Please Note: This document was revised 5/14/2014 to reflect new due dates for when institutional/campus sampling plans are due and additional information about follow-up plans.

This document was revised 06/03/2014 to reflect that an institution’s census date should be used to determine student eligibility.

Multi-State Collaborative 2014/2015 Pilot Study
SAMPLING PARAMETERS AND SUGGESTED SAMPLING METHODS
Prepared by: MSC Sampling Subgroup

In an effort to balance needs for simplicity and institutional flexibility in sampling as well as needs for psychometric analysis of the validity and reliability of the assessment process and assessment tools, pilot study campuses 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 agreed upon by the MSC Data Management and Pilot Study Subgroups and endorsed by the Multi-State Collaborative members.
- Be submitted to Gloria Auer at GAuer@sheeo.org. There are three submission stages:

  **Stage One:** Submit a draft of the planned sampling methods as soon as it is completed, but no later than June 9, 2014. Sampling plans submitted by this date will receive feedback on the plan by June 30, 2014. Submission should include detailed documentation of the planned sampling method and a completed MSC Sample Plan Matrix and Evaluation Tool—sent as a separate document.

  **Stage Two:** Final sampling plans are due by July 20, 2014. Finalized sampling method plans should include thorough and complete documentation of the method and a completed MSC Sample Plan Matrix and Evaluation Tool—sent as a separate document

  **Stage Three:** By January 2015, submit documentation detailing the sampling process as implemented highlighting where the process deviated from the planned sampling protocols, where difficulties arose in implementing the sampling method, how adjustments based upon the fall 2014 experience might improve the sampling process, and other observations. As part of this submission, institutions are encouraged to submit a table showing how the demographic characteristics (including gender, race/ethnicity, age, Pell eligibility, and high-level major or program groupings) of the total eligible student population compare to the demographic characteristics of those students included in the sample whose work was submitted. A template for submitting this documentation will be provided by the MSC Sampling Subgroup later this year.

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

**PLEASE NOTE:** There will be no public reporting of any data collected or statistical analysis undertaken. At the state and multistate levels, data will be aggregated by segment; the individual institution participant will be unknown. Individual institution data will be coded so as to allow for it to be returned to the individual institution upon request. Individual institution data will not be retained at the state or multistate level.
QUESTIONS: If your institution has specific sampling questions, please contact your MSC State Point Person:

Connecticut  Arthur Poole, Director of Educational Opportunity, Connecticut Board of Regents for Higher Education, poolea@ct.edu
Indiana     Ken Sauer, Senior Associate Commissioner for Research and Academic Affairs, Indiana Commission for Higher Education ksauer@che.in.gov
Kentucky    Melissa Bell, Assistant Vice President for Academic Affairs, Kentucky Council on Postsecondary Education melissa.bell@ky.gov
Massachusetts  Bonnie Orcutt, Director, Learning Outcomes Assessment, Massachusetts Department of Higher Education borcutt@bhe.mass.edu
Minnesota   Lisa Foss, Associate Vice President/Associate Provost, St. Cloud State University lhfoss@stcloudstate.edu
Missouri    Rusty Monhollon, Assistant Commissioner for Academic Affairs, Missouri Department of Higher Education rusty.monhollon@dhe.mo.gov
Oregon      Ken Doxsee, Associate Vice Provost for Academic Affairs, University of Oregon doxsee@uoregon.edu
Rhode Island Janet Durfee-Hidalgo, Director of PK-20 Affairs, Rhode Island Board of Education, janetdh@ribghe.org
Utah        Phyllis “Teddi” Safman, Assistant Commissioner for Academic Affairs, Utah System of Higher Education psafman@ushe.edu

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.

- Students enrolled in an associate’s or bachelor’s degree program.
- 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.
  
