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Abstract
As part of an institution-wide reform initiative at Montana State University, an adaptive, senior exit survey was developed and delivered via the World Wide Web. Individualized surveys were automatically generated for students so that questions particular to specific major and non-major courses could be administered as well as questions regarding university services. The principle advantages of providing a survey in this format include the ability for students to enter extended student-supplied responses to questions using the keyboard, the use of sampling techniques to target questions to specific student groups, and the delivery of individualized survey results privately to department administrators.

Introduction
In this paper we describe the development and implementation of Montana State University's (MSU) innovative, web-based, senior exit survey for undergraduates. The survey represents one component of MSU's Institutional Reform (IR) Project funded by the National Science Foundation (NSF-EHR #9850116). This project comprises several initiatives designed to move MSU from a campus with promising "hot-spots" of innovation in undergraduate science, mathematics, engineering, and technology (SME&T) education to a campus with truly campus-wide involvement in reform and improvement efforts. These initiatives include faculty professional development, a campus profile, and dissemination of effective teaching approaches, each of which will be described in detail elsewhere.

The survey described here was designed to contribute to the project strand focusing on developing a Teaching and Learning Campus Profile for campus-wide formative assessment to provide an accurate understanding of our accomplishments and highlight what still needs to be done. The survey was tested for the first time in spring 2000, and, therefore, at this point, we are unable to report on our ultimate goal of using data from this survey to inform and influence decision-making on our campus. We, therefore, must admit that we are not reporting the results of an assessment project because arguably the most critical component of the assessment cycle closing the assessment loop is absent from our discussion. However, we feel that the approach and results of the project to date are worth sharing with others interested in using the World Wide Web as an effective mechanism for collecting assessment data.

Needs Assessment
In the fall of 1998, we met with more than a dozen department heads or designated representatives across campus to review their individual departmental assessment plans. The goal of these meetings was to identify ways in which our reform project, still in its most formative phase, could serve to support the assessment needs of individual departments. The most common purpose of departmental assessment plans was

51

gathering data from senior students and alumni, viewed as potentially useful for informing decision-making regarding instructional programs.

However, it was clear that both methods being used to gather this data--the hand-written, university-wide senior exit survey and individual exit interviews--had enormous shortcomings. First, the questions on the existing university-wide senior survey (see discussion below) were viewed as too general to be useful for any-specific decision-making at the departmental level. Second, individual exit interviews were criticized for being time-consuming, not yielding statistical results, and completely missing the large number of non-majors who often enroll in courses outside their major department. For example in 1999, 89% of the student credit hours in the MSU Physics Department were from non-major, general core courses, which are rarely taken by the physics majors individually interviewed by the department head. As the discussions proceeded, there emerged the concept of an adaptive survey that could ask different questions of different students based on their particular majors and the specific elective courses they had taken. This was clearly something that could be most easily implemented using the technology and flexibility of the World Wide Web.

The Original Senior Survey
During 1995, MSU's Assessment and Outcomes Committee developed two surveys, one for graduating seniors and the other for recent alumni. The original surveys were intentionally abbreviated so they could be distributed on a single duplexed page. Questions were designed to reflect MSU's core curriculum objectives and services offered at the University as well as elicit students' opinions on issues of teaching, advising, and administration. The surveys shared several common elements so that responses of seniors and alumni could be compared. Individual colleges mailed the senior survey as part of a packet of graduation ceremony instructions with some colleges also including a second sheet of supplemental questions to collect information specific to their programs. Alumni surveys were also mailed from the President's Office to students who had graduated four years previously, with the hope that a four-year interval was long enough to give alumni some perspective on their University experiences and yet short enough to make their comments relevant to current programs. These surveys were a low-budget effort consisting of one mailing and no follow-up.

Response rates to this paper survey have varied from 33 to 41 percent for the senior survey and from 21 to 34 percent for the alumni survey. Because of these low response rates, it is questionable whether the results can be reliably generalized to the entire population. More importantly, when we compared four years of data, the responses were found to be quite stable displaying no obvious trends, which might in part be a result of the way that the responses were reported (i.e., the percentage of students responding "very effective" and "effective" were combined). There appears to be little guidance in support of reform efforts from that data.

In addition, when we conducted an informal survey of a subset of potential data users (managers of the bookstore, facilities services, residence life, health services, library, etc.) we discovered that only the Dean of Libraries was aware of the data's existence. Others reported that a response to the single question on a survey regarding their particular service--an overall satisfaction rating--would supply insufficient information on which to base decisions. A few of these services already had in place a significant assessment program to meet their specific needs (e.g., the bookstore) but most others felt that responses to a limited number of more specific questions would be useful. All were willing to work with us to develop additional questions for inclusion on a new survey.

