Development of an instrument for indirect assessment of college business programs

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ABSTRACT

In the spirit of continuous improvement, universities are constantly seeking ways to measure and enhance their effectiveness. Within colleges of business, the importance of assessment has been highlighted recently by AACSB accreditation standards dealing with assurance of learning. While AACSB standards focus primarily on direct measures of student learning, indirect measures of students' experiences can also yield important and actionable knowledge. This paper reports on the validation of a "home-grown" exit survey of business seniors (n = 837) in two universities. The instrument taps into students' evaluations of their general education courses, business core/common classes, experience in their majors, advising, and resource availability. In data from one university, exploratory factor analysis was used to create six reliable summary indices of students' evaluations. This factor structure was replicated in data from the second university. Use of instruments such as this to improve business programs is discussed.

Keywords: Assessment, Learning Outcomes, Continuous Improvement, Cost-Effective, Indirect Assessment Measures

INTRODUCTION

Since the late 1980's, institutions of higher education have been under the scrutiny of accrediting organizations and other constituents to provide evidence of improvements in student learning. In 2003, the Association to Advance Collegiate Schools of Business (AACSB) International, a prominent accrediting agency for colleges of business, significantly increased the emphasis on assessment in its accreditation standards for business programs (Pringle (Michel, 2007; Martell, 2007). AACSB requires direct measures of learning, but recognizes the contribution that indirect measures of program assessment can make (AACSB, 2011; Pokharel, 2007).

The Accrediting Council for Colleges and Business Programs (ACBSP) another leading accrediting organization, supports, celebrates, and rewards teaching excellence. The organization undertook a rebranding initiative in 2008 to reflect its global presence and better describe its mission that focuses on assessment and quality assurance. ACBSP recommends the use of both direct and indirect assessment instruments to collect relevant data for an effective assessment process (ACBSP, 2009).

The accreditation process focuses first on whether students have acquired the knowledge and skills that programs set out to teach, but also judges schools based on the systems they have in place to support learning. Examples of such systems include academic advising, career services, tutoring and other remedial help, faculty-student communications, and personal growth. Measurement of the effectiveness of these support systems and of student satisfaction with program elements are not amenable to direct tactics, but can be assessed through indirect measures (Nelson & Johnson, 1997). Based on these data, program improvements can be made (e.g., Hamilton & Schoen, 2005; Rajecki & Lauer, 2007). Furthermore, global concepts such as student satisfaction have been demonstrated to have a significant, albeit indirect, effect on retention and learning in universities (Tinto, 1993).

In assessment, direct measures test students' accomplishment – that is, what students have learned – while indirect measures assess students' or others' opinions of what students have learned, or their levels of satisfaction with programs or support services. This article reports on the development and validation of an indirect instrument designed to measure graduating seniors' opinions about their learning, program, and services during their matriculation as business students at two universities.

BACKGROUND

In the spirit of continuous improvement, institutions of higher education are constantly seeking ways to measure and improve their effectiveness. Although some constituents predicted that assessment was just a phase, it does not show any signs of going away. In fact, calls for assessment of student learning and accountability are stronger than ever. The current Secretary of Education, Arne Duncan, announced an initiative, the "Race to the Top" program that advocates a stronger commitment to improving the educational process than in the past. The program focuses on adopting standards that prepare students for success in college and in the workplace (2009). Under Arne Duncan's leadership, the Department of Education has adopted a "cradle to career

education plan to help every student emerge with marketable job skills" (Dillon & Lewin, 2010).

Former Secretary of Education Margaret Spellings, Arne Duncan's predecessor, submitted a report in 2006 that focused on the deficiencies of this country's higher education system (Miller & Malandra, 2006). The findings of the Commission on the Future of Higher Education indicated that little to no progress has been made over the past decade in adult literacy, and a still unacceptable number of college graduates "lack the critical thinking, writing and problem-solving skills needed in today's workplaces". Once envied internationally as an exceptional system, U. S. higher education is falling behind other countries. We now rank "12th in higher education attainment and 16th in high school graduation rates". Spellings urged U.S. educators "to embrace a culture of continuous innovation and quality improvement" (Miller & Malandra, 2006).

