



CALIFORNIA  
NORTHSTATE  
UNIVERSITY

**Assessment of  
Student  
Learning Outcomes'  
Handbook**

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## **Learning Outcomes' Assessment at CNU**

Learning outcomes assessment is the purposeful, systematic measurement of student learning at various levels of learning. The goal is a cycle of continued improvement of academic quality for the institution. Effective learning outcomes' assessment is always responsive to the following questions:

- What knowledge, skills, attitudes, values will successful students have acquired upon graduation?
- How well do students perform relative to these learning outcomes?
- How can programs improve to provide a stronger academic experience to students?

## **Purpose of the Handbook**

The purpose of this handbook is to assist CNU faculty, program chairs, and Directors of Assessment, and Assessment Committee Chairs in conducting learning outcomes' assessment. It is a step-by-step guide that expounds the basic concepts and processes, provides examples and strategies for meeting the specific requirements, and offers approaches for making assessment a useful tool in curricular renewal.

## **Learning Outcomes Assessment and Academic Quality**

CNU has two processes for assessing academic quality: *Program Review* and *Learning Outcomes' Assessment*. Learning outcomes' assessment is an annual process by which faculty assess student mastery of program-level learning outcomes (PLOs) and course learning outcomes (CLOs).

Program review occurs every five years and examines programs' overall functioning by studying administrative data, graduate outcomes, and other measures of effectiveness. In addition, the program review also provides an opportunity for academic program faculty to examine learning outcomes data collected through the annual learning outcomes assessment. The program review includes the direct assessment of PLOs. (Refer to Program Review Handbook.)

## **Benefits of Learning Outcomes Assessment**

When conducted properly, learning outcomes' assessment has benefits for the entire institution. It benefits students by ensuring they master the material of their degree program at an appropriate level of performance and by providing academic and professional programs that are responsive to both their own (and society's) needs. It benefits faculty by providing the feedback necessary to lead curricular development. Finally, it benefits the entire institution by giving the institution documented evidence of student learning and achievement, thereby validating the institution is achieving its mission and goals.

## **Learning Outcomes' Assessment at CNU**

At CNU, there are four primary groups directly involved with assessment activity.

- Faculty develop learning outcomes, assess student performance, and provide the necessary analysis to understand learning outcomes in their programs.
- Directors of Assessment manage the assessment process within their programs and submit yearly assessment reports that provide evidence of the activity.

- The Directors of Assessments work with the Vice President of Institutional Research, Quality, and Assessment to plan for appropriate assessment methodology and practices and provides support throughout the process. The Director of Assessment for each college coordinates the overall effort for the college’s assessment activities with assistance from the Assessment Committee and Assessment Committee Chair.
- The University’s Assessment Committee, consisting of representatives from all the schools and divisions in the University, reviews and advises assessment activity to keep the university aligned with requirements of regional accreditation. The college’s Assessment Committees review student learning results from which specific recommendations for improvement are generated to be addressed program faculty. Student learning outcomes(SLO) reports are used to provide evidence, where appropriate, in the budget process.

### **Six steps of learning outcomes assessment**

There are six steps of learning outcomes’ assessment: develop/revise learning outcomes, design outcome measures, collect data, analyze and evaluate data, create assessment report, and plan for the next assessment cycle. The Assessment Handbook is divided into six sections addressing each of these steps. Each section provides a basic overview of the goals and purpose of the step, lists the specific activities for departments associated with the step, and offers suggestions and potential strategies for effectively completing the step.

<b>SIX STEPS OF LEARNING ASSESSMENT</b>
<b>1. Develop/revise learning outcomes</b>
<b>2. Design outcome measures</b>
<b>3. Collect data</b>
<b>4. Analyze and evaluate assessment data</b>
<b>5. Write action plans and create annual assessment report</b>
<b>6. Plan for next assessment cycle</b>

The ideas and suggestions for completing the steps are intended to provide useful information for faculty and department chairs. Since each academic department differs in terms of size, approach, and outlook, it is important to ensure that the assessment approach matches the needs of the program. Staff from the Office of Institutional Research and Assessment are available to discuss ideas and plan for programs to build a learning outcomes’ assessment program that meets its needs.

### **Cyclical nature of learning assessment**

Since the primary goal of learning outcomes program assessment is continued improvement of the quality of education offered by CNU; the process is cyclical in nature. Assessment is an ongoing process that should grow and change as programs evolve and develop.

## Section I: Developing Learning Outcomes

The first step in learning outcomes' assessment is the creation of outcomes, which reflect the core knowledge and material of the program. Most programs have previously developed learning outcomes, so this step of the process allows for reexamination and potential revision. The development of learning outcomes should capitalize on the depth of knowledge of the faculty and thereby help shape the nature and direction of the program.

### Checklist of Needed Activity for Developing Learning Outcomes:

- Key learning outcomes developed
- Evidence of faculty participation in developing learning outcomes
- Verification that outcomes are; being performed by students, observable, and measurable

This section describes characteristics of strong learning outcomes, provides suggestions on how to develop outcomes, and discusses a process by which programs can scrutinize learning outcomes to ensure their strength.

### Effective learning outcomes

**California Northstate has clearly articulated expected SLOs at the institutional, programmatic, and course levels. Institutional Learning Outcomes (ILOs) include the knowledge, skills, abilities, and behaviors (i.e., critical thinking, written communication, oral communication, professionalism, quantitative reasoning, and information literacy) that students are expected to demonstrate by the end of their course of study, and these are aligned with the core competencies articulated by WASC.**

Program Learning Outcomes (PLOs) specify the knowledge, skills, attitudes, values, and behaviors that students will be able to do or demonstrate upon successful completion of their program of study.. PLOs are created by faculty when a program is first created (based on appropriate outcomes for that field of study and the degree level, as well as alignment with the Institutional Learning Outcomes).

