

**2006 AIR RESEARCH GRANT PROPOSAL**

**Obtaining a Liberal Education and Breadth of Study: An Analysis of College Transcript Data**

Datasets of Interest:  
Baccalaureate and Beyond  
Integrated Postsecondary Education Data System

Grant Amount Requested: \$29,972

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## PROJECT SUMMARY

While understanding student learning has long been a concern of scholars and policymakers, “there is not much that is known about college student achievement” (Association of American Colleges and Universities, 2005, p. 2), especially in terms of breadth of knowledge across disciplines. Instead, research on student learning and achievement tends to focus on specific knowledge and skill areas such as written communication and quantitative literacy, and relies heavily on student self-reports.

Surprisingly, little research has been conducted in one important area of student learning, the course-taking behavior of undergraduates. The purpose of this project is to understand why some students study a broad array of courses across disciplines, while others narrowly focus their course of study. The project will seek to answer three questions:

1. What academic, demographic and social attributes of the student explain breadth of study?
2. What attributes of the undergraduate institution, such as selectivity and financial resources, explain why breadth of study varies between schools?
3. Can a student achieve a liberal education at a research university? In other words, is breadth of study greater at liberal arts colleges versus other types of institutions?

The project will use four sets of data to understand students’ course-taking behavior. The first two datasets will be taken from the Baccalaureate and Beyond: 93/03, a nationally representative panel study of college students graduating during the 1992-1993 academic year. In addition to a wealth of student and parent demographics and attitudinal data, Baccalaureate and Beyond also contains college transcript data for the survey respondents. The course transcript file is a rich and relatively untapped database, containing all courses taken by the survey respondents, coded by a common scheme across undergraduate institutions. The Baccalaureate and Beyond survey and transcript datasets will provide the dependent variable and student-level independent variables. Two additional datasets, the IPEDS surveys and Peterson’s college guidebook, will provide data about the undergraduate institution.

The dependent variable is the breadth of courses taken by a student during college, and is based on a mathematical formula commonly used in economics and political science to study concentration; it varies from 0 to 1, with a score of 1 indicating that a student took courses from all available subject areas, while a score of 0 indicates a student took courses in only one area. Subject areas will be based on the four-digit Classification of Instructional Program codes used to code courses in the transcript database. Three sets of independent variables will

be used to explain course breadth: student-level, such as socio-economic background and academic preparation; undergraduate experiences, such as whether a student lived on campus or worked during college; and institutional-level variables, such as financial resources, student body size, and the type of course distribution requirements. Models will be estimated using multilevel modeling, which takes into account the complex survey sample for Baccalaureate and Beyond.

Given the importance of a liberal education to post-secondary outcomes, it is important that we understand why some students achieve breadth in their course of study. Understanding student course-taking behavior also gets to the heart of the academic enterprise, allowing us to understand if certain types of institutions, such as liberal arts colleges, really do a better job in providing students with a liberal education. Given that the use of performance indicators based on student outcomes in higher education is growing, understanding how institutional attributes affect student behavior has grown increasingly important.

This project differs from previous research on student learning in several ways. First, the study will use course transcripts as a proxy for student learning. This avoids some of the well-known measurement error issues with surveys and self-reports of learning. Second, the project will analyze a rich and valuable dataset that has been largely ignored by the higher education community. While the transcript studies of the NCES high school surveys have been analyzed, the higher education transcript section of Baccalaureate and Beyond is underused. Analysis of these data should yield useful insight into student behavior, and publication of research using these data will also increase the visibility of the data in the higher education community. Third, the project will quantitatively measure liberal education in terms of course breadth, using a nationally representative dataset. To date, no study of liberal education has been conducted on a nationally representative dataset. Fourth, the project looks specifically at what student and institutional attributes may affect breadth in course-taking.

The project will be important to scholars and policymakers interested in liberal education in general, and whether liberal education differs across institutions in particular. It will be of interest to higher education administrators concerned as to how and why their institution produces some students who take a broad array of courses while others adopt a narrow focus. Administrators will also be interested in the effect of course distribution requirements on breadth of study, a current topic in the debate over curricular reform.

