included several interesting slides on governance.</td>
<td><a href="www.educause.edu/sites/default/files/library/presentations/CAMP091/SS05/CAMP-2009-02-USC_IdM.pdf">www.educause.edu/sites/default/files/library/presentations/CAMP091/SS05/CAMP-2009-02-USC_IdM.pdf</a></td>
</tr>
<tr>
<td>Paper delivered February 5, 2009 at CAMP: Delivering, Sourcing, and Securing Services throughout the Student Identity Life Cycle Workshop, Tempe AZ.</td>
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<td></td>
</tr>
<tr>
<td>Governance and Collaboration: The Essential Ingredients for Successful Identity Management</td>
<td>Using the identity life cycle of the Cornell student as a model case, D. Yeah and A. Beesing discussed the value of approaching identity management as a collective responsibility and the important role of governing bodies in achieving shared goals. Business and IT operations must partner to meet rising expectations for streamlined access to information in a world where services are distributed not only across multiple campus units but also across multiple institutions.</td>
<td><a href="www.aacrao.org/identity/gov:ance_collaboration.pdf">www.aacrao.org/identity/gov:ance_collaboration.pdf</a></td>
</tr>
<tr>
<td>Paper delivered July 9, 2008 at the AACRAO Identity Management Workshop. Baltimore, MD</td>
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<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
<th>URL</th>
</tr>
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<tbody>
<tr>
<td><strong>Identity Proofing</strong></td>
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<tr>
<td>InCommon Bronze and Silver Identity Assurance Profiles</td>
<td>The InCommon Identity Assurance Program, developed by the U.S. InCommon Federation, provides identity proofing and other credential-related practices in higher education.</td>
<td><a href="http://www.incommonfederation.org/assurance/">www.incommonfederation.org/assurance/</a></td>
</tr>
<tr>
<td><strong>Roles and Security</strong></td>
<td></td>
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<tr>
<td>Identity Management at Princeton through Roles</td>
<td>T. Bross provided a thorough overview of how Princeton developed its roles approach and managed the process and technology to support it. He included detailed information pertaining to how Princeton manages the challenge of multiple affiliations and roles.</td>
<td><a href="http://www.educause.edu/Resources/Stage3OhManHowDoImanageAllOfThem/163712">www.educause.edu/Resources/Stage3OhManHowDoImanageAllOfThem/163712</a></td>
</tr>
<tr>
<td><strong>Managing Guest and Affiliate Access</strong></td>
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</tr>
<tr>
<td>Leveraging Guest Accounts for Ubiquitous Web Sign-On System Acceptance</td>
<td>This podcast by Jo B. Craig and Wes Craig provides an interesting but more technically oriented case study of how the University of Michigan manages accounts for guests.</td>
<td><a href="http://www.educause.edu/blog/E2005PodcastLeveragingGuestAccounts/165911">www.educause.edu/blog/E2005PodcastLeveragingGuestAccounts/165911</a></td>
</tr>
<tr>
<td>Collaborators at the Gates of Troy: Extend- ing E-Services at USC</td>
<td>This presentation by Brendan Bellina describes USC’s well-developed guest management system.</td>
<td><a href="http://www.educause.edu/Resources/CollaboratorsattheGatesofTroyE/162231">www.educause.edu/Resources/CollaboratorsattheGatesofTroyE/162231</a></td>
</tr>
<tr>
<td><strong>User Convenience vs. Security Concerns</strong></td>
<td></td>
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</tr>
<tr>
<td>The Enterprise Authentication Implementation Roadmap, August 2006.</td>
<td>This document describes a recommended approach that campuses can use in building enterprise authentication services and practices to be used in a federated environment.</td>
<td><a href="http://www.nmi-edit.org/roadmap/draft-authn-roadmap-03/">www.nmi-edit.org/roadmap/draft-authn-roadmap-03/</a></td>
</tr>
<tr>
<td>U.S. InCommon Federation. InCommon Identity Assurance Program</td>
<td>Refer to InCommon Bronze and Silver Identity Assurance Profiles for recommendations for password resets and other authentication-related practices.</td>
<td><a href="http://www.incommonfederation.org/assurance/">www.incommonfederation.org/assurance/</a></td>
</tr>
<tr>
<td><strong>Provisioning and De-provisioning of Services and Seamless Transitions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providing Access to Services through-out the Student Life Cycle</td>
<td>As students move from prospect to alum the services provided also change, driving the processes, roles, and authorization that support them. This presentation, given by R.L. “Bob” Morgan, offers an explanation of provisioning and how the University of Washington is managing the access through the student life cycle.</td>
<td><a href="http://www.educause.edu/Resources/Stage4ProvidingAccesstoService/163742">www.educause.edu/Resources/Stage4ProvidingAccesstoService/163742</a></td>
</tr>
</tbody>
</table>

Table 1. IDM Resources Listing, by Subject Matter
“Cradle to endowment services” is a phrase we hear often. Colleges and universities provide services to potential students (including those yet to apply) early in the recruiting process and continue to provide services to alumni long after they leave campus. Aside from being an argument for role-based access, this reality increases the complexity of providing seamless transitions from one role to the next.

Provisioning—or “automating the mapping of identities to accounts, credentials, and access rights,” according to the Burton Group—can help. Ideally, the campus has one consolidated IAM system, making the establishment of roles and groups less complicated. Service changes are keyed off of updates to the source systems and movement of the individual through the student life cycle and into the alumni cycle. Provisioning services when an individual becomes eligible (and de-provisioning when that eligibility ceases) means significant work on the governance side in terms of defining roles, life cycles, and the boundaries marking movement from one role to the next.

CONCLUSION

Rapidly changing technology makes it challenging to keep abreast of the privacy, security, and management of information and identities. Policy and leadership will be key during this time of change. Although governance tends to lag behind technological advancements, getting your policy-making house in order will greatly ease identity and access management issues, even as they continue to become more complex.

As a parallel effort to campuses’ development of governance practices, AACRAO is collaborating with EDUCAUSE and Internet2 on identity and access management outreach. To date, these organizations have offered two workshops, one pre-conference seminar, and several track sessions at their respective conferences. The “Identity Management” track at AACRAO’s July 2009 Technology Conference will constitute the next opportunity to learn more from this effort.

About the Authors

MARK MCCONAHAY attended Indiana University in Bloomington, Indiana, where he received a B.A. in Mathematics (1979) and Master of Science of Environmental Science (1984). He joined the Office of the Registrar at Indiana University in Bloomington in 1982 as an Analyst/Programmer and has been the Associate Registrar of Systems since 1990. In addition to his work in the Office of the Registrar, McConahay has presented at several conferences, received two EDUCAUSE Best practice Awards (then CAUSE), two CUMREC Best Paper Awards, and contributed to books and articles. He has been a member of the EDUCAUSE program committee and the CUMREC Board of Directors. McConahay is now the Senior Associate Registrar at Indiana University.

ANN WEST holds a joint appointment with EDUCAUSE and Internet2 to lead the outreach for their NSF grant to build an inter-operable identity service infrastructure for research and education. Previously as the Director of Distributed Computing Services at Michigan Technological University, West managed the design, deployment, and operations of campus-wide applications, security and identity services. Ann graduated with a B.A. in Latin from the College of Wooster, and pursued the role of community builder, technical communicator and analyst, project manager, policy developer, publications editor, and marketing manager. Today she performs these roles on a much broader scale for the higher education community.

KAREN HANSON has been employed at the University of Wisconsin-Madison for fifteen years in the Office of the Registrar. Her current appointment is Associate Registrar for Enrollment Services, focusing on identity and access management, course enrollment, and data services for teaching and learning systems. She is a graduate of Beloit College.

DEAN WOODBECK does communications and outreach work for Internet2 and the InCommon Federation. He has more than 25 years experience in Web development, publications and public relations in higher education through his work at Internet2, as well as at Michigan Technological University and Clarkson University. His work developing technology applications for alumni relations at Michigan Tech earned the highest national award, a Grand Gold Medal, presented by the Council for the Advancement and Support of Education (CASE). He holds a bachelor’s in scientific and technical communications from Michigan Tech and a master’s in journalism and mass communications from the University of Minnesota.
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A guide for United States admissions officers to the structure and content of the educational system of Australia, including descriptions of the state and territorial public school systems. Also includes a formal set of comparability and placement recommendations based upon the author's research.

Item #9026 $95 nonmembers | $70 members (2004)

BRAZIL
A study of the structure and content of the educational system of Brazil, including extensive descriptions of undergraduate and technical programs. Also includes specific regional and country-wide statistics, and the author's recommendations on the evaluation of foreign educational credentials.

Item #6538 $85 nonmembers | $60 members (2004)

THE PEOPLE'S REPUBLIC OF CHINA
A study of the educational system of the People's Republic of China, from preschool to higher education. Includes information on entrance examinations, vocational education, and a thorough guide to the academic placement of students in educational institutions in the United States.

Item #6536 $85 nonmembers | $60 members (2000)

INDIA
A study of the educational system of India, including the different types of universities, computer and management education, and a detailed list of professional associations in India. Also includes guidelines to the academic placement of students in educational institutions in the United States.

Item #5342 $85 nonmembers | $60 members (1998)

KYRGYZSTAN
The Educational System of Kyrgyzstan describes the current educational structure of Kyrgyzstan and serves as a guide to the academic placement of students in educational institutions in the United States. This monograph contains information on both secondary and higher education, grading scales and a directory of post-secondary institutions in Kyrgyzstan. It also covers transitional issues, fraud and academic corruption.

Item #9020 $45 nonmembers | $30 members (2003)

PHILIPPINES
A study of the educational system of the Philippines from basic to higher education, with information on academic and vocational degrees, and non-traditional education, including Islamic education. Serves as a valuable guide to the academic placement of students in educational institutions in the United States, with information on accrediting agencies and professional education associations in the Philippines.

Item #6537 $85 nonmembers | $60 members (2001)

ROMANIA
A study of the educational system of Romania, includes an extensive list of sample diplomas, and detailed guidelines for admissions officers in the academic placement of students in educational institutions in the United States.

Item #5339 $75 nonmembers | $50 members (1998)

TAIWAN
An extensive guide to the structure and content of the educational system of Taiwan, from kindergarten through graduate and professional studies. Includes detailed information about schools recognized and not recognized by the Ministry of Education, a vital guide for any admissions officer considering incoming students from Taiwan.

Item #6539 $95 nonmembers | $70 members (2004)

THAILAND
A study of the educational system of Thailand and guide to the academic placement of students in educational institutions in the United States. Covers preschool education onwards, with a particular emphasis on higher education studies, including degrees and teaching methods. Includes information about teacher training, technical and vocational educational and health studies.

Item #5341 $75 nonmembers | $50 members (1998)

UNITED KINGDOM
Offers guidance on the structure and content of the United Kingdom’s education system. The five-chapter guide includes a historical look at major legislative and policy changes affecting the system as a whole, and offers details on the country’s Further Education, Secondary Education, and Professional Qualifications frameworks. Additionally, helpful reference information can be found in the book’s five appendices, including: a key to system-related acronyms and listings of the UK’s higher education institutions and further education colleges; details on the National Qualifications Framework; and a comprehensive listing of professional bodies and learned societies.

Item #9027 $95 nonmembers | $70 members (2006)

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College and university admissions offices publish the numbers of “college preparatory” courses they recommend. However, they typically fail to publish how well students should perform in high school courses in order to succeed in college. This study assesses the relationship between high school course performance and college performance. A strong relationship was found between poor performance in high school courses and lesser success in college (as measured by first-term college GPA and first-year retention). The common admissions recommendation that students take 16 courses of college-preparatory coursework is perhaps necessary but not sufficient for helping students succeed and helping institutions achieve high success rates.
Most college admissions guides include information on the number of high school courses required by selective colleges and universities. Similarly, admissions offices publish the numbers of “college-preparatory” courses they recommend. The “Common Data Set” that asks colleges and universities to report their particular admissions practices specifically solicits the number of high school courses required in each subject. In addition, most relevant research on the relationship between students’ high school and college performance focuses on aggregated high school GPA and standardized test scores as predictors of college success (Trusty and Niles 2004). Still,

…it is sensible to give weight to the factors that predict persistence through to graduation and to those factors that predict academic success. While SAT and ACT scores are meant to do just that, institutions have additional data at their disposal that have the potential to make better predictions. The number of high school courses taken in subjects such as math, science, and foreign languages can often be good indicators of success and persistence (Hosler and Anderson 2005, 71).

However, college admissions guides and offices typically fail to recommend how well they expect students to have performed in those courses. Furthermore, student performance in individual high school courses has not been studied sufficiently to determine its value in predicting college success or failure.

Understanding which high school courses influence college success extends to policy recommendations for higher education. In A Nation at Risk, The National Commission on Excellence in Education (1983) recommended that high school students take more rigorous courses, especially if they intended to succeed in college. More recently, the U.S. General Accounting Office (2003) recommended that students pursue a stronger high school curriculum to influence college completion rates because of findings from the “Beginning Postsecondary Students” (BPS) study linking rigor of high school curriculum with baccalaureate attainment. Organizations such as American College Testing (ACT) have long advocated for more rigor in high school course choices in order to help prepare students to be successful in college (Smith 2007). However, “rigor” connotes students’ choices to take those courses, not students’ performance in those courses. A U.S. Department of Education report that tracked high school seniors’ course-taking trends from 1972 to 2004 stated that A Nation at Risk’s recommendations for increased rigor are resulting in students’ taking higher-level courses in mathematics, science, and foreign language (Ingels and Dalton 2008).

