The structure of an undergraduate major and student learning: A cross-institutional study of political science programs at thirty-two colleges and universities

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Abstract

Is there a relationship between the way an undergraduate major in the social sciences is structured and student learning? In this paper, I address the relationship between the structure of the undergraduate major and student learning using data from the political science discipline. To assess the impact of the structure of the major on student achievement, a 29-item electronic questionnaire was employed. I find a very strong relationship between the degree to which a political science major program is structured and student knowledge, even when controlling for plausible alternative explanations for student performance. The results support the notion that majors that are characterized by a sequenced set of courses, the existence of a senior seminar or capstone course, and a required research methodology course taken early on in a Student's career, better prepare political science students than do relatively unstructured majors.

Is there a relationship between the way an undergraduate major in the social sciences is structured and student learning? This is an extremely important and central question for social scientists in higher education for two reasons: (1) in this era of “assessment,” social science disciplines are coming under increasing pressure to demonstrate their utility in undergraduate education; (2) unlike other factors that affect student success (such as student ability and ambition) departments can more easily manipulate the structure of undergraduate majors (at least relatively speaking). Thus, understanding the relationship between the structure of the undergraduate major and student development is potentially a key element in instituting effective reforms in the undergraduate curriculum at colleges and universities across the country.

In this paper, I address the relationship between the structure of the undergraduate major and student learning using data from the political science discipline. Indeed, there has been considerable interest in recent years in political science as to whether the structure of the undergraduate major has an impact on
student learning. Some scholars have argued that the way a major is structured directly affects student development. For instance Wahlke (1991) criticized those political science undergraduate programs that had only a few required courses and other courses were offered as electives without any effort at sequencing them. Indeed, both the Association of American Colleges and Universities (AACU) report on the Liberal Arts and Sciences, and the report produced by the APSA Task Force on Political Science (Wahlke, 1991), noted that unstructured programs are incapable of promoting the necessary skills required of political science students. The AACU report argued that only a consciously structured major that promotes sequential learning creates the “building blocks of knowledge that lead to more sophisticated understanding and . . . leaps of the imagination and efforts at synthesis” (AACU, 1985, p. 24). The development of thinking skills cannot be accomplished “merely by cumulative exposure to more and more . . . subject matter”. Majors which emphasize breadth at the expense of depth result in “shallow learning unless students also grasp the assumptions, arguments, approaches, and controversies that have shaped particular claims and findings” (Wahlke, 1991, p. 49).

Thus, how a political science major is structured is posited to be related to student learning. However, despite this assertion, relatively little empirical work has been done that systematically examines the relationship between the structure of the major and the development of political science undergraduates. Some works have described programs that seek to emulate the recommendations made by the APSA Task Force and AACU reports, but do not offer evidence that such programs have a positive impact on student learning (Breuning, Parker, & Ishiyama, 2001). Other works have sought to establish a connection between the structure of the major and student reasoning styles by comparing two institutions (Ishiyama & Hartlaub, 2003). However, no studies to date have systematically compared across a number of institutions to demonstrate an empirical connection between the structure of the political science major and student learning. This paper seeks to investigate the purported connection between the structure of the political science major and some aspects of student learning by analyzing data collected from a survey of (32) colleges and universities from across the United States.

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1. Design and methodology

To assess the impact of the structure of the major on student achievement, a 29-item electronic questionnaire was employed and distributed between March 1 and April 15, 2002. Notification was sent via e-mail to the heads of the political science departments at 96 schools that employed the Major Field Aptitude Test (MFAT) Political Science II for assessment purposes. Of the total number of departments employing the MFAT, (32) complete and usable responses were received (a 33.3% response rate).¹ The questionnaire included items regarding student performance on the MFAT, as well as major and other departmental characteristics. The data were collected using the electronic survey software Perseus Survey Solutions 3.5, which secures the anonymity of respondents and prevents multiple responses from a single respondent.

1.1. Variables

The principal dependent variable for this study is “student learning.” To measure student learning, it is important that outcomes be measured in a way that allows for comparisons between students across a number of institutions. Measures such as aggregate grade point
average are too particular to individual institutions. Thus, I used the Major Field Aptitude Test (MFAT) Political Science II produced by Educational Testing Services (ETS). The Major Field Test program is an innovative battery of undergraduate outcomes tests that is used by schools and departments at more than 600 colleges and universities across the world to measure student academic achievement and growth. Academic departments benefit from the use of the tests as the scores allow for detailed curriculum review and evaluation and allows for comparison of test scores with national comparative data. The MFAT Political Science II is a widely used test to assess the learning of political science students. The Major Field Test in political science consists of 120 multiple-choice questions, some of which are grouped in sets and based on such materials as theory passages, statistical tables, matrices, and sets of ungrouped data. The questions are drawn from the courses of study most commonly offered in undergraduate programs; the diversity of curricula is taken into account.