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## PROJECT DESCRIPTION

### A. Statement of problem

What students learn in college has long been a major concern of both scholars and policymakers. Yet, as a recent report by the Association of American Colleges and Universities (2005) indicates, “there is not much that is known about college student achievement” (p. 2), especially in terms of breadth of knowledge across disciplines. Instead, research on student learning and achievement tends to focus on specific knowledge and skill areas such as written communication and quantitative literacy, and relies heavily on student self-reports. While intellectual and practical skills in specific areas are one component of a liberal education, knowledge of human culture and the natural world gained from the study of many different disciplines is a separate and understudied component (Association of American Colleges and Universities, 2005; Gaff, 1983).

Understanding whether students are achieving a liberal education is more important than ever. While a liberal education is seen as crucial to success in the private sector (Association of American Colleges and Universities, 2005), especially given increased globalization and the transition to a knowledge-based economy (Gaff, 2004; Yankelovich, 2005, November 25), recent focus groups indicate that many high school students do not understand what a liberal education is, what its benefits are, or even how to achieve it (Schneider & Humphreys, 2005, September 23). Anecdotal evidence indicates that students are increasingly turning away from a broad course of study in order to double or even triple major (Gomstyn, 2003, October 24). Even the institution that traditionally emphasizes a liberal education, the liberal arts college, appears to be on the decline (Breneman, 1994; Hoover, 2005, November 25).

The purpose of this project is to understand why some students study a broad array of courses across disciplines, while others narrowly focus their course of study. The project will use a rich and relatively untapped database, the course transcript file from *Baccalaureate and Beyond: 93/03*, to understand breadth of study. This database contains all courses taken by graduating seniors in the *Baccalaureate and Beyond* study, coded by a common scheme across undergraduate institutions. The project will seek to answer three questions:

1. What academic, demographic and social attributes of the student explain breadth of study?
2. What attributes of the undergraduate institution, such as selectivity and financial resources, explain why breadth of study varies between schools?

3. Can a student achieve a liberal education at a research university? In other words, is breadth of study greater at liberal arts colleges versus other types of institutions?

#### *Literature review*

While the literature on student learning in college is vast (Pascarella & Terenzini, 1991, 2005), understanding student learning, especially across institutions, is quite difficult. No common exit examination or portfolio is used nationally across institutions. While standardized tests such as the Graduate Record Examination are taken on a national basis, they suffer from selection bias, as only a small subset of college graduates take these exams. Some scholars have initiated research projects that include direct assessments of student learning across institutions, but the sample sizes are usually quite small (e.g., Pascarella, Wolniak, Cruce, & Blaich, 2004).

Some scholars have addressed this issue by using student self-reports of gains in knowledge in specific areas (Hu & Kuh, 2003; Li, Long, & Simpson, 1999; Lundberg & Schreiner, 2004; Pace & Connolly, 2000), but these studies are based on convenience samples of institutions and are not nationally representative. There are problems of accuracy and interpretation across institutions with this approach; for example, has a student at an open-admissions college who reports an increase in quantitative literacy actually learned as much as a student at CalTech who checks a similar response on the same survey? In another area of research, scholars have focused on student engagement, or classroom and out-of-classroom activities that are correlated with student learning (Hu & Kuh, 2002; Kuh & Hu, 2001; Pike & Kuh, 2005). While useful, such an approach can only indirectly shed light on what students learn in college.

One area of learning that has received surprisingly little attention is the coursework of college students. Studying student transcripts has several advantages. First, there are no issues with accuracy as with self-reports, because the data all come directly from institutional databases. Second, coding of courses by one central group can avoid differences in interpretation of survey questions by students at one type of institution versus another. Third, we can use breadth of study across disciplines as a proxy for learning across the traditional liberal arts fields of arts, humanities, mathematics, sciences, and social sciences. Research has demonstrated that the number of courses taken in different areas directly affects student learning (Astin, 1993; Pascarella & Terenzini, 2005; Tsui, 1999). Unfortunately, current research on breadth of knowledge is limited to questions asking students if they have acquired a broad general education (Association of American Colleges and Universities, 2005; Pace & Connolly, 2000).

Given the emphasis on a liberal education in much of the discussion about the state of higher education, there is a dearth of research about the college curriculum and what courses students take while in college. Most of the higher education literature in this area focuses on why students pick particular majors (e.g., Feldman, Smart, & Ethington, 1999; Fiorito & Dauffenbach, 1982; Porter & Umbach, in press; Simpson, 2001), not why some students take a broad array of courses. While valuable, focusing on field of major is a narrow approach to understanding student learning and ignores the non-major courses that students take in college.