Other policy makers believe that high school preparation is disconnected from success in college (Achieve 2005). A SHEEO-sponsored report suggests that “the mismatch of standards, curriculum, and assessments between K–12 and postsecondary means that students often get conflicting signals about what constitutes adequate preparation” (Conger and Tell 2007, p. 38). The authors further suggest that a lack of consensus exists about which high school courses students should take. The report uses high
school grades, ACT scores, and compulsory statewide end-of-course assessments or statewide ACT/SAT testing interchangeably to predict students’ college performance.

Many studies attempt to relate pre-college academic ability not only with academic performance in college but also with retention and completion (Tam and Sukhatme 2003; U.S. General Accounting Office 2003). However, these studies often use indirect measures of academic success, such as ACT scores (e.g., Nora and Cabrera 1996) or aggregated high school GPA (e.g., Glynn, Sauer and Miller 2006) as predictors. Other studies examine students’ course-taking choices as predictors and recommend that students enroll in a more rigorous high school curriculum in order to be more successful in college (Horn and Kojaku 2001; Pike and Saupé 2002). These studies typically do not address how well students perform in their high school courses.

Admissions practitioners as well as researchers generally understand that prior academic performance is the best available predictor of success in college. “It seems logical that what students spend most of their time doing in school (taking courses) has a strong bearing on later academic experiences” (Trusty and Niles 2004, p. 12). Most studies of high school performance focus on high school GPA as the predictor. Because individual unit grade data are not available, GPA is used most often. College GPA typically is used as the dependent variable in studies of student success. “A student’s grades are probably the single most revealing indicator of his or her successful adjustment to the intellectual demands of a particular college’s course of study” (Pascarella and Terenzini 1991, p. 88). In conducting student success and retention studies, institutional researchers and state higher education boards often use ACT scores, high school curriculum, or both to control for prior academic preparation and academic aptitude.

Colleges and universities with higher mean ACT scores are considered to be more selective, and more selective institutions have been found to have higher retention rates. A statewide study of first-year retention among public universities in Ohio found lower remedial course-taking rates and higher retention rates for students who had completed ACT’s defined “core curriculum” (Ohio Board of Regents 2007). Core curriculum typically includes three or four units each in English, mathematics, science, social studies, and a foreign language. A study of “core” vs. “non-core” high school courses and their effect on university student achievement (Maryland State Higher Education Commission 1996) had a similar finding.

Detailed outcomes of high school core curricula have not been assessed for their appropriateness as predictors of student success. High school transcripts may be evaluated by admissions staffs, but detailed outcome data have not been systematically assessed in student success studies (Breland et al. 2002; Hawkins and Clinedinst 2006). Studies of high school curricula typically have relied on aggregated GPA or students’ self-reported course completion and performance (Camara and Echternacht 2000; Horn and Kojaku 2001; Noble and Sawyer 2002; Zwick 2007), though there are some exceptions (Geiser and Santelices 2007; Jung, Choonoo and Mastrorilli 2007). Many of these studies found that high school GPA is more effective than test scores in predicting success in college in terms of first-term university GPA, first-year retention, and degree attainment (Zwick 2007).

Adelman (1999; 2006) has studied detailed high school transcript data. In his extensive analyses of high school transcripts, he combines high school performance data elements into constructs called “academic resources,” “academic intensity,” and “academic quality” in order to predict completion of a college degree. These constructs variously use the number of high school units by subject, Advanced Placement, and level of mathematics course(s) taken. Adelman concludes that “the academic intensity of the student’s high school curriculum still counts more than anything else in precollegiate history in providing momentum toward completing a bachelor’s degree” (p. xviii).

Some limited studies of student performance in individual high school courses and their predictive validity for success in college have been conducted. For example, Craney and Armstrong (1985) found a moderately positive relationship between high school and college chemistry grades (though the sample was quite limited). The scarcity of more extensive studies is due to the lack of availability of detailed high school transcript data for analysis. Studies that do include subject-specific course grades as predictors typically use the self-reported courses and grades from the descriptive questionnaires that students complete when they register to take the ACT or SAT (Maryland State Higher Education Commission 1996). A study by Camara
et al. (2003) found that self-reported grades collected by the College Board are inflating over time and are becoming less reliable predictors in admissions decisions.

Another reason that performance in high school courses has not been studied systematically is that high school grading is not believed to be uniform (Camara 1998; Miller 2006). “The Carnegie unit, the original model for the credit hour, began in high schools because colleges found that entering students were prepared so variously that it was hard to determine on the basis of grades alone who was ready, or not, for college-level work” (Miller 2006, B24). In addition, high school grades are thought to be problematic because of perceived grade inflation, differences in grading scales among schools, different grading taxonomies, and different teacher grading standards within schools (Camara 1998; Sedlacek 2004; 2007). It also is due to testing agencies’ assertion that high school grades are less able than test scores to predict college success (Geiser and Santelices 2007). Even so, high school grades are believed to be the most often used measure in college admissions decisions (Camara 1998; Hawkins and Clinedinst 2006). Regardless of alleged problems with uniformity, high school course grades are used because they demonstrate a given level of knowledge and skill in the course (Noble and Sawyer 1987). “The superiority of HSGPA over standardized tests has been established in literally hundreds of ‘predictive validity’ studies undertaken by colleges and universities” (p. 4). ACT makes the case that its test is based conceptually on high school curriculum components; the test is designed to assess these components more uniformly than GPA and to eliminate the variability of different high schools’ grading practices and non-cognitive factors included in high school grades (Noble and Sawyer 1987; 2004). However, use of standardized tests such as the ACT and SAT for admissions decisions is subject to increasing criticism, with the result that they are being used less frequently (The Journal of Blacks in Higher Education 2005/2006; Sedlacek 2004, 2007).

Previous studies to assess the relationship between high school GPA or standardized test scores and first-term university GPA have several problems. Predictive validity studies such as those done by ACT and the College Board typically use regression analyses or other linear models to study the relationship between prior academic achievement or aptitude and college success. They are neither accessible nor intuitive to admissions practitioners. These studies do not use performance in individual high school courses but rather GPA. Consequently, the mean may be skewed or may misrepresent a distribution of course grades. As a single measure, GPA dilutes the effect of individual detailed predictors of success. “By aggregating the performance of students into a single composite score, the impact of individual subjects is lost” (Jung, Choonoo and Mastrorilli 2007, p. 3). Furthermore, college student success studies by ACT rely most heavily on the test scores as proxy measures of academic preparation (Smith 2007; Zwick and Sklar 2005).

Borden (2004) used a small sample of high school transcripts to assess the relationship between students’ course grades and their first-term university GPA. He found a strong relationship between the number of “D” and “F” high school grades and lower first-term college GPA. Other studies have begun to be conducted in which electronic high school transcript data are utilized. A study of subject-specific course averages found that the predictive power of first-year, first-term university GPA could be improved by 7 percent over high school GPA (Jung, Choonoo & Mastrorilli 2007). A survey of statewide data capabilities revealed that seven of the 50 states have unit-record student transcript data on courses completed and grades earned (Achieve 2005). More detailed studies of the relationship between high school course performance and performance could be conducted.

Admissions offices increasingly are adopting a more comprehensive view of student success within an enrollment management framework that includes student retention as an indicator (Hosler and Anderson 2005). A number of studies have found a positive relationship between high school performance and first-year retention (Astin and Oseguera 2005; Caison 2005; Dubrock 2000; Glynn, Sauer and Miller 2006; Tinto 2003). However, these studies do not include detailed analyses of the courses students have taken in high school and how well they have done in those courses. Nora, Barlow, and Crisp (2005) cite a number of studies showing that high school GPA positively influences student performance in college but has very little influence on retention.

Because of the complexity and diversity of academic and non-academic preparation for college and college success, Hoffman and Lowitzki (2005) recommend a more
complex approach to college admissions that goes beyond the current practice of using test scores and average grades. The present study addresses the problems identified for faculty, administrators, and admissions practitioners. For faculty and administrators, the present study presents a new resource for improving student success in college. For admissions practitioners, focusing on particular course grades may prove a useful tool in making more accurate admissions decisions. Detailed high school transcript data demonstrate not only students’ academic preparation in the courses students choose but also how well students do in those courses.

METHOD
This study analyzes actual high school transcript data to assess the relationship between students’ performance in high school and college courses. It expands upon the principles of a sample-based study of the effect of students’ failure in high school courses on those same students’ success in college (Borden 2004). In 2005–06, the offices of Institutional Research and Admissions at a large research university in the Midwest gathered high school transcripts from all admitted applicants for the fall 2005 freshman class (N = 11,027). In this study, only high school transcripts of matriculants (N = 4,165) were used.

Independent variables were the actual recorded high school grades in core courses. Core courses include the following: English, mathematics, science, social studies, and foreign language. The recommended high school curriculum for applicants to this university is four years of English, three years of mathematics, three years of science, three years of social studies, and two years of foreign language. In addition, one year of visual or performing arts is recommended (this unit was not included in the analysis). High school grades in all four years of English, mathematics, social studies, science, and foreign language were identified and recorded in an Access database, along with students’ identification numbers.

College success usually is defined as first-term college GPA and first-year retention (Eno et al. 1999; Mathiasen 1984; McManus and Stewart 1974; Nora, Barlow, and Crisp 2005; Pascarella and Terenzini 1991; Pike and Sauer 2002). Dependent variables of student success were first-term university GPA and first-year attrition/retention status. Data on individual students’ first-term university GPA and first-year attrition/retention status were extracted from the University’s student information system by matching the students’ identification numbers with the data in the Access database. These fall 2005 first-year students were tracked until fall 2006 to determine whether they returned to the University.

Comparisons were made between high school courses and grades and the two measures of student success: first-term GPA and first-year retention. In particular, this study focused on students’ combined grades of “D” or “F” in high school core courses and their relationship with measures of student success in college. The analysis is presented using simple descriptive statistics rather than general linear models. The numbers of D/F grades in these core high

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Table 1.
High School Preparation (in Number of Units) and Student Success

<table>
<thead>
<tr>
<th>GPA</th>
<th>Total Class (%)</th>
<th>Fall College Prep (%)</th>
<th>All but Language (%)</th>
<th>Math &amp; English Only (%)</th>
<th>Non College Prep (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HS</td>
<td>FTU</td>
<td>HS</td>
<td>FTU</td>
<td>HS</td>
</tr>
<tr>
<td>3.5 &amp; above</td>
<td>17</td>
<td>23</td>
<td>17</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>3.00–3.49</td>
<td>35</td>
<td>28</td>
<td>34</td>
<td>29</td>
<td>35</td>
</tr>
<tr>
<td>2.50–2.99</td>
<td>33</td>
<td>21</td>
<td>33</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td>2.00–2.49</td>
<td>12</td>
<td>14</td>
<td>13</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>1.50–1.99</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Less than 1.50</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>First-Year Retention Rate</td>
<td>—</td>
<td>80</td>
<td>—</td>
<td>80</td>
<td>—</td>
</tr>
</tbody>
</table>

1 First-Term University
school courses were analyzed to determine if there were relationships with first-term university GPA and with first-year retention.

The data were analyzed with a series of SAS programs written to organize the descriptive results. The numbers of high school units in each of the core subject areas were counted and then cross-tabulated with different groupings of first-term university GPA. The numbers of high school units in the aggregate also were compared with first-term university GPA and first-year retention rates. Finally, the numbers of D/F grades in the five core high school subject areas were cross-tabulated with groups of first-term university GPAs. Particular focus was placed on students with a first-term university GPA less than 2.0. The D/F frequencies were compared with first-year retention rates.

RESULTS
Comparisons of first-term university GPA were made among fall 2005 freshmen with different levels of high school preparation, as measured by different combinations of numbers of high school core courses taken. Table 1 shows both high school GPA and first-term university GPA distributions in total and for different combinations of high school coursework taken. Fourteen percent of fall 2005 freshmen had a high school GPA less than 2.5; 28 percent of these had a first-term university GPA below 2.5. Fourteen percent had a first-term university GPA of 2.0 and below. Comparisons were made among students with the full recommended core curriculum; all recommended core units but language; recommended English and math units only; and students with less than the recommended curriculum. These combinations were selected to emphasize skills or skill sets commonly recognized by admissions practices. Comparisons of first-term GPA and retention were made. No discernible differences in either high school or university GPA or retention were found among the different preparation groups. The distributions of first-term university GPA were very similar among the total class: students with and without the full recommended core curriculum.

Table 2 shows the total number of college preparatory core units and the number and percent of fall 2005 freshmen with a first-term university GPA less than 2.0. It also shows the mean first-term GPA and first-year retention rates. There was no apparent linear relationship between the number of units taken and first-term university GPA ($r = 0.1$). There also was no apparent linear relationship between the number of units taken and retention. How-

<table>
<thead>
<tr>
<th>Number of College Prep Units</th>
<th>N</th>
<th>First-Term University GPA</th>
<th>First-Year Retention (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;1.5 (%)</td>
<td>1.5-1.9 (%)</td>
</tr>
<tr>
<td>20</td>
<td>297</td>
<td>7.7</td>
<td>6.1</td>
</tr>
<tr>
<td>19</td>
<td>856</td>
<td>6.0</td>
<td>7.7</td>
</tr>
<tr>
<td>18</td>
<td>1,029</td>
<td>7.4</td>
<td>5.9</td>
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<td>17</td>
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<td>7.3</td>
<td>7.5</td>
</tr>
<tr>
<td>15</td>
<td>234</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>14</td>
<td>146</td>
<td>11.6</td>
<td>3.4</td>
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<td>9.1</td>
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<td>14.3</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>0.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>
taken thirteen or fewer units; although the small N may make the dependent variable values unreliable, the average university GPA, percent university GPA below 2.0, and first-year retention rates generally were lower.

