Multi-State Collaborative (MSC) to Advance Learning Outcomes Assessment
Demonstration Year

Sampling Parameters and Suggested Sampling Methods

In an effort to balance the need for simplicity and institutional flexibility in sampling with the need for psychometric analysis of the validity and reliability of the assessment process and assessment tools, MSC Demonstration Year institutions will generate their own samples of student work following sampling processes that work for their institution’s structure and size, curricula, and student body given the institution stays within the sampling parameters provided below.

- The sampling process adopted by each institution should demonstrate efforts to create a representative sample of students from whom student work products will be collected. Such a sample should reflect the general characteristics of the eligible student population with respect to gender, race/ethnicity, major or program of study, Pell eligible, and age. These were the student characteristics identified and endorsed by the MSC members.

- Participating institutions should submit a draft of their respective sampling plan by October 31\textsuperscript{st} to Gloria Auer at gauer@sheeo.org. Submission should include detailed documentation of the planned sampling method and a completed “MSC Sample Plan Matrix and Evaluation Tool” (attached). The Sampling Review Committee will review your sampling plan and provide you with feedback. In some instances, the Sampling Review Committee may request that you submit a revised plan. Please note that although the deadline for submission of your sampling plan is October 31, the actual sampling window extends through Spring 2016.

- Institutions that participated in the MSC 2014/2015 Pilot Study should reconsider carefully their pilot-study-approved sampling plan before resubmission, specifically and most importantly, taking into account their ability to implement their sampling plan as written. When resubmitting your institution’s sampling plan for the Demonstration Year, please specify the areas of your sampling plan you revised and what led you to make these revisions as well as other observations.

- The MSC Sampling Committee will undertake a final review of institution sampling plans in order to evaluate institution sampling methods and identify where implemented processes across institutions converged.

PLEASE NOTE: The ability to obtain samples of work from 75-100 students depends on the willingness of faculty members to participate in the MSC project. This is true whether an institution begins by sampling students, courses, or faculty. Several institutions are implementing promising methods of encouraging faculty participation. For example, several institutions have already begun communicating with faculty members about the purposes and benefits of the MSC. Other institutions are sharing information about the VALUE rubrics with their faculty and encouraging faculty to visit the MSC website and view the information available for faculty (http://www.sheeo.org/MSC). Increasing faculty understanding of the purposes and benefits of the project will make it easier to recruit faculty and meet sampling targets.

Eligible Student Population
The eligible student population from which to generate your sample of students and student work includes those students nearing graduation—nearing degree completion—as measured by credit completion. The total eligible student population includes:

- Students enrolled in an associate’s or bachelor’s degree program
  
  **Second Degree Exclusion:** Students who are matriculated in a bachelor’s degree-granting program who currently hold a bachelor’s degree should be excluded from the sample at both two-year and four-year institutions. Students who are matriculated in an associate’s degree-granting program who currently hold an associate’s or bachelor’s degree should be excluded from the sample at two-year institutions.

- Students who have completed a minimum of 75% of the total credits required to graduate—as opposed to completion of major or specific program or certificate degree requirements—as of the institution’s established census date.
  
  o The total eligible student population includes those students who have completed 75% or more of the college credits required to graduate as of the institution’s established census date. In order to have a total population we can potentially say something about—at the multistate and possibly state levels—we need to maintain the definition of the total eligible population to include only those students who have completed 75% or more of the college credits required to be graduated. Lowering this completion rate to 50%, for example, does not allow for a useful body of students to generalize up to, in this case students nearing graduation. At the two-year level, we would be looking at students at the end of their first year combined with students at the end of their second year. At the four-year level, we would be looking at students at the end of their second year, third year, and fourth year.
  
  o While different programs/majors may require completion of more credits for a degree in this field as compared to the minimum specified to earn an associate’s or bachelor’s degree, this distinction is not important in this project. If a student needs to complete 120 credits to be graduated with a degree (even if the student is enrolled in an engineering or nursing program, for example, that requires completion of more than 120 credits), these students would be part of the eligible student population if they completed 75% of the 120 credits or more (90 credits or more).
  
  o **Example:** If a student must complete 120 credits to be graduated with a baccalaureate, students who have completed 90 credits or more constitute the eligible student population. There is no upper bound on the number of credits completed.
  
  o **Example:** If a student must complete 60 credits to be graduated with an associate’s degree, students who have completed 45 credits or more constitute the eligible student population. There is no upper bound on the number of credits completed.