A smaller body of literature looks at course curriculum in higher education, but most of this work is descriptive in nature (Adelman, 2004a, , 2004b; Boli, Katchadourian, & Mahoney, 1988; Boyer & Ahlgren, 1987), or focuses on why students choose particular courses (Babad, 2001). Only one study was located that looked at breadth of study in college using the High School and Beyond Longitudinal Study (Zucker & Dawson, 2001), but the analysis was limited to a cross-tabulation that indicated students who completed only some college credits had a greater breadth of study than students who completed a bachelor's or advance degree.

In sum, understanding course breadth of study has several advantages over student self-reports, and very little research has been conducted on why students take the courses they take. The goal of this project is to expand our knowledge of student course-taking behavior using a nationally representative study of graduating seniors. At the end of the project, we will have a greater understanding as to why do some students succeed at studying a broad array of subjects, while others do not.

## **B. Proposal of work**

### *Data*

The project will use four sets of data to understand students' course-taking behavior. The first two datasets will be taken from the Baccalaureate and Beyond Longitudinal Study 93/03, a nationally representative panel study of college students graduating during the 1992-1993 academic year. In addition to a wealth of student and parent demographics and attitudinal data, Baccalaureate and Beyond also contains transcript data that have been coded consistently across undergraduate institutions. The Baccalaureate and Beyond survey and transcript datasets will provide the dependent variable and student-level independent variables. Two additional datasets, the Integrated Postsecondary Education Data System (IPEDS) surveys and Peterson's college guidebook (Peterson's, 1992), will provide data about the undergraduate institution.

### *Dependent variable*

There are several different ways to classify the curriculum, by a focus on its form (e.g., decontextualized vs. contextualized (Goodson, 1992)), whether it meets a certain set of standards such as the New Basics (Horn & Kojaku, 2001), or by some type of count measure. Count measures range from a simple count of subject areas (Dolton & Vignoles, 2002) to mathematical formulae that measure breadth. This paper adopts the latter approach, as much of the discussion over a liberal education focuses on the concept of breadth.

A wide variety of formulas have been proposed to conceptually measure concentration and dispersal (Hall & Tideman, 1967; Ray & Singer, 1973). One of the most common is the Herfindahl-Hirschman index (Hirschman, 1945), often referred to as the H index. It has been used extensively to measure concentration in a variety of areas, such as firms within an industry (Curry & George, 1983), power in the international system (Mansfield, 1992), and breadth of courses (Zucker & Dawson, 2001). In the present context, if  $P$  indicates the percentage of courses a graduating senior has taken in a specific content area, and  $N$  denotes the number of subject areas in the curriculum, the H index is simply the summation of these squared percentage shares:

$$H = \sum_{i=1}^N P_i^2 \quad (1)$$

We can see that H increases as a student increasingly concentrates in a single subject area; if a student takes only courses in one subject area, the value of this measure equals 1.

As noted by Ray and Singer (1973) and Mansfield (1992), this measure has several drawbacks; it is sensitive to the size of  $N$ , and it does not vary between 0 and 1 but instead between  $1/N$  and 1. They propose an alternative measure that resolves these issues, and varies from 1 (a student has taken courses in one area) and 0 (a student has taken equal shares of courses in all areas):

$$CON = \sqrt{\frac{\sum_{i=1}^N P_i^2 - 1/N}{1 - 1/N}} \quad (2)$$

Subtracting CON from 1 results in a measure that increases as a student takes courses from an increasing number of disciplines. This measure of breadth will be the main dependent variable in the analysis.

Besides the appropriate measure of breadth, an appropriate measure of course content area is also needed. The Baccalaureate and Beyond transcript database has classified all courses across institutions with the six-digit 1990 Classification of Instructional Programs (CIP) codes (National Center for Education Statistics, 2002). The

specificity of the CIP coding scheme varies from two digits, four digits, and six digits. Using the two-digit CIP codes produces too coarse a measure of content area, because the two-digit codes combine all related program areas into one category (e.g., 45 for all the social sciences, 13 for all education programs). Six-digit codes produce too fine a measure because they divide programs into many discrete sub-specialties. For example, the six-digit codes for history differentiate between five different areas of history such as “American (United States) History” (45.0802), “European History” (45.0803), etc. Clearly, for the purposes of this project, courses in this content area should be counted under the general rubric of “history,” and the four-digit CIP codes appear to best differentiate between different programs of study in this manner. For example, four-digit codes in the social sciences differentiate between fields such as “Economics” (45.06), “History” (45.08), “Political Science and Government” (45.10), and “Sociology” (45.11). Thus, the measure of breadth will be calculated using the four-digit CIP codes for each course in a student’s transcript.