The New Web-Based Senior Survey
In the summer of 1999, we developed a conceptual model for a web-based adaptive survey. Once we were committed to an electronic survey, another potential benefit of the technology became apparent. Rather than presenting the same set of broad questions to each student completing the survey, sampling could be used to ask different sets of questions of different students. This procedure would allow a more detailed and extensive set of questions to be asked without increasing the time burden on individual students. However, the trade-off was a reduced number of respondents for any particular set of questions. We hoped that some mechanism of increasing the response rate, such as making survey completion a graduation requirement, would provide a sufficiently high response rate that a random sampling process with more students and fewer questions would be valid.

A full proposal for a web-based senior exit survey was presented to the University Assessment and Outcomes Committee in Fall 1999. This proposal contained no specifics about the items to be included but rather focused on a general structure and on categories of questions. The proposal included a consultative process for generating the items for inclusion in those question categories. It was proposed that the Assessment and Outcomes Committee retain responsibility for items related to broader issues of teaching and learning, with input from our project team, while items specific to departments, majors, and university services (e.g., the Student Union) be developed in individual consultation with those groups. The proposal was accepted and we were charged with developing the items, creating the database program, and implementing the survey in Spring 2000. The issue of requiring students to complete the survey was deferred until after the first trial of the new survey with the hope that publicity and departmental cooperation could be used to significantly increase response rates.

The project team initially developed the items for the teaching/learning component of the survey. Some items were used from the original survey; some items were adapted from other surveys that we evaluated, and some new items were written. An ad hoc sub-committee of the Assessment and Outcomes Committee reviewed the items and recommended some changes. The full Assessment and Outcomes Committee then approved the final version.

Teaching and Learning Component to the Survey
There were three different versions of the teaching and learning component to the survey. The database program cyclically assigned one of the sub-surveys to each student so that each only responded to about one third of the items described below. Collectively, students were asked to
* rate the effectiveness of seven different teaching approaches in helping them learn (i.e., lectures, reading, study groups, etc.),
* rate the effectiveness of general core and major specific courses (rated separately) in helping them achieve a list of 13 different learning goals such as writing clearly, using information technology, and reasoning mathematically,
* rate the general quality and availability of courses in both the core and in the majors,
* report the frequency with which they were asked to perform eight different types of learning activities in their large-enrollment courses (e.g., in-class problem solving or formal presentations),
* rate MSU in meeting a series of 11 goals adapted from a list of 12 attributes of good practice in improving undergraduate education reported in the *American Association of Higher Education Bulletin* (American Association),
* rate the quality and availability of advising,
* report the frequency with which they encountered 14 different instructional strategies (e.g., explaining the importance/relevance of assigned readings or holding review sessions before tests) (*Research Report 98-03*), and

53

❖   report the frequency of nine different student assessment strategies such as multiple choice
     exams or graded homework.

All items use a five point Likert-scale with only the end-points labeled. For instance, in
one section students are instructed: "Please rate the effectiveness of each of the
following approaches in helping *you* to learn. Use a scale from highly effective to
completely ineffective." Students then select one of five radio buttons (the electronic
version of filling in a circle or checking a box) with the first labeled "Highly Effective"
and the last labeled "Completely Ineffective." In appropriate cases, a "N/A" choice was
provided.

With only the endpoints labeled it is reasonable to interpret the responses at the interval
level. That is, it can be assumed that the difference between any two adjacent scores
represents the same interval. Based on this assumption, it is reasonable to report the
average score for the population rather than just the number of students selecting each
option. If all choices are labeled, the scale should only be interpreted at the ordinal level
making the average score less meaningful (Jaeger).

University Services and Demographic Components

In early 2000, we invited interested departments to work with the project team to
develop department-specific questions. These questions would be asked either of the
departments' majors or, alternatively, of non-majors who had taken one or more elective
courses in the department. The department heads were assured that all data gathered
from these questions would be confidential and would not be shared with any other
campus group. Four departments participated in submitting questions about elective
courses, and three submitted questions to be asked of majors. The department heads
were encouraged to use both Likert-scale and written response questions.

The database program was designed to assign these questions based on information
about major and elective courses submitted when the students began completing the
survey. The text explained that some departments had requested specific questions be
asked of their majors and then asked students to select their major from the list of those
departments. The survey then asked students to select from a list all departments from
which they had taken courses outside their majors. Students who had not taken a course
in any of the listed departments would not receive questions about non-majors courses.
Otherwise, the program randomly assigned questions from one of the selected
departments.

The survey also contained questions on four different campus services: the Student
Union; computer services; the Financial Aid Office; and the library. The questions for
each of these services were generated in consultation with the service providers with
assurance that the data would be confidential. Again, we encouraged the use of both
Likert-scale and written response questions. Finally, demographic data was gathered on
all students using the same questions as the original survey.

