Web and Mail Surveys: Preliminary Results of Comparisons Based on a Large-Scale Project

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NOTE: This should be considered as preliminary data and further research might not support these conclusions. If you want to check further before using the results, please contact John Kennedy (kennedyj@indiana.edu; 812 855 2573).

Introduction

This paper describes some lessons learned with regard to administering a large scale national survey of college students using multiple survey modes. The data reported here were collected under the auspices of the National Survey of Student Engagement (NSSE). The NSSE is a three-part survey of a random sample of more than 250,000 undergraduate students in approximately 325 colleges and universities conducted using both paper and Web survey modes. The survey was piloted in 70 schools in spring and fall 1999 and fully implemented with about 275 additional schools in spring 2000 (NSSE 2000). The survey will be administered annually at about 250 institutions. The Indiana University Center for Postsecondary Research and Planning is conducting the NSSE. The Indiana University Center for Survey Research is managing the survey procedures. The project is funded by The Pew Charitable Trusts and is cosponsored by The Carnegie Foundation for the Advancement of Teaching and The Pew Forum on Undergraduate Learning.

Most students were surveyed using traditional mail survey procedures, including postcard reminders and follow-up mailings. In addition, many received email reminders. The NSSE 2000 administration included 55 Web-only schools where students were surveyed using only email messages and a Web survey. Students at traditional mail survey schools were also given a URL and invited to participate in the survey on the Web in lieu of returning a paper questionnaire. Since most undergraduates have access to computers and the Web, the NSSE project is a unique opportunity to develop Web survey procedures and analyze the impact of the Web on survey data collection among a group in which the Web is easily accessible as a mode choice.

This presentation describes the NSSE project, the survey procedures, and some mode differences in responses. Specifically, we analyze the response differences between the traditional mail survey, the students who chose the Web survey instead of the paper questionnaire, and the students who were in the “Web-only” group. We also analyze selected mode effects on responses between the mail and Web versions. Finally, we present an analysis of the differences in procedures between mail and Web surveys.

Purpose of the National Survey of Student Engagement

Colleges and universities have few external incentives to improve undergraduate education. In large part this is because discussions about "quality" focus too much on resource and reputational measures, licensure requirements, and program review or approval mechanisms and not enough on what matters most to undergraduate learning and personal development -- good educational practices that engage students in meaningful activities.

The National Survey of Student Engagement (NSSE) was designed by a selected group of college student assessment experts to determine the extent to which students are engaged in empirically-derived good educational practices and what they gain from their college experience. The NSSE survey instrument, ***The College Student Report***, contains questions regarding student behaviors that are highly correlated with many highly desirable learning and personal development outcomes of college. Responding to the questionnaire requires that students reflect on what they are putting into and getting out of their college experience so that, consistent with a value-added approach to outcomes assessment, the progress or gains students say they make is a value-added

judgment. The instrument is appropriate for students at both public and private four-year colleges and universities. The results describe the experiences of first-year students and seniors, as it is these two groups of students in which stakeholders are most interested. Adequate numbers of students are surveyed at every school to ensure meaningful, credible, and usable results. An important component to the project is that it is administered by a reputable third-party organization. Most surveys of this sort are usually administered by institutions themselves. Because of differences in sampling procedures, survey results are often not comparable over time either between or within institutions.

The results from the NSSE survey will be of interest to higher education administrators, curriculum designers, government officials, parents, and students. The aggregated data from students at different colleges and universities about how they spend their time and what they gain from their experiences will be used to create a national set of benchmarks of good educational practices that can be monitored over time. At the institution level, the NSSE provides administrators and faculty with information about student and institutional performance that can be influenced directly and indirectly by faculty members, administrators, and students themselves. Further, prospective college students, their parents, college counselors, and academic advisers can use this information to assist students in college choice.

Structure of the Instrument

The College Student Report asks students to report the frequency with which they engaged in 20 activities that represent good educational practice, such as interacting with faculty members and peers, participating in selected curricular programs, and taking advantage of other opportunities for learning and development the college provides. Additional items assess the amount of reading and writing students did during the current school year; the number of hours per week they devoted to schoolwork, extracurricular activities, employment, and family matters; and the nature of their examinations and coursework. The NSSE also collects background information including the student's age, gender, race or ethnicity, living situation, educational status, and major field. The psychometric properties of the NSSE are very good, with the vast majority of items equaling or exceeding acceptable levels. Most items have been used for years in established college student assessment programs, and improvements were made to individual items and the overall instrument based on results from the spring 1999 field test described below.