Finally, the number of content areas to be used when calculating breadth of study must be determined. An absolute measure would simply pick a certain number of areas to calculate breadth. For example, one could use the total number of four-digit CIP codes in the 1990 classification, or the number of four-digit CIP codes that correspond to the traditional liberal arts (arts, humanities, mathematics, natural sciences, and social sciences). Alternatively, one could use a relative measure based on the number of different program areas offered by an institution. While no national database exists with this information, it can be proxied for each Baccalaureate and Beyond institution by looking at the CIP program areas of undergraduate degrees granted during the previous several years as listed in the IPEDS Completions database. Both approaches will be explored in the project, as well as formulations that focus solely on the traditional liberal arts as well as all program areas including professional and vocational fields.

#### *Independent variables*

*Student background variables.* Because one area of inquiry for this project is the effect of institutional characteristics on breadth of study, it is important to control for differences in the makeup of the student body across schools. Students at liberal arts colleges, for example, come from higher socio-economic backgrounds and have higher test scores than students at universities (Pascarella, Wolniak, Cruce, & Blaich, 2004). The student background variables to be used in this project are age, gender, race, parental education, SAT score and private high school attendance.

Age is the student's age at graduation, and is included because older students are less likely invest heavily in education (Becker, 1993); hence, there may be an age effect on whether a student pursues a broad array of courses. Dummy variables for females, Blacks, Hispanics, Asians, and other (includes missing racial/ethnic information) measure differences in demographic background. Course-taking behavior in high school has been found to vary by gender and race/ethnicity (Chaney, Burgdorf, & Atash, 1997; Lee, Chow-Hoy, Burkam, Gevert, & Smerdon, 1998). To take into account family background, two dummy variables measure whether one or both of the student's parents have a college degree and whether one or both have a graduate degree. Research indicates that student engagement and learning significantly differs by parental education (Pascarella, Pierson, Wolniak, & Terenzini, 2004; Pike & Kuh, 2005).

Unfortunately, the Baccalaureate and Beyond survey does not include many questions concerning pre-college characteristics; however, controlling for pre-college characteristics is crucial when trying to understand the effects of college on students (Astin & Lee, 2003). Two measures of pre-college academic background, SAT score and high school type, are included in the model. SAT score is included as a measure of academic preparation, and has been shown to strongly affect student engagement in college (Inkelas, 2003; Porter, in press). High school type is measured with three dummy variables indicating attendance at a Catholic, other religious private or non-religious private high school. Previous research has shown that educational outcomes differ between graduates from these types of high schools and public high schools (Chaney, Burgdorf, & Atash, 1997; Evans & Schwab, 1995; Lee, Chow-Hoy, Burkam, Gevert, & Smerdon, 1998); a similar effect may occur for course-taking behavior in college.

*Undergraduate experiences.* Because a large proportion of students reside on campus at liberal arts colleges, a dummy variable is included that indicates whether the student lived on campus while an undergraduate. The residential nature of the liberal arts college is one of the key differences that distinguish it from other types of higher education institutions (Astin, 1999).

Undergraduate debt may affect course-taking behavior, because students with large amounts of debt may double- or triple-major in order to maximize their chances on the job market (Gomstyn, 2003, October 24). Millett (2003), for example, found a negative impact of debt on graduate school application behavior, indicating that debt may affect college student choices (although some studies have found little or no impact of debt (e.g., Monks, 2001; Weiler, 1994)). Student debt is measured with two dummy variables, one measuring student debt between \$100 and \$5,000, and one measuring student debt over \$5,000. The reference category is no debt at graduation.

Also included are a dummy variable indicating that a student attended school full-time during college as well as the average number of hours spent working per week during college; both have been shown to have a strong impact on student engagement. Because the demands of the major may affect the number of courses a student takes outside the major, and thus breadth of study, dummy variables indicating primary academic major will be included.

*Characteristics of the undergraduate institution.* The final set of variables measures characteristics of the Baccalaureate and Beyond institution attended by the student. A recent study has found that students from selective schools are, on average, more engaged in college (Porter, in press); similar research in other areas of student outcomes shows a strong effect for selectivity (e.g., Black & Smith, 2003; Brewer, Eide, & Ehrenberg, 1999; Titus, 2004). Selectivity is measured by average SAT score for the incoming class in 1992, taken from Peterson's college guidebook (when SAT score is not available, converted ACT scores will be used (Marco, Abdel-fattah, & Baron, 1992)).