Course Learning Outcomes (CLOs) specify the knowledge, skills, attitudes, values, and behaviors that students will be able to do or demonstrate upon successful completion of a given course. Effective outcomes statements are usually expressed as knowledge, skills, abilities, attitudes, and values that students will possess upon successful completion of a program. Learning outcomes statements provide guidance for faculty regarding content, instruction, and evaluation, and serve as the basis for ensuring program effectiveness. Because we evaluate student performance in terms of specific actions, the strongest learning outcomes are measurable and observable. Please see *Tool 1: Key questions to consider when drafting learning outcomes* to assist you in creating effective learning outcomes.

### Tool 1: Key questions to consider when drafting learning outcomes

- What is the most essential knowledge students need to have acquired upon successful completion of the program?
- Are there specific skills or abilities students need? What are they?
- How does the program attempt to shape students'

### Selecting the right verb

Given that learning outcomes focus on observable and measurable actions performed by students, the selection of an action verb for each outcome is crucial. Determining the best verb to use in a learning outcome can be challenging because of its need to accurately reflect the knowledge, skills and abilities being studied. *Tool 2: Common learning outcome action verbs* provides a brief list of verbs that are used in writing learning outcomes at the collegiate level.

#### Tool 2: Common learning outcome action verbs

Analyze	Demonstrate	Prepare
Apply	Design	Rate
Compare	Develop	Revise
Compile	Discuss	Select
Compute	Evaluate	Use
Create	Explain	Utilize
Critique	Predict	Write

Certain verbs are unclear and subject to different interpretations in terms of what action they are specifying. Verbs/verb phrases such as know, become aware of, appreciate, learn, understand, and become familiar with should be avoided; they frequently denote behavior that is not easily observed or measured.

### Strengthening weak learning outcomes

The process for strengthening learning outcomes is to re-examine the original characteristics used of strong outcomes. By asking the three questions in *Tool 3: Evaluating learning outcomes*, weaknesses in learning outcomes emerge.

#### Tool 3: Evaluating learning outcomes

- Is the action done by the students?
- Is the specified action observable?
- Can the specified action be measured?

### Revising learning outcomes

The process of writing learning outcomes is not simple. Determining the outcomes a program wants to examine can pose the first challenge. In addition, drafting the outcome often takes several revisions to develop a strong one that reflects the intentions of the faculty. However, the effort put into drafting strong outcomes will be returned through an easier time developing measures, collecting data, analyzing the results, and ultimately making recommendations for improvement. Strong outcomes will help to focus the entire process and allow for the most useful results from the assessment process.

## Section II: Designing Outcome Measures

After developing learning outcomes, the second step in the assessment process is to select outcome measures. While learning outcomes describe the knowledge, skills and abilities that students should possess after instruction (or completion of the program), outcome measures are the specific tools and methods that generate data and information about students' performance relative to learning outcomes.

There are two types of outcome measures: direct measures and indirect measures. Each serves an important function in assessment, and when used together they provide a richer perspective on student learning by providing direct evidence and context to understand student performance.

→ **Direct measures** are methods for assessing actual samples of student work to provide evidence of student performance relative to the learning outcomes.

→ **Indirect measures** are methods for assessing secondary information on student learning that do not rely on actual samples of student work.

Each type of outcome measure serves a particular purpose. Direct measures assess the extent to which students' work meets the learning outcome performance standards. Indirect measures compliment direct measures by providing supportive evidence, information, and student perspective. Together they provide a richer perspective on student learning by providing direct evidence and context to understand student performance.

### Outcome measures should meet three criteria

Regardless of the type of measure used, strong measures share three basic qualities:

- Provide sufficient data and information to measure the learning outcome
- Are not overly burdensome for departments to collect
- Have established performance standards and expected results to help guide the analyses

### Selecting direct measures

There are many issues to consider when selecting direct measures of learning. Programs should be creative in determining the most useful way to measure student performance, but at the same time ensure that the methods allow for meaning from interpretation and results. *Tool 1: Sample direct measures* provides a list of some of the more common methods within higher education and can help foster ideas for developing measures.

### Checklist of Needed Activity for Developing Outcome Measures:

- At least one direct measure for each learning outcomes
- Indirect measures that will facilitate understanding of the assessment data, when appropriate
- Evidence of faculty participation in the development of measures
- Established performance standards for each measure being used
- Expected results for each measure being used

### Tool 1: Sample direct measures

- Student papers, projects, portfolios, Student Performances and presentations Tests and Examinations
- Thesis Evaluation
- Course-Embedded Assessments
- Pre-test/Post-test Evaluation
- Case studies

**Course-embedded assessments** are direct measures which use student work in specific courses to assess student learning. Students are already motivated to do their best on these assessments because they are conventionally graded on them. For example, if one learning outcome requires students to synthesize the literature on a topic in the field, student research papers may be evaluated using a rubric to assess how well they meet the learning outcome. Many classroom assignments can be used for course-embedded assessment as long as they assess a learning outcome. Course-embedded assessment measures take advantage of student motivation to do well, and directly assess what is taught in the classroom. These assignments are assessed with analytic rubrics that measure LO performance:

**Examinations:** Many course-level learning Outcomes can be assessed by examinations given within the course. In some cases the outcomes measured by the examinations will be identical to the program's student learning outcomes and, the exam questions will assess both course and program outcomes. With some creativity, exam questions can also be written to cover broader Program Learning Outcomes (PLOs) without losing their validity for course grading. In programs without capstone courses, it might be possible to write a coordinated set of exam questions that provide a fuller picture of student learning when administered in exams across a series of courses.