Survey and Sampling Procedures

A distinctive feature of the NSSE is the random sampling of students included in the survey. This is very unusual for national surveys of this type and scale. Registrars (or their equivalents) at the participating institutions sent lists of students who met certain criteria (second semester freshmen, first semester sophomores, seniors) to us. From the lists, we randomly selected the students for the survey. Sample sizes varied depending on undergraduate enrollments. At schools with fewer than 4000 students, the standard sample size was 450 (225 first year students, 225 seniors), 700 at schools with between 4000 and 15,000 students, and 1000 at schools with more than 15,000 undergraduates. In some schools, the number of students was fewer than the standard sample size, so all students were included. In other

schools, additional students were included at the request of the schools.

Spring 1999 Field Test. The purpose of the spring 1999 field test was to test the instrument and the survey processes. This step was needed to learn how the NSSE items were working and to develop working arrangements with participating institutions. We developed and tested three modes of NSSE administration: paper, Web-based, and interactive voice response (Telephone Audio CASI). In the field test, a typical three-mailing process was used. Towards the end of the field period, a Web survey option was provided to a sample of nonrespondents at one school. The Web survey increased cooperation by about 10 percent. Also, IVR was tested to determine its effectiveness. IVR was not at all effective and was dropped from future development activities.

The overall response rate for the spring field test was 43% (3226 students, 1555 first-year students and 1671 seniors). This participation rate was lower than preferred but higher than all but one of the twelve schools typically realize with undergraduate surveys.

Fall 1999 Pilot. Fifty-eight colleges and universities participated in the fall 1999 pilot. Fifty-three schools were surveyed using paper and Web-option; five were Web-only. One school used a special version of the Web survey that was tied to its spring course registration. Because of the differences in administration, its results are not included here.

Overall, the results were very similar to the spring field test. Among the paper and Web institutions the response rate was 43 percent, and the response rate for the Web-only schools was 38 percent (See Tables 1 and 2). Reasons for why the Web response rate was lower than the paper mode will be explained later.

In the first full national scale survey this past spring, NSSE 2000, the survey was expanded to about 275 colleges and universities and about 197,000 students. The data from this survey are still coming in, so we are not yet able to provide any official report. However, the current returns indicate that the results should be similar to the 1999 field test and pilot survey.

Questionnaire Design

The paper version of ***The College Student Report*** is formatted for scanning using scantron technology. The questionnaire has four pages. There are three “other, specify” questions. Instructions are included on the first page and the fourth page contains mostly “demographic” questions.

The Web questionnaire was programmed using Cold Fusion. Except for color differences used to enhance navigation on smaller screens, it has essentially the same design and layout as the paper questionnaire. The questionnaire is programmed such that students respond to all questions before submitting their responses. To reduce item non-response, especially non-response related to screen scrolling, questions that are not answered when the responses are first submitted are returned to the student as missing questions, and the students are provided with a second opportunity to respond.

Data Analysis

Tables 1 and 2 contain selected response rates and differential response

patterns from the Fall Pilot. In the Fall Pilot, approximately 35,000 students were sampled from 57 colleges and universities. The sample sizes ranged from 180 to 2000 students. Students at 53 schools received paper questionnaires. The cover letter that accompanied the questionnaires provided a URL, login ID, and password that would allow students to use the Web version of the questionnaire.

Table 1: Response Rates by Mode; Fall Pilot

	Mail Survey			Web-only
	Paper	Web-Option	*Total*	
Sample			*29809*	5147
Respondents	10187	2286	*12473*	1966
Response rates	34.90%	7.83%	*42.73%*	38.48%
Response by Mode	81.67%	18.33%	*100.00%*	

Table 1 presents the overall response rates by mode. The response rates are calculated removing the “undeliverable” and “not applicable” from the denominator. Relatively few questionnaires were considered undeliverable because, in most cases, when the first questionnaire was returned as undeliverable we sent the second questionnaire to the permanent or home address of the student. Because schools did not have current addresses for the school year until October in some cases, the first mailing was late and the survey period was somewhat compressed.