Student body size is included in the models to take into account the differences in size between liberal arts colleges and universities. Some research indicates that size is negatively associated with a variety of student outcomes (Pascarella & Terenzini, 2005). To measure a possible nonlinear effect for student body size (e.g., as student body size increases, the impact increases but gradually levels off), student body size is also included as a squared term.

A large body of research has shown that contact with faculty increases engagement and learning (Inkelas, 2003; Lundberg, 2003; Lundberg & Schreiner, 2004; Pascarella & Terenzini, 2005). Student-faculty contact will be measured by two variables. The first, student-faculty ratio, is commonly used in the literature. The second, the percentage of graduate students in the student body, has been used less extensively (e.g., Toutkoushian & Smart, 2001). Much of the literature showing that liberal arts colleges have better student outcomes has speculated that the lack of graduate students is one primary cause. Without graduate students, faculty involvement with undergraduates is greater.

Financial resources are measured by expenditures per student, defined as the total educational and general expenditures and transfers from the IPEDS Finance survey divided by the number of students. The percentage of the budget devoted to research, instruction, academic support and student services measures institutional emphases in these different areas. The percentage of spending on research in part acts as a proxy for a school's research facilities, as well as the research emphasis of the institution. School location is measured by three dummy variables

indicating that the school is in an urban area (defined by IPEDS as large or mid-size city), an urban fringe area (defined by IPEDS as the urban fringe of a large or mid-size city), or area type missing/unknown. The reference category for these variables is large towns, small towns and rural areas combined. Expenditures per student control for differences in resources between schools, while the location dummy variables control for urban status.

Whether an institution has a set of course requirements and the exact form of the requirements may affect breadth of study. Requirements at the high school and state levels have been shown to affect course-taking behavior at the high school level (Chaney, Burgdorf, & Atash, 1997; Clune & White, 1992). Data for this variable will be taken from Peterson's college guidebook, which includes a short narrative description of the course distribution requirements for each college. These narrative descriptions will be coded to reflect the course distribution requirements at each institution.

As stated previously, the size of the curriculum at a particular institution must be taken into account, as breadth of study may be narrower at smaller institutions because the number of subject areas offered is small. National data on college curricula are not available. Differentiation in the college curriculum is measured by the number of different undergraduate majors graduating in the 1992-1993 academic year, using the CIP codes in the IPEDS Completions survey to count the number of different majors at an institution.

Finally, dummy variables for Carnegie research, doctoral and comprehensive universities will also be included to measure any differences between institution types after controlling for differences in student populations and institutional attributes. A common finding in the engagement literature is that student learning and engagement is higher at liberal arts colleges compared to research universities (Pascarella, Wolniak, Cruce, & Blaich, 2004); in part, this may be due to the emphasis that faculty at these institutions place on liberal arts for undergraduate students (Ruscio, 1987).

#### *Statistical approach*

Because the Baccalaureate and Beyond is a survey based on a complex sample, traditional regression analysis will yield biased coefficient estimates and standard errors (Thomas & Heck, 2001). Instead, a multilevel modeling approach that takes into account the grouping of students within schools is the appropriate statistical technique (Raudenbush & Bryk, 2002). Such an approach will be used for the multivariate models for this project. Both random intercept and random coefficient models will be explored. Missing data will be handled with a combination of imputation and listwise deletion (Allison, 2002).

### **C. Dissemination plan**

The results of the investigation will be disseminated in four ways. First, paper(s) from the project will be submitted for presentation to the 2007 Association of Institutional Research Forum and the 2007 meeting of the Association for the Study of Higher Education. Papers presented at the AIR Forum are also submitted to the ERIC Clearinghouse on Higher Education for scanning and indexing.

Second, paper(s) from the project will be posted on Dr. Porter's website at Iowa State University. This posting will allow the paper to be viewed by a large audience, as well ensure that the paper will be indexed by various web search engines, most importantly Google Scholar.

Third, the Department of Educational Leadership and Policy Studies at Iowa State University is considering the development of a policy institute, which would publish several policy briefs each year that would be mailed to policymakers and scholars across the country. If the institute is created, the results of the research project would likely be disseminated as a policy brief on liberal education.

Fourth, all paper(s) will be submitted to research journals in higher education, such as *Journal of Higher Education* and *Research in Higher Education*. Given the timeline for the project and typical review and publication times for these journals, results from the project could appear in print by the end of 2009.