- Credits completed may have been earned at the participating institution or may have been transferred into the institution from any other regionally accredited two-year or four-year public or private institution within or outside of the state.

- Students may be either full-time or part-time.

- Students may be enrolled in day or evening courses.

- Students may be enrolled in traditional (classroom based, face-to-face), online or hybrid/blended courses.

- Student work may be drawn from courses independent of the course numbering. Because no common numbering system with respect to the level of the course has been determined, specifying which courses student work may or may not be drawn from based upon course numbering schemes would be somewhat arbitrary.

**Sample Size from Each Participating Institution and State:**

The primary purpose of the 2014/2015 MSC Pilot Study was to establish an effective process for the multistate assessment of student learning using selected VALUE rubrics. Moving forward, the Demonstration Year of the MSC looks to generate valid and reliable estimates of student academic achievement in three outcome areas: written communication, quantitative literacy, and critical thinking. The following specified sampling sizes are based upon this objective.

At the state level:
• States should attempt to obtain a total of 1,000 student artifacts for each outcome per sector. This will yield a confidence interval of three percent at the .05 level. Relaxing the requirement to a confidence interval of five percent at the .05 level would require a sample size of about 400 artifacts for each outcome per sector.

At the institution level:

• Targeted minimum of 75–100 independent artifacts per outcome per institution.
• Institutions willing and able to collect a larger sample of student artifacts for assessment are encouraged to do so if institution resources allow. Sample size at the institution level to allow for significance testing (generalization to the total population when generating a random sample) will depend upon the size of the total eligible population, the margin of error, and confidence level. Those institutions may consult with the MSC Sampling Committee, if necessary, to assist in determining the needed sample size at the institution level. In the event you want to reach out to the MSC Sampling Review Committee, please email Bonnie Orcutt, Chair, at borcutt@bhe.mass.edu.
• Based upon their experience in the MSC Pilot Study, returning institutions have more insight into:
  o The viability of their sampling process and the ability to scale up
  o The ability to identify where they encountered difficulties in obtaining their sample of student work.
  Such difficulties might include:
    • The inability to collect a diverse sample of artifacts for the targeted outcome
    • A limited number of willing faculty
    • Having willing faculty who do not have an appropriate assignment, among other difficulties, and
    • The ability to potentially identify patterns in the resulting data as compared to patterns identified at the state and multistate levels. This may open institution-wide discussions about the observed trends.

Helpful Exploratory Work to Assist in Developing Sampling Process

As institutions develop their sampling process, they might consider asking the following questions:

• Where on the campus are eligible students? What courses were eligible students enrolled in last Fall and Spring? What courses are they likely to be enrolled in this Fall and Spring?
• Who are likely to be your willing faculty?

Sampling is about asking questions. What group of students might you be interested in knowing more about now and down the road? Do you have a diverse group of students and faculty who are willing to participate in the project? Can you increase the diversity of the pool of students and faculty if needed? How might you be able to begin bringing faculty on board?

Identification of Institution-Specific Research Questions

It may be helpful to consider what institutional research questions you hope to explore through participation in the Demonstration Year. For example, you may want to understand more about the demonstrated proficiencies of native versus transfer students. How might your sampling process need to be adjusted to answer this question? Such questions may lead you to collect information on additional student characteristics such as whether a student is first-generation, transfer, and/or veteran.

Generating Your Sample

Overview

The object of the sampling procedure is to identify an initial group of students who meet the requirements for inclusion in the Demonstration Year, i.e., nearing graduation (as defined above) and whose completed work demonstrates one or more outcomes being assessed in the Demonstration Year (written communication, quantitative reasoning, critical thinking, and for those institutions electing to assess a fourth outcome--please see requirements, civic engagement). Institutions should plan to generate a backup sample in order to account for the likelihood that some of the initially
selected students may not complete the targeted assignment because they’ve withdrawn from the course or institution, did not submit the assignment, or in the case where the institution has chosen to require student consent, declined to give consent, or for any other reason.