For the paper version, the overall response rate was about 43 percent. About 82 percent of the students in the paper/Web-option version chose to respond to the paper questionnaire; about 18 percent chose the Web version. The overall response rate for the Web-only schools was about five percentage points lower than the paper schools. However, we detected serious problems with the list provided by one school where many students sent email messages stating they were graduate students. Without validation of that status, we did not remove them from the sample. If the rates were calculated without this school, the overall Web survey response rate is 47 percent. One of the five Web-only schools started the survey very late in the semester, yet had a response rate almost equal to the other schools, suggesting that Web surveys do not require as much time in the field as mail surveys.

There was also substantial variation across schools in response rates. Among the paper/Web-option schools, the rates ranged from 28 to 59 percent. Also, there were variations among schools in the proportions that completed the questionnaire on the Web. The proportion that responded using the Web option ranged from about 5 percent of all returned questionnaires to one school where 42 percent used the Web version. At only six schools did 25 percent or more of the students elect the Web version. Among the Web-only schools (if the school with the list problem is excluded) the overall response rates ranged from 42 to 58 percent.

Table 2: Differential Response by Gender and Mode; Fall Pilot

	Mail Survey			Web-only	TOTAL
	Paper	Web-Option	*Total*		
male	2816	1100	*3916*	1013	4929
	57.13%	22.32%	*79.45%*	20.55%	100%
female	6878	1181	*8059*	1300	9359
	73.49%	12.62%	*86.11%*	13.89%	100%

Some schools did not provide information about the gender of their students, so we cannot calculate response rates by gender. However, the numbers in Table 2 indicate that males were less likely to cooperate. Though women comprise a larger proportion of all undergraduates, the data indicate lower male participation. In the next few months, we intend to look at differences in participation rates for those schools that provided information on the gender of their students.

Males appear to select the Web option more frequently than females. While about 27 percent of the female undergraduates used the Web version, over 42 percent of males used it. These data indicate that offering a Web version might reduce the gender differential, but additional analysis is needed to confirm this tentative conclusion.

Table 3: Selected Mode Differences; Fall Pilot

	Mail			Web-Only
	Overall	**Paper-Option**	**Web-Option**	
Acquiring a general education	3.29	3.29	3.32	3.25
Being honest and truthful	2.75	2.72	2.84	2.83
Talked with faculty about career	2.26	2.27	2.30	2.17
Worked with faculty on research	1.41	1.40	1.42	1.43
Worked with other students in class	2.37	2.36	2.47	2.34
Courses emphasize evaluation skills	2.61	2.58	2.69	2.61
Socializing with other students	3.04	2.94	3.18	3.32

Table 3 shows results by response mode for seven illustrative questions. All questions except the “socializing” question had four-point Likert-scale responses. Only item mean scores are reported to simplify the comparison. They illustrate some of the differences found between modes. The patterns of differences suggest that a more systematic, fine-grained analysis is needed. We used bivariate regressions to test for mode effects between students who completed the survey on the Web and those who used the paper version. On balance, students who used the Web version usually reported more positive outcomes. Moreover, these differences persisted after controlling for 10 demographic and context variables: year in school, race or ethnicity, sex, age, sorority or fraternity membership, major field, full-time or less enrollment, a measure of institutional selectivity, and institutional type as determined by the 1994 Carnegie Classification Index.

However, most of the impact associated with the Web version is a function of the students who elected to use the Web option. That is, when we compared the Web-option against Web-only, we found that for most items those who used the

Web-option reported more positive outcomes even after statistical controls. Web-only students reported responses comparable to those of the students who used the paper version. Rarely did we find that Web-only is associated with more positive outcomes than Web-option or paper version.

In summary, little evidence suggests an overarching Web effect. For example, while there were many statistically significant differences, the substantive differences are not all that large. Further, much of the reported favorable effects associated with the Web survey results might be explained by as yet uncontrolled student characteristics inherent in the decision to use the Web-option. That is, those students who are more engaged in their undergraduate activities might be more likely to choose the Web version. There may be a "selection" bias, not necessarily a mode effect. When the spring 2000 data are available, we will be able to provide a much more robust testing ground to examine Web effects.

Analysis of the Survey Procedures

The national scope of the survey allows for some potentially instructive analysis and evaluation of the survey procedures. On balance, the Web survey approach appears to have some potential advantages as well as some drawbacks.