### **D. Description of policy relevance**

Although there is little research at the post-secondary level, there is a large body of research at the high school level that has shown the impact that the high school curriculum can have on post-graduation outcomes (Altonji, 1995; Bernheim, Garrett, & Maki, 2001; Brown & Corcoran, 1997; Dolton & Vignoles, 2002; Horn & Kojaku, 2001; Light, 1999); something similar is likely at work in higher education beyond simply the impact of the college major. Clearly, the private sector recognizes the importance of a liberal education in preparing students for the workforce (Association of American Colleges and Universities, 2005). If there is a connection between a student's college curriculum and post-graduation outcomes such as graduate school attendance, job performance, and salary, it is important that we understand why some students achieve breadth in their course of study.

Understanding student course-taking behavior gets to the heart of the academic enterprise, allowing us to understand if certain types of institutions, such as liberal arts colleges, really do a better job in providing students with a liberal education. Given the current debate over rising education costs, the expense of the liberal arts college model of education (McPherson & Shapiro, 2000), and whether research universities are really structured to benefit

undergraduates (Boyer Commission on Educating Undergraduates in the Research University, 1998; Brooks, 1994), it is important that we understand whether similar patterns of learning occur across different types of institutions.

In addition, the use of performance indicators in higher education is growing, and schools are increasingly judged by a variety of student outcomes. If factors commonly beyond the control of an institution, such as the overall size of the student body or selectivity, strongly affect performance on a student outcomes measure, then these institutions might be unfairly penalized for “poor” performance. Understanding how institutional attributes affect student behavior has grown increasingly important with the advent of performance indicators.

### **E. Discussion of innovative concepts of project**

This project differs from previous research on student learning in several ways. First, rather than rely on student engagement as a proxy for student learning, this study relies on course transcripts as a proxy for student learning. Not only does this avoid some of the well-known measurement error issues with surveys in general and self-reports of gains in knowledge in particular, but it also focuses on breadth of study, an area of student achievement that is relatively unexplored.

Second, the project will analyze a rich and valuable dataset that has been largely ignored by the higher education community. While the transcript studies of the NCES high school surveys have been analyzed, most notably by Adelman, the higher education transcript section of Baccalaureate and Beyond is underused. Analysis of these data should yield useful insight into student behavior, and publication of research using these data will also increase the visibility of the data in the higher education community.

Third, the project will quantitatively measure liberal education in terms of course breadth, using a nationally representative dataset. To date, no study of liberal education has been conducted on a nationally representative dataset. Results will be generalizable to all four-year institutions of higher education in the United States.

Fourth, the project looks specifically at what student and institutional attributes may affect breadth in course-taking. At the student level, knowing which student subgroups are less likely to take a broad array of courses can help to inform interventions and programs designed to increase liberal learning in college. At the institutional level, if particular institutional characteristics such as a low student-faculty ratio or an absence of graduate programs are correlated with greater breadth of study, then understanding the impact of these characteristics can help guide discussion of how we should structure higher education institutions to maximize student learning.

**F. Discussion of audience to whom the project will be important**

The project will be important to scholars and policymakers interested in liberal education in general, and whether liberal education differs across institutions in particular. It will be of interest to higher education administrators concerned with how and why their institution produces some students who take a broad array of courses while others adopt a narrow focus. Administrators will be interested in the effect of course distribution requirements on breadth of study, a current topic in the debate over curricular reform (Gaff & Wasescha, 2001).

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## BIOGRAPHICAL SKETCH

Dr. Porter received his Ph.D. in political science, with one of his concentrations in econometrics. Since obtaining his doctorate, he has furthered his statistical skills through attendance of statistical workshops as well as enrolling in several mathematics courses.

Currently, Dr. Porter is Associate Professor of Research and Evaluation in the Department of Educational Leadership and Policy Studies at Iowa State University. Prior this position, he spent nine years in the field of institutional research, most recently as Director of Institutional Research at Wesleyan University. During this time, he gained much experience constructing and analyzing complex datasets, as well as presenting analytical results to a variety of audiences.