**Analysis of course papers:** Course papers can be used as measures for student learning outcomes. Because students create these papers for a grade, they are motivated to do their best and these papers may reflect the students' best work. This process typically requires development of a rubric that focuses on program learning outcomes. Faculty groups read these same papers to assess the attainment of PLOs. This second reading should be done by someone other than the instructor or by others along with the instructor, as the purpose for the assessment is different from grading. Scoring rubrics for the papers, based on the relevant learning outcomes should be developed and shared with faculty raters prior to rating to promote inter-rater reliability.

**Analysis of course projects and presentations:** Products other than papers can also be assessed for attainment of program learning outcomes. For example, if students are required to give oral presentations, other faculty and even area professionals can be invited to these presentations and can serve as outside evaluators using the same rubric as other raters.

**Student performances:** In some areas, such as teaching or counseling, analysis of student classroom teaching, mock counseling sessions or other performances can provide useful measures of student learning. A standardized evaluation form is necessary to ensure consistency in assessment. One advantage of using performances is that they can be videotaped for later analysis.



**Cross course measures** are direct measures of PLO performance. Cross-course measures examine students' work that incorporates multiple dimensions of knowledge, skills and abilities developed throughout the entire program. The most common types of cross course measures are capstone course papers and projects, and student portfolios. These are assessed with analytic PLO rubrics:

**Capstone courses:** Capstone courses provide an opportunity to measure student learning, because this is where students are most likely to exhibit their cumulative understanding and competence in the discipline. One of the purposes of capstone courses is to provide an opportunity for students to "put it together," which typically requires students to integrate the knowledge, skills and abilities found in the program's learning outcomes.

**Student portfolios:** Compilations of students' work in their major can provide a rich and well-rounded view of student learning. The program usually specifies the work that goes into the portfolio or allows students to select examples based on established guidelines. By compiling a range of student work, portfolios can be used as the measure for more than one learning outcome. Portfolios can also be valuable for the student by providing a reflection of their skills and abilities. Portfolios do require strong, well-constructed rubrics to make the process of extracting assessment data manageable.

**Internship supervisor evaluations:** If the program has a number of students who are doing relevant internships or other work-based learning, standard evaluations by supervisors using a rubric designed to measure a particular learning outcome across the duration of the internship may provide data on attainment of learning outcomes. In addition, when programs exercise control over the content of internships, those settings can serve as capstone experiences where students can demonstrate their knowledge skills and abilities.

### Selecting indirect measures

Like selecting direct measures, there are many issues to consider when selecting indirect measures of learning. Programs should be creative in determining the most useful way to measure student performance, but at the same time ensure that the methods allow for meaning from interpretation and results. *Tool 2: Sample indirect measures* provides a list of some of the more common methods within higher education and can help cultivate ideas for developing indirect measures.

CNU conducts two surveys each year that can be analyzed as indirect measures of learning. The Alumni Survey and the Graduating Student Survey both contain questions regarding the learning experience at CNU.

#### **Tool 2: Sample indirect measures**

- Graduating student and alumni surveys
- Employer and internship supervisor surveys
- Exit interviews and focus groups

In addition, programs are able to add supplemental questionnaires to the Alumni Survey that can be used to answer specific questions and issues of the program. The benefits of including these types of measures into department assessment plans are that they have built in comparisons by examining the program's responses relative to the University or school and they require limited work by chairs and faculty in collecting the data.

While University surveys may provide some insights into students learning experience, they sometimes lack the specificity needed by programs in their assessment activity. Accordingly the programs may need to conduct their own primary research to address the issues. These methods may be quantitative or qualitative in nature, but should still address the key issues of strong measures.

**Internship Supervisor Survey:** Internship supervisors may provide general feedback to programs regarding the overall performance of a group of students during the internship providing indirect evidence of attainment of learning outcomes. This should not be confused with internship supervisors' evaluation of student performance on specific learning outcomes.

**Focus Groups:** Focus Groups provide in-depth, qualitative interviews with a small number of carefully selected people who are thought to represent the population of interest (students in the program). For program assessment, students are brought together to discuss their perceptions of how well they achieved the program's learning outcomes.

**Exit Interviews:** Graduating students are interviewed individually to obtain feedback on the program. Data obtained can address strengths and weaknesses of the program and/or assess relevant concepts, theories or skills related to the program's learning outcomes.

**Area Expert Comments:** Comments made by area experts can be useful in gaining an overall understanding of how students will be judged in a given field. This differs from having experts use the same rubric faculty raters use, and instead focuses on their opinion of the quality of students' work and the program in general. This should not be considered a direct outcome measure but it can serve as a valuable indirect measure.

**Establishing performance standards:** When interpreting assessment results, it is useful to set a performance standard that specifies the acceptable level of student work or response. For each learning outcome the program should ask "What is an acceptable performance standard for this learning outcome?" This performance standard may be a passing score on an exam, a rubric rating of "meets program standards" on a student paper or another indicator of the quality of student work.

**Establishing expected results:** By setting expected results for the percentage of students meeting or exceeding performance standards before data collection begins, the program can gauge its effectiveness in helping students meet the learning outcomes. For example: Seventy-five percent of students met the performance standard set by the department for the outcome measure on ethical reasoning. This can be compared to the expected result of 80% meeting the performance standard which reveals an area for improvement.

### **Evaluating measures**

It is possible to evaluate outcome measures by asking the three questions found in *Tool 3: Questions for evaluating outcome measure*. If faculty and chairs are able to answer “yes” to all of three questions, it is likely that a strong set of measures has been developed.

#### **Tool 3: Questions for evaluating outcome measures**

- Does the measure provide sufficient data and information to analyze the learning outcome?
- Does the measure require a reasonable amount of work to collect?
- Does the measure establish performance standards to help guide the analysis?

## Section III: Collecting Data

Data collection is the next step in the assessment process. This section will cover the process of collecting student work and indirect measures, rating work, and storing data. The collection process may seem like a daunting task, but with planning, it can move more smoothly and provide quality data and information about the programs learning outcomes.