Table 3 shows, for each number of D/F high school grades received, the percent of fall 2005 freshmen earning first-term university GPAs of less than 2.0, the mean first-term GPA, and the first-year retention rate. Comparisons were made between high school D/F grades and performance in college, as expressed in first-term GPA and first-year retention. A strong positive relationship was found between students’ performance in their high school and college courses. The correlation coefficient between the number of D/F grades and the percent of students with a first-term university GPA less than 2.0 was 0.9; it was 0.64 for retention. Compared to students with zero D/F grades in high school core courses, students with between one and five D/F grades are two to five times more likely to have university first-term GPAs less than 2.0. Only 58 students had six or more D/F grades (this small N may affect the reliability of the dependent variable values). Figure 1 shows the following relationships: Mean university GPA decreases as the number of D/F grades increases. In addition, first-year retention decreases approximately 15 percent as the number of D/F grades in high school core courses increases from zero to at least one. Figure 2 (on page 31) shows the first-term mean GPA by number of D/F grades, from zero to ten. (Both figures display zero through ten D/F grades.)

Disaggregating the data either by subject or by year in school results in greater differences between students with zero or more D/F grades. Table 4 shows the number of D/F grades received in each of the five subject areas. The pattern is similar to that when the total units are combined. For each of the unit subjects, students with more D/F grades—as compared to students with zero D/F grades—have first-

<table>
<thead>
<tr>
<th>Number D/F</th>
<th>N</th>
<th>First-Term University GPA</th>
<th>First-Year Retention (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;1.5 (%)</td>
<td>1.5-1.9 (%)</td>
</tr>
<tr>
<td>0</td>
<td>2,611</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>560</td>
<td>10</td>
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<tr>
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Figure 1. First-Term GPA below 2.0 and First-Year Retention by Number of High School D/F Grades
term college GPAs less than 2.0, have lower mean university GPAs, and have lower first-year retention rates. The difference in mean GPA between having zero D/F grades and one D/F grade is greater for English, as is the percent with a first-term university GPA less than 2.0. Differences in performance are greater for students receiving D/F grades in their last two years of high school (Table 5, on page 30). As the number of high school junior and senior D/F grades increases, first-term university GPA and retention decrease. The percentage of students with a first-term university GPA less than 2.0 is three to six times greater than for students with no D/F grades.

**DISCUSSION**

There is a stronger positive relationship between students’ performance in high school courses and their success in the first term of college than between the numbers of high school courses they take and their success in the first term of college. Various comparisons were made between students’ high school grades and college performance, as measured by first-term GPA and first-year retention. As the number of D/F high school grades increases, the percent of freshmen earning first-term GPAs of less than 2.0, the mean first-term GPA, and the first-year retention rate all decrease. Compared to students with zero D/F grades, students with between one and five D/F grades are two to five times more likely to have college first-term GPAs less than 2.0. The mean GPA decreases as the number of D/F grades increases. In addition, as the number of D/F grades increases, first-year retention decreases: students with at least one D/F grade in high school have a 15 percent lower retention rate than students with zero D/F grades.

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**Table 4.**

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An analysis was done of the number of D/F grades received in each of the subject areas. The pattern is similar to that identified when the total numbers of units were combined. However, the difference in mean GPA between having zero D/F and one D/F is greater for English, as well as for the percent with a GPA less than 2.0. Differences in performance were slightly greater for students receiving D/F grades in their junior and senior years of high school. As the number of high school junior and senior D/F grades increases, first-year college GPA and retention decrease.

This research has several policy and practice implications for admissions and advising. Most colleges and universities strive to admit those applicants who are most likely to succeed. Because probability of success is an important but not exclusive factor in admissions decisions, other factors are considered (e.g., open access students, children of alumni, athletes, students with other competencies in desired academic programs). However, as greater external emphasis is placed on institutional performance in terms of student outcomes, it is desirable to utilize more accurate predictors of success in the admissions process. Many public universities find it difficult to maintain a balance between providing access and opportunities for under-prepared and underrepresented students in their states and recruiting students most likely to succeed so as to improve institutional and student success rates. Even as they seek to balance access and academic excellence, admissions offices sometimes admit students who are only marginally prepared for the rigors of higher education. College student success rates may be improved by giving admissions and advising personnel better information about which students are more likely to succeed. Rather than using high school GPA and test scores in their decisions, admissions offices should use high school course performance data, along with test scores and high school GPA, to admit students most likely to succeed. Of course, college and university data systems need to be able to support this recommendation by including detailed high school course data.

The purpose of this study is to show that it is not which courses students take but how well they perform in those courses that best predicts student success and failure, particularly for marginal high school students with a high number of D/F grades who seek nevertheless to attend college. In common practice, high school preparation most often is expressed as an aggregated GPA or number of courses taken. This study operationalizes high school preparation both in terms of courses taken and courses successfully completed; further, it demonstrates that success in core high school courses is more closely related to success in college than simply the numbers of core high school courses taken.

Additional analyses could be conducted with these detailed high school transcript data. For example, although this study presents analyses of the success rates of matriculated students, data also are available on students who were admitted but did not matriculate. This study suggests that students were admitted on the basis of traditional admissions criteria—i.e., ACT scores, high school GPA, and high school courses taken. The implication is that there were errors in admissions decisions: students were admitted (and
subsequently matriculated) who perhaps should not have been. One of the policy implications of this study is that admissions decisions could be refined. Errors of exclusion also may be occurring. For example, according to 2005 transcript data, 291 students who did not have any D/F grades in high school courses were not admitted. These students represent an existing pool of potential matriculants—who likely would have succeeded in terms of their first-term university GPA and first-year retention. If the goal of enrollment management is to consider a broader approach to recruiting and retaining students, then this important finding should influence admissions practices. A commitment to student success suggests that admissions offices should recruit, admit, and yield students likely to succeed. A commitment to access suggests that admissions offices should not exclude—by denying admission—students who are likely to succeed and ultimately to complete their education. Likewise, students should not be admitted to college if the probability of their failure is high.

This study complements existing research and common understandings about the relationship between performance in high school and performance in college. Recommendations for admission practice include a more extensive examination of high school transcripts. Furthermore, the “cut-off” criterion of sixteen units of college-preparatory coursework is perhaps necessary but not sufficient for admitting students most likely to succeed in college. In admissions practice and publications, the recommendation to simply have taken the courses should be changed to a desired level of performance in those courses. There is less evidence of a relationship between the volume of high school preparation and student success in college than between students’ performance in college preparatory courses and their performance in college.

There also are implications for first-year experience efforts and student advising. For a variety of reasons, admissions offices must grant admission to students who performed marginally in high school. When any student is admitted below any of these “likely to succeed” academic guidelines, the student should be encouraged to participate in at-risk student intervention programs and student success programs, if they exist.

Because probability of success is an important but not exclusive factor in admissions decisions, other factors are used when admitting students (e.g., local admissions policy, children of alumni, athletes, multicultural students, students in desired academic programs). Students admitted below an established and recognized threshold of “likely to succeed” should be recommended for participation in at-risk intervention programs.

Further study is recommended. More detailed analyses of those students who leave college in their first year should be done, profiling patterns of success and failure in high school. Similar analyses should be done of students who earn a first-term university GPA less than 2.0. The interaction between academic difficulty in the first term and attrition after the first year of college, as related to performance in high school courses, also could be explored.

This study was conducted at one moderately selective public university. As state data systems collect and make available more detailed high school course and college grade data, additional studies to determine the generalizability of these findings should be conducted. This study examines two broad measures of student success: first-term university GPA and first-year retention. The relationship of performance in core high school courses to performance in particular general education and other college courses should be examined. This study uses primarily elementary descriptive statistics. Future studies could use more sophisticated analyses, such as linear regression, logistic regression, and path analysis, to identify other patterns of direct and indirect variables that contributed to the findings in this study.
College admissions guides and publications make student performance data available to prospective students. Traditionally, these data include input variables on high school performance, such as ACT scores, high school percentile rank, and high school GPA. They include criteria for admission (often using the same variables) as well as the number of high school units required. The data also may include measures of college success such as retention rates and college GPA. Data on inputs, admissions criteria, and performance in college are used independently of one another. This line of research—linking performance in high school courses with performance in college, particularly for at-risk students—should be continued to enable colleges and universities to help their students be more successful. “The goal of any [student success] research... is to gain as much information as possible and [to] use the information in a way that makes the greatest difference in improving student success rates” (Roth 2008, 76). Indeed, student success and institutional success are inseparable (Levitz, Noel and Richter 1999).

REFERENCES


About the Author

A. Michael Williford, Ph.D. is Associate Provost for Institutional Research and Assessment and Associate Professor of Counseling and Higher Education at Ohio University in Athens, Ohio. He is active in enrollment management and planning research, student outcomes assessment, as well as student success research.
BASIC PERSPECTIVES ON STRATEGY

In most interpretations, strategy starts at the top of an organization. Executive-level leaders act as strategic architects to decide how an organization ought to interact with its environment and achieve its central goals (e.g., Andrews 1996; Davies 2000; Hambrick and Fredrickson 2001; Quinn 1996). While most or all members of an organization can contribute to strategy making, strategy must have focus; lack of focus could prove fatal to the organization. For this reason, top management must take primary responsibility for making final strategic decisions (Finkelstein and Hambrick 1996; Markides 2004). Thus, strategy emerges from key decisions that senior leaders make to determine an organization’s direction. A “Who? What? How?” model helps to parse a given strategy: Who will be the customer? What products or services will the organization offer the customer? How can an organization offer those products or services in a cost-effective way (Markides 1997)?

As a recognizable practice, strategy dates to the 1960s (Mintzberg and Lampel 1999); since then, it has spawned a considerable volume of literature. In broad terms, interpretations of strategy can vary based on how much they emphasize either competition or strategic learning and innovation. For example, in some literature, positioning to maintain a competitive edge informs strategy. Based on an analysis of its own strengths and weaknesses, a company can stake out a position in its industry where the competition is weakest (Porter 1996a; Porter 1998). From another perspective, organizations ought to “change the rules of the game” through true entrepreneurship. The new economy ushered in by the Information Age has shortened the life cycles of products and strategies. To succeed, compa-
Colleges and universities generally do not allow for the top-down style of leadership that many definitions of strategy assume. Rather, postsecondary institutions are loosely coupled professional bureaucracies composed of individual employees and academic units that can pursue individual strategies with little or no input from management (Mintzberg 1979; Mintzberg and Rose 2007; Weick 1976). While highly controlled strategy tends to emerge in corporate settings, it should not remain completely alien to higher education. Colleges and universities can develop organization-wide strategy alongside operational effectiveness, perhaps making operational effectiveness a part of strategy (Porter 1996b). This paper suggests that middle managers in higher education—because of their roles in allocating resources and coordinating business processes—can make sizable contributions to institutional strategy by leading efforts for operational effectiveness. A case study of the traditional role of registrar serves to illustrate the strategic potential of middle management in higher education.

Mintzberg et al. categorize strategies as prescriptive or descriptive. Prescriptive approaches to strategy dictate what organizations ought to do whereas descriptive approaches describe patterns of organizations’ actions over time. More specifically, this schema includes ten schools of strategy: the design, planning, positioning, entrepreneurial, cognitive, learning, power, cultural, environmental, and configuration schools. The first three are prescriptive, the next six are descriptive, and the configuration school includes both prescriptive and descriptive elements (Mintzberg, Ahlstrøn and Lampel 1998; Mintzberg and Lampel 1999). Prescriptive strategies stand out as highly planned and deliberate; descriptive strategies emerge or arise from organizations’ patterns of actions (Mintzberg 2007b; Mintzberg, Ahlstrøn and Lampel 1998; Mintzberg and Waters 1985). By prescribing strategy, an organization’s leadership can more likely pursue predictable results: Organizational growth is more assured because of
the level of control over strategy. By contrast, some of the remaining schools (e.g., cognitive, learning, environmental) allow for greater flexibility as strategies emerge from mental processes and environmental changes. Descriptive approaches can allow for radical innovation, but they carry the risk of unpredictable or directionless growth (Markides 2004; Mintzberg and Lampel 1999). Markides (2001) cites Nestlé’s Nespresso product (a system for making espresso coffee easily at home) as an example of innovation that went awry with cost overruns until the company made the deliberate, strategic decision to change the product’s target audience. In practice, then, organizations should seek to balance prescriptive and descriptive elements of strategy to allow for innovation that moves in a particular direction.

Through its emphasis on competition, much of the literature assumes that strategy operates only in corporate settings. Nevertheless, in a broad sense, strategy has to do with how an organization moves forward to meet certain goals. Nothing precludes the use of strategy in organizations whose primary motives do not center on profit-making. This paper takes the position that colleges and universities can use strategy to great benefit. As the next section describes, though, leaders who would introduce strategy at their institutions must take great care to tailor it to the higher education context.