- Student work must be completed during Fall 2015 or Spring 2016. Student work completed prior to Fall 2015 may not be included in your sample of student work to be assessed as part of the MSC Demonstration Year.
- Student work may be completed and submitted at any point during the 2015/2016 academic year. We are assessing the level of student proficiency in a specific outcome resulting from learning that took place over the student’s entire academic experience, not just learning that is acquired during the course from which the student work is being drawn.
- Institutions may begin uploading student work in November 2015. Additional information and a specific date are forthcoming.

**Sampling Parameters**

As noted above, institutions are asked to implement sampling methods that generate a representative sample of students from whom student work products will be collected. The degree to which institutions are able to generate a representative sample varies across institutions. That said, independent of the institution’s ability to generate a representative sample, sampling methods should abide by the following parameters. These parameters will help institutions avoid generating biased samples or relying on samples of convenience.

1. Students/student artifacts should be drawn from students majoring across a variety of disciplinary areas or programs, enrolled in courses offered by a variety of disciplinary areas and programs, and instructed by a variety of instructors. Following are examples of samples that fall outside of this sampling parameter and will, as a result, introduce significant sampling bias reducing the usefulness of the data forthcoming from the sample.
   - Samples that include students drawn from only one or two majors or programs. Example: Sampling student work completed by psychology and sociology majors only.
   - Samples that include students drawn from only one or two courses. Example: Sampling student work from two sections of a general education capstone.
   - A sample which includes students drawn from courses within only one or two disciplinary areas or paraprofessional or professional programs. Example: Sampling student work from courses offered by the economics and mathematics department. These courses may have students from multiple majors and programs, but this approach would still introduce significant sampling bias.
   - A sample which includes students enrolled in courses instructed by only one or two instructors. Example: Instructor X is willing to participate and offers courses in the health sciences, psychology, and education. Drawing a large percentage of student work from courses taught by this one faculty member even though the course will include students from different major/program areas will introduce significant sampling bias.

2. Limit of 7–10 artifacts collected in total, not per outcome, from any one faculty member or any one course
3. Limit of one artifact per student
4. One artifact may be scored for more than one outcome.

**Suggested Sampling Methods**

Once the eligible population of students has been identified, several sampling methods may be used:

A. Begin with students
   1. Identify the eligible student population as defined above.
   2. Identify the courses these students have enrolled in during Fall 2015.
   3. Contact the instructors of these courses (courses the eligible students are enrolled in) to ask if they’ll have assignments that address one or more of the following outcomes—written communication, quantitative literacy, critical thinking, and (for those institutions which will have collected the benchmark number of rubrics for each of the three required rubrics), civic engagement—for which they’ll be willing to submit corresponding student work for assessment as part of the MSC Demonstration Year.
4. Generate a list of student ID numbers for all eligible students enrolled in the courses outlined above in #3. This is the “original/starting” list.
5. Select a random sample of 100 student ID numbers per outcome from this original list building into the sampling process the limitations outlined above. This will be the initial sample.
6. Generate a backup sample by removing from the original (starting) list of eligible student ID numbers those ID numbers selected for the initial sample. From the remaining list of student ID numbers, repeat the sampling procedure in step 5. This is your backup sample of students. The purpose of having a backup sample is explained in the Overview.

B. Begin with courses:
   1. Identify a list of courses being offered during the Fall semester in which the students from the eligible student population are most likely to be enrolled.
   2. Contact the instructors of these courses (courses the eligible students are enrolled in) to ask if they’ll have assignments that address one or more of the following outcomes—written communication, quantitative literacy, critical thinking, and (for those institutions which will have collected the benchmark number of rubrics for each of the three required rubrics) civic engagement—for which they’ll be willing to submit corresponding student work for assessment as part of the MSC Demonstration Year.
   3. From this list of courses, generate a list of student ID numbers for all eligible students enrolled in the courses as defined above in #2. This is the “starting/original” list.
   4. Select a random sample of 100 student ID numbers per outcome from this original list building into the sampling process the above limitations. This will be the initial sample.
   5. Generate a backup sample by removing from the original (starting) list of eligible student ID numbers those ID numbers selected for the initial sample. From the remaining list of student ID numbers, repeat the sampling procedure in step 4. This is your backup sample of students. The purpose of having a backup sample is explained in the Overview.