The data collection process consists of three basic steps: **gathering** necessary student work and other information, **evaluating** the results, and **storing** the data. The **Gathering, Evaluating, and Storing (GES)** process is used for both direct and indirect measures; however some of the specific steps will vary. The key to simplifying the data collection process is planning. *Tool 1: Questions to ask in planning data collection* provides a number of questions to think about before gathering data.

### Checklist of Needed Activity for Collecting Data:

- Direct data collected for each learning outcome and measure
- Indirect data collected, if appropriate
- Secure electronic database of both direct indirect measures
- Examples of the student work for each performance standard in either paper or electronic form.

#### Tool 1: Questions to ask in planning data collection

Direct Measures	Indirect Measures
<ul style="list-style-type: none"> <li>• Where is the student work coming from?</li> <li>• How will the student work be organized and stored for evaluation?</li> <li>• When will it be evaluated?</li> <li>• Who will be responsible for evaluating?</li> <li>• How will the performance data be stored? How will it be secured?</li> <li>• How will examples of student work be stored? Paper? Electronically?</li> <li>• Are there FERPA issues to consider?</li> </ul>	<ul style="list-style-type: none"> <li>• Who will conduct the research for the measure?</li> <li>• When will research be done? In a class?</li> <li>• How will the results be tabulated or a categorized?</li> <li>• If you are using institutional data, will special data analysis need to be done?</li> </ul>

### Step 1: Gathering

The process of gathering materials for direct measures varies greatly depending on the measures used. For course-embedded measures or capstone experiences, it is necessary to coordinate with the faculty member teaching the course to ensure the student work is collected and forwarded for assessment. If a portfolio is being used, it will be necessary to determine who is responsible for putting the portfolio together.

When using indirect measures, the gathering phase consists of conducting the necessary research (survey, focus group, or other measures). Indirect measures based on secondary analysis of

material (e.g. course syllabi) need these materials to be compiled. Programs should set a schedule that outlines the materials needed to simplify follow up and ensure all student work is collected.

## Step 2: Evaluating

The evaluation phase for direct measures includes the examination of student's work by faculty to determine the level to which it meets the learning outcome. Because assessment looks to evaluate specific aspects of the student work, rubrics are often used as guidelines in the process.

Effective rubrics, standardized evaluation forms used to assess student work toward meeting learning outcomes, can be developed in many different ways to assist the evaluation process. They can describe qualitative as well as quantitative differences; and are often used to assess assignments, projects, portfolios, term papers, internships, essay tests, and performances. They allow multiple raters to assess student work effectively by increasing the consistency of ratings and decreasing the time required for assessment. The development of rubrics is covered in Appendix A: Rubric Toolbox.

Regardless of the type or style of rubric used, there are a few general principles to ensure they are effective. *Tool 2: Steps for using a rubric to evaluate student work* outlines the basic process of using rubrics.

### Tool 2: Steps for using a rubric to evaluate student work

- Review the rubric with all raters to ensure it is consistently understood.
- Use the descriptors in each performance level to guide ratings
- Assign the rating that best represents the student's work

The key to achieving consistency between raters is conducting a "norming" session to allow faculty raters to reach consensus on the levels of student work at each level of the performance standard. *Tool 3: Steps to "norming" a rubric* provides the basic process of a norming session.

### Tool 3: Steps in "norming" a rubric

- Explain to the raters how to use the rubric
- Provide samples of student work
- Discuss each sample and determine how raters determine scores
- Reach a general consensus on each level of the performance standard

For indirect measures that the department is conducting, the evaluation phase consists of the compiling of the results into a form that are meaningful to those doing the assessment. For survey data, this will generally include entering the data into a data set for analysis and generating the descriptive statistics. For more qualitative work such as focus groups, this part of the process maybe the extraction of any themes or ideas.

## Step 3: Storing

There are two different storage issues which departments need to address. The first is an electronic storage system of all the data that are compiled from students' work and results from indirect measures.

For tracking direct (and some indirect) measures programs may create an electronic database/Excel spreadsheet to store all of their assessment data for later analysis.<sup>5</sup> The database will typically list all students and their performance on the measure.

Because this database will have individual student information, it is very important to ensure it remains secure and that only faculty and staff involved in the assessment activity have access to the contents.

Many times, however, indirect measures may not be trackable by specific students. For these types of measures a descriptive report of the results will be useful as the program reviews the direct measures.

The second storage issue facing the department revolves around copies of student work and responses to questionnaires. It is generally advisable to retain copies of or access to the direct measures until the University Assessment Committee has reviewed the final report. If these examples contain either students' names or student id numbers, it will be necessary to maintain a secure filing system. *Tool 5: Protecting student identification* provides a procedure to limit inappropriate access to student information. While this requires a bit of work upfront, it can help the program avoid thorny issues later.

Additionally, it is recommended that samples of students' work be stored to document the assessment process. Generally for each direct measure, an example at each level of the performance standard should be saved. Electronic copies of student work can reduce space required for storage and allow the original work to be returned to the students. These documents can be scanned and stored as PDF files to help limit the amount of storage space necessary.

**Tool 5: Protecting Student Identity**

- Assign a unique numeric code to all students enrolled in program (Do not use student ID or Social Security Number)
- Store number in secured database
- Collect student work with name
- Print appropriate code on each example of student work
- Redact work to eliminate evidence of authorship

## Student awareness of assessment activity and privacy issues

Students should be aware that their work may be used in the assessment purposes. *Tool 6: Syllabi statement regarding student work in assessment* provides an example of a statement that departments may want to use. By incorporating the statement on select or all program courses the department informs students about its assessment work.