Implementation

A critical issue that we had to address was our ability to verify the identity of those completing the survey without compromising our desire for making the responses anonymous. We decided to use a combination of the students' last names and student ID numbers to verify identity. When students accessed the system, which could be done from any computer with an Internet connection, their information was compared to a list of all students eligible to graduate and complete the survey. If a student's name was on the master list, it was removed from the list, and the student was advanced to the survey. Students were repeatedly reassured that once they entered the system, there was no way that student responses could be matched with their name and that the survey was truly anonymous. In the event a student's name was not on the "approved" list, she or he was prompted to check the information and try again. Because this would be our first experience with this protocol, we decided to allow students who were not on the main list to complete the survey anyway with the data stored in a separate file. This turned out to be important because we discovered later that our list of potential seniors was missing several important groups who otherwise would not have been able to complete the survey.

A consultant with previous database programming experience was hired to do the necessary computer PERL programming to implement our survey design. It took about six weeks to get an early version of the survey operational under a UNIX platform so that we could work on debugging and a non overburdening page design.

After review by the Assessment and Outcomes Committee, the survey was tested with a group of twelve paid volunteers. These students each completed all of the questions on the survey (the sampling routine was disabled for this portion) while one of us observed. The students were encouraged to "think aloud" and give explanations for their selections so that we could identify any questions that the students were interpreting differently than we had intended. They were also encouraged to make suggestions that would help make the questions more easily understood. As a result of this, some minor changes were made but, more importantly, the general soundness of the survey was verified. Most importantly, the successful nature of student-supplied responses using the keyboard, in the form of text-boxes, became readily apparent.

Besides ease of access, one of the principal benefits of such an electronic format is the flexibility that it affords. This was demonstrated late in the survey development when we were contacted by a colleague in the Department of Education who was conducting a study on students' experiences in senior capstone courses. He asked whether questions pertinent to his study could be easily added to the survey; indeed we were able to readily add 13 questions related to his targeted courses.

The survey was made available to students at the beginning of April 2000, with students beginning to complete it almost immediately. The biggest problem we have at this point is finding appropriate ways to encourage widespread participation. We had initially hoped to work closely with instructors of senior capstone courses to publicize the survey, but, for a variety of reasons, this did not prove to be a productive approach. We did post 125 flyers around campus, place a large advertisement in the school newspaper, hand out "business card" announcements at commencement, put a link to the survey on the commencement homepage, e-mail students in colleges with a listserv (nursing and business), and call individual instructors around campus to have them encourage their students to complete the survey. Unfortunately, the completion rates were still disappointing with only 250 out of a possible 1000 students completing it.

This increases our resolve to work in the future toward making the senior exit survey completion a graduation requirement as many other institutions have already done.

Technically, we are very pleased with the results in that only one student contacted us with difficulties (contact information was placed several places in the survey), and all elements of the database program were apparently faultless. A preliminary review of the data also reveals that students took a great deal of time to enter many lengthy and thoughtful comments as well as complete the rating items. We feel that this rich data has more potential to influence decision-making than that from the old survey. Finally, the process of involving service providers and department heads in developing items has not only alerted them to the existence of the survey (many were unaware of it until we approached them) but it has given them critical ownership in the process. Next year, it will be straightforward to include questions from other interested departments or service providers. Our biggest challenge now is to improve the response rate, which we feel will only really be possible by making the survey a required element.

Author Note: We would be happy to share our database program with any institution interested in adapting it for its own assessment purposes. Please address all correspondence to the first author.

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THINKING ABOUT IT . . .

My Job, My Self I'm intrigued by the psychological devastation that seems to accompany the current layoffs, not to mention much of the recent unemployment, as well as under-employment. It doesn't seem to be just a matter of money--it seems to be a matter of self-worth, of self-esteem; personal identity seems to be at stake.

It's an intriguing claim: one is what one does for money. And I suppose that insofar as one chooses what one does, it's valid. But one doesn't necessarily get to choose one's work. That's the false premise. Perhaps there was a time one could so choose--perhaps, between 1945 and 1980, if you lived in the U.S. or Canada, and if you were white, and if you were male, and at least lower middle class.

Certainly in many European and Asian countries, the state has told people what jobs they would have. Even in the U.S. and Canada, in war time, the state made that decision: a lot of men would not otherwise have chosen to be soldiers; a lot of women would not have chosen to work in munitions factories.

But political power is not the only factor that coerces one's career choice: economic pressures, as in the Depression, have not only determined what job one had, but whether one had a job.

And let's not forget social pressures: the 'career' choices for people not privileged by sex, race, or class have always been less broad. Do you really think that every secretary chose, out of all the careers there are, to be a secretary? Social conditioning, whether

56