C. Begin with faculty:
   1. Identify faculty most likely willing to participate in the pilot study.
   2. Contact these faculty members to ask if they’ll have assignments addressing one or more of the following outcomes—written communication, quantitative literacy, critical thinking, and (for those institutions which will have collected the benchmark number of rubrics for each of the three required rubrics) civic engagement—and which they’ll be willing to submit corresponding student work for assessment as part of the MSC Demonstration Year.
   3. From this list of courses, generate a list of student ID numbers for all eligible students enrolled in the courses that the faculty member has indicated will have an appropriate assignment and for which they’ll be willing to submit student work. This will be the “original/starting” list.
   4. Select a random sample of 100 student ID numbers per outcome from this list, building into the sampling process the above limitations. This will be the initial sample.
   5. Generate a backup sample by removing from the original (starting) list of eligible student ID numbers (those ID numbers selected for the initial sample). From the remaining list of student ID numbers, repeat the sampling procedure in step 4. This is your backup sample of students. The purpose of having a backup sample is explained in the Overview.

Guide to generating a random sample

Once a list of student ID numbers for all eligible students has been generated (independent of the sampling method employed), draw a random sample of 100 student ID numbers per outcome, accounting for the sampling limitations detailed above.

Simple Random Sampling

1. Computer-Generated Random Sample
• Simple random sampling involves selection of the artifacts to be assessed without any order or plan. This may be done with a random numbers table or by computerized random number generators. Instruct the software package to select a random sample of student ID numbers that meets the sampling total of 100 and that abides by the following sampling limitations:
  o Limit of 7–10 artifacts collected in total, not per outcome, from any one faculty member or any one course
  o Limit of one artifact per student
• To generate the backup sample, remove members from the initial sample drawn from the list of student ID numbers for all eligible students and repeat the random sampling procedure.

2. Manually-Generated Random Sample

• Sort the compiled list of student ID numbers by order of the last three digits of the ID number beginning with 000 and ending with 999. Pick a random start point—either by using a table of random numbers or by asking three colleagues to each supply you with a single digit. The result will be a particular three-digit number, for example, “321.” Locate the appearance of this last-three-digit number. Select this number and 99 consecutive numbers immediately following it returning to the top of the list if you reach the bottom before you have selected your sample of 100 students.
• To generate the backup sample, remove members from the initial sample drawn from the list of student ID numbers for all eligible students and repeat the random sampling procedure.

Systematic Sampling

From the generated list of student ID numbers for all eligible students, select the nth student ID until you have reached the targeted sample size you want to obtain. For the Demonstration Year, many institutions are targeting a sample size of 100. To accomplish this, divide the number of total students in your generated list of eligible students by the sample size you want to obtain (100) to determine your interval. For example, if you have a generated list of 500 student IDs, the resulting interval is 5. Determine a random start point at the top of the list from 1–5. If you choose 4, to select the sample, start with the 4th student ID in the list and take every 5th ID. You would be sampling the 4th, 9th, 14th, 19th and so on until you reach your sample size of 100.

Stratified Sampling

Stratified sampling involves the formation of strata or levels of selection based on important characteristics in order to create a sample that resembles the total eligible population from which it has been chosen while maintaining an appropriate degree of randomness. Once a list of student ID numbers from all eligible students has been generated, sort the student IDs into homogeneous groups. Sort by the student characteristics collected such as gender, Pell-eligible, race/ethnicity, age bracket, and/or major or program of study during the semester in which artifacts are being collected (Fall 2015 or Spring 2016). From this homogenous total subgroup population, draw a random sample from each group using one of the random sampling methods above. You must identify the target sample number for each of these separate subgroups. Given the small size of institutional samples, stratified sampling is not likely possible. Institutions that collect a larger sample size may have the ability to undertake stratified sampling for a limited subset of student characteristics collected. Institutions considering the use of stratified random sampling may contact the MSC Sampling Review Committee for guidance. For those who want to reach out to the Sampling Review Committee, please contact Bonnie Orcutt, Chair, at bocutt@bhe.mass.edu.