### **Tool 6: Syllabi statement regarding the retention of student work**

Notice:

*Copies of your coursework including any submitted papers and/or portfolios may be kept on file for institutional research, assessment and accreditation purposes.*

As noted in the section about keeping data work secure, student work is protected by The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99). To comply with FERPA regulations, student work should either be maintained in a secure system with access limited to those involved in assessment or should have all personally identifiable information removed. Even without a name, some student work is considered identifiable if it contains sufficient information about the student to enable the author to be identified.

### **Strategies for collecting data**

By reviewing the original planning questions in *Tool 1: Questions to ask in planning data collection* before collecting data, programs can avoid many potential roadblocks in the data collection process. The following example lists three common roadblocks that can occur during this process and illustrates an effective plan for data collection.

## Section IV: Analyzing Assessment Data

Analysis of data is the next step in the assessment process. Analysis is a process that provides better understanding of data and allows inferences to be made. It summarizes the data, enhances the value of information gathered and provides direction for decisions regarding program improvement. While data analysis can be relatively complex, for the purpose of assessment it is usually basic.

### Checklist of Needed Activity for Analyzing Assessment Data:

- An indication of the number students participating in the assessment activity for each outcome measure
- The percentage of students who met or exceeded the performance standard for each outcome measure

This section discusses the core elements of data analysis and provides strategies for and examples of analysis. The underlying theme of this section is to illustrate how to link data to the learning outcomes and provide a basis for using data to improve student learning.

### Before analyzing data

Two important steps should be completed before analyzing data. The first step is to review the data visually. Reviewing data has two benefits: It allows for the identification of outliers and possible mistakes, and it enables basic patterns or trends to emerge. For example, it may be clear that all students who took a particular class had difficulty with a particular outcome.

The second step of the process is to determine the appropriate method for analyzing the data. This can range from simply counting the number of successful students to higher powered statistical analyses. The two key factors are first to make sure the analysis method fits the data; and second, to ensure that method aligns with the program's needs. There are two types of data used in assessment each with different methods of analysis.

**Categorical data** are based on groupings or categories for the evaluation of student performance. For example a simple passed/failed score is categorical because there are two groups into which students can be placed. Often rubrics generate categorical data by using a scale of "exceeding expectations," "meeting expectation," and "failing to meet expectations".

**Numerical data** are based on scales that reflect student performance. Tests which are scored based on the percentage of questions answered correctly generate numeric data.

Direct measures can generate either categorical or numerical data. Student's papers rated on an assessment rubric may be categorized as "meeting standard" or "failing to meet standard". However the papers may be scored on a numerical scale indicating the overall quality of the paper with respect to the learning outcome.

Indirect measures can also generate either categorical or numerical data. By asking students on a questionnaire: "Did you have sufficient writing in the program?" a program would compile categorical data based on those saying "yes" and those saying "no." However, by asking students to indicate how strongly they agree with a statement like "there was sufficient writing required in



my program”, numeric data could be generated by applying an agreement scale. (5 – Strongly agree, 4 – Agree, 3 – Neither, 2 – Disagree, 1 – Strongly disagree).

### Analyzing assessment data

Once the data have been reviewed and the type determined, the process of analyzing data follows. *Tool 1: Methods for analyzing data* provides a brief overview of the basic methods used to analyze assessment data.

Assessment’s focus on student achievement of learning outcomes typically requires the determination of counts and percentages. Together they show clearly the number of students involved in the activity and the rate of successful display of the outcome. All data, regardless of type can be analyzed using counts and percentages. Numeric data has the additional benefit of being able to be analyzed using descriptive statistics. Mean, median, and mode provide useful information to interpret data by allowing for easier comparison between groups and tests for significant differences.

#### Tool 1: Methods for analyzing data

- **Percentage:** Proportion of total cases falling into a category
- **Mean:** Average of a set of scores
- **Median:** Middle value in an ascending list of scores
- **Mode:** Most frequent score
- **Standard Deviation:** Average distance of scores from the mean
- **Percentile:** Percentage of a distribution of scores that is equal to or below a specified value.

### The impact of dispersion

By examining how data are distributed around measures of central tendency, particularly the mean and median, a richer understanding of the data emerges. The standard deviation represents the average deviation of scores about the mean. Small standard deviations in student performance indicate that performance levels varied little across students in the sample. Large standard deviations indicate a greater variability in levels of student performance. Standard deviations are commonly reported with the mean. Percentiles represent the percentage of a distribution of scores that are at or below a specified value. They are calculated by the formula  $\text{Percentile} = S_b/n \times 100$ , where  $S_b$  is the number of scores below the score of interest, and  $n$  is the total number of scores. They are often reported with the median which by definition is the 50<sup>th</sup> percentile. For example: a median score of 75 on a final exam would be the 50<sup>th</sup> percentile indicating 50% of students scored above 75 and 50% scored below. By examining the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles one can gain a sense of a student’s performance relative to the group.

### Missing data and valid responses

Working with assessment data, there are many instances when data will not be available for every student. As a general rule, missing data should be excluded from calculations of percentages and descriptive statistics. If a program has ten (10) students, and eight (8) submit a needed paper for the assessment of an outcome; then eight (8) submitters become the basis of the analysis. Extending the example, if six (6) of the submitted papers meet or exceed the performance standard, then a program would indicate 75% of students submitting papers showed mastery of the outcome rather than 60% of all students in the program.

Missing data can routinely be handled by utilizing the IBM SPSS statistical package. Within the Office of Institutional Research and Assessment, all missing data is denoted as “99” and excluded from all analyses. The following steps will assist in eliminating missing data from the analyses:

1. On the SPSS data sheet, toggle over to “variable view” at the bottom left hand of the screen.
2. Under the “Missing” column, click on the “...” button for a variable that has missing data that needs to be excluded.
3. Insert “99” under the “Discrete missing values” field.
4. Click “OK” and repeat for each variable with missing data.