Dr. Porter has conducted and published interdisciplinary research in several areas of postsecondary education, including student persistence, student engagement, student satisfaction, faculty research productivity, and survey research methodology. He has published over two dozen articles in peer-reviewed journals and edited volumes since 2000. His articles have appeared (or are scheduled to appear) in several higher education journals, such as *Research in Higher Education*, *New Directions for Institutional Research*, *AIR Professional File*, *Journal of College Student Retention*, and *Journal of Applied Research in the Community College*, as well as journals in other disciplines, such as *Economics of Education Review*, *Public Opinion Quarterly*, and *Social Science Computer Review*. He is currently a member of the editorial board for *Research in Higher Education*.

He is a regular presenter at regional and national conferences such as the Association for Institutional Research, Association for the Study of Higher Education, and the American Educational Research Association. He won the North East Association for Institutional Research award for Best Paper twice and the Charles F. Elton Best Paper Award from the Association for Institutional Research once. In addition to presenting papers, he teaches workshops on multilevel modeling and survey research. He is an active participant in these organizations and is currently a member of the Publications Committee of the Association of Institutional Research.

Much of his research has used national datasets such as the National Survey of Post Secondary Faculty, Baccalaureate and Beyond, Beginning Postsecondary Students, and various IPEDS surveys. In addition to expertise with large datasets, he has considerable experience using survey data, having published in leading journals of survey research methodology as well as edited a monograph on survey research issues. A major focus of his research is the

impact of organizations on individuals, using a variety of statistical techniques such as multilevel modeling. This project is a natural extension of his research interests, especially his research on how college affects students.

## **CURRICULUM VITAE**

### **Education**

- Ph.D. University of Rochester, 1996, Political Science. Fields of study: econometrics, comparative politics, legislative processes.
- M.A. University of Rochester, 1995, Political Science.
- B.A. Rice University, 1987, Political Science.

### **Professional experience**

- 2005-present Associate Professor of Research and Evaluation, Department of Educational Leadership and Policy Studies, Iowa State University.
- 2000-2005 Director of Institutional Research, Wesleyan University
- 2000 Evaluation Researcher, School of Nursing, University of Maryland, Baltimore.
- 1996-2000 Research Analyst, Office of Institutional Studies, University of Maryland, College Park.

### **Refereed articles**

- Porter, S.R. (in press). Institutional structures and student engagement. *Research in Higher Education*.
- Porter, S.R., & Toutkoushian, R. K. (in press). Institutional research productivity and the connection to average student quality and overall reputation. *Economics of Education Review*.
- Porter, S.R., & Umbach, P.D. (in press). Student survey response rates across institutions: Why do they vary? *Research in Higher Education*.
- Porter, S.R., & Umbach, P.D. (in press). College major choice: A multilevel analysis of person-environment fit. *Research in Higher Education*.
- Porter, S.R., & Swing, R.L. (2006). Understanding how first-year seminars affect persistence. *Research in Higher Education*, 47(1), 89-109.
- Porter, S.R., & Whitcomb, M.E. (2005). Email subject lines and their effect on web survey viewing and response. *Social Science Computer Review*, 22(3), 1-8.

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- Porter, S.R., & Umbach, P.D. (2001). Analyzing faculty workload data using multilevel modeling. *Research in Higher Education, 42*(2), 171-196.
- Porter, S.R. (2000). The robustness of the graduation rate performance indicator used in the *U.S. News & World Report* college rankings. *International Journal of Educational Advancement 1*(2), 145-164.

### **Monographs**

- Porter, S.R. (Ed.). (2004). *Overcoming survey research problems*. New Directions for Institutional Research, no. 121. San Francisco: Jossey-Bass.

### **Chapters in edited volumes**

- Porter, S.R. (2005). What can multilevel models add to institutional research? In M.A. Coughlin (Ed.) *Applications of advanced statistics in institutional research*. Tallahassee: Association for Institutional Research.
- Porter, S.R. (2005). Policies on conducting survey research: an emerging issue in higher education. In P.D. Umbach (Ed.), *Survey research: Emerging issues*. New Directions for Institutional Research, no. 127 (pp. 5-15). San Francisco: Jossey-Bass.
- Porter, S.R. (2004). Pros and cons of paper and electronic surveys. In S.R. Porter (Ed.), *Overcoming survey research problems*. New Directions for Institutional Research, no. 121. San Francisco: Jossey-Bass.
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- Porter, S.R. (2001). Retention research with national databases. In R. L. Swing (Ed.), *Proving and improving: Strategies for assessing the first college year* (Monograph No. 33). Columbia, SC: University of South Carolina, National Resource Center for The First-Year Experience and Students in Transition.