The major content areas covered on the test and the approximate distribution of questions among the areas are:

1. United States Government and Politics (28–31% of the questions)
2. Comparative Politics (20–23% of the questions)
3. International Relations (23–26% of the questions)
4. Political Theory and Philosophy (16–29% of the questions)
5. Methodology (10% of the questions)

This test is designed to measure the knowledge of political science graduating seniors have accumulated in their years at the university. The reported composite score is based on two subscores—United States Government and Politics and Global Political Understanding—and ranges from 0 to 200. In 1996–1999, 96 colleges and universities used the MFAT Political Science II, and 2735 students nationwide took the test.

On the questionnaire, the department heads were asked to estimate the percentage of students who took the test who scored above the 80th percentile and the percentage of students who scored above the 50th percentile.

A second dependent variable that was incorporated into this project was graduate/professional school placement. Although not all programs seek as one of their goals, placement in graduate or professional school, this is increasingly becoming an element of the assessment programs adopted by many institutions to assess the performance of programs—hence, I include it here as an additional dependent variable.

Turning to the independent variables in the model, for my purposes, structure refers not only to how many classes are offered in a major but whether the classes are sequenced so that material in the courses are consciously linked into a coherent whole. To be sure, all majors have some structure. However, in an effort to be consistent with the AACU report, I conceive of a structured major as one in which courses are consciously sequenced and linked together. To measure structure, I measure four dimensions derived from the APSA task force report.

The specific recommendations of the Task Force on the political science major included the following, distilled from Wahlke (1991):

1. There should be an integrated and sequential course of study rather than a disconnected set of individual courses. The purpose of such an integrated curriculum is to provide
for sequential learning, with the knowledge acquired in one course being extended and developed in a subsequent course.

2. The curriculum should culminate in a senior seminar or equivalent “capstone experience”.

3. The curriculum should familiarize students with the assumptions, methods, and analytical approaches of the discipline. This recommendation includes requiring students to enroll in a course on research design and methodology, and this be done early in a student’s career. However, political science is an eclectic discipline; thus, it is “particularly important that (students) become familiar with the problems of normative inquiry as well as those of empirical analysis, and learn to combine the two appropriately” (Wahlke, 1991, p. 52).

For the purposes of measurement, four items were derived from these recommendations and used to calculate the variable “structure”: (1) whether or not courses are sequenced into a coherent whole; (2) whether or not the curriculum includes a senior seminar or capstone course; (3) whether or not a research methodology course is required; and (4) when the methodology course is required in the sequence of courses.

To measure the degree of structure, I asked five questions of the department heads. First to measure the degree of coherence and sequencing, I asked two questions: (1) how many common classes are majors required to take in order to graduate (i.e. all bachelors degree candidates are required to take specific classes, e.g. all majors must take American Government)? This is consistent with the recommendations of the Wahlke report that suggested that majors provide broad coverage of the principal subfields of the discipline in a thematic way. Thus, the greater the number of common classes taken, the more likely the major seeks to cover the principal subfields of the political science discipline (especially American Politics, Comparative Politics, International Relations, Public Administration/Policy and Political Thought). If the respondent indicated that three or less courses were required (meaning that the major does not require all subfields, even if Comparative Politics and IR, or American politics is combined with Public Policy are combined as is often the case at many schools—albeit without much justification) then the program was scored a “0”. If four or more classes were required, then this was scored a “1”; (2) whether or not students were required, strongly recommended, recommended, or not required at all to take political science courses in sequence (i.e. in sequence as indicated by course numbers). If sequencing was not required then the major received a score of “0”. If sequencing was not required then the major received a score of “0”.

Second, I asked whether the program had a senior capstone course and whether or not a research methodology course was required. If the response was positive for both of these questions than they were scored as a “1”. If otherwise, then they were scored a “0”. Third, I asked whether or not a research methodology course was required for graduation, assigning a “1” if the answer were affirmative and a “0” if the answer were negative. Finally, I asked in what year of the student’s college career the methodology course was typically taken. If the methodology course was generally taken as an underclassmen (first or second year students) then this was coded as a “1” and if taken only as an upperclass student then this was coded as a “0”. This indicated whether or not a methodology course was used to lead into other courses, rather than tacked on at the end of a student’s tenure at the institution. The composite dependent
variable "structure" resulted from adding the five dimensions together and dividing by five to create a ratio measure as the dependent variable.

In addition to the principal independent variable "structure", I also examined the effects of a number of potential alternative explanations for student performance. These included the average composite ACT or SAT score for incoming freshman political science majors, how many political science majors and how many FTE political science faculty were in each department. In addition, I calculated a dummy variable for small colleges (total undergraduate student population of 2500 and below), with the idea that small, liberal arts colleges are qualitatively different kinds of institutions when compared to larger state or private universities.