It is notable that the 2006 Commission's report gathered important data through the use of indirect assessment instruments (U.S. Department of Education, National Center for Education Statistics, 1992 National Adult Literacy Survey, and 2003 National Assessment of Adult Literacy). The report goes on to identify examples of direct (CLA) and indirect assessment instruments (NSSE) that could be used to develop a comprehensive understanding of a student's learning experience. Yet, a study by Price and Randall (2008) indicated that students' opinions of their perceived knowledge did not correlate with students' actual knowledge. If indirect measures do not accurately reflect what students learn, of what value are they?

In the late 1980s, early in this assessment movement,, authorities in the field asserted that measuring learning outcomes alone was not enough evidence to gain a comprehensive understanding of student performance. These experts assert that direct assessment methods provide evidence of student skill development in integrating and applying principles and concepts. Student portfolios, course-embedded assignments, capstone projects, and similar activities provide evidence of how well students gain knowledge and transfer learning. Whereas, indirect assessment methods identify student learning behaviors, provide perceptions of student learning, and offer evidence of how well institutions have prepared students for their careers or advanced work. Indirect evidence can be obtained through self-reports or reports from those who observe students' work. Indirect assessment instruments such as alumni, student, and employer surveys, internships, focus groups of key constituents, or graduate follow-up studies can add value to a program's assessment efforts. In addition, faculty expectations can be obtained through the use of indirect assessments (Hutchings, 1989; Banta & Associates, 2002; Maki, 2002). So, what utility do indirect measures of student perceptions yield? Although students may not have a clear understanding of what they have learned until later in their careers, their perceptions and observations of all facets of academic life during the learning process are valuable to the institution in planning and recruiting.

Colleges and universities have long used commercially available indirect measures of program outcomes, including various kinds of student, alumni, and employer surveys. The data are often used in strategic planning and administrative decision-making. For example, the National Survey of Student Engagement (NSSE; Indiana University Center for Postsecondary Research, 2009) is administered in hundreds of institutions annually to "provide a comprehensive picture of the undergraduate student experience at four-year and two-year institutions". Indirect measures also include many

other commercially available instruments (e.g., Student Satisfaction Inventory (Noel Levitz, Inc., 2009); and various Making Achievement Possible (MAP) surveys (EBI, 2009)). These provide the advantages of standardization, ease of administration, data analyses, and comparability to peer institutions. However, the financial costs of these instruments may be beyond the reach of many institutions in today's environment.

Other institutions utilize "home-grown" indirect measures of student perceptions (e.g., Baker & Bealing, 2004; Cheng, 2001). In light of the current budget crises and economic conditions, an assessment process that uses non-commercial indirect assessment methods may be the best approach for many institutions struggling to balance their ever-shrinking budgets.

One commonly used home-grown device is the senior exit survey, usually an instrument that questions graduating seniors about various aspects of interest about the program. Senior exit surveys are easily constructed and administered, can reflect local issues and concerns, and be adapted over time (Baker & Bealing, 2004; Nelson & Johnson, 1997). Unfortunately, few institutions have examined the validity of these instruments, nor have they been widely shared; therefore, the value of the data they generate is uncertain. Further, because these surveys are often unique, benchmarking against other programs is often impossible.

The purpose of the present research was to create a valid indirect assessment instrument available to other institutions for purposes of business program evaluation. The plan for the research was to analyze an existing student opinion survey in one sample and to then explore the structure of that same instrument in a second similar sample from a different institution. If successful, data generated could be used by each institution to create baselines and/or identify potential problem areas or student groups with particular issues, and institutions could compare students' experiences over time, particularly after efforts were made to improve. Data could also be used to benchmark against peer schools.

METHOD

Overview of the Research

Participating in this study were two universities, both part of a single public university system. University 1 is located in southeastern Pennsylvania, University 2 in western Pennsylvania; both are in rural areas within 60 miles of major metropolitan areas. University 1 and 2 had undergraduate populations of around 10,000 and 8,500 students, respectively. In both universities, the sample was obtained from students majoring in business administration. The survey was administered to students over a period of years from 2003 to 2009. The same 14 items that formed the instrument described in this study were utilized in both institutions, but the method of administration varied (described below), and in both institutions the survey was supplemented with other items of local interest.