Web surveys appear to be less costly to administer. First, mass email software (spamming) allows personalized messages and eliminates the costs of printing and postage. Also, the survey data are stored in a database, so there is immediate access to it. Survey processing time and costs are significantly reduced.

Another positive factor of the Web survey is that survey processes can be completed more quickly. A typical mail survey design with multiple mailings requires a field period of least two months. With the Web surveys, we noticed spikes after each mail message, and the impact of the message declined within 2-3 days of the mailing. Using the Web, a four-contact survey process could be completed within three weeks with no loss of response. However, for this survey, we were not able to implement this rapid process because we did not want to introduce additional mode effects. Some of the questions, such as the number of papers students say they wrote or the number of books they say they read, will probably differ, depending on what point in the semester students complete the survey. So we tried to administer the Web survey over the same time period as the mail survey.

Our preliminary analysis indicates that students can complete the Web version of the survey in less time than the paper version. Our observations of students filling out the questionnaire in focus groups indicates that ***The College Student Report*** takes about 15 minutes to complete by filling in the bubbles. The data collected from the Web version indicate that the average amount of time to complete the instrument was about 12 minutes.

It is not yet clear whether programming costs are more or less than designing a self-administered scan form. Both processes are time-consuming and costly. Over time, as software improves, the programming costs of Web surveys should decrease more rapidly than the costs of developing scan forms. The scan form design software we use can produce interactive PDF files that we think will reduce development costs of both versions significantly.

However, the Web survey had some serious drawbacks, some of which we did not anticipate. First, we found that access to the Web is not the same as understanding how to use the Web. Our “help desk” had to answer many questions about simple issues such as how to use submit buttons (even though the information could be easily found in a “help” file). Many students had old versions of browsers that did not support simple Javascripts. We found, as have many others, that AOL users require special procedures. In effect, we had to “dumb-down” the programming and processes to allow for software capabilities and Internet connectivity.

A second related issue was the greater-than-anticipated costs of maintaining a “help desk” for both email messages and toll-free calls related to Web issues. Although the number of callers was high, for the most part they were requesting information that was already available on the “help desk” such as their login ID and password.

Third, we found that the lists of email addresses we received were not always correct. The institutions have varying degrees of skills in generating lists, and many institutions did not have an accurate list of their students' email addresses. Some institutions sent us the wrong email addresses. As a result, we sent messages to the wrong students along with the authentication information. While most people do not usually open misaddressed US postal mail, it seems that many email messages were opened by the wrong persons.

Finally, many students have multiple email accounts and do not use their school-based accounts as a primary correspondence medium. In the Fall Pilot, students at one of the Web-only schools made us aware of this problem. We received many emails from students using email addresses that differed from their school email addresses. This school also participated in an experiment where one-half of the students received the initial mailing by paper and one-half by email. The response rate of those who received the paper letter was 4 percentage points higher than the email-only group.

Conclusion

Certainly the Web will become a more popular method of collecting data. However, it is still unclear when, if ever, it will become a prominent and reliable mode of data collection. Besides the problem of surveying people who do not have ready access to the Web, there are many technological problems to overcome. Even college students who have broad access to the Web and appear to use it for many things are not necessarily going to use it to respond to surveys. While the potential for using the Web as a substitute for other forms of self-administered questionnaires exists, the overall benefit of having another mode might not justify its cost at this point, especially if the target group does not have good Web access.

Currently, Web surveys are feasible in constrained environments such as within organizations. In the future, as the Web becomes more accessible and usable, it is likely that Web surveys will become more broadly used.

The NSSE project is in its first year of national surveys. Over the next few years, we expect to conduct a variety of analyses of the impacts of alternative survey procedures. Researchers working on the project will also examine more closely such issues as mode and selection effects, differences in responses between early and late responders, and other procedural and mode

differences. The availability of large databases will permit careful analysis that allows for multivariate research with both individual and contextual level variables that are not usually available in higher education research.

Source materials

Kuh, George D. (1999). The College Student Report. National Survey of Student Engagement, Center for Postsecondary Research and Planning. Bloomington: Indiana University School of Education.

Kuh, George D. (2000, May). The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties. Bloomington, IN: Center for Postsecondary Research and Planning, Indiana University School of Education.

Much of the description of the project included in this paper was derived from the materials on the NSSE Website (www.indiana.edu/~nsse). A questionnaire demo is available at: www.collegereport.org/NSSEDemo.htm