### **Works in progress**

- Porter, S.R. Baccalaureate institutions and the decision to pursue graduate studies in science and engineering: An analysis of Baccalaureate and Beyond, 1993-2003. Manuscript in progress.
- Porter, S.R. A closer look at faculty service: What affects participation on committees? Paper to be presented at the 2006 meeting of the American Educational Research Association, San Francisco, CA.
- Porter, S.R., & Feldmann, M. Institutional isomorphism in American higher education, 1976-2003. Paper to be presented at the 2006 meeting of the Association for Institutional Research, Chicago, IL.

Porter, S.R., & Longley, M. Are student survey response rates dropping? An analysis of response rates reported in *Research in Higher Education*, 1973-2005. Paper to be presented at the 2006 meeting of the Association for Institutional Research, Chicago, IL.

Porter, S.R. & Whitcomb, M.E. Mixed-mode contacts in web surveys: Paper is not necessarily better. Paper revised and resubmitted to *Public Opinion Quarterly*.

Pryor, J.H. & Porter, S.R. The effect of alcohol use on student engagement. Manuscript in progress.

### **Grants and awards**

Educating future scientists: Understanding the impact of baccalaureate institution on the decision to pursue graduate studies in science and engineering. \$27,500 research grant, Principal Investigator. Association of Institutional Research, 2003-2004.

National Center for Education Statistics seminar participant. Using the 1988 National Education Longitudinal Study Database for Research and Policy, May 2003, Potomac, MD.

Association of Institutional Research / National Science Foundation Fellowship. Institute on the Databases of the National Science Foundation, June 1999, Arlington, VA.

Best Paper, 2004 meeting of the Association of Institutional Research, Boston, MA.

Best Paper, 2002 meeting of the Northeast Association of Institutional Research, Annapolis, MD.

Best Paper, 1999 meeting of the Northeast Association of Institutional Research, Newport, RI.

### **Professional service**

Editorial board member, *Research in Higher Education*.

Reviewer, *American Educational Research Journal*, *Journal of College Student Development*, *Journal of the First-Year Experience*, *Journal of Official Statistics*, *Social Science Computer Review*.

### **Memberships in professional organizations**

American Educational Research Association

Association for Institutional Research

Association for the Study of Higher Education

Association for Institutional Research in the Upper Midwest

Mid-America Association for Institutional Research

North East Association for Institutional Research

## **BUDGET**

### **A. Salaries and wages**

Two months of summer salary and one month of salary for the fall semester (equivalent to one course buyout) will allow the principal investigator enough time to complete the project in time for presentation at the 2007 Annual Forum.

### **B. Fringe benefits**

Fringe benefits include health, dental, life and disability insurance, social security and retirement contributions, and are based on annual wages at a rate of 26.6% for faculty at Iowa State University. Fringe benefits are treated as direct costs by the institution.

### **C. Travel**

The travel budget will allow the principal investigator to present the results of the research project at the 2007 AIR Annual Forum and the 2007 annual conference of the Association for the Study of Higher Education.

### **D. Participant support**

Not applicable to this project.

### **E. Other direct costs**

The budget includes costs for photocopying of research articles and printing copies of the final research paper for dissemination at both conferences and mailing of the research paper to interested scholars and institutional researchers.

**Budget table**

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Personnel				
	Principal investigator:	1 FTE academic year month	\$7,038	
		2 FTE summer months	<u>\$13,872</u>	
	Total Salaries and Wages			\$20,910
Fringe Benefits	Rate = 26.6%		\$5,562	
Travel	2007 AIR and ASHE conferences		<u>\$3,000</u>	
	Total Benefits and Travel			\$8,562
Other Direct Costs				
	Materials and Supplies		\$250	
	Publication Costs/Dissemination		<u>\$250</u>	
	Total Other Direct Costs			\$500
<b>TOTAL AMOUNT OF AWARD</b>				<b><u>\$29,972</u></b>

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### **CURRENT AND PENDING SUPPORT**

There is no current or pending support for this or related projects.

### **FACILITIES, EQUIPMENT AND OTHER RESOURCES**

In addition to Dr. Porter's work computer, Iowa State University has provided an additional stand-alone personal computer for analysis of the restricted use dataset (Dr. Porter currently has a restricted use data license from NCES). The university will also provide copies of the latest version of SAS statistical software for initial data analysis and construction of multilevel datasets, as well as the latest version of HLM (Hierarchical Linear Modeling) software for estimating multilevel models.