Survey Instrument

The instrument was originally developed at University 2 in 2006 when the School of Business combined questions from the university's senior exit survey and a more comprehensive department student survey to minimize the number of surveys administered to students. The revised student survey collects students' perceptions of the learning process, the curriculum, and educational outcomes. The questionnaire asks students to assess the quality of their education in general education, core business courses, and their major; advising; and business program effectiveness.

The survey gathers demographic information on GPA, age, transfer status, gender, enrollment status, employment status, and hours per week worked. Students also are asked to indicate their academic year of study so the data for each group of students (freshmen, sophomores, juniors, and seniors) could be analyzed individually or for the student body as a whole.

Students were asked to respond to statements along a 5-point Likert scales ranging from 5, "strongly agree," to 1, "strongly disagree". Items appear in Table 1 (Appendix). In both universities, students also gave demographic information: gender, overall grade point average, enrollment status, hours worked per week, and major.

The plan for the analysis was for data from all administrations of the instrument in University 1 to be aggregated, and an exploratory factor analysis of the data be completed to observe the factor structure. Reliability would be assessed in this sample, and if adequate, then the factor structure would be confirmed using aggregated data from University 2.

Administration of the Instrument – University 1

At university 1, the survey was distributed to business majors in their required senior seminar courses, capstone courses taken in the last semester of the senior year. Faculty teaching these courses were given copies of the survey and asked to administer them to students in their courses during class time. Students took the surveys anonymously. The survey was administered at the university 1 to graduating seniors in five semesters: Spring 2004, Fall 2007, Spring 2008, Fall 2008, and spring 2009.

While an attempt was made to have all graduating seniors complete the survey, not all did. A description of the sample can be found in Table 2. The sample was composed of 258 males and 208 females, with 15 not reporting their sex. The median reported grade point average was 2.5-3.0; 96% of the students were full-time. 267 worked some hours at a job, with 147 working 11 – 20 hours weekly.

Mean ratings of the 14 items are shown in Table 1 (Appendix). The lowest of students' responses were 3.37 ("The quality of instruction in the core courses of the business program was excellent") and 3.41 ("The quality of instruction in the liberal arts and sciences course was excellent"). The highest rated item was 4.32, "The faculty teaching in my major area were well-versed in the subject matter of the courses they taught").

Administration of the Instrument – University2

The student survey was administered to students in the classroom in senior business core courses in the spring of 2006 and 2007. It was administered online each spring semester to all students in 2008 and 2009. A description of the sample for university 1 is reported in Table 2 (Appendix). Only data collected from seniors were used in this analysis. A total of 356 seniors have responded to the survey since 2006, as indicated in Table 3 (Appendix).

The sample consisted of 198 males and 157 females (one did not report gender). Results were analyzed controlling for age, major, gender, citizenship, enrollment status, year in the program, number of credits transferred, and GPA. Some questions were revised or added to the survey in 2007 and were not comparable to 2006 results.

The median reported grade point average was 3.47. Most of the students (97.4%) were full-time, and 354 students worked from 1 – 10 hours per week at a job. The lowest mean responses to the statements in the survey were (3.36) to "The quality of instruction in my major courses was excellent" and (3.33) to "The quality of instruction in the core courses of the business program was excellent." The highest mean responses were (4.37) to "The business program provided sufficient opportunities for me to work in groups" and (3.99) to "The faculty teaching in my major area were well-versed in the subject matter of the courses they taught". The survey continues to be administered online each spring semester using an online survey program.

ANALYSIS AND RESULTS

Scale Development

An exploratory factor analysis on the data from University 1 assessed the structure of the data, utilizing SPSS to conduct a principal components analysis of the 21 items. Results of the oblique rotation, which converged in 9 iterations, are presented in Table 4 (Appendix). Only items with component loadings over .45 were retained. No items cross-loaded and each factor were supported by at least two items. The four-factor solution accounted for 61.06% of the variance. Results (factor loadings) appear in Table 4 (Appendix).

