

Using the National Survey of Student Engagement to Measure Undergraduate Research Participation

Many institutions rely on the National Survey of Student Engagement's (NSSE) *The College Student Report* as one measure of undergraduate research on campus. In this article I examine the usefulness of individual campus NSSE data concerning a particular question—item 7d, which asks students whether or not they have engaged in a research project under the direction of a faculty member or if they plan to. A thorough discussion is required to understand what exactly is being measured in that portion of the survey. I also offer one suggestion for a comparative method for counting undergraduate research: students' participation in undergraduate research celebration days. I outline the potential benefits of using this participation as a benchmark within and among institutions of similar types and sizes. No study of this approach as a method for counting undergraduate research has ever been conducted.

Introduction

Undergraduate research is a high-impact educational practice that emerges in countless ways, even across the same discipline (Finley 2011). In essence, the way the term is or is not defined will affect how a student will respond to the NSSE question about participation (Fechheimer, Webber, and Kleiber 2011). The Council on Undergraduate Research (CUR) uses this definition of undergraduate research: "An inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline" (Council on Undergraduate Research 2011). Many institutions use a variation of this definition on their campuses.

In reality, undergraduate research is a term used to describe an abundance of activities. Undergraduates may consider research to include: washing dishes in a lab, engaging in an immersive summer research program, writing a formal teaching plan for introductory percussion students learning marimba solos, data entry, website mining, conducting an innovative project on melanoma cells leading to a publication—among innumerable other options. At least some of these types of engagement ultimately lead to outcomes such as professional development, research design skills, and an understanding of data collection and analysis (Lopatto 2010).

Item 7d in *The College Student Report* is problematic because "research" is not precisely defined. What does the item actually measure? In 2000, NSSE conducted several focus groups

to address measures of validity within the survey. Its report says the following about the item:

Worked with a faculty member on a research project. *Some students were uncertain about what would be considered a "research project." Would a research paper be considered this? Or only things more akin to lab-work? The response options also posed a challenge because most students indicated "never". Response options were not all used, and it functioned more like a dichotomous yes/no answer (National Survey of Student Engagement 2010).*

The report discusses the changes in the instrument relating to issues discussed within the focus groups. The item relating to undergraduate research was shifted to a different area of the survey. The 2001 version of the survey item included an additional phrase: "outside of course or program requirements." The added phrase does not, however, seem to resolve the underlying problem concerning students' confusion about the term "research project." Changes to the instrument are scheduled for the 2013 version, but NSSE officials had not released any proposed changes for item 7d at the time of this publication.

NSSE and The College Student Report in Brief

NSSE is a project housed within the Center for Postsecondary Research at Indiana University. The Pew Charitable Trusts, a non-profit organization with a focus on public policy (Pew Charitable Trusts 2011), awarded funds to the center in 1998 for research on good student practices that result in positive outcomes for college students (National Survey of Student Engagement 2011). The grant was used to create and implement *The College Student Report*. According to the NSSE website, the report's survey was first administered in 2000 (National Survey of Student Engagement 2011). Since its inception, the survey has been used by 1,493 four-year institutions, which have administered it to more than 2.5 million students. Although technically labeled *The College Student Report*, the survey and the results are commonly called NSSE (pronounced "nessie").

The survey consists of 28 questions, some of which include multiple sub-questions. The sidebar on the following page provides information regarding the benchmarks of achievement used in the annual reports issued to individual institutions.

Five Benchmarks of the College Student Report

The items of the survey used to define the benchmarks are those that are considered impactful in the student experience.

- Level of Academic Challenge: Based on 11 items of the survey.
- Active and Collaborative Learning: Based on 7 items of the survey.
- Student-Faculty Interaction: Based on 6 items of the survey. (Question 7d is located in this benchmark for assessment.)
- Enriching Educational Experiences: 12 items of the survey.
- Supportive Campus Environment: 6 items of the survey

(National Survey of Student Engagement 2011).

The NSSE website states that the questionnaire takes approximately 15 minutes for students (samples of freshmen and seniors) to complete either online or in a paper version and that the 2010 version produced an average response rate of 37 percent of freshmen and seniors from participating institutions.

