ASSESSING STUDENT LEARNING AT PURDUE FORT WAYNE

An Institutional Guide for Integrating Assessment, Pedagogy, and Curriculum to Improve Student Learning

ABSTRACT

The PFW Assessment Handbook is designed to support academic departments and colleges in implementing PFW's Assessment Plan. It is supplemented by the Assessment Workbook which provides tools for completing the Annual Assessment Report as part of Program Review.

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PURDUE UNIVERSITY®
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INTRODUCTION: Reframing Assessment to Improve Student Learning and Success

The PFW Assessment Manual provides the rationale behind and support for the Revised Assessment Plan that was approved with the passage of Senate Document 15-6. This Introduction to the Manual describes the research based model that is the foundation of the assessment design.

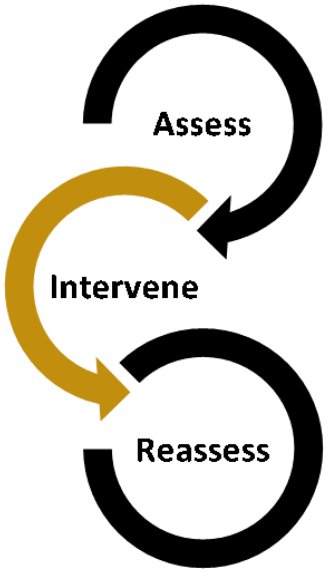
Peter Ewell (2002) discussed the history of assessment and concluded that while assessment has sustained as an institutional practice, it has sustained in a "peculiar form" (p. 23). Specifically he suggested that, for the majority of institutions, assessment failed to deliver on its promise to improve student learning and emerged:

1. As an "add on" principally at the behest of administration seeking to satisfy external audiences.
2. In an activity framework that was "broad" (many pockets of activity) but not "deep" (activities that lead to substantive changes aimed at improving student learning and success) (Ewell, 2002, pp.22-23).

Fulcher, et al (2014) briefly reviewed the literature of assessment focusing on how assessment practice has evolved to examine if action is taken on assessment findings. They concluded that the promise of assessment is rarely realized as little action is taken on results. This suggests despite increased assessment activity, the "peculiar form" of broad but not deep assessment identified by Ewell (2002) continues. Hutchings, Kinzie, and Kuh (2015) suggest that while higher education institutions collect evidence of student learning, such evidence often fails to result in shaping learning practices (p.28). Ikenberry and Kuh (2015) claimed that the assessment movement began in response to external demands and evolved into a culture of compliance. "As a result, the *purposes of assessment* – collecting and reporting data to external audiences – continue to take primacy over the institution's *consequential use* of the results of outcomes assessment"(Ikenberry and Kuh, 2015, p. 6). Fulcher, et al (2014) conclude that too frequently institutions focus on "assessment *mechanics* rather than effective pedagogy and curricula" and state that the result is a failure of institutions to intentionally connect assessment, pedagogy and curricula in a manner that supports improving student learning (p. 4). They agreed with Hersh and Keeling's (2013) recommendation that higher education institutions strive for a culture of learning rather than a culture of assessment and proposed "…integrating the three pillars of learning – assessment, pedagogy and curriculum – at the program level with the aim of evidencing learning improvement (p. 4). The PFW Programmatic Learning and Assessment Model is grounded in this integrated perspective of assessment, pedagogy, and curriculum as a foundation for developing a culture of learning. The purpose of this guide is to support PFW programs in developing and implementing an assessment strategy that is integrated with pedagogy and curriculum and focused on improving student learning.

The PFW Programmatic Learning Assessment Model builds on the Program Learning Assessment, Intervention, and Re-assessment (PLAIR) Model (Fulcher, K.H., Good, M.R., Coleman, C.M., & Smith, K.L., 2014). Their model focuses on assessment as a continuous process as illustrated in Figure 1:The PFW Model builds on Fulcher, et. al. (2014) to more explicitly integrate programmatic curricular design elements. Specifically, the PFW Model embeds the assess-intervene-reassess model within a larger perspective of an instructional design model. The design of the PFW model can be stated linearly as:

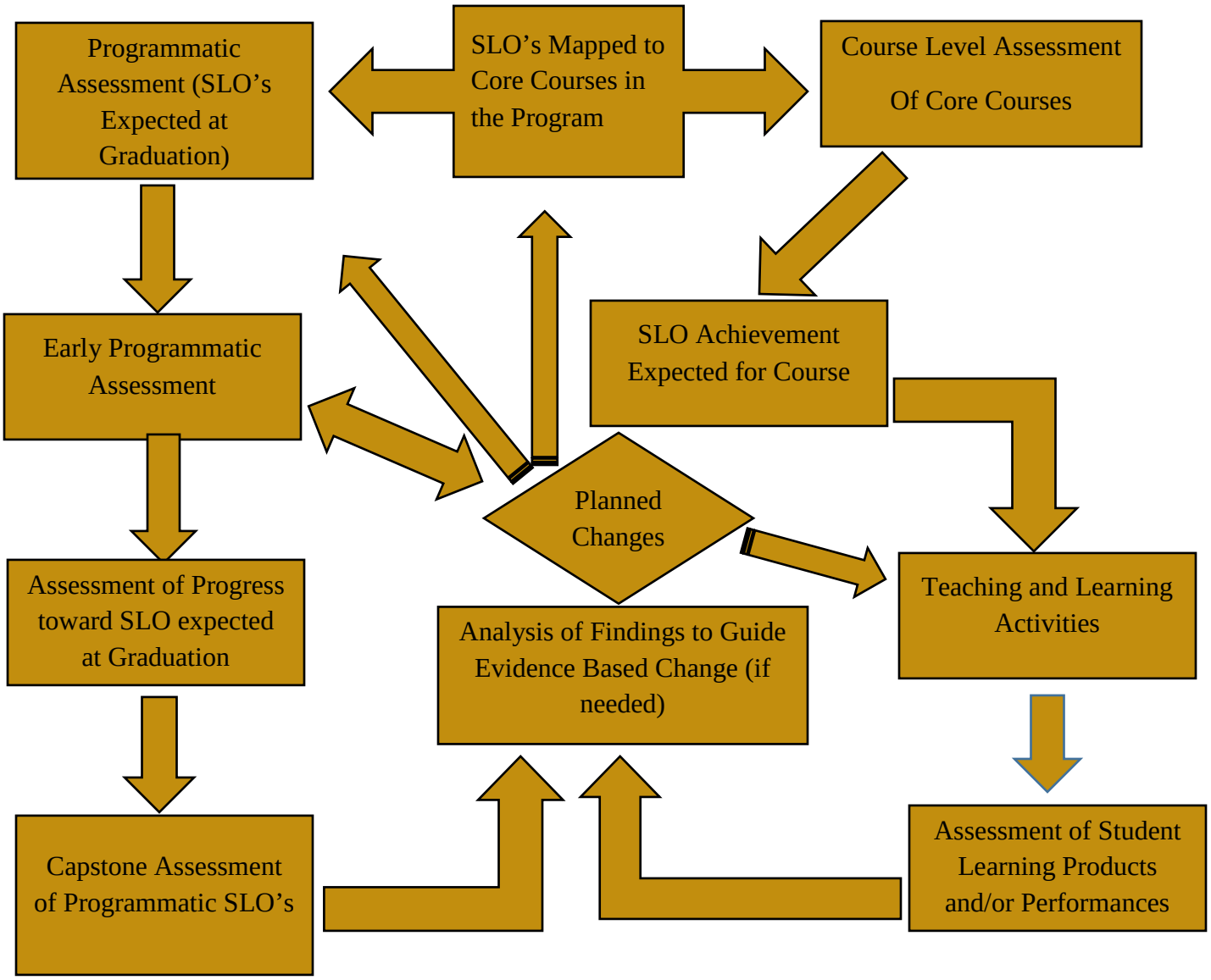
Figure 1: Assessment Process Model (PLAIR)



1. **identifying** common expectations for graduates of an academic program as measurable student learning outcomes;
2. **aligning** student learning outcomes at the programmatic level to institutional level student learning outcomes as expressed presently in the PFW Baccalaureate Framework;
3. **defining** common specific curricular (core) and co-curricular points where student progress toward outcomes is measured through a curricular map;
4. **developing** measures (embedded in learning activities within the curriculum and independent of the curriculum through departmentally determined activities);
5. **analyzing** data gleaned through the measures to examine how and/or the extent to which current learning activities (e.g. specific learning strategies at the course level, sequencing, curricular coverage and expectations of courses at the programmatic level, etc.) are contributing to expected student learning gains **(assess)**;
6. **applying** findings to propose changes in the curriculum or pedagogy to improve student learning **(intervene**);
7. **evaluating** how the changes impact student learning to "close the loop" **(reassess)**

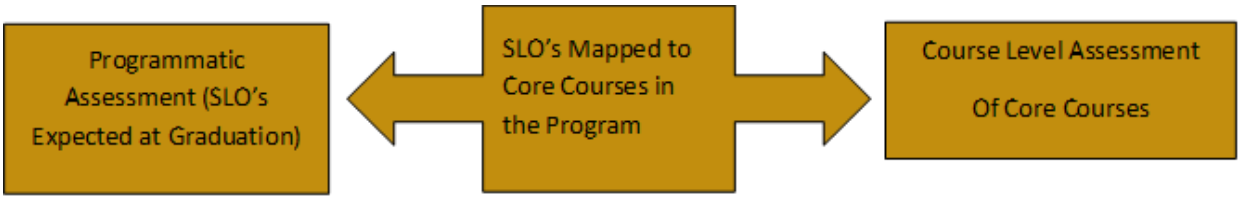
This linear process can be expressed through an operational model that integrates course and programmatic assessment, pedagogy (or interactions between faculty and students), the learning environment, and the formally stated curriculum as illustrated in Figure 2 (Figures 3 through 5 follow to help increase understanding of the PFW Model Components).

Figure 2: PFW Model for Integrating Course Level and Programmatic Assessment, Pedagogy and Curriculum



The PFW Programmatic Learning Assessment Model emphasizes authentic assessments of student learning that are embedded in the curricular plan of an academic program (Figure 3).

Figure 3: PFW Academic Assessment Model Scaffold



The model stresses identifying the common curricular experiences shared by all students as a core curriculum within the program (I.e. departmentally defined common requirements of all majors) and assessing student learning at specified points (courses or other student learning experience) as illustrated in Figure 4.

Figure 4 Course Level Integration in Programmatic Assessment