HOW STRATEGY DOES (NOT) FIT IN HIGHER EDUCATION

American colleges and universities have seen dramatic shifts in their environment in recent decades. Changing demographics have caused a shift in the clientele colleges and universities serve. Traditional college students (those between eighteen and twenty-two years old) make up a declining share of the student population, and increased immigration has meant that colleges now serve more students whose first language is not English (e.g., Albers 2006; Keller 1983; Levine 2001). Further, college curricula have come under increased scrutiny, with some pundits arguing for a return to traditional liberal arts instruction and others seeking more practice-oriented education (e.g., Bok 2006; Kronman 2007; Sullivan and Rosin 2008). Finally, the high cost of attending college has led students and observers to question the true value of a college degree.

This author interprets increased scrutiny of higher education as a call for strategy. Strategy represents how an organization interprets and responds to its environment. By answering an organization’s “Who? What? How?” strategy succinctly tells customers/clients what sorts of products or services they can expect from the organization (Markides 1997, 1998). Students and the general public demand answers to the “Who? What? How?” of what colleges can do for them. They challenge individual institutions both to get a handle on the current environment and to remain flexible as their needs continually reshape the environment. The work of the Commission on the Future of Higher Education, convened in late 2005 by then-U.S. Secretary of Education Margaret Spellings (Zemsky 2007), exemplifies the accountability- and information-driven environment in which colleges and universities operate. The Commission began its work by taking on Spellings’s charge to seek more information from postsecondary institutions on their operations and on learning outcomes. While Zemsky (2007) writes of the Commission’s demise, now more certain as the Administration has changed, the drive for information that led to the Commission’s formation will remain.

While certain authors (e.g., Keller 1983; Rowley 2001) have called for using strategy in the management of academic institutions, strategy and higher education have had an uneasy relationship. With roots in business, any given perspective on strategy has either implicit or overt connections to competition, which does not mesh well with educational values. Certainly this article does not seek to write off such values as mere window dressing. However, competitive motives do drive the operations of colleges and universities at least in part; engaging with strategy merely makes such motives explicit. As long as institutions continue to draw from a finite number of students and to serve students with finite resources, competition between institutions is inevitable. Further, the changing profile of college students and the increased scrutiny of what colleges can do will heighten competition as institutions struggle to adapt in a changing environment.

Beyond the apparent incongruence between academic values and competition, many colleges and universities have difficulty answering “Who? What? How?” because of their organizational type (Markides 1997, 1998). Mintzberg (1979) presents a schema for understanding types of organizations (or “bureaucracies”) based on five basic employee groups. The operating core delivers the primary
product or service. Core members report through middle managers up to the senior managers who form the strategic apex. The technostructure standardizes and measures the operators’ work, while support staff perform duties ancillary to the organization’s core work. Different organizational types emerge based on the proportions and relative influence of each employee group. For example, machine bureaucracies, such as manufacturing companies, are characterized by an operating core that does highly standardized, controlled work. Because of the standardization, the technostructure has great organization-wide influence, and management holds centralized control of decision making. With such standardization and control, management in a machine bureaucracy can dictate strategy by dictating how the work of operators ought to change to move the organization in a given direction. Answering “Who? What? How?” in such an organization often proves easy because the answers come from the few top managers at the strategic apex.

Professional bureaucracies, such as colleges and universities, present a stark contrast to highly controlled machine bureaucracies (Mintzberg 1979). Such organizations include the same principal parts: operating core, middle managers, strategic apex, technostructure, and support staff. However, these groups have different levels of influence from their counterparts in machine bureaucracies. Because research and teaching represent the principal work of colleges and universities, faculty members make up the operating core. In contrast to machine bureaucracy operators, though, college faculty carry out nonstandardized work with little control from anyone but that of each faculty member. While deans, provosts, and presidents play managerial roles, they have much less influence to direct the core work of their organizations than managers in machine bureaucracies and cannot unilaterally hand down strategy to as powerful a group of operators as college faculty. Answering “Who? What? How?” for an institution proves difficult because the institution may have as many

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STRATEGIC ENROLLMENT = ADMISSIONS = INTERNATIONAL ED = LEGAL = NEW TECHNOLOGIES = RECRUITMENT = AND MORE...
from emergent strategy in turn can translate into environments more quickly. The nimbleness that arises in this environment, operators can respond to and change with their own strategies. Because of their proximity to the environment and more flexibility to respond to it, an institution’s net strategy thus would emerge as a composite of how each faculty and larger unit responds to its own environment. With no intermediating layer of management, the operating core and the environment and controls core work thus carry much weight.

The lack of centralized control over core teaching and research can limit possibilities for institution-wide strategic movement in a given direction. With faculty operators largely controlling their own work, individual professors often can pursue their own teaching and research—strategies that may not coincide with institutional priorities. Mintzberg (2007a) chronicles the strategies he has pursued throughout his own academic career. At an aggregated level, any institution consists of loosely coupled systems, such as academic departments or schools, that respond to their own external environments and that may have strategies of their own (Telem 1981; Weick 1976). For example, a college of education might seek to increase enrollment by older students who want to pursue teaching as a second career; a college of engineering at the same university might target its recruitment efforts at prospective female and minority students. Because an institution’s strategy lies in the core work of academic units and faculty members, the strategy the institution as a whole realizes responds to multiple environments and so may not answer the “Who? What? How?” triad succinctly.

Given the lack of central control and powerful operators, emergent or descriptive strategy types (as described in Mintzberg 2007b; Mintzberg, Ahlstrand and Lampel 1998; Mintzberg and Waters 1985) can have great applicability to colleges and universities. Management in many types of bureaucracies negotiates the boundaries between the operating core and the environment and controls core work and, ultimately, strategy (Mintzberg 1973, 1979). However, because senior academic leaders do not play the same controlling role, allowing institutional strategy to emerge from the academic work of operators makes sense. With no intermediating layer of management, the faculty and academic units who form the operating core have greater potential for contact with the external environment and more flexibility to respond to it. An institution’s net strategy thus would emerge as a composite of how each faculty and larger unit responds to its own environment. Such a scenario for strategy has great potential for nimbleness: Because of their proximity to the environment, operators can respond to and change with their environments more quickly. The nimbleness that arises from emergent strategy in turn can translate into innovation (Markides 2004; Mintzberg and Lampel 1999). Arguments for allowing strategy to emerge from core academic work thus carry much weight. Not only do emergent strategies fit well given the organizational type of colleges and universities, but they also allow for nimbleness, flexibility, and innovation.

Conversely, recent external demands also can make strong arguments for deliberate strategy, despite its apparent incongruence with higher education. Bringing the priorities of faculty members or larger academic units together to move an institution in a particular direction demands imagination and strong leadership, to say the least. Many institutions have broad objectives or mission statements (e.g., educating the underserved, staying at the forefront of medical research, etc.) that could encompass the work of individual faculty members, but often, such broad statements verge on platitude (Keller 1983). Colleges and universities that would pursue deliberate strategy face the challenge of formulating strategy broad enough to encompass the work of academic units and faculty but narrow enough to have meaning. Nevertheless, the magnitude of today’s environmental shifts calls for drastic, deliberate change to the academy (e.g., Keller 1983).

Striking a balance between prescriptive/deliberate and descriptive/emergent strategy seems the most pragmatic approach for higher education. While the organizational structure of most colleges and universities tends to favor emergent strategy, the unprecedented challenges facing higher education rule out an exclusively emergent strategy focus: Institutions that are simply pushed in certain directions might not survive. A case study of strategy at McGill University from 1829 to 1980 illustrates a mixed deliberate and emergent approach that leans toward emergent (Mintzberg and Rose 2007). Individual changes—initiated by professors, for example—might be highly deliberate, but the university overall moves forward much more slowly. With no executive-level architect of strategy, McGill’s strategy emerges from deliberate micro-changes. As the McGill study indicates, universities exhibit great strategic stability over time and often mirror the slower pace of change in society at large. Nevertheless, the dramatic increase in U.S. college costs since the end of the McGill study period (1980) has meant that external constituents demand a greater return on their investment. In response, college leaders must seek to bring about some institution-
wide change without neglecting the potential for innovation and flexibility that emergent strategy allows.

Introducing operational effectiveness (OE) measures may serve to inject needed deliberateness into innovative, emergent strategy. Whereas strategy distinguishes organizations from one another, OE refers to an organization’s ability to maintain its strategic distinction over competitors by performing its core activities more efficiently and at lower cost (Andrews 1996; Porter 1996b). Both strategy and OE determine performance, but they are interdependent. A well-managed organization may have the ability to turn its inputs into outputs cheaply and efficiently, but if its activities do not set it apart from its competitors, it could fail. Similarly, an organization that has a unique strategy will fail if it cannot control its operating costs. Most organizations have a technostructure that ensures OE by standardizing and measuring the work of the operating core.

Professional bureaucracies such as colleges and universities, however, have small, weak technostructures (Mintzberg 1979); this can contribute to a lack of operational effectiveness. Introducing greater OE in higher education can lead to the appearance of subordinating academics and educational quality to cost containment. While OE measures would question the cost-effectiveness of an institution’s core academic work, enhancing educational quality should form the final goal of such questioning. For example, an institution with inadequate laboratory space probably should not make the strategic decision to expand its science programs. In the long run, such an expansion could work against the goal of high-quality instruction because of the lack of a key resource. Expanding science programs makes more sense if the institution has the wherewithal to upgrade facilities or construct new ones. Thus, OE in higher education should not work against the academic work of the operating core but rather should enhance academic quality by ensuring that the institution has the means to support its strategy. Some may say that loose coupling, a plethora of strategies, and lack of managerial control invite disaster for higher education. In fact, neglect of OE—academic strategy with few means to measure success or to account for effective use of resources—may prove at least as devastating. Davis (2008) notes, “At some point, the public will not continue to support the truly good and great things we do in higher education if we keep demonstrating that we can’t effectively manage the mundane” (p. A64).

Porter (1996b) notes a dangerous trend in other industries toward conflating OE and strategy. Competition becomes a zero-sum game in which rivals simply try to do the same things better than one another. In such a scenario, OE does not allow consumers to distinguish one company from another; rather, all competitors come to look the same. In higher education, though, observers often note the reverse: Institutions that are well-run will stand apart from their peers. OE, along with research and teaching strategies, might serve as a useful basis for competition. This author argues for finding a middle ground between deliberate and emergent approaches to strategy that highlights OE but not to the neglect of the “good and great things” that define institutions, their academic units, and their faculty. Colleges and universities ultimately can develop innovative yet viable strategy by developing the capacity of middle managers to serve as a technostructure that works to increase OE.

**MIDDLE MANAGEMENT, OE, AND STRATEGY**

Scott (1980) provides a definition of collegiate middle management that emphasizes, ironically, the nebulosity of the category. Middle managers include salaried career administrators who have not come from faculty ranks but who nevertheless have executive authority. Their responsibilities center on the effective functioning of their institutions. In addition, many of the units under the direction of middle management—including student service offices—have their own external “customer” groups and therefore, like faculty and academic units, have a direct connection with the external environment. Still, these service units and their leaders often remain unacknowledged by senior administrators, faculty, and much of the outside world.

Collegiate middle management grew dramatically between 1929 and the 1960s, and it certainly has grown since Scott (1980) wrote. This growth often has led to charges of administrative bloat. In previous generations, the professional practice of student affairs (a significant component of middle management at many institutions) focused on coordinating services toward the development of the whole student (Gardner 1949). However, when one looks today at student demand for services in the form of multi-mil-
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lion-dollar fitness facilities, well-appointed dorm rooms, and the latest in technology, one wonders how much “coordination” can occur. Demand now pulls colleges and universities in many directions, leading to the creation of administrative silos and, ultimately, higher operating costs. For their part, many institutions foster such demand by ramping up auxiliary services and marketing them as aggressively as academic programs (Slaughter and Rhoades 2004). The rush of middle management to meet any and all student demand can lead to unfocused growth—growth that clearly is not strategic. Simply looking for more efficient ways to provide new services can work against efficiency if those services represent an attempt to be all things to all students. Not only must middle managers seek to provide services efficiently, but they also must question the necessity of continuing to provide them at all.

At most colleges and universities, middle management functions largely as support staff. It provides services that support but do not contribute directly to an institution’s core work (Mintzberg 1979). Although student service functions serve students directly and therefore interact with the external environment, such services are ancillary to the academic program. Certainly the nature of middle managers’ work will remain ancillary to academics. (After all, no one applies to college to live in a dormitory or to participate in student groups without also enrolling in classes.) Nevertheless, developing the capacity of middle management to serve as a technostructure can increase an institution’s potential to develop strategy that works in concert with OE and that in turn maximizes institutional performance. Strategy sets the institution apart from its peers; OE ensures that it maintains the strategic distinction efficiently.

A CASE STUDY: THE REGISTRAR AS PART OF A TECHNOSTRUCTURE

The registrar position represents one of the oldest roles in higher education that falls under the middle management rubric. Over the course of centuries, it has taken on many technostructure-like functions. Examining the position in detail provides a case study of the potential of collegiate middle management to serve as a technostructure. Registrar or registrar-type positions date back to the early days of universities. O’Dell (1938) traces the position to fifteenth- and sixteenth-century universities; Quann (1979) dates it to the Middle Ages. The historical record does not indicate the presence of registrars at American institutions until the nineteenth century (O’Dell 1938; Quann 1979). Indeed, for much of the nineteenth century, faculty members carried out the registrar function on a part-time basis. However, as U.S. college enrollments grew, particularly in the 1880s and 1890s, the position began to evolve into full-time professional work. By 1890, 25 percent of American research universities had full-time registrars (Young 2006). The median year of establishment for the registrar position in U.S. higher education was 1887, predating even the chief business officer and dean of students (Russell and Shelburne 1937).