The survey has been extensively tested for reliability and validity. The strength of the survey is apparent in a benchmarking system that compares institutions (Kuh 2001; Chen *et al* 2009). The Center for Postsecondary Research at Indiana University provides extensive information regarding the psychometric measures used to ensure the reliability and validity of the survey for institutions and other consumers (National Survey of Student Engagement 2011). After the survey data is tabulated, a report is issued to each institution whose students participated, including their response rate. In addition, data from all other institutions of similar size with comparable missions can be found in the annual report or on the NSSE website.

NSSE officials state that the objective of the survey is to “provide data to colleges and universities to assess and improve undergraduate education, inform state accountability and accreditation efforts, and facilitate national and sector benchmarking efforts, among others” (National Survey of Student Engagement 2010). The goal is to provide institutions with the means to understand which areas on campus are performing well and which could use improvement (Kuh 2003). The survey, itself, is available to administrators to help them understand what the campus’s results mean, so they can begin to take action in areas in which student engagement is lacking (Kinzie and Pennipede 2009). *The College Student Report* provides benchmarks (see sidebar) in five areas of student engagement for campuses to use for comparison with other institutions (Gordon, Ludlum, and

Hoey 2008). The survey’s results for a particular campus may provide the campuses with an overall understanding of students’ perceptions about areas of engagement and how the campus situation can be improved (National Survey Student Engagement 2010). Comparative baseline data from other institutions can help campuses set goals for improvement.

Gathering Institutional and NSSE Data

In my data collection regarding item 7d of the NSSE survey on undergraduate research, 72 directors of undergraduate research were contacted by email requesting access to their NSSE data, particularly comprehensive raw data for question 7d of the survey. Fourteen directors responded, however, only seven responses fit the needs of the project. The directors were identified from a conference held by CUR in 2011. Regarding item 7d, the instrument allows students to select from the following four responses: “Done, Plan to do, Do not plan to do, Have not decided.”

The responding directors also provided records of students’ participation in sponsored symposia (or celebration showcases) for years corresponding to the available NSSE data. The campuses in this survey typically hold at least one annual student presentation event accessible to all students on campus. While the data I collected do not provide a comprehensive assessment of undergraduate researchers’ participation in these events on a particular campus, the number of participants does indicate a measurable level of student activity that can be validated by a campus office of undergraduate research. Records of undergraduate enrollment were obtained through each university’s website.

Data Analysis

In presenting my results, some data were manipulated with simple statistics to provide an overall understanding of seniors’ participation in research at a single institution. The data presented below represent two measures of undergraduate research on individual campuses: self-reported responses to NSSE 7d and counts of students who participated in the campus symposium/celebration day. The second column in Table 1 illustrates the total undergraduate enrollment at the individual institution that corresponds to the year of the data collected by NSSE. Where possible, the spring enrollment data were used for the academic year instead of the fall enrollment. Spring enrollment data are a better indicator of the population of the institution because major symposia/celebration days are typically held in the spring, and the NSSE survey is distributed in the spring semester. Next, the reported number of seniors who responded in the NSSE survey that they had “done” research while an undergraduate is represented in column three, with the percentages these

Table 1: NSSE and Symposia Data *

Institution Name (Data Year)	Total Undergraduate Enrollment	NSSE Count of Seniors Responding Had “Done” Research	NSSE Percentages of Seniors Responding Had “Done” Research	Symposia Participation
The Ohio State University (2010)	41348	2434	22.4%	540 (-5.22% of senior class)
University of Missouri (2009)	23042	NA	27%	143 (-2.48% of senior class)
University of Nebraska-Lincoln (2010)	17627	265	26%	220 (-4.99% of senior class)
University of South Carolina (2009)	17874	531	14%	132 (-2.95% of senior class)
Utah State University (2008)	13179	NA	25%	100 (-3.03% of senior class)
University of Wisconsin – Eau Claire (2008)	10096	NA	25%	588(-23.3% of senior class)
Weber State University (2009)	23001	NA	17%	89 (-1.55% of senior class)

* A full list of references is available in Supplemental Materials in the Spring 2012 issue of the *CURQ on the Web*.

numbers represent of total campus enrollment provided in the fourth column. Rates of total student participation in undergraduate research symposia for the corresponding year are stated in the fifth column. Additionally, a percentage was calculated to approximate the total number of seniors participating in symposia. The percentage was obtained by dividing the total undergraduate enrollment at each institution into equal quarters. To roughly estimate the seniors’ response rate, the percentage assumes all of the students participating in the stated symposium year are seniors. (Actual numbers were not gathered from the institutions in the interests of time and not imposing too great a burden on individual offices of undergraduate research.) This percentage was included in the data table as a crude scaling figure for the NSSE and symposia participation data.