### Formative Assessment

Formative assessments (e.g., quizzes, application exercises, and assignments given to check for rudimentary comprehension) measure students' initial and developing understanding of the concepts taught. Formative assessments are important in the teaching and learning process, as they provide feedback for both the student and faculty of the students' progress; summative assessments are critical because they measure what students have learned by the end of courses or programs.

### Assessment Rubrics:

The rubrics include indicators of knowledge, skills, abilities, and behaviors that describe what students are expected to demonstrate, and each of the indicators includes a descriptor for each performance level. Essentially, rubrics are used to communicate and measure the expected PLO or CLOs at the desired levels, generally "proficient" and preferably "exemplary," by the conclusion of a course. This assessment process provides faculty with a portfolio of summative assessments, with corresponding rubrics, that serve as documentation for students' learning.

The use of rubrics in the curriculum is valuable not only because of their utility in measuring learning outcomes and in communicating expectations of these outcomes, but also because of their design as a reliable, valid instrument for assessment. Faculty are able to ensure their rubrics accurately describe what should be measured (e.g., the skills, knowledge, and abilities appropriate for the CLO) and that their rubrics, when used by various faculty members, produce consistent assessment results.

Our 2016 WSCUC report: Let's find a home for this paragraph!

CNUCOP utilizes a Program Review Plan, which details which PLOs and ILOs are to be validated in which academic year, in an assessment event, which CNU calls its LO Palooza—an annual faculty-driven and hosted event in which faculty undergo a norming session, followed by the cross-college validation of learning outcomes through the analytic rubric-based assessment of de-identified student artifacts from signature assignments and assessments that are embedded at critical points late in the curriculum. In addition to the comprehensive program review process, each program utilizes an annual curricular review process, in which course and faculty evaluations, student survey results, and student learning outcomes are compiled each year in the Assessment Report and are used to make improvements in courses and in teaching and learning.

Assessment Report:

## Presenting analysis

Tables and graphs are useful in presenting analysis because they focus attention to specific results. Tables are useful for reporting multiple percentages and frequencies, comparison of student performance with stated performance standards and some descriptive statistics. They provide an ordered way for readers to see results quickly for each outcome measure without having to search through text to find a particular result. Graphs can further enhance the visual impact of assessment. Graphical representations of results show differences in variables, which makes graphs highly effective in showcasing assessment results.

When sharing the results of program assessment it may be useful to report each learning outcome and outcome measure paired with the corresponding results of the analyses, which joins the multiple outcome measures (direct and indirect) for each learning outcome. Next, compare the results with the specified performance standard and discuss the implications of the data as they relate to the program. Both strengths and areas for improvement are discussed, because showcasing program success is just as important as identifying areas for improvement, when it comes to making data based decisions about the program.

When comparing student performance to specified performance standards, a table with the counts and percentages may be useful to summarize the data. The example in *Tool 2: Example of table of counts and percentages* shows data collected from 20 student portfolios for two learning outcomes. It indicates the number of students completing the portfolio component and the percentage who were below, met and above the performance standard. While 70% of students in the sample achieved or exceeded the standard, 30% were below the performance standard.

Tool 2: Example of table of counts and percentages				
	# of students evaluated	% of students		
		Below Performance Standard	Meeting Performance Standard	Above Performance Standard
Demonstrate critical thinking and writing skills within the discipline	20	30	50	20
Apply specialized knowledge within Trans Psych and related fields	18	5	5	90

## The role of advanced statistical analysis

As a program's assessment activity and data increase, more advanced analysis may be useful in understanding student learning. It is possible to

- Study differences in performance to examine the effects of curricular change
- Conduct pre and post assessments to evaluate effect of specific learning experiences
- Compare program students to national performance on certification examinations

The Office of Institutional Effectiveness will work with programs looking to incorporate these and other types of analysis into their assessment activity.

## Section V: Reporting Results

The next step of the cycle is reporting results of program assessment. This phase focuses on interpreting strengths, areas for improvement, and identifying recommendations to enhance student learning. There are two steps in writing the assessment report:

1. Working with faculty to understand assessment results
2. Writing the final assessment report

### Working with faculty to understand assessment results

Including program faculty in all steps of the assessment process is important to ensure its meaningfulness and effectiveness. The inclusion of faculty insights is probably most important in interpreting results and identifying strategies for improving student learning. The methods used for sharing results is driven by character of the department, with some pouring over all the data generated and others simply reviewing summary analysis outlined in Section IV of the handbook. Using summary reports of assessment results, and the University Assessment Committee's review of the previous year's report will typically facilitate rich discussion and generate useful interpretation for the assessment report.

### Writing the assessment report

The assessment report is the document which summarizes a program's assessment activities, program decisions, and future directions. The report is reviewed by the University's Assessment Committee, and used by the academic program to evaluate its effectiveness. This report also serves as the principle evidence of learning outcomes assessment for institutional accreditation. It is typically compiled by the program chair and faculty based on the work outlined earlier in this Handbook. The report contains three components: Outcome Reports, Executive Summary, and Appendix of Supporting Material.

**Outcome reports** examine each learning outcome individually (see Appendix C). This section of the report is divided into three sections: Outcome and Past Assessment, Assessment Activity, and Interpretation of Results.

*Outcome and Past Assessment* gives an overview of past assessment activity with this learning outcome. This section gives a brief description of trends and general findings.

### Checklist of Needed Activity for Reporting Assessment Results:

- One completed outcome-specific report for each learning outcome assessed during the year which includes results, interpretation, and implications
- An executive summary including a list of student learning outcomes, description of the overall findings, any challenges the program faced in its assessment activity, and Assessment Committee recommendations.
- An appendix of materials used in the assessment process including direct and indirect measures

*Assessment Activity* describes each component of the assessment process. It includes the following sections:

**Outcome measures** includes a description of each measure used for this outcome by identifying how the measure was created, when it was implemented, and who used it. The description also indicates if it is a direct or indirect measure.