Factor 1, explaining 34.47% of the variance, was composed of 5 items all of which asked students for their evaluations of their impact of their business program. Factor 2 explained 10.58% of the variance. This factor consisted of 2 items. The 2 items in this factor both related to advising. Factor 3 explained an additional 8.64% of the variance. It consisted of 4 items dealing with teaching in their majors and the level of sincere interested from faculty in their majors. Factor 4 explained 7.39% of the variance. It consisted of 2 items related to students' opportunities for group work.

Composite indices for each group were created. Reliability analyses were conducted for each, resulting in acceptable Cronbach's alphas (Nunnally, 1967), as reported in Table 5 (Appendix).

Confirmatory Factor Analysis (on University 2 Data)

A confirmatory factor analysis on the data from University 2 was then performed. The results are reported in Table 6 (Appendix). Specifically, CFA is used to test the fit of the proposed four-factor structure that obtained for the University 1 dataset. The model tested in this study was estimated using maximum likelihood estimation (MLE). Previous literature advocates the use of MLE over other methods because of its sensitivity to model misspecification. First, model fit was determined using the minimum fit function $_{X}^{2}$. As this index is extremely sensitive to sample size (Hu & Bentler, 1995), it was supplemented with additional fit indices.

The model summary reported in Table 7 (Appendix) provides us with a quick overview of the model, including the information needed in determining its identification status. There are 104 distinct sample moments, 45 parameters to be estimated, thereby leaving 59 degrees of freedom and a chi-square value of 106.669 with a probability level equal to .000.

There are 26 regression weights, 17 of which are fixed and 9 estimated. The results are reported in Table 8 (Appendix). The 26 fixed regression weights include the first of each set of four factor loadings and the 13 error terms. There are 6 covariances and 17 variances, all of which are estimated. An examination of the solution (estimate values, standard errors, critical ratio) reveals all estimates to be reasonable and statistically significant.

Goodness of fit statistics was assessed. Table 9 (Appendix) reports the model fit summary. Note: CMIN is the chi-square statistic. According to our value of 106.669, with 59 degrees of freedom and a probability less than 0.0001 suggests that the fit of the data to the hypothesized model is not adequate. But the problems with the theoretical construct of chi-square are well known in the literature (the most common findings are large chi-square values relative to degrees of freedom). So alternative goodness-of-fit statistics have been developed, some of which are reported in Tables 11 through 14 (Appendix). The baseline comparisons shown in Table 10 (Appendix) are classified as incremental or comparative indices of fit. The most commonly reported are the comparative fit index (CFI). This fit index compares model fit of the proposed model to that of an independence model and is particularly sensitive to complex model misspecification[1]. The CFI of 0.928 indicates a well fitted model.

The next set of fit statistics provides us with the noncentrality parameter (NCP) estimate, reported in Table 11 (Appendix). The NCP value of 47.669 indicates a moderate fit. The RMSEA reported in Table 12 (Appendix) is particularly useful as an absolute fit index in detecting complex model misspecification. RMSEA values <.05 indicate good fit; values between 0.08-0.10 indicate mediocre fit and values >0.10 indicate poor fit. Our RMSEA value of 0.06 indicates a mediocre to good fit.

The next cluster of statistics, Akaike's Information Criterion (AIC), addresses the issue of parsimony in the assessment of model fit. The results are reported in Table 13 (Appendix). The criterion for good fit is the default model AIC value has to be lower than that of Saturated and Independence model. According to the criteria, the model is a good

[1] Hu and Bentler (1998, 1999) suggest that CFI values indicating adequate model fit should exceed .95. Although a value > .90 was originally considered representative of a well-fitting model.

fit. The Expected Cross-Validation Index (ECVI) measures the discrepancy between the fitted covariance matrix in the analyzed sample and the expected covariance matrix that would be obtained in another sample of equivalent size. The results are shown in Table 14 (Appendix). Given the lower ECVI value for the default model (ECVI = 0.998) compared to both the independence model and saturated model, it represents the best fit to the data[2]. Based on these several goodness of fit measures, the hypothesized four-factor CFA model fits the sample data well.

CONCLUSION AND IMPLICATIONS

This study reports on an attempt to address the dilemma universities face by providing one way that a college might assess its students' reactions and outcomes at a price that is inexpensive compared to many options which presently exist. It demonstrated that a "home-grown" instrument can achieve acceptable reliability across two samples of university seniors and potentially yield valid and actionable information upon which universities can make decisions.