PLEASE NOTE:

Randomly generated samples may not ensure that all important populations have been included. For example, smaller majors or underserved demographic groups may not be included in a randomly generated sample. Given the small sample sizes at the institution level, this is likely to be the case. To the extent possible, care should be taken with any sampling procedure to ensure that representation across groups is achieved or accounted for. Moving forward, as institutions and states look to collect samples that allow for disaggregation by student characteristics, representation and randomness may best be met through stratified sampling.
**EXAMPLE:** The diagram below is a visual depiction of stratified sampling using proportional allocation. The subgroups may be more or less specific or narrow depending upon the size of the total subgroup population. If you have very small numbers of total eligible student subgroups, stratification will be based upon broad categories—male or female; white, Hispanic, Black, other. If you have larger total eligible student subgroups, this may allow for sampling using more specific subgroups such as eligible Black male students or eligible Black male students majoring in economics. The more specific your subgroup, the larger the sample sizes required for both significance testing and for protecting student identity at the institution level.

**TOTAL ELIGIBLE STUDENT POPULATION**
The total eligible student population is equal to 1,000 students. Of that 1,000, 800 (80%) are White; 100 (10%) are Hispanic; 75 (7.5%) are Black; 5 (.5%) are Asian; 10 (1%) are Pacific Islanders; 600 (60%) are female; 400 (40%) are male; 550 (55%) are Pell-eligible; 450 (45%) are not Pell-eligible. These subgroups are overlapping so you need to undertake multiple iterations of sampling or a significantly larger sample size will be required in order to have much more specific subgroups, such as Pell-eligible, Black males majoring in economics, to avoid the ability to identify any individual student.

**MALE**
List of student IDs of eligible male students to sample from. Males account for 40% of the total eligible population. The sample of 300 should be 40% male.

Subgroup size: 120

**FEMALE**
List of student IDs of eligible female students to sample from. Females account for 60% of the total eligible population. The sample of 300 should be 60% female.

Subgroup size: 180

**RANDOM SAMPLE**
120 student IDs

**RANDOM SAMPLE**
180 student IDs

**TARGETED TOTAL SAMPLE SIZE:** 300
TOTAL ELIGIBLE STUDENT POPULATION

The total eligible student population is equal to 1,000 students. Of that 1,000, 740 (74%) are White; 150 (15%) are Hispanic; 100 (10%) are Black; 1% are other racial groupings.

TOTAL SAMPLE SIZE: 297

Reporting:

At the end of the Spring 2016 semester, after you have fully implemented your sampling process and completed your collection of student work, a reporting structure will be forwarded to you. This document will ask you to detail the actual implemented sampling process highlighting deviations from your sampling plans, where you ran into difficulty in implementing your sampling plans, and how you might improve upon your sampling process. As part of this submission, institutions will be asked to submit a table showing how the demographic characteristics (including gender, race/ethnicity, age, Pell eligibility, and major or program of study) of the total eligible student population compares to the demographic characteristics of those students and their respective submitted student work included in the actual sample. A template for submitting this documentation will be provided.

Questions: If your institution has specific sampling questions, please contact your MSC State Point Person. Their roster follows this page.
Multi-State Collaborative (MSC) to Advance Learning Outcomes Assessment
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Steering Committee/State Point Persons

CONNECTICUT
Arthur Poole
Director, Educational Opportunity
Connecticut Board of Regents for Higher Education
Office of Policy and Research
Hartford  (860) 493-0238
poolea@ct.edu

Michael Ben-Avie
Director of Assessment
Southern Connecticut State University
Office of Assessment and Planning
New Haven  (203) 392-5093
benaviem1@southernct.edu

HAWAII
Monica Stitt-Bergh
Associate Specialist, Assessment Office
University of Hawai‘i at Manoa
Honolulu  (808) 956-6669
bergh@hawaii.edu