The early and even the middle decades of the 20th century mark a transitional time for the registrar function. For example, a 1920s profile of registrars at small liberal arts colleges in the South shows the roots of the profession in faculty work: Of 32 survey respondents, 30 served as faculty members who taught for approximately six hours per week. Respondents had a median of 12.5 years of teaching experience but only 3 as a registrar (Tansil 1928). Nevertheless, the founding of the American Association of Collegiate Registrars in 1910 served to define the registrar function as a profession (O’Dell 1938; Scott 1980).

Further, certain technical duties of the registrar function began to coalesce: Registrars sometimes served in a student life or student personnel capacity (Burnett 1958; Cordrey 1933); more frequently, they kept attendance records, admitted students, worked with financial aid issues, recorded grades, and responded to requests for data (Clifton 1914; McGinnis 1937; Tansil 1928). Some literature evinces a concern for quantifying and measuring learning and student achievement, giving the registrar’s role further prominence. Data maintained by registrars helped drive institutional decisions, develop effective systems of measuring student achievement and grade weighting, ensure uniformity of grading practices, and rank students (Holy 1929; M. Meyer 1914; M. F. Meyer 1932; Tansil 1928). In short, the registrar role moved further away from that of student service generalist and closer to keeper of data (Quann 1979). Because of its concern with the measurement and quantification of core academic activities, registrars’ work came to resemble that of a technostructure.

Examination of the present-day work of registrars shows that the role includes characteristics of support staff
and technostructure; it also reveals how loose coupling can divorce registrars’ work from institutions’ academic cores, despite the linkages between the two (Mintzberg 1979; Weick 1976). For example, as support staff, registrars enforce compliance with the regulations set by faculty governing bodies; yet it is conceivable, that students and individual faculty members might hold registrars directly responsible for unpopular academic regulations. Further, registrars’ work to maintain data can serve to quantify the overall academic work of the institution. The master course schedule breaks the curriculum into chunks that can be used to measure student progress and indicate demand for different courses and programs. However, nothing necessarily ties the nuts-and-bolts data kept by the registrar’s office to the performance of the institution’s operating core.

While registrars’ work often becomes detached from that of academic operating cores, the preceding examination of the registrar function indicates how it has served to quantify academic inputs and outputs and, accordingly, how it forms part of a technostructure. For example, registrars can combine technical and institutional knowledge in order to use technology strategically rather than making data systems an end in themselves (Bogue 1976; Lanier 1995). Taking into account the increased power of technology, Lanier (2006) notes how registrars in the 21st century have become business process managers who deliver information and resources that support the academic missions of their campuses. Registrars have more opportunity to work for the greater benefit of their institutions by tapping into the natural links between their work and the academic core and, thus, by further developing as part of a technostructure that increases operational effectiveness for viable academic strategy.

**CONCLUSION**

Among institutional middle managers, the registrar perhaps represents an anomaly: The nature of registrars’ traditional duties, the link between those duties and academics, and the power of technological systems often place registrars in a better position than other managers to quantify the core academic work of their institutions. Thus, registrars can have great strategic value for their institutions because of their ability to serve as leaders in OE. Senior institutional leaders who seek to encourage strategic innovation from academic divisions without sacrificing OE would do well to encourage registrars’ ability to measure academic successes. More broadly, the example of the registrar suggests that middle management functions do have links to the core work of academic institutions. Finding and making use of those links, along with developing the potential of middle managers to measure and determine the value of their own work, represents a logical step toward building a technostructure. More research on specific functions within collegiate middle management can help to determine how these functions can contribute to OE and, thus, to strategy.

Loose coupling and emergent strategy will always characterize academia; indeed, they can form an important source of innovation by allowing academic divisions and individual professors the flexibility to respond to their respective client groups. However, introducing some strategic deliberateness through OE allows colleges and universities to keep producing the “good and great things” (Davis 2008, p. A64) that define us for our students and for the general public.

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About the Author

SAM J. FUGAZZOTTO is Associate Registrar at Teachers College, Columbia University. He holds an M.S.Ed. from Northwestern University.
My name is Richard, and I’m a recovering university administrator. I’ve been administration-free for six years, but I continue to have flashbacks to a career that led to this battle with PASD: Post-Administrative Stress Disorder. Sharing with you what I learned from my staff during my 30-year career will allow me to confront the ghosts of decisions past—ghosts that haunt me for the mistakes I made sitting behind a big desk in a large office, out of earshot of the buzz arising from the tiny desks in Cubicle Land.

In my past life I worked at three different universities, all mid-size public institutions. I was responsible, at various times, for supervising staffs that recruited and admitted students, evaluated their transfer credit, awarded them financial aid, registered them, checked them out for graduation, and organized their commencement ceremonies. My preparation for this career consisted of a couple of liberal arts degrees and five years of high school teaching and coaching.

Western Washington University enrolled 9,000 students when I was appointed director of admissions. I was 29 years old, with three whole years as an admissions counselor under my belt. I had never supervised anyone over the age of eighteen. I suddenly found myself responsible for a staff of eight women, all older, wiser, and more experienced than I, and a male associate director ten years my senior who had been the other finalist for the job I had just landed. I remember well the day my new boss, an old-school kind of guy, summoned me to his office to tell me I had the job. I was no longer to be “Dick Riehl, everybody’s buddy,” he explained; rather, I was “Richard Riehl, Director of University Admissions.” I understood him to mean that my new responsibilities would force me to make enemies because of the difficult decisions I’d have to make. In hindsight, I think he also meant I had to grow up.

Upon returning to my new, more spacious office, my first two thoughts were, “Now what do I do?” followed by the solemn vow, “Never let ’em see you sweat.” I was lucky to have on my staff a competent, experienced, and well-respected office manager who already ran the office. She told me what to do and how and when to do it, all while allowing me to think that I was the one in charge. That represented the beginning of my education by those who called me “boss.”

I was especially fortunate to have two talented associate directors, including the one who had competed against me for the director’s job but who was extraordinarily gracious in defeat, invariably loyal, and possessed a great sense of humor. I learned that he also had never met a rule or a policy that shouldn’t or couldn’t be bent or broken. My other associate was likewise a respected professional with
a wonderful sense of humor. But unlike the other, he believed that rules were rules and rarely—if ever—should they be bent or broken. The three of us had some spirited conversations during the years we worked together.

What I learned was that both of them could make persuasive arguments. I found myself searching for decisions that, like the porridge of the three bears, were neither too hot nor too cold, but just right for the circumstances.

What I didn't learn early enough in my career was that sometimes, in the interest of avoiding conflict, I was not as open and honest as I should have been in my decision making. I wanted to be loved by all. I learned, however, that in the long run, avoiding uncomfortable confrontations often led to more trouble for both my staff and me.

After sixteen years of figuring out how to be a good director of admissions at Western, I headed to the Midwest, where “Assistant Vice President” was added to my job title at Indiana State University. I inherited an easy-going boss whose feathers never seemed to get ruffled. Whenever he was warned that morale was low, he’d just smile and say, “Yes, morale always seems to be bad and getting worse, doesn’t it?” He accepted the grumbling of faculty and staff as part of the territory for administrators.

Experience taught me that some unhappy staff members are happiest when those around them are unhappy and can be persuaded that the boss is the source of all their unhappiness. Happy staff members, on the other hand, tend to take responsibility for—and create—their own happiness.

Except for news shows, I don’t watch much TV. But I’m addicted to “The Office,” with Steve Carell as Michael Scott, the boss at a branch office of Dunder-Mifflin Office Paper. In a recent episode, Michael cheerfully declared, “An office is a place where dreams come true.” He was blithely unaware that his overblown ego and self-pity made him the office’s chief dream-crusher. In one of his lower moments, Michael reflected that he had become a boss because the word had once meant something good, like, “Wow, that’s a boss sweater you’re wearing today!” It was sad for him to learn that the word had come to mean “the jerk in charge.”

I must admit that I recognize a little of Michael Scott in myself. Bosses love to be loved, and sometimes they do the stupidest things to try to gain that love from their staff. If the worker bees are unhappy, it becomes time for a party or a Wear-Your-Pajamas-to-Work Day. Some people love office parties and silly games; others find them annoying. Some believe it’s important for everyone to feel he is part of one big, happy family; others prefer to be left alone to do their work.

Now that I am entering my “golden years,” I understand that big, happy families that get along without occasional falling outs engendered by too much togetherness and too few compatible personalities are mostly the creation of fiction writers. Expecting a collection of individuals hired for their technical expertise to perform a variety of different jobs and working together in a confined space to love one another unconditionally is a fantasy. No amount of partying and game playing can make it reality.

Team building, however, is a different matter. I wish I had been more honest in explaining to each staff member what unique qualities she brought to the team. For example, some people flourish in groups; others are hermits. Some can’t see the forest for the trees; some can’t see the trees for the forest. Some are confrontationally honest; others are fragile flowers whose self-esteem needs constant tending. Some are well-organized; others are scatter-brained creative geniuses. It is the boss’s job to help each staff member understand how her unique qualities can enhance the team. That can be a challenge when so many egos are involved.

It was as a high school basketball coach that I learned the meaning of “role players.” One team member spent more time on the bench than on the court because he was somewhat athletically challenged. But Dennis could do one thing better than anybody else on the team: He could keep our opponents guessing. Because Dennis was slightly cross-eyed, it was impossible for the defense to know where he might pass the ball next. So whenever our team was challenged by a full court press, I sent Dennis into the game to save us. On those occasions, our bench warmer became our star player. Unfortunately, I didn’t always apply as an administrator what I had learned as a coach about role players.

In my later days as a boss, I began to realize the power staff members have to make their boss a success or a failure. A boss can make his staff better by telling them the truth rather than what he thinks they want to hear. As a rookie boss, I had the advantage of having a staff who knew more than I did; who knew that they knew; and who took pity on me. They prevented me from making serious blunders by telling me when they thought I was wrong.
In my second administrative position, I was the oldest and most experienced in the office. My staff tried hard to find out what I wanted them to say so they could show me how smart they were. It felt good to be so highly respected, but it didn’t feel so good when things went wrong and I realized nobody had been brave enough to tell me what I didn’t want to hear.

Shortly after my arrival at Indiana State, my new, young staff told me that recruitment information nights were held at motels throughout the state. When I learned how expensive it was to rent conference rooms, I suggested that we could save money and promote community spirit by holding the events in public libraries. I did so with such enthusiasm that nobody warned me about the drawbacks. I didn’t know it would be so hard for families to find their local public libraries. I didn’t know that some libraries closed their doors as early as 8 pm, which meant that our guests sometimes had to leave before we could answer all their questions. Despite the poor turnouts and inconveniences, we marched on until one evening, when our dean of housing, five academic advisors, and two admissions counselors accompanied me to an information night event where we were greeted only by a lone prospective student, his parents, and his little sister. Our next recruitment event was held at a Holiday Inn.

Another lesson I learned from my staff is that a boss can make erroneous assumptions based on one unhappy staff member, subjecting the rest to desperate attempts to make that one person happy. I should have learned better from an experience I had had as a high school English teacher: A student teacher I was supervising was quite bright and articulate and had the attention of all but one of her students. Unfortunately, he was the brightest and most arrogant student in the class. His sarcastic wit made her feel like a failure. I saw 29 attentive students who liked her; she saw the one who didn’t and thought the rest hated her. As a boss, I sometimes found myself spending more time worrying about one disgruntled staff member than about the productivity of the rest of the staff.

One of my favorite authors is Malcolm Gladwell, an economist and staff writer for the New Yorker. In his latest bestseller, Outliers: The Story of Success, Gladwell researched the cause of airplane crashes and discovered that many of them were caused not by catastrophic technical failures, violent weather, or incompetent pilots; rather, they were caused by “mitigated speech” in the cockpit—that is, speech used by a lower-level co-pilot who doesn’t want to appear to be questioning the pilot’s judgment. Rather than warning “This is an emergency. We have to land now,” the first officer might observe, “Captain, we seem to be running out of fuel.” It made me wonder how many times my own “co-pilots” told this “pilot” what I wanted to hear rather than what I needed to hear in order to avoid crashing and burning.

You can improve your boss’s performance as a supervisor and make your own office life happier if, when evaluation time comes around, you tell your boss what you consider to be your own special talents and how they can contribute to the office’s success. Ask if your boss agrees with your self-assessment. There is no need to confess your shortcomings! Ask, instead, how you can leverage your skills to improve your own job performance. This is also your opportunity to tell your boss what he can do to help bring out the best in you.

I wish I had given my superiors more honest feedback about their job performance. Had my staff done that for me, their work lives might have been happier, and these confessions of an ex-boss might have been unnecessary. Indeed, the ghosts of decisions past might not be haunting me today.

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The Missing Enrollment Meltdown

By Kathleen Dawley and Jonathan P. Epstein

Shifting economic winds over the past year brought an end to a powerful, healthy wave that many higher education institutions rode successfully in recent years. While the work of college and university enrollment leaders and organizational executive teams is never easy, the recent student demographic spike, the abundance of online admission applications, and half a decade’s surge in financial markets made for mostly smooth sailing—until last fall.

Shivers of panic quickly shot through higher education. Captured vividly by both mainstream and industry media, the 2009 enrollment season was predicted to be among the most devastating in American higher education history. Some went so far as to predict that historical data would no longer be helpful in forecasting enrollment results.