One of the advantages of this instrument is that it is relatively short (14 items plus demographics). Students generally complete the instrument in 5 – 10 minutes. However, from a measurement perspective, additional items should be added to improve some scales, in particular, the advising scale. Also, items might be included to measure other aspects of student programs, for example, tutoring, availability of resources (e.g., computer labs, library), teaching styles, and so on. Finally, additional demographic data, such as ethnicity, number of transfer credits, and age, could be collected. These changes would, however, add to the length of the survey.

Perhaps most important is that even as it stands, this instrument yields actionable data. For example, the differences in ratings between majors are interesting. Accounting and Finance majors were, overall, more positive than other majors. However, these majors tend to have higher grade point averages, and did find an overall effect of grade point average on ratings. Furthermore, at University 1, the student major-faculty ratio is lower for that major than for some others, and that also could well be affecting students' perceptions of their experiences.

This study is, of course, not without its limitations. Like all indirect assessments, it relies totally on students' self-reports of demographics and mental states. Potential error in students' reporting of variables such as GPA could be corrected by making the surveys non-anonymous and obtaining this data from University records. If this were done, not only would measures be more accurate, they might be measured as continuous variables, making more powerful analytic methodologies available. However, non-anonymity may affect the willingness of students to answer survey questions truthfully. Also, the sample, which was intended to be a census of the various graduating classes, fell short in response rate, and faculty or students may have been self-selecting in their administration of or willingness to take the survey.

The mean values on all scales were above the scale midpoint, which seems like very positive ratings. This may be partly due to a feel-good effect in graduates close to graduation. On the other hand, all items were constructed such that higher scores

[2] Because ECVI coefficients can take on any value, there is no determined appropriate ranges of values.

reflected more positive evaluations. Reversing some items in the instrument might attenuate that problem.

In conclusion, it is clear that indirect measures of students' learning are important, both for programs desiring to improve and for our larger society. But from another perspective, what soon-to-be alumni say about an institution contributes to its reputation, and their future donations contribute to its well-being. These may be based on far more subjective basis than what students have actually learned in their program. As noted previously, students' evaluations of their own learning has been found to be unrelated to their actual learning as measured by objective, direct means (Price & Randall, 2008) – in other words, students may not really know what they are learning. On the other hand, their opinions about programs, quality of instruction, advising and other support services may have important implications for colleges.

REFERENCES

ACBSP. (2009, August). *ACBSP standards and criteria for demonstrating excellence in baccalaureate/graduate degree schools and programs*. The Accrediting Council for Colleges and Business Programs (ACBSP): Overland Park: Kansas.

AACSB. (2011, January). *Eligibility procedures and accreditation standards for business accreditation*. AACSB International-The association to Advance Collegiate Schools of Business. Retrieved from: www.aacsb.edu/accreditation/standards-2011-revised-jan-2011-final.pdf

Baker, R.L., & Bealing, W. E. Jr. (2004). Outcomes assessment: the senior exit survey. *Pennsylvania Journal of Business & Economics,* Vol. 10, No. 1, 65 – 77.

Banta, T. W. & Associates. (2002) *Building a scholarship of assessment*. San Francisco, CA: Jossey-Bass.

Cheng, D.X. (2001). Assessing student collegiate experience: Where do we begin? *Assessment and Evaluation in Higher Education,* Vol. 26, No. 6, 525 – 538.

Department of Education (ED), O. (2009). *Prepared Remarks for Secretary of Education Arne Duncan, House Education and Labor Committee, May 20, 2009*. US Department of Education. Retrieved from ERIC database.

Dillon, S. & Lewin, T. (2010). Education chief vies to expand U.S. role as partner on local schools. *The New York Times*. Retrieved from: http://www.nytimes.com/2010/05/04/education/04educate.html?_r=1

Educational Benchmarking, Inc. (EBI). (2009). *Making achievement possible (MAP-works).*Retrieved from: http://www.map-works.com/

Hamilton, D.M., & Schoen, E.J. (2005). Same song, different verse: Evaluation and improvement of an established assessment program. *In Assessment of Student Learning in Business Schools: Best Practices Each Step of the Way*. Edited by K. Martell and T. Calderon. Vol. 1, No. 2. 138 – 153.