INDIANA
Ken Sauer
Senior Associate Commissioner
Research & Academic Affairs
Indiana Commission for Higher Education
Indianapolis  (317) 464-4400
ksauer@che.in.gov

Noelle Wikert
Academic Affairs Coordinator
Indiana Commission for Higher Education
Indianapolis  (317) 464-4400
nwikert@che.in.gov

KENTUCKY
Melissa Bell
Assistant Vice President for Academic Affairs
Kentucky Council on Postsecondary Education
Frankfort  (502) 573-1652
melissa.bell@ky.gov

Jill D. Compton
Senior Associate for Student Success
Kentucky Council on Postsecondary Education
Frankfort  (502) 573-1555
jilld.compton@ky.gov

MAINE
Brian Doore
Director, Office of Assessment
University of Maine
Orono  (207) 581-1522
brian.doore@maine.edu

MASSACHUSETTS
Bonnie Orcutt
Director of Learning Outcomes Assessment
Massachusetts Department of Higher Education
Boston  (617) 994-6915
borcutt@bhe.mass.edu

MINNESOTA
Lynda Milne
Associate Vice Chancellor for Academic Affairs
Minnesota State Colleges and Universities
St. Paul  (651) 201-1887
lynda.milne@so.mnscu.edu

Earl Potter III
President
St. Cloud State University
St. Cloud  (320) 308-2102
ehpotter@stcloudstate.edu

Linda Conway, Executive Asst
lmconway@stcloudstate.edu
(320) 308-2102

Lisa Foss
Associate Vice President/Associate Provost
St. Cloud State University
St. Cloud  (320) 308-4028
lhfoss@stcloudstate.edu

MISSOURI
Rusty Monhollon  
Assistant Commissioner for Academic Affairs  
Missouri Department of Higher Education  
Jefferson City (573) 751-5221  
rusty.monhollon@dhe.mo.gov

Angelette Prichett  
Research Associate-Academic Affairs  
Director, Missouri Academic Program Review  
Director, Curriculum and Assessment Initiatives  
Missouri Department of Higher Education  
Jefferson City (573) 522-2150  
angelette.prichett@dhe.mo.gov

OREGON  
Ken Doxsee  
Vice Provost for Academic Affairs  
University of Oregon  
Eugene (541) 346-2846  
doxsee@uoregon.edu

Tami Oar, Executive Asst  
toar@uoregon.edu (541) 346-4345

Sandra Bailey  
Director of Assessment  
Oregon Institute of Technology  
Klamath Falls (541) 885-1915  
sandra.bailey@oit.edu

Sean Pollack  
University Academic Policy Specialist  
Oregon Higher Education Coordinating Commission  
Salem (503) 947-5925  
sean.pollack@state.or.us

RHODE ISLAND  
Jeanne Mullaney  
Program Chair  
New England Educational Assessment Network  
Assessment Coordinator  
Community College of Rhode Island  
Warwick (401) 825-2478  
jmullaney@ccri.edu

TEXAS  
Rex Peebles  
Assistant Commissioner  
Academic Quality and Workforce  
Texas Higher Education Coordinating Board  
Austin (512) 427-6520  
rex.peebles@thecb.state.tx.us

UTAH  
Teddi Safman  
Assistant Commissioner for Academic Affairs  
Utah System of Higher Education  
Salt Lake City (801) 321-7127  
psafman@ushe.edu

STATE HIGHER EDUCATION EXECUTIVE OFFICERS  
Julie Carnahan, MSC Project Director  
Vice President, SHEEO  
Boulder CO (303) 541-1635  
jcarnahan@sheeo.org

Gloria Auer, MSC Admin  
Executive and Editorial Asst  
gauer@sheeo.org (303) 541-1625

ASSOCIATION OF AMERICAN COLLEGES & UNIVERSITIES (AAC&U)  
Terry Rhodes, Coordinator VALUE Initiative  
Vice President, AAC&U  
Washington, DC (202) 387-3760  
rhodes@aacu.org

Rebecca Dolinsky  
Program Manager and Research Analyst  
Dolinsky@aacu.org (202) 884-7409

Kate Drezek McConnell  
Senior Director for Research and Assessment  
mcconnell@aacu.org (202) 999-8395