Surrounded by dire rhetoric, many institutional leaders were understandably fearful as this past year’s enrollment cycle charted its course. But along the way to the enrollment cycle’s fatal capsizing—severe excess capacity at smaller, private colleges; ballooning yields at public institutions nationwide; unrecognizable enrollment patterns—something else happened. The enrollment apocalypse simply never arrived.

This is not to say that the recent enrollment cycle wasn’t immensely problematic, presenting complex challenges for many institutions and resulting in disappointing outcomes for some. This is also not to say that dire financial crises for some colleges and universities have been resolved. Some have new enrollment challenges; others have had persistent difficulties recruiting a full freshman class. But there are severe and persistent budget problems at many institutions that are not enrollment related. Instead, these problems stem from endowment losses and expensive capital projects. While there were several months when it was easy to garner attention predicting enrollment disasters and dismal futures, those forecasts never held water.

As summer winds down and another fall approaches, it’s a good time to reflect on the past year, look forward to the next, and explore why the enrollment doomsayers weren’t just wrong, but wrong for all the wrong reasons.

WHAT HAPPENED?

In late May, The Chronicle of Higher Education released a survey providing systematic, quantitative evidence that, in large part, many institutions made their first year classes. The New York Times also reported that many selective institutions achieved admission-to-enrollment yields that looked eerily similar to yields from fall 2008. It took substantial work and more money in many cases, but the sky didn’t fall. Families made the kind of difficult enrollment decisions they make every year, committing to their
aspirations and the lifelong value of a quality higher education for their children.

There was certainly truth in predictions of shifts in the enrollment landscape. However, many institutions still thrived in this environment by doing their work strategically and efficiently. Many private colleges and universities stepped up to offer more generous financial aid packages, even amidst budget-cutting throughout the rest of the institution, accepting the tradeoff of an increased discount rate in exchange for robust enrollment.

In general, the majority of institutions find themselves up or down modestly compared to prior years—results that are comparable to many enrollment cycles. Set against the backdrop of terrifying expectations, these fluctuations seem a relief in comparison.

Why were the enrollment doomsayers so far off? And how could we have known that the panic last fall and winter was in part irrational? There were trends, societal realities, and hints about the discrepancy between families’ intense emotions about the economy and their largely unchanged intentions about enrollment choices. The answers lie in the importance of higher education in American society as well as families’ determined responses to economic contraction and uncertainty. These events can all feel like the end of the world. So far, however, this has not been the case.

A BLAST FROM THE PAST?

For those involved in the stewardship of higher education, the headlines throughout the past year chronicled a very anxious journey. Would the economic downturn drive tuition up, aid to students and families down, and force students away from college?

This is not the first time we’ve been tested in this manner in recent history. Consider life 30 years ago—repeated energy crises, continual Middle East unrest, deep global recession, vast structural unemployment, torrid inflation. Who remembers the Misery Index? Higher education seemed perilously vulnerable then. We worried about possible retrenchment among private institutions, demographic bubbles bursting, steep application and enrollment drops, belt-tightening for prestigious schools, deficits, mergers, and even closings. Sound familiar?
One has to recognize, however, that this period like many other downturns also gave rise to innovations such as the World Wide Web, personal computers, supercomputers, mobile telephones, pocket calculators, video games, fiber optics—advances with deep roots in the learning opportunities provided by higher education institutions. Within higher education, as well, the concept of enrollment management was developed and adopted, improving preparedness for a remarkably similar storm 30 years later.

WHAT WAS FORGOTTEN ALONG THE WAY?

To reflect on this challenging year and to help guide your perspectives during the enrollment cycle that has just begun, we’d like to offer three insights that may not have been obvious in the midst of the storm:

- **It’s not just the economy.** It is easy to blame the economy for everything and forego scrutiny of an institution’s specific attributes and performance. However, all throughout the cycle—from early decision statistics, to application totals, to enrollment results—the evidence has pointed to substantial variability in results, especially within institutional types. This indicates that factors beyond the economy were at work.

  Performance in this climate appears to be as much a function of how well institutions have positioned themselves for and reacted to the economic downturn as it is to the downturn itself. In other words, results are based not solely on what is happening to institutions or what institutions are, but on what institutions do.

  For example, the conventional wisdom was that smaller, private, non-urban, tuition-dependent colleges were in deep trouble. Alas, among many such institutions, with some hard work and aggressive recruitment, this year was more stressful and occasionally disappointing, but not calamitous. By minimizing price increases, moderating enrollment targets, digging more deeply into applicant pools to admit more students, and increasing the generosity of financial aid award packages in anticipation of the recessionary market forces, a significant number of these institutions found success, even in the challenging economy. A key question now becomes whether this success is sustainable next year and beyond, and at what cost.

- **Historical data matter.** Early in 2009, we heard at many professional conferences and read in more than a few media outlets the view that “historical data no longer matter.” It is only human amidst uncertainty to warm ourselves to the idea that there is no way we can know what is happening, what to do, and what can be learned from the past. Such thinking can also be illusory and lead to regrettable decision making.

  While it’s true that this past year’s journey was markedly different from the one that preceded it, just imagine a ship’s captain in troubled seas renouncing past and present evidence and experience to navigate through such adversity. And assume, for the sake of argument, your institution did just that. What is the alternative strategy?

  During other recent downturns—the October 1987 stock-market crash, the “dot com” bubble burst, our national mourning following September 11, 2001, and other events similarly billed at the time as the economic equivalents of the “storm of the century”—the last thing that effective leaders chose to do was destroy the records, discard the map, and disable the navigation system.

  What is so startling about these declarations is that many of the doomsayers have themselves lived through these prior downturns. Next time, we will benefit from maintaining our perspective and memories of history’s important lessons. After all, who among us can possibly argue that we have nothing to learn from how institutions, including our own, have acted and reacted during past downturns?

- **It is still predictable.** Another disconcerting lament we heard suggests that one simply cannot make enrollment predictions and projections in this economic climate.

  We would like to disagree politely, but we cannot. We disagree vigorously. The truth is—as we said last winter—this year’s outcomes were still predictable, but with one unsurprising caveat: What we did not know back in February was how much predictive power had been lost due to economic turbulence.

  It’s certainly true that some institutions experienced disruption this year in yield among particular student subgroups, but rare was the case that an institution’s results were starkly different than they might have expected had they admitted the same students with the same financial aid awards in a prior year. Why, in all the
concern about economic conditions and job losses, did predictive power remain relatively stable?

To the degree that families make decisions on a similar set of criteria as they used in recent years, your ability to predict and project in the aggregate remains strong. Let’s not forget that families have been considering cost when making enrollment decisions for quite some time. Cost was indeed a larger consideration for many families this year. This is an extension of an ongoing trend, but it is not an entirely new phenomenon. It is essential to distinguish between an entirely new concept and the continuation, change in tempo, or other modification of an older one.

The idea that enrollment decisions would suddenly be made upon a sweeping new set of criteria that no one could have considered or imagined was an illusion. We are still sailing in the same ocean, even though the waters are rough.

FINDING CALMER SEAS

As we look with both hope and hesitation toward the coming enrollment cycle, we should learn from the past twelve months—both about what happened and especially what did not occur. And as we grow more focused on the question marks on the horizon, we need to anticipate the perspective of rising high school seniors who have spent the past year thinking differently about their own college search than classes in years past. What will they choose when next spring rolls around? Will they be more deeply influenced by the recession? How will colleges address the next round of challenges? How many can afford to be as generous for a second consecutive year? What other options exist?

Facing these pressing questions, managing fear effectively is essential because fear can produce misguided and even counterproductive decisions. Unchecked fear can disable even the truest internal compass. We are more than a year into a severe global recession that, now more than ever, requires marshaling evidence and utilizing institutional memory, historical knowledge, and professional experience in concert to plan and execute successful strategies.

Some institutions may have found their way to home port this year a little lighter in applications, enrolled students, or revenue than they had hoped. For nearly every institution, the silver lining is that the coming months are an opportunity to enhance capabilities, acquire more information, and adjust navigation tactics.

There is time to generate the research and develop the knowledge that will help you better understand the new baseline that this enrollment cycle has established and avoid needless repetition of unsatisfying results. This year is not lost, even for institutions that have fallen short of goals, if the experience helps ensure they find the pathway home during the coming enrollment cycle.

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An Appreciative Approach to Training Undergraduate Admissions Student Workers

By Alex Fippinger

In most admissions offices, the focus of training sessions for student telecounselors and tour guides is on transmitting information about the institution. Although this transmission of institutional knowledge is important, these training sessions are opportunities for student admissions employees to consider how their work relates to their personal development and future aspirations. To maximize the benefits of training for student workers as well as admissions offices, this article will explore infusing the principles of “Appreciative Advising” into training admissions student workers. Such training will benefit student workers, institutions, and prospective students. The six phases of Appreciative Advising are designed to facilitate learning about students’ experiences, motivations for attending college, and how they can effectively use their college’s resources to make their dreams a reality. Before providing specific examples of how the six phases can have a positive impact on the training of student workers and the benefits of this approach to training, the mission of undergraduate admissions offices and the roles of student workers in these offices will be explained.

**THE MISSION OF UNDERGRADUATE ADMISSIONS OFFICES**

Offices of undergraduate admissions serve as the first point of contact that prospective students and their parents have with an institution. These offices are charged with recruiting and admitting students. For an admissions office to be successful, an institution should have a clear statement of purpose for its admission policy, review as many applications as possible, and consider each applicant’s background when assessing his or her achievements (Camara and Kimmel 2005).

**The Role of Telecounselors and Tour Guides in Admissions Offices**

Admissions offices often employ students to serve as telecounselors and tour guides. In today’s consumer-driven culture, colleges that choose not to use some form of telecounseling or related technology in their admissions processes are significantly less competitive (Henderson and Swann 1998). Telecounselors make periodic phone calls to determine applicants’ level of interest; request necessary documents; issue open house invitations; set testing dates; and remind applicants about tuition/housing deposits (as required by the institution). Current students usually are employed as telecounselors; this allows institutions to recruit students in a subtle and personal way (Henderson and Swann 1998).

University tour guides, or ambassadors, are undergraduate volunteers or employees who provide prospective
students and their families with campus tours and answer questions about life on campus. They often answer challenging questions while working to assuage the fears of anxious parents and hesitant students. Tour guides usually are extroverted students who enjoy meeting new people, developing relationships, and extolling the virtues of their school.

Appreciative Advising

Appreciative Advising is a theory that incorporates elements of positive psychology, appreciative inquiry, and reality therapy to create a person-centered, strengths-based approach to advising students. The six phases of Appreciative Advising are Disarm, Discover, Dream, Design, Deliver and Don’t Settle (Bloom, Hutson and He 2008). As the advisor and student progress through the six phases, they build a trusting relationship. While developed as a framework for academic advisers working with college students, the principles of Appreciative Advising are transferable to other settings, including the training of undergraduate admissions employees.

APPRECIATIVE ADVISING FOR UNDERGRADUATE ADMISSIONS STUDENT WORKERS

Disarm

This phase in Appreciative Advising is the “initial creation of a safe, welcoming environment for students” (Bloom, Hutson and He 1998, p. 35). An advisor or counselor’s first interaction with a student is incredibly important. It is essential to make a positive first impression on students in order to gain their trust (Bloom, Hutson and He 1998).

To “disarm” new student workers, the admissions supervisor should warmly greet students as they enter the training location. Further, to help students meet one another and to put everyone at ease, there should be several opening “ice breakers” in which the facilitator and student workers participate. The beach ball activity is one such example. In this activity, members of the group toss a beach ball labeled with personal questions. Participants who catch the ball introduce themselves to the group, share their major and hometown, and choose a question on the beach ball to answer. As the activity progresses, students and supervisors learn one another’s names and begin to establish relationships. The goal of the disarm phase is twofold: to ease students’ anxieties about the training and to create a positive, trusting atmosphere.

Discover

In the “discover” phase, advisors learn about students by using “positive, open-ended questions that can extract narratives through which they can help students identify their strengths, passions and skills” (Bloom, Hutson and He 1998, p. 43). Sample “discover” statements include “Tell me about a time when you really felt connected to and/or loyal to this institution”; and “Tell me about a time when a faculty [member], staff, or student at this institution positively impacted your life.” After pairs of partners have had sufficient time to share their stories, the supervisor should ask for volunteers to share an inspirational story they heard from their partner. This exercise provides student workers with an arsenal of stories about what it means to be a student at their institution; these stories can be shared subsequently with prospective students.

Dream

In the “dream” phase, advisors work to establish trust so that “students will reveal their wildest hopes and dreams for their lives” (Bloom, Hutson and He 1998, p. 55). In order for the trainer to get to know the student workers and to give them an opportunity to practice articulating their goals (either in pairs or in a large-group setting), the supervisor can ask such “dream” phase questions as “How is your major related to your passions and life goals?” Or, “If you could do anything with your life and you had unlimited time and money, what would you do and why?” The supervisor listens carefully to students’ dreams and helps them develop positive mental images of the future.

Design

In this fourth step of the Appreciative Advising process, students and their advisors co-create a plan as a tool to make their dreams reality (Bloom, Hutson and He 1998). The advisor also provides positive feedback, makes effective referrals (when necessary), and ensures that following this process of reflection, the student leaves the meeting with a hard copy of his “designed goals” for the future.