Hu, L. T., & Bentler, P. M. (1995). Evaluating model fit., *Structural equation modeling: Concepts, issues, and applications*. R. H. Hoyle (Ed.) Thousand Oaks, CA: Sage 76-99.

Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to under parameterized model misspecification. *Psychological Methods*, Vol. 3, 424–453.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, *Structural Equation Modeling.* Vol.6, No.1, 1-55.

Hutchings, P. 1989. B*ehind outcomes: Contexts and questions for assessment.* Washington, DC: AAHE Assessment Forum.

Indiana University Center for Postsecondary Research (2009). *National survey of student engagement (NSSE).* Retrieved from: http://nsse.iub.edu/html/about.cfm.

Maki, P. (2002). *Using multiple assessment methods to explore student learning and development inside and outside of the classroom.* Retrieved from: http://naspa.org/NetResults/PrinterFriendly.cfm

Martell, K. (2007). Assessing student learning: Are business schools making the grade? *Journal of Education for Business*. Vol. 82, No. 4; 189 - 195.

Miller, C. & Malandra, G. (2006). A national dialogue: The secretary of education's commission on the future of higher education, *Issue Paper 2. Accountability/Assessment.* Washington, D.C.: U.S. Department of Education.

Nelson, E.S. & Johnson, K.A. (1997). A senior exit survey and its implications for advising and related services. *Teaching of Psychology*. Vol. 24, No. 2, 101 – 105.

Noel Levitz Inc. (2009). S*tudent satisfaction inventory.* Retrieved from: https://www.noellevitz.com.

Nunnally, J. (1967). *Psychometric theory.* New York: McGraw-Hill.

Price, B.A., & Randall, C.H. (2008). Assessing learning outcomes in quantitative courses: using embedded questions for direct assessment. *Journal for Education in Business.* May/June, 288 – 294.

Rajecki, D. W. & Lauer, Joan B. (2007). Improved Advising Ratings In An Undergraduate Psychology Program. *Psychological Reports*, Vol. 100, No.1, 171-176.

Pokharel, A. (2007). Assurance of learning (AoL) methods just have to be good enough. *Journal of Education for Business.* Vol. 82, No. 4; 241-243.

Rajecki, D.W., & Lauer, J.B. (2007). *Psychological Reports.* Vol. 100, 171 – 176. Need title of article.

Tinto, V. (1993). *Leaving College: Rethinking the causes and cures of student attrition.* Illinois: University of Chicago Press.

APPENDIX

Table 1. Items, Means, and Standard Deviations for Universities 1 and 2

Item	University 1			University 2		
	N	Mean	S.D.	N	Mean	S.D.
The quality of instruction in my major courses was excellent.	481	3.99	.73	350	3.36	.97
The quality of instruction in the core courses of the business program was excellent.	469	3.37	.88	350	3.33	.95
The faculty teaching in my major area were well-versed in the subject matter of the courses they taught.	479	4.32	.71	351	3.99	.73
The faculty teaching in my major area were always well-prepared to teach the class.	481	4.19	.77	351	3.77	.81
The faculty in my major were genuinely interested in the welfare of the students.	481	4.17	.87	351	3.71	.91
The business program provided me with good knowledge of the functional areas of business.	480	4.18	.69	347	3.82	.77
The business program helped me to appreciate the importance of ethical decision making and social responsibility.	479	4.09	.86	347	3.93	.79
The business program helped me to appreciate the globally interdependent and culturally diverse business environment which currently exists.	479	3.93	.88	347	3.73	.86
The business program provided sufficient opportunities for me to work in groups.	478	4.45	.70	171	4.37	.70
The business program helped me understand group behavior and conflict resolution.	479	4.09	.93	347	3.78	.93
The business program helped me to recognize and solve problems with critical and analytical thinking.	479	4.01	.78	347	3.87	.71
The business program helped me to become proficient in effectively using computer hardware and software.	480	3.81	.96	229	3.63	.96
My major advisor was always available during office hours or when I made an appointment.	477	4.14	1.13	231	3.89	1.17
I would recommend my advisor to other students.	474	3.82	1.34	172	3.56	1.32