**Performance standard** defines the assessment criteria and how well students (overall) are expected to perform on this measure. This section also includes a justification for the expected performance level. For example, if a new outcome was added to the program, students may not be expected to perform at 80%, but rather 50%. It is important to explain the justification for this standard not only for the reviewers, but also to create and maintain a record for the program.

**Data collection** explains the collection procedures. A clear description of this process will also allow for easy replication in the future. *Tool 1: Data collection questions* gives a list of three basic questions to address when completing this section of the report.

**Tool 1: Data collection questions**

- *How were data collected?*  
Did each professor ask students to submit 2 copies of papers so that one copy could be used for the assessment? Did the chair ask each faculty member to submit papers to him/her?
- *When was data collection?*  
Fall semester? Spring semester?
- *Which students were included?*  
Students in a specific course? Seniors? Juniors?

**Analysis** section describes results and how data were analyzed. The following questions should be addressed:

*What approach was used to analyze data?*

Average scores on a multiple-choice test? Percent rated in each category on a rubric?

*What did you find?*

What are your results?

*Did you have the level of participation expected?*

Did you receive data from all courses who should have contributed? How many participants are missing? Does the work received provide a good sample to determine if the learning outcome was or was not achieved?

*Interpretation of results* provides meaning to the data collected in the assessment process and includes the following three sections:

**Extent this Learning Outcome has been achieved by students** discusses how well students performed on each measure (direct and indirect) by summarizing information from **Analysis** section for each measure. In this section, the outcome

is viewed as a whole entity and not in its component parts as in the *Assessment Activity* section.

**Program strengths and opportunities for improvement relative to assessment of outcome** requires the program to define where students are performing at the highest and lowest, and what this means for the program. How do results indicate that the department is adequately supporting (or not supporting) this learning outcome?

**Discuss planned curricular or program improvements for this year based on assessment of outcome.**

This section describes the plan for action for the next year. Planned improvements usually address one of the following areas:

- Courses supporting learning outcomes
- Learning outcomes
- Measures (rubrics, tests, surveys)

**Executive summary** through its different sections provides a brief history of previous assessment activities and linkages to school and university mission. This section includes the following components:

*Description of where documents are stored* provides direction for finding assessment data. It is advisable for programs to retain (or have access to) student work generating assessment data for one year. This allows for easy reference while the University Assessment Committee is reviewing the report. This can be done either in paper form or electronically. Programs should maintain samples of student work for each level of performance standards used in the assessment activity (e.g. exceeding the standard) as part of the report to make future examination possible.

*Lists of all outcomes past and present* provides an ongoing history of learning outcomes for the program. All learning outcomes should be included in this list.

*Description of linkage to departmental and university mission* refers to specific aspects of the school and

university mission that relate to the program. Completing this section requires an explanation of how the program connects to the university mission and school plan. See *Tool 2: University Mission and Link to Strategic Plan* for further information.

*Describe how the program implemented its planned improvements from last year*  
It is important to provide the program and reader an understanding of what occurred and why. The following information needs to be included in this section:

**Tool 2: University Mission and Link to Strategic Plan**

**University Mission**

**To advance the Art and Science of Healthcare**

*See University portal for Strategic Plan*

- Description of the specific planned improvement for each outcome
- How the program concluded that improvements needed to be made
- Who was involved in the implementation
- When the completion occurred

<b>Tool 3: Example of Documentation of Implemented Planned Improvements</b>		
<b>Outcome</b>	<b>Planned Improvement</b>	<b>Update</b> ( <i>Indicate when, where, and how planned improvement was completed. If planned improvement was not completed, please provide explanation.</i> )
Apply ethical reasoning in discussing applied issues.	Add a case-study assignment to course that reinforces ethical theories learned in previous course	The professor who primarily teaches course X reviewed the course syllabus and decided to add a homework assignment to week 5 in which students reflect on the ethical consideration of a research project.
Write a coherent argument using primary sources	Invite the library faculty to course X to review finding primary sources	We decided against this planned improvement because starting in the fall course X is no longer a requirement for the major. Instead we have decided to work with the library faculty to develop an online refresher that will be targeted to a series of elective courses

*Response to University Assessment Committee Recommendations*

Each program will receive a report from the Assessment Committee with one of the following boxes selected:

**Report accepted as submitted** – If this box was selected, indicate that your report was accepted as submitted.

**Revisions required to accept report this year** – If this box was selected, describe what actions taken to have report accepted.

**Recommendations for next year’s assessment process** – If this box was selected, list each recommendation and if it was or was not implemented. A thorough response to this item gives context for why recommendations were or were not acted on.

**Appendix of supporting materials** is a compilation of materials that aids in the understanding of the outcome reports and the executive summary. *Tool 3: Items often included in assessment report appendices* lists the types of materials that are most commonly included. Appendices should include copies of all assessment instruments including rubrics. By including items such as rubrics and other measures in the appendices, those who read the assessment report will have a better understanding of how the results were achieved and a context for interpreting recommendations for improvement.

<b>Tool 4: Items often included in assessment report appendices</b>
<ul style="list-style-type: none"> <li>• Notes from meetings with faculty</li> <li>• Examples of outcomes measures</li> <li>• Rubrics used to score student work</li> <li>• Questionnaires used in indirect measures</li> <li>• Charts and graphs illustrating results of data analyses</li> <li>• Reports from institutional surveys</li> </ul>



## Section VI: Planning for the Next Assessment and Closing the Assessment Loop

Assessment is a cyclical process that builds on previous work and activity. The “assessment loop” is closed once a program takes findings from its assessment results, and implements changes based on those findings. Generally, assessment findings indicate a need to modify the assessment process or the academic program.

- Checklist of Needed Activity for Planning and Implementing Changes:**
- Results from current assessment cycle
  - Draft of assessment report

Making any change also requires consideration of resources and developing a plan of action. The following section provides a framework for thinking about taking action to close the assessment loop.