Adapting this to the training setting, the supervisor facilitates student workers’ design of plans for their academic and co-curricular involvement during their remaining
time at college. A question asked during this phase might be “What kind of experiences are available at our institution that will help you develop skills that may be transferable to your future work?” Specifically, the trainer and students discuss how the skills they will develop in their admissions positions will be transferable to their work after graduation. Having students write down their ideas in a planning document helps them solidify their plans. A planning document should describe ways in which students may become engaged via extracurricular activities on campus. This will further enhance student workers’ knowledge about campus activities—knowledge they can share subsequently with prospective students.

Deliver

The “deliver” phase involves students’ carrying out the plan written down during the design phase (Bloom, Hutson and He 1998). While it is the students’ responsibility to meet the objectives described in their plans, the advisor energizes the students by reassuring them that they have the skills necessary to follow through with their plans.

Toward the end of the training, the supervisor should recap what has been accomplished during the training session. She should express her confidence in the student workers’ abilities to accomplish their plans and should encourage student workers to establish realistic timelines for completing the objectives they identified. Finally, she should remind student workers that she is available to help them pursue their dreams and negotiate any obstacles that may arise.

Don’t Settle

In the “don’t settle” phase, advisors support and then challenge students to raise their own internal bar of expectations. “As the bar goes up, the Appreciative Advisor clearly explains the reason for its rise and aligns the student’s previous accomplishments and strengths with his/her capability to meet this higher expectation” (Bloom, Hutson and He 1998, p. 99).

Appreciative Advising is not a one-time training session. Rather, it is a continual process of growth and development. As telecounselors and tour guides begin to achieve the goals they set for themselves in their personal and professional lives, their supervisors will work with them to discover new areas for improvement and growth.

As part of this continuous training, supervisors will encourage and energize students before, during, and after work hours. For example, in the five minutes before work officially begins, the supervisor may get students excited about the university by allowing them to share recent successes with their co-workers.

THE BENEFITS OF APPRECIATIVE TRAINING

The benefits of instituting an Appreciative Training extend not only to student workers but also to the institution and prospective students and their families.

Student Workers

Appreciative Training benefits student workers because it allows them to build closer relationships with their supervisors; discover their passions and interests; and realize opportunities for engagement both inside and outside of the classroom. Appreciative Training helps student employees understand what they value about their institutions and how they can share their stories with prospective students.

Supervisors who use Appreciative techniques help students learn about their institution while simultaneously allowing them to reflect on their own hopes for the future. As a result, the training process increases students’ self-efficacy and goal-orientation, which have “been linked to success in many areas, including college” (DeWitz, Walsh and Woolsey 2009).

Colleges and Universities

College and university admissions offices will net increased positive results by taking an Appreciative approach to training their student employees. As they establish authentic and genuine relationships with prospective students and their supervisors through the Appreciative process, admissions employees will become more personally invested in their jobs.This will occur as the students discover how the transferable skills they are acquiring relate to their personal career aspirations.

Students will understand how their work relates to their personal goals and will be more likely to continue their studies at the institution. Student employees also will be more comfortable asking their supervisors questions and discussing personal and professional challenges. Finally, student workers will market the institution to prospective students and their parents with genuine and sincere
enthusiasm. The resulting relationships will benefit the institution. Admissions officers know that they can expect an overwhelmingly positive response from prospective students who receive individualized attention.

Prospective Students
Prospective students and their parents will benefit from speaking with student workers trained in the techniques of Appreciative Advising. Having developed plans for the future, employees can share with prospective students how they will be using university resources such as study abroad, their courses, and the career center to attain their goals. Also, by learning how to ask prospective students Appreciative questions, telecounselors and tour guides will learn more about the particular needs of prospective students and their families.

CONCLUSION
The benefits of adopting an Appreciative approach to training student telecounselors and tour guides are many. The Appreciative Training method is a continuous process: Although it could be initiated at a retreat or designated “training day,” it would require a semester to complete successfully. Throughout the semester, the supervisor or facilitator would guide student workers as they discovered their own stories, learn how to share those stories with others, and set goals for personal and professional growth.

Nothing leaves a stronger impression on prospective students and parents than a student’s ability to articulate her authentic, positive experiences at an institution. As undergraduate admissions workers become increasingly self-aware and able to form meaningful relationships with others as a result of their Appreciative training, they will become more effective advocates for their institutions. Appreciative Training has the potential to radically improve the admissions process for all parties involved.

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Garbage In, Garbage Stays: How ERPs Could Improve Our Data-Quality Issues

By Richard L. Riccardi

“Bad data.” In our world of data-driven decision making, these two words can send chills up the spines of executive managers who rely on “good data” to make enrollment projections, resource allocations, and budget recommendations. In this spiraling economy, presidents and provosts want “numbers they can count on;” the last thing they want to hear when making mission-critical decisions is that the data are “dirty,” “inaccurate,” or “just not right.” Yet institutions struggle daily with data quality issues that affect not only the lives of students but also the bottom line. In a recent brief entitled “The impact of Bad data on demand creation,” Sirius demonstrated that following “data quality best practices” resulted in a 66 percent increase in revenue. The average company (one that did NOT follow best practices) had data error rates of up to 25 percent; those companies that had reengineered their data quality processes still had data error rates of 10 percent. With the amount of data processed doubling every twelve to eighteen months, data cleaning costs climb at similar rates, coupled with lost revenue resulting from faulty data. The Sirius report summarized this phenomenon with the “1–10–100” rule: “It takes $1 to verify a record as it is entered, $10 to cleanse and de-dupe it, and $100 if nothing is done, as the ramifications of the mistakes are felt over and over again” (Sirius 2008).

As universities begin to implement business intelligence tools such as end-user reporting, data warehousing, and dashboard indicators, data quality becomes an even greater and more public issue. Clearly, the benefits of “data to the desktop” and “information at our fingertips” initiatives are numerous. In Leadership and the New Science, Meg Wheatley states that “if data is [sic] free to move, it meets up with diverse observers that develop their own interpretations. An organization rich with many interpretations develops a wiser sense of what is going on and what needs to be done. Such organizations become more intelligent” (Wheatley 2006). That said, “bad data” that are “free to move” typically end up in the hands of vocal constituents who, like the town crier, let everyone from the president to the parking attendant know that the data are “wrong,” the numbers “can’t be trusted,” and, most of all, ask, “How can you cut/eliminate my program based on those data?” With automated tools taking nightly snapshots of the database, the faulty data grow exponentially, propagating as another layer of the data warehouse. No matter how many times we mow the data “fields,” the bad data—like fields full of dandelions—seem to regenerate overnight.

When the problem of data quality is thrust into public forums, the natural tendency is to cast blame. And because the data typically originate with the campus’s enterprise...
resource planning (ERP) system, the fault must lie in the keepers of that system: the IT department. The verdict is not difficult to justify: IT stands for “information technology,” so that department also must be responsible for the “information” emanating from the technology (i.e., the software): If the data are wrong, the fault must be theirs: “Guilty” as charged. The irony is that while many IT professionals know that their universities have a data-quality problem, they believe that others within their organization assume that the problem is IT’s to solve. Ted Friedman, Vice President of Research at Gartner, states that data quality “is a business issue; this is not an IT issue, and the only way you’re going to be successful is if you put some accountability on business and engage the business side of the house” (DeFalice 2005). Mirroring the business world, and in the spirit of shared governance, data governance bodies have become the method of engaging the “functional side of the house,” assigning the role of data steward to data-centric positions such as registrar, controller, alumni director, and institutional researcher. Tony Fisher, President and General Manager of DataFlux Corporation, notes that data stewards “blend elements of both business and IT to build more effective systems. They understand the technical requirements of different applications. But, more importantly, they also recognize the business value and characteristics of data” (Fisher 2005). Like Donny and Marie Osmond (“a little bit country, a little bit rock and roll”), data stewards need to be both functional and technical. Fisher notes that “because data stewards bridge the gap between business users and IT, employees who fill these roles need a diverse skill set” (Fisher 2005). However, the assumption is that data stewards are additional resources placed between IT and the functional units—that is, a luxury most universities cannot afford. As noted above, the role typically is added on to those of mid- to upper-level managers of crucial data enterprises, ostensibly because those individuals have the operational knowledge of the processes as well as the necessary technical skills. However, these “funky-tech” employees also are managing offices and solving the latest crisis, so the data steward tasks of developing and documenting data policies and procedures concerning definitions, classification, inquiry, access, security, usage, collection, dissemination, and maintenance are overwhelming at best and never completed at worst. Ultimately, the data-quality problem is neither an IT/technical problem nor an end-user/functional problem; rather, it is a universal/university problem that requires dedicated resources to which none of these aforementioned areas can commit. Therefore, once bad data are introduced into the system, they typically remain: “Garbage in, garbage stays.”

So how can our ERPs assist in minimizing our data-quality issues? They can take a different, more proactive approach than the existing, reactive model. Like the person following the elephants in the parade with a broom and a bucket, institutions typically take the back-end approach to data quality, cleansing records after the mess has been made. This role typically has been assigned to institutional research directors or registrars, who execute or distribute validation reports identifying incorrect data to the departments that created the bad data and expecting the guilty parties to correct the flawed records (i.e., “You make the mess, you clean it up.”). In fact, the problem may be so immense and/or complicated that some type of IT intervention (for example, in the form of a program/script) is required to clean the data. Some institutions even require the individual who input the faulty data to attend training so as to become “re-certified” in the appropriate data entry skills. While all of these techniques represent noble attempts to address the data-quality problem, they never address the origins of the dilemma; in addition, they are incredibly resource intensive at a time when resources are at a premium. In this age of processing power that dwarfs our previous, antiquated systems, why can’t better data validation occur at the point of data entry, so that offices process records once instead of twice? Why can’t the system “know” that I’m not a bicentennial student (i.e., more than 200 years old)? Why does the system let me create course sections that take place before the university was established? If I’m entering a batch of new freshmen; why do I have to type “N” over and over? And the biggest question of all: Why can’t the system be changed to work correctly? ERP vendors would argue that end-users are limited in their data input (thereby increasing data quality) by a number of features, such as fields with lists of valid values, so that “N” means a new student, “T” means a transfer student, and “Z” cannot be entered because it’s not on the list of valid entries. However, typing “N” on the admissions processing screen does not validate that the student is actually “new;” for example, the student may be re-ad-

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mitting to the university under a new major such that he thought he was a “new” student, submitted an application, and was processed as such. That said, some business logic is built into the system so that errors will be displayed when certain data quality events occur, such as registering for the same course multiple times, adding a new student into the system when another student has the same social security number, or accidentally setting a person’s date of birth as a future date. Nevertheless, it would be impossible for ERP vendors to build business logic responsive to the particular needs of every university they serve, so that usually, only major errors (such as the ones just mentioned) are handled. Finally, many mailing address and phone number issues can be solved by third-party add-on software that validates the data fields as the end user types them—at an additional cost, of course. Unfortunately, many schools cannot afford the extra expenditure of added software, nor can they modify the ERP software themselves due to the complexity of the code and the lack of technical resources to make programmatic changes.

Therefore, a new model is suggested for ERP systems at the data-entry level. This new model allows for the flexibility of university-specific business logic while maintaining data integrity and accuracy:

- After each data field is completed, whether on the Web or in the baseline system, a data validation routine is executed based on rules set by the institution. Accessed either as a standalone form or as a pop-up window when the cursor is on a specific database field, the rules form has the following features:
  - Minimum and maximum value option for numeric and date fields.
  - Every free-form text field has the option to be spell-checked.
  - All fields have an optional, system-wide default value.
  - Customizable error message text overriding the default message.
  - Hyperlink option in the error message, which, for example, could bring the user to the appropriate section of the campus’s data standards document.
  - Text fields have optional “Autocomplete/Live Suggest” functionality whereby the system learns from text input and displays suggestions as the user types. In this predictive text model, the system would “know” that a user typing “Failed prereq” probably is going to type “Failed prerequisite” and so suggests “Failed Pre-Requisite” as the completed entry. Not only does this save data entry time, but it also affords more standardization of text fields, which can aid in searching as well as data integrity.
  - Text fields have optional “Live Search” functionality, where direct search results are displayed in real time as the user types into a search or text field. For example, an end user could search for the word “FAFSA,” see all of the text comments where the word appeared, and then select one to be entered in the text field. Again, the benefits of standardization in text fields cannot be understated: Our former student information system allowed end users to input transfer coursework from previous institutions attended, but the institution’s name was a free-form text field. When I wrote the academic history conversion program to our current ERP, I discovered 28 different ways to spell/abbreviate “Gateway Community Technical College.” As Martha Stewart might say, data standardization is “a good thing.”
  - Option of “fatal” error checking, such that the end user cannot continue unless the data pass the conditions met, or “warning” error checking, such that the user is notified of the error but can override the check. Both options would be accompanied by an audible reminder that an error has occurred that needs to be handled appropriately.
  - All fields have an optional user default value which would override the system default value. The first time a user logs into the system, she enters a value into a data field and presses the “default” button, which sets the field-level default value. For example, if the user is processing transfer students, she could enter a “T” into the student type field and click the default button; from that moment forward, every time she went to enter data in the student type field, the system would default a “T” (which could be typed over, if needed). The defaults are valid for as long as the user is logged into the system and also can be saved to a “preferences” file which would load automatically the next time the user logged in.
  - Table-driven fields (i.e., a finite list of predefined values) can be linked together, with correct and incorrect combinations of the data values linked within those tables.
Those data combinations that are not correct result in display of a user-defined “warning” message instructing the data entry person that this particular grouping of data is not appropriate. For example, “student type” and “admit type” usually are table-driven fields in ERPs, but certain data value combinations—for example, a “new re-admit”—are not valid. In this case, the system could be set up to link the two fields and their data elements so that this combination would result in an error. Linking would not be limited to just two tables; for example, adding the “student level” field would allow universities to develop specific data groupings for undergraduate and graduate students. This data validation would occur in real time and would include the option to be set to “fatal” instead of just a “warning” message. For example, with “fatal” linking enabled, once an end user enters the student level as “GR,” for graduate, only values in linked tables that are appropriate for graduate students would be available for the data entry person to select. Thus, in this case, when the data entry person moved to the “admit type” field, the value “FS” (for “Fresh Start”) would neither appear nor be able to be entered as (at my school, at least) the program is available only to undergraduate students. With “warning” and “fatal” linking, universities have the option to warn the end user that the data are an exception. Ultimately, this feature would allow schools to take full advantage of the “relational” part of databases by enabling end users to create and maintain their own business-appropriate data relationships.