Table 2. Description of Sample – University 1

Semester of Administration	Number of Respondents	Response Rate
Spring 2004	47	35%
Fall 2007	67	85%
Spring 2008	105	62%
Fall 2008	84	82%
Spring 2009	178	81%
Total	481	68%

Table 3. Description of Sample – University 2

Semester of Administration	Number of Senior Respondents	Response Rate
Spring 2006	118	41%
Spring 2007	125	43%
Spring 2008	63	19%
Spring 2009	50	19%
Total	356	30%

Table 4. Results of Exploratory Factor Analysis on Data from University 1

Item	Component			
	1	2	3	4
The business program provided me with good knowledge of the functional areas of business.	.754			
The business program helped me to appreciate the importance of ethical decision making and social responsibility.	.693			
The business program helped me to appreciate the globally interdependent and culturally diverse business environment which currently exists.	.718			
The business program helped me to recognize and solve problems with critical and analytical thinking.	.688			
The business program helped me to become proficient in effectively using computer hardware and software.	.656			
My major advisor was always available during office hours or when I made an appointment.		.914		
I would recommend my advisor to other students.		.908		
The faculty teaching in my major area were well-versed in the subject matter of the courses they taught.			-.840	
The faculty teaching in my major area were always well-prepared to teach the class.			-.764	
The quality of instruction in my major courses was			-.807	

excellent.				
The faculty in my major were genuinely interested in the welfare of the students.			-.691	
The business program provided sufficient opportunities for me to work in groups.				-.719
The business program helped me understand group behavior and conflict resolution.				-.776

Table 5. Descriptive statistics of composite indices

	Cronbach's Alpha	**N**	**Mean**
Factor 1 – Perceived Effect of Program	.76	479	4.007
Factor 2 – Advising	.82	472	3.983
Factor 3 – Quality of major	.78	479	3.711
Factor 4 – Group	.602	477	4.276

Table 6. Model Summary

Number of distinct sample moments:	104
Number of distinct parameters to be estimated:	45
Degrees of freedom (104 - 45):	59

Minimum was achieved
Chi-square = 106.669
Degrees of freedom = 59
Probability level = .000

Table 7. Parameter Summary

	Weights	Covariances	Variances	Means	Intercepts	Total
Fixed	17	0	0	0	0	17
Labeled	0	0	0	0	0	0
Unlabeled	9	6	17	0	13	45
Total	26	6	17	0	13	62

Table 8. Parameter Estimates

	Estimate	S.E.	C.R.	P	Label
PRGFUNCT <--- Factor 1	1.000				
PRGETHIC <--- Factor 1	1.148	.154	7.440	***	
PRGGLOB <--- Factor 1	1.152	.151	7.625	***	
PRGCRIT <--- Factor 1	1.077	.141	7.649	***	
PRGCOMP <--- Factor 1	.796	.187	4.253	***	
ADVAVAIL <--- Factor 2	1.000				
ADVREC <--- Factor 2	1.068	.293	3.641	***	
FACMVERS <--- Factor 3	1.000				
FACMPREP <--- Factor 3	1.080	.113	9.599	***	
QINSTMAJ <--- Factor 3	1.062	.130	8.158	***	
FACMINTR <--- Factor 3	1.005	.121	8.323	***	
PRGGROUP <--- Factor 4	1.000				
PRGCONFL <--- Factor 4	1.470	.367	4.009	***	

Table 9. Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	45	106.669	59	.000	1.808
Saturated model	104	.000	0		
Independence model	13	753.628	91	.000	8.282

Table 10. Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.858	.782	.931	.889	.928
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 11. NCP

Model	NCP	LO 90	HI 90
Default model	47.669	22.615	80.560
Saturated model	.000	.000	.000
Independence model	662.628	578.782	753.939

Table 12. RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.064	.044	.083	.116
Independence model	.192	.180	.205	.000

Table 13. AIC

Model	AIC	BCC	BIC	CAIC
Default model	196.669	203.554		
Saturated model	208.000	223.913		
Independence model	779.628	781.617		

Table 14. ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.998	.871	1.165	1.033
Saturated model	1.056	1.056	1.056	1.137
Independence model	3.958	3.532	4.421	3.968