NSSE also offers a new program on its website allowing individuals to build a comparative report concerning individual items based on institutional type. NSSE data were gathered from a total of 298,562 student responses (2009-2010) for this particular report with a total of 20.3 percent of these students indicating they had “done” undergraduate research (see Table 2).

Item 7d: What is actually measured?

Offices of undergraduate research and campus administrators use NSSE data as one measure of undergraduate research. Yet the NSSE question 7d simply asks whether or not the student has worked on a research project with a faculty member outside of class. As a result, students who primarily clean petri dishes in a lab, for example, may select “done”

in response to this question. The NSSE question does not specify where on the undergraduate research experience continuum a “research” experience must fall. Instead, the survey may encompass students who have started the preliminary stages of undergraduate research but never completed a project or never presented information about their own research project. This may lead to an overestimation of undergraduate researchers on campus. Administrators who look to the survey results as a count of undergraduate research engagement may be misled by the quick and easy percentages offered.

NSSE also may exclude students from disciplines, such as arts and humanities, who may not define their scholarly and creative work as “research.” The term “research” may be an unfamiliar one for some students who conduct scholarly activity such as analyzing Victorian-era art for feminist themes. In this example, an undercount of undergraduate research would result.

In conjunction with symposium participation numbers, NSSE may provide a clue to undergraduate research directors concerning the depth of engagement on campus. For example, in 2009 at the University of Missouri, 27 percent of students responded to item 7d by saying they had conducted research. However, the estimated percentage of seniors participating in the given year’s symposium is only 2.48 percent. The University of Missouri has a clear disparity between the number of students who state they have participated in undergraduate research on NSSE and the number of students who present their research at the annual event sponsored by the undergraduate research office. This discrepancy in counts may lead to an interesting discussion of how

Table 2: Student Responses to Item 7d (2009-2010)

Type of Institution	Total NSSE Count of Seniors Saying Had “Done” Research	NSSE Percentages of Seniors Saying Had “Done” Research
Research Universities (very high research activity)	10164	25.3%
Research Universities (high research activity)	10147	20.7%
Doctoral/Research Universities	3441	17.7%
Master’s Colleges and Universities (larger programs)	12808	16.1%
Master’s Colleges and Universities (medium programs)	4888	19%
Master’s Colleges and Universities (smaller programs)	122	20%
Baccalaureate Colleges—Arts & Sciences	7397	28.6%
Baccalaureate Colleges—Diverse Fields	3510	19.1%
Total	54477	20.3%

undergraduate research is perceived on this campus or it may point to a dramatic underutilization of the spring showcase event by students. Simply, students at the University of Missouri may consider undergraduate research to consist of any of the activities discussed earlier, including washing petri dishes or entering data. This is only one interpretation of the inconsistency in the separate counts. However, by comparing these numbers undergraduate research directors and administrators may gain considerable insight into how the term “research” is defined and disseminated on a particular campus.

The data from the University of Wisconsin at Eau Claire presented in Table 1 are unusual when compared with the data shown for other institutions. UW-Eau Claire reported an extremely high proportion of students engaged in undergraduate research symposia. The NSSE data perfect the same information reported by the institution. UW-Eau Claire promotes a campus-wide culture of undergraduate research and reports funding many students’ research. Undergraduate researchers who are funded are required to either present at the system’s undergraduate research celebration day, the campus poster event, or to produce a written report of the research completed. A portion of tuition is designated to



Summer Interns at the University of Missouri pose for a group photograph. These students were funded by seven different programs and represent 24 different institutions.

Photo credit: Abbye Klamann

fund high-impact practices such as undergraduate research. Students at UW-Eau Claire voted and approved a differential tuition fee to improve the institution’s programs that promote “best practices.” Further, the campus provides funding for students to present at professional conferences and meetings. Overall, the climate of the campus encourages students to participate in undergraduate research and to engage in campus or system-wide scholarly events (K. Havholm, personal communication, August 30, 2011).