For more involved data conditions, custom SQL can be attached to each variable (pasted into a text box to be executed as part of the validation routine) to allow for more complex, institution-specific business logic. This could be as complex as verifying that a student with a student type of “N” does not have previous coursework in the system.

With this model, technology is leveraged to produce data that are as clean as possible at the initial point of entry. At a recent conference, a presenter was asked how he handled data quality in his institution’s data warehouse. He responded that he had “two ‘crackerjack’ data people” working constantly on the job. Imagine what we could do for retention and graduation rates if those employees were mentoring students rather than power-washing the data warehouse. Imagine our ERP vendors concentrating on “business intelligence” on the front end rather than the back end. Imagine our institutions focusing more on student quality than on data quality. Imagine us leading the parade rather than pushing the broom and dragging the bucket.

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About the Author

RICHARD L. RICCARDI is the Director of the Office of Management Information and Research at Southern Connecticut State University. Prior to his current position, he was the Project Manager and Student Team Leader for Southern’s ERP implementation as well as a Systems Analyst and Assistant Dean for Graduate Studies and Continuing Education. He holds a B.S. in Mathematics and a M.S. in Research and Measurement from Southern, and a Sc. D. in Management Information Systems from the University of New Haven.
The title Mission and Money sums up the book’s central argument: Public and non-profit private universities must balance the competing interests of fulfilling unprofitable social missions and generating sufficient revenue to survive. Weisbrod, Ballou, and Asch use a “two-good” framework to describe that inherent tension. Because financial concerns can draw institutions away from social goods, some readers might expect criticism of those colleges and universities that stray from their mission. However, the authors avoid taking such a stance and thereby more successfully portray the complexity of benefiting society while staying in business.

In the “two-good” framework, money speaks for itself while mission sums up a school’s primary reason for existing. In an effort to describe “mission” more fully, Weisbrod and his co-authors present their theoretical framework through different higher education sectors. That is, schools are categorized on the bases of whether or not they grant degrees and of ownership type (e.g., public, private non-profit, or for-profit). Commonly recognized categories include four-year private universities and two-year public colleges. Ownership form and institutional type play a role in determining not only the mission of any given institution but also the types of activities in which it can engage to generate revenue. “Mission activities” include teaching, research, and public service. Thus, the missions of public and private non-profit schools center on using these activities for broader social purposes. Teaching undergraduates remains fundamental to most institutional types. Research and public service, however, allow for further distinctions: For example, community colleges emphasize teaching and public service more than research. In contrast to public and nonprofit institutions, for-profit schools exist to make money. For such schools, mission and revenue goods are the same. They tend to focus on undergraduate teaching and typically do not engage in basic research or service (neither of which has much potential to generate profit).

While different combinations of mission activities suggest different institutional types, distinctions in recent decades have become blurred as a result of institutions’ quests for revenue. Since the end of World War II, various federal financial aid programs have emerged to help students pay for college. Many private institutions, having come to depend on federal funds, now seem more
like public schools. More recently, decreasing state appropriations have forced public institutions to become more tuition dependent—and, consequently, more like private schools. Finally, the Bayh-Dole Act of 1980 encouraged universities to accept federal grants to support research and then to profit from its results. As a result of the Bayh-Dole Act, public and non-profit institutions have come to look more like for-profit schools in their use of a mission goal—research—to generate revenue. Regardless of the loftiness of mission goals, schools first must survive if they are to continue to fund those goals. The recent confluence of revenue-seeking strategies across institutional types has made institutions’ struggle for financial survival even more apparent.

Because of their struggle to survive, higher education institutions engage in many behaviors that are characteristic of for-profit entities. Schools also engage in competitive strategies that one expects only in business. For example, the Polytechnic Institute of Brooklyn once absorbed New York University’s (NYU) School of Engineering. More recently, Polytechnic again joined forces with NYU, becoming NYU’s School for Engineering and Applied Sciences. The histories of NYU and Polytechnic thus show an initial acquisition (of NYU’s Engineering School) and then a merger (of Polytechnic with NYU) (Jaschik 2008). Schools also may choose to specialize their academic offerings and effectively reduce the number of competitors with which they must contend. Conversely, by broadening their offerings, institutions can compete in new markets in different regions or countries. Such behavior, however, necessitates calculated tradeoffs. For example, while the above-mentioned merger of Polytechnic University and NYU may have brought in additional tuition revenue from a broader student base, a vocal group of Polytechnic alumni nevertheless have remained opposed to the merger and have cut off their financial support. Presumably NYU and Polytechnic’s leaders weighed the revenue potential from the merger against the projected loss of alumni donations.

As the preceding discussion of business-like behavior in higher education illustrates, public and nonprofit private schools have much greater potential for mission and money conflict. Straying too far or for too long in the direction of mission can create financial problems; alternatively, simple pursuit of revenue can lead to neglect of broader social purposes. Hybrid goals can emerge from this mission-money tension. To revisit the NYU-Polytechnic example: the merger may make good financial sense if it results in more students and research funds. It also might expand NYU’s basic research portfolio by bringing on board new faculty who have different research interests. Thus, the business-like activities and search for revenue that inhere in higher education do not necessarily preclude the advancement of social mission so long as institutions carefully balance concerns of mission and money.

The challenge of striking the right mission-money balance emerges clearly in Weisbrod, Ballou, and Asch’s analyses of the different ways in which institutions bring in revenue: tuition (Chapter 5), donations (Chapter 6), endowments (Chapter 7), and patents on research (Chapter 8). Other common revenue streams (Chapter 9)—including lobbying, distance education, and opening foreign campuses—evidence the same tension with mission. For example, while tuition constitutes the greatest source of revenue for many institutions, strategic use of financial aid to enroll more full-paying students can help to subsidize the tuition costs of less affluent students, thus helping to fulfill the social mission of educating under-served populations. Similarly, though endowment management seems solely a revenue concern, institutions must take care to invest in companies whose practices do not conflict with social missions. Universities that receive income from patents must balance the mission good of free dissemination of knowledge with the revenue good of keeping patentable knowledge private. In general terms, overemphasizing revenue generation can erode public confidence in an institution, with subsequent negative effects on revenue. This counterintuitive relationship between mission and revenue emerges most clearly in the development of college “brands.” Having a strong brand (as, for example, in the case of Harvard, Williams, etc.) can attract greater revenue, but institutions build their brand through mission fulfillment. Whereas seeking to grow a brand for its own sake can damage a school’s reputation, maintaining a good brand through mission activities can increase financial stability and provide a buffer against competitors.

Chapters eleven through fourteen discuss how the “two-good framework” plays out both in core activities of higher education institutions and in the work of key employees. Chapter 11 argues that, in recent decades, public and nonprofit institutions have come to more closely re-
semble for-profit schools in their growing preference for part-time faculty, particularly in disciplines in which full-time salaries are relatively high. Whereas faculty hiring patterns may redefine the academic work of institutions from the inside, collaborative ventures among colleges (or between colleges and for-profit enterprises) seem to reshape the business of higher education from the outside. In most cases, collaborative arrangements arise from teaching or research purposes (though the authors do note a joint venture between the University of Delaware and the Shaner Hotel Group to operate a hotel on campus land).

Intercollegiate athletics evinces perhaps the greatest tension between mission and money concerns. Chapter thirteen contrasts the role of athletics at Division I and Division III schools. Although the public often perceives athletics programs as major sources of revenue—and, therefore, as potential threats to mission fulfillment—the authors note that only a handful of schools profit from sports. Division III schools tend to tout athletics as part of a well-rounded education—a mission good—and often lose money on their sports ventures. In contrast, schools with large, nationally known athletics programs have much greater potential to make money from sports. But the revenue good even of these programs has qualifications: For example, money-making sports such as football and men’s basketball subsidize less profitable teams. These smaller, less profitable teams in turn are more mission-related as they provide opportunities for larger numbers of students to participate in athletics.

Chapter fourteen discusses the mission-money tension in intercollegiate athletics through the terms of employment for presidents and head coaches at representative Division I schools. The employment contracts of many Division I coaches underscore dramatic skewing toward the revenue potential of sports: Coaches receive bonuses for both the academic and the athletic successes of their players (though as a rule, bonuses for classroom performance pale in comparison to those for victory on the field). In contrast, presidents tend not to receive such a predictable mix of performance incentives. Indeed, presidential con-
tracts often do not mention tangible goals or incentives. Rather, the standards for judging presidential performance broadly recapitulate an institution’s overall direction and whether it will focus more on mission or money concerns. A candidate who has risen through the academic ranks to the post of president probably would stand on the other side of the mission-money divide from a candidate coming to academe from the corporate world.

Chapter fifteen closes out *Mission and Money* with public policy recommendations relating to the tension between revenue generation and mission fulfillment. Notably, the authors do not lay out prescriptions or express any hoped-for outcome; rather, they note the need for national dialogue on how far public and nonprofit private institutions ought to go in their quest for revenue. They also suggest that government leaders should be able to justify any limits they impose on revenue generation. The book’s subtitle, *Understanding the University*, summarizes the authors’ project in this final chapter. In thinking about and discussing acceptable ways for higher education to generate revenue and fulfill social missions, we do not engage in a merely academic exercise. Rather, we come to understand what colleges and universities need in order to survive—and, ultimately, what they mean for society today.

If Weisbrod, Ballou, and Asch were to take a strong position on mission or money, they would have two options: Either they could recognize revenue and financial survival as the driving force behind institutions’ activities or they could view money concerns as detrimental to social mission. Many readers will appreciate that they take neither position. For example, the need for revenue emerges simply as a need that is neither good nor bad. Like other organizations, colleges and universities compete in a particular marketplace and so must have the wherewithal to survive; unlike organizations whose end goal or mission centers on continued financial survival, higher education institutions pursue revenue to support *unprofitable* mission activities. The authors’ relatively neutral presentation of mission and money helps readers understand the potential for identity crisis that higher education institutions must face on a regular basis. Two powerful forces—societal expectations of what colleges and universities should do and stark financial reality—pull institutions in opposite directions. This tension emerges more clearly because the authors choose not to pontificate either for or against mission or money.

While the authors’ neutral stance makes it easier to portray the realities of institutional life, some readers might wish they had described the extent to which the quest for revenue can aid or impede mission fulfillment. Literature from past decades, on effectiveness in higher education (e.g., Cameron 1978) and on success in meeting mission-based objectives (e.g., Conrad 1974; Doucette, Richardson and Fenske 1985; King and Breuder 1976), might inform such positions, for researchers tend to operationalize effectiveness using both mission and money matters.

Simply stated, can institutions that stray too far toward either mission or money continue to function effectively? Discussion of answers to that question would help underscore the dangers of losing balance. For this reviewer, *Mission and Money* highlights not only an identity crisis endemic to higher education but also the potential for that crisis to erode the legitimacy of colleges and universities. The authors show how colleges and universities can continue to exist, but many readers in the higher education community and in the general public will want to understand why some institutions should continue to exist.

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**CONTENT CORRECTION**

In the previous issue of *College and University* (Vol. 84 No. 4), Don Hossler and David Kalsbeek’s article entitled “Admissions Testing & Institutional Admissions Processes: The Search for Transparency and Fairness” made reference to the following missing citations on page nine, paragraph two:


AACRAO TO CELEBRATE
100 YEARS OF
SERVICE WITHIN
HIGHER EDUCATION!

In preparation for the AACRAO Centennial, the association has launched a Centennial Website featuring information on upcoming events, photos, personal stories from members and video interviews with leaders from the higher education community.

Visit the Centennial website at www.aacrao.org/centennial to learn about AACRAO’s past, present and future endeavors.

- Learn about the founding of the association
- Peruse the planned Centennial Celebration events
- Test your knowledge of AACRAO history

AACRAO’s 2010 Annual Meeting will commemorate this major milestone. As always, the Annual Meeting will share best practices, provide a comprehensive treatment of the most pressing issues facing higher education, and allow you to network with colleagues.

PHOTOS NEEDED FOR AACRAO CENTENNIAL CELEBRATION
Help illustrate AACRAO’s distinguished history. Do you have pictures of past AACRAO conferences? Look into your archives to find photos for our Centennial Celebration at the Annual Meeting in New Orleans in 2010. Please label all scanned photos with the date taken and send them to Matt Ogle at oglem@aacrao.org.

AACRAO would like to thank the following sponsors for their generous support of the AACRAO Centennial:

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