### Changes in the assessment process

When reviewing the assessment results, it is also important to evaluate the assessment process. This involves considering all aspects involved in creating the assessment report. Reviewing learning outcomes as well as approaches to gathering data will provide direction on improving the assessment process.

### Learning outcomes

*Tool 1: Re-assessing learning outcomes* provides a structure for reviewing student learning outcomes. Based on findings from the student learning outcome assessment results, a program may want to retain, modify, or eliminate an outcome.

<u>Results from assessment activity</u>		<u>Likely use of outcome during next cycle</u>
Students not performing adequately relative to outcome	→	If recommendations impact student learning immediately, re-assess outcome using same measure during next cycle.
	→	If recommendations impact student learning over an extended timeframe; schedule re-assessment for later
Students performing adequately relative to outcome	→	If same results for the past 3 years, consider replacing this outcome. Potentially schedule re-assessment at an appropriate interval (e.g. three years)
Students performance relative to outcome yields unclear current results	→	If difficulty in determining appropriate level relates to outcome; re-write outcome and reassess during next cycle
	→	If difficulty relates to measures; retain outcome; revise measure; and re-assess during next year

## **Measures**

In addition to changing outcomes, there might be a need to change the type of data collected. If results obtained were not as expected, it is also important to know if better information could be collected to demonstrate student learning. This change could vary from modifying items on a multiple-choice test to creating a new rubric for reviewing essays.

## **Data collection procedures**

In addition to having the correct measures, it is also important to consider how data were collected in previous student learning assessments. Knowing who was included in the assessment data, and when data were collected are important to understanding if changes need to be made in data collection procedures.

## **Changes in the academic program**

Results from the student learning assessment may indicate that program curricula need to be reviewed and adjusted. Mapping learning outcomes to the curriculum is the first step to understanding if changes are necessary. Changing how concepts are introduced and the timing of that introduction to students are two common findings from student learning assessments.

## **Mapping outcomes to the curriculum**

Results may indicate a need to understand where students are introduced to concepts defined in the learning outcomes. Mapping learning outcomes to program courses is the first step in understanding where students are introduced to the material they need to master.

Mapping outcomes to the curriculum can be done by collecting evidence to help indicate whether the class is “Introduced”, “Developed”, or “Mastered” on each PLO. By doing this, the instructor on record or teams can:

- Reviewing course assignments (formative and summative) on levels of Bloom’s taxonomy and how each assignment is linked to the corresponding PLO.
- PLO Palooza data with interrater reliability data.
- A review of course syllabi and objectives.

An example of a curriculum map is presented below. Please notice that all PLOs are mapped to each course in terms of “Introduced”, “Developed”, and “Mastered, and that courses can have different levels within and between each PLOs.

CNUMHA Curriculum (Course-to-PLO)

Course	PLO 1				PLO 2				PLO 3			PLO 4				PLO 5		
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	4.4	5.1	5.2	5.3
MHA 501	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
MHA 502	I	I	I	I	D	D	D	D	I	I	I	I	I	I	I	I	D	
MHA 503	D	D	D	D	I	I	I	I	D	D	D	D	D	D	D	D	D	
MHA 504	D	D	D	D	I	I	I	I	D	D	D	D	D	D	D	D	D	
MHA 505	D	D	D	D	I	I	I	D	D	D	D	I	D	D	I	D	I	
MHA 506	I	D	I	I	D	D	D	D	D	D	D	D	D	D	D	D	D	
MHA 507	D	I	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
MHA 511	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
MHA 512	D	D	D	D	I	I	I	D	D	D	D	D	D	D	D	D	D	
MHA 531	D	D	D	D	I	I	I	D	I	I	I	I	D	D	D	D	D	
MHA 532	D	D	D	D	D	D	D	D	I	I	I	I	D	D	D	D	D	
MHA 551	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
MHA 552	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
Electives:																		
MHA 521																		
MHA 522																		
MHA 523																		
MHA 524																		
MHA 525																		
MHA 533																		
MHA 534																		
MHA 541																		
MHA 541																		
Capstone:																		
MHA 600	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
MHA 601	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
MHA 602	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	

<b>KEY</b>
Introduced (I): Yellow
Developed (D): Blue
Mastered (M): Green

Please see the following pages for a list of all courses in the curriculum and a list of the Program Learning Outcomes for reference.

**Examining concept reinforcement**

Often programs will discover that students are introduced to the concept in the curriculum, but course assignments and planned experiences are not sufficient to help students master those concepts. This may lead to considering modifications in assignments, readings, or general teaching approaches to reinforce concepts with students. A program may also discover that a new course needs to be created to sufficiently address a learning outcome.

**Examining course sequencing**

Sometimes faculty will discover that the course provides sufficient support for the student to master the material, but course sequencing should be adjusted so that students are introduced to concepts that build on and complement each other. The student learning assessment process can be used as an audit of the programmatic educational experience.

**Assessment plan**

It is important to include an assessment plan for reference and closing the closing the loop. Assessment plans include learning outcome type, measurement or measurement tool, benchmark, timing, who is the responsible party, and follow up details.

## **Taking Action**

Opportunities to improve the assessment process and curriculum may emerge from assessment results, but will not be realized without planning and implementation. The assessment loop is only closed if actions are taken to make modifications where necessary. Answering who, what, when, and where questions about assessment modifications are helpful to planning and implementing any changes. *Tool 2: Questions for*

*planning change* provides a few questions to assist with mapping and implementing changes.

### **Tool 2: Questions for planning change**

- Who will implement the changes?
- Who needs to be involved to make these changes successful?
- What will be changed?
- What needs to occur in order for things to change?
- When will the changes be put in place?
- Where will they be implemented?
- How will they be implemented?