For most of the institutions in the sample, a disparity is evident between the symposia counts and the NSSE counts of students saying they had participated in research. The ambiguous language of the survey instrument appears to lead students to select “done” at a higher rate in institutions where the culture of undergraduate research is not well defined. In short, the instrument fails to provide a concrete measure of high-level engagement because the definition may not embrace all disciplines and does not require that an original contribution be made. As a result, the survey simply allows for students to define the term “research” for themselves. Although data collected from the instrument provides some insight to the institution about how undergraduate research is perceived or understood by students, the results of the survey do not provide an institutional method for reporting an undergraduate research count that is meaningful for undergraduate research program directors or administrators.



Photo credit: Abbye Klamann

Prairie View A&M University student Vivienne Echendu presents her summer research to a faculty member at the University of Missouri. Vivienne's summer internship was supported by the NSF Research Experience for Undergraduates program.

Measuring Research Day Participation

Many campuses have undergraduate research day celebrations, poster forums, symposia, or some other term used for an undergraduate research showcase. These showcases typically highlight students on campus who have completed their own research or scholarly/creative projects, analyzed their work, and prepared themselves to present the material to the community. The projects completed by students who participate in undergraduate research symposia land firmly within CUR's definition of undergraduate research.

Each campus implements this event in a different way. For example, the Office of Undergraduate Research at the University of Missouri holds two poster forums each year. All students on campus are encouraged to participate in the event. Some departments host a poster session exclusively for the students of the department. Other students outside a structured program may never formally present their work. Therefore, the count of undergraduate researchers based on the campus-wide poster events does not encompass all of the students who might be considered to have conducted research or engaged in other creative activities along the undergraduate research continuum. However, despite an anticipated undercount, using the numbers of students participating in a campus undergraduate research symposium is an easy and systematic way to tally actual students who have achieved a certain level of accomplishment.

Rather than using student responses to an ill-defined item on the NSSE survey as the measure of comparison among institutions, comparing the participation numbers at institutions' sponsored undergraduate research symposia might be a more salient measure for campuses to use. Presumably all institutions have similar challenges in ensuring students participate in such events, and therefore students will be similarly undercounted. Not all institutions have the resources

and long-standing history of undergraduate research that UW-Eau Claire does, so the measure I've outlined may be a more accurate way to benchmark the quality and level of undergraduate research among campuses. In summary, an institution can benefit from comparing the number of students participating in campus-wide undergraduate research symposia or celebrations to the participation numbers at other similar-sized and Carnegie-categorized institutions.



Photo credit: Abbye Klamann

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Future Study

This article begins to scratch the surface of measuring student participation within and among campuses. Studies should be conducted concerning the reliability and validity of using data on undergraduate research symposia as a method for institutional benchmarking. The literature reflects a dearth of qualitative research exploring the ways students define "undergraduate research." Further understanding of how this concept is understood on individual campuses may provide the key for using national assessment tools like NSSE.

In the meantime, the NSSE survey results prompt some interesting questions for undergraduate research directors. How are students defining undergraduate research? How long does the engagement last? How can the campus's office of undergraduate research capture more students in symposia?

The NSSE survey results should not be the sole report provided to stakeholders and administrators as the campus undergraduate research count. Instead, the information should be used in concert with the physical participation counts of presenters at undergraduate research symposia. The latter information reports a tangible number of students

who have achieved a defined level of undergraduate research experience.

Such information can be divided into useful data for undergraduate research offices and administrators. For example, a national database of statistics on numbers of students participating in undergraduate research celebration days, by institution, may provide a detailed and comparative measure of achievement and involvement that is lacking in the NSSE statistics. Data categories could include students' characteristics (year in school, major), mentor characteristics (department, rank), project information (broad academic discipline, poster/oral presentation or performance), and funding source, if any. This information is easy for undergraduate research administrators to gather and put into an online form. A centralized, searchable database accessible through an organization such as CUR would be an invaluable service for campuses to use in understanding participation numbers and how they compare with peer institutions. Further, open dissemination of such data could foster a collaborative and collegial atmosphere for promoting engagement in undergraduate research among institutions across the nation.

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