2. Results

Table 1 reports the results of regressing the dependent variable, the reported estimated percentage of students scoring at the 80th percentile and above on the MFAT-II Political Science test, against the four principal independent variables. As indicated, the degree of structure in the major is positively related to the dependent variable and the relationship is statistically significant at \( p \leq .01 \). This indicates that the more structured the political science major the greater the degree to which political science graduates score very well on the MFAT. This relationship also holds in Table 2 where the dependent variable (the estimated percentage of

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<th>Coefficient</th>
<th>( t ) statistic (absolute value)</th>
<th>VIF</th>
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<td>Student faculty ratio</td>
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Adjusted \( R^2 = .23; N=32. \)

** \( p \leq .01 \).

Table 2

<table>
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<th>Variable</th>
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Adjusted \( R^2 = .08; N=32. \)

* \( p \leq .05 \).
students scoring at or above the 50th percentile) was also related to the structure of the major. However, the remaining independent variables were unrelated to the MFAT scores. Thus, the student/faculty ratio and whether or not the department was at a small college made little or no difference with regard to MFAT scores. Interestingly, performance on the MFAT by department was unrelated to the estimated average ACT/SAT score for incoming freshman political science students. These results strongly suggest that the structure of the major impacts greatly on student learning, even when controlling for student/faculty ratio, estimated “ability” of incoming students in a political science program, and the size of the college and university. Finally, the variance inflation factor (VIF) scores indicate that there is no problem with multicollinearity in both the models reported in Tables 1 and 2.

The results in Table 3 examine the impact of the structure of the major, as well as the other independent variables on the estimated percentage of students proceeding onto graduate/professional school. As indicated, the structure of the major has little impact on graduate/professional school placement rates. Neither does the student/faculty ratio nor the measure of student ability (ACT/SAT scores). Interestingly, small colleges are more effective at promoting entrance into graduate/professional school. This is not surprising given the attention that many small private liberal arts schools have a longstanding tradition as preparatory institutions for entrance into advance degree granting programs, compared to the “general education” missions of larger public universities. Taken together with the findings in Tables 1 and 2, this might suggest that the ideal combination is the existence of a structured major at a relatively small college or university, which would not only promote student learning and well-prepared students, but would be most effective in promoting graduate or professional school placement.

In sum, there appears to be a very strong relationship between the degree to which a political science major program is structured and student knowledge as assessed by the MFAT, even when controlling for plausible alternative explanations for student performance. Thus, the results support the notion that majors that are characterized by a sequenced set of courses, the existence of a senior seminar or capstone course, and a required research methodology course taken early on in a student’s career, better prepare political science students than do relatively unstructured majors.

Of course, these findings might also indicate that the degree to which a major is structured merely produces students who are better able to take standardized tests. This
is indeed a possibility that cannot be discounted by the data available. However, the earlier work of Ishiyama and Hartlaub (2003) analyzed individual student performance, and suggested that more structured majors also produce graduates who are able to think more abstractly and critically than graduates of relatively unstructured programs. Thus, taken together with our findings in this paper, these results suggest that a structured major has an impact far beyond merely better preparing students to take standardized tests.

Another potential problem with the results, which is much more difficult to explain away, is that I relied very heavily on self-reports of department heads. The accuracy of the results depends heavily on the veracity of the data provided by department heads. There is always the possibility that department heads will tend to exaggerate the accomplishments of their students. Although there is no perfect way to control for these "errors," if one assume that department heads are more likely to exaggerate in their favor than underestimate their department’s performance, then the errors tend in one direction. Thus, although the actual percentages may be inaccurate, the rank ordering of the various schools is likely to remain intact. In other words, the errors may call the size of the coefficients into question, but I would still be able to interpret the direction and significance of the coefficients. Therefore, one can still determine whether more structured majors produce graduates who score relatively better on the MFAT than relatively unstructured majors, even given these "errors" in reporting by department heads.

3. Conclusion

The above results indicate that the more structured the political science major the better political science graduates perform on a standardized test designed to assess student knowledge, even when considering alternative explanations. This finding supports the literature that advocates the development of a political science curriculum that consciously structures the major to emphasize sequential learning. Indeed, such a structured major appears to better promote the learning of political science undergraduates than majors that are not structured. At a time when the undergraduate political science major is under increasing fire across the nation, these findings indicate a potential direction for future reforms in a college or university’s undergraduate political science curriculum to improve how the discipline affects the development of our students.

Notes

1. A raw total of 40 responses were received, but 8 did not include enough usable information (such as reported percentile scores for the MFAT) to be incorporated into this study.
2. Political science seniors at Truman State University have been taking this Nationally Normed test since 1990.
3. The composite ACT and SAT scores were made comparable in the final calculation for this variable.
References