  **Example:** If a student must complete 120 credits to be graduated with a baccalaureate, students who have competed 90 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 pilot study institution or may have been transferred into the institution from any other regionally accredited two- 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 or each participating consortium:

- Targeted minimum of 75–100 independent artifacts per outcome per institution
- Institutions operating as part of a consortium will share the responsibility of meeting the minimum targeted number of artifacts. For example, if three two-year institutions are participating as a consortium, each institution may target the collection of 35 artifacts per outcome yielding a total of 105 artifacts per outcome for the consortium.
- Institutions willing and able to collect a larger sample of student artifacts for assessment are encouraged to do so if campus 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 the MSC Sampling Subgroup, if necessary, to assist in determining the needed sample size.

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 study, i.e., nearing graduation (as defined above) and whose completed work demonstrates one or more outcomes being assessed in the pilot study (written communication, quantitative reasoning, and for those institutions electing to assess a third outcome, critical thinking). Campuses 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 the student withdrew from the course or institution, did not submit the assignment, or in the case where the campus has chosen to require student consent, declined to give consent, or other reason.

- Student work must be completed during fall 2014. Student work completed prior to fall 2014 may not be included in your sample of student work to be assessed as part of the MSC pilot study.
- Student work may be completed and submitted at any point during fall semester 2014. 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 participating as a consortium should all follow an agreed upon sampling method.

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 campuses are able to generate a representative sample varies across institutions. But, independent of the campus 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 para-professional 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. Limit of one outcome assessed per artifact—one student artifact should not be used to assess 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 2014.
   3. Contact the instructors of these courses (courses the eligible students are enrolled in) to ask if s/he will have an assignment that addresses one or more of the following outcomes—written communication, quantitative literacy, and/or critical thinking (for those institutions electing to assess a third outcome) —for which s/he is willing to submit the corresponding student work for assessment as part of the pilot study.
   4. Generate a list of student ID numbers for all eligible students enrolled in courses for which the faculty member has indicated s/he will have an appropriate assignment and for which they are willing to submit student work for written communication and/or quantitative literacy and/or critical thinking (for those institutions electing to assess a third outcome).
   5. Select a random sample of 100 student ID numbers per outcome from this 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 4. 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 instructor of these courses to ask if s/he will have an assignment addressing one or more of the following outcomes—written communication, quantitative literacy, and/or critical thinking (for those institutions electing to assess a third outcome) —for which s/he is willing to submit the corresponding student work for assessment as part of the pilot study.
   3. From this list of courses, generate a list of student ID numbers for all eligible students enrolled in —written communication, quantitative literacy, and/or critical thinking (for those institutions electing to assess a third outcome) —for which s/he is willing to submit the corresponding student work for assessment as part of the pilot study.
   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.

C. Begin with faculty:
   1. Identify faculty most likely willing to participate in the pilot study.
   2. Contact the instructor of these courses to ask if s/he will have an assignment addressing one or more of the following outcomes—written communication, quantitative literacy, and/or critical thinking (for those institutions electing to assess a third outcome) —for which s/he is willing to submit the corresponding student work for assessment as part of the pilot study.
   3. From this list of courses, generate a list of student ID numbers for all eligible students enrolled in —written communication, quantitative literacy, and/or critical thinking (for those institutions electing to assess a third outcome) —for which s/he is willing to submit the corresponding student work for assessment as part of the pilot study.
   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:
     - Limit of 7–10 artifacts collected in total, not per outcome, from any one faculty member or any one course
     - Limit of one artifact per student
     - Limit of one outcome assessed per artifact–one student artifact should not be used to assess more than one outcome
   - 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 $n^{th}$ student ID until you have reached the targeted sample size you want to obtain. For the pilot study, 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 obtain 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 2014). 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 Subgroup for guidance.
PLEASE NOTE:

Randomly generated samples may not ensure all important populations are 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 be best 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 or 80% are white; 100 or 10% are Hispanic; 75 or 7.5% are black; 5 or .5% are Asian; 10 or 1% are Pacific Islanders; 600 or 60% are female; 400 or 40% are male; 550 or 55% are Pell-eligible; 450 or 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

**WOMEN**
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, 740 or 74% are white; 150 or 15% are Hispanic; 100 or 10% are black; 1% other racial groupings.

**TOTAL SAMPLE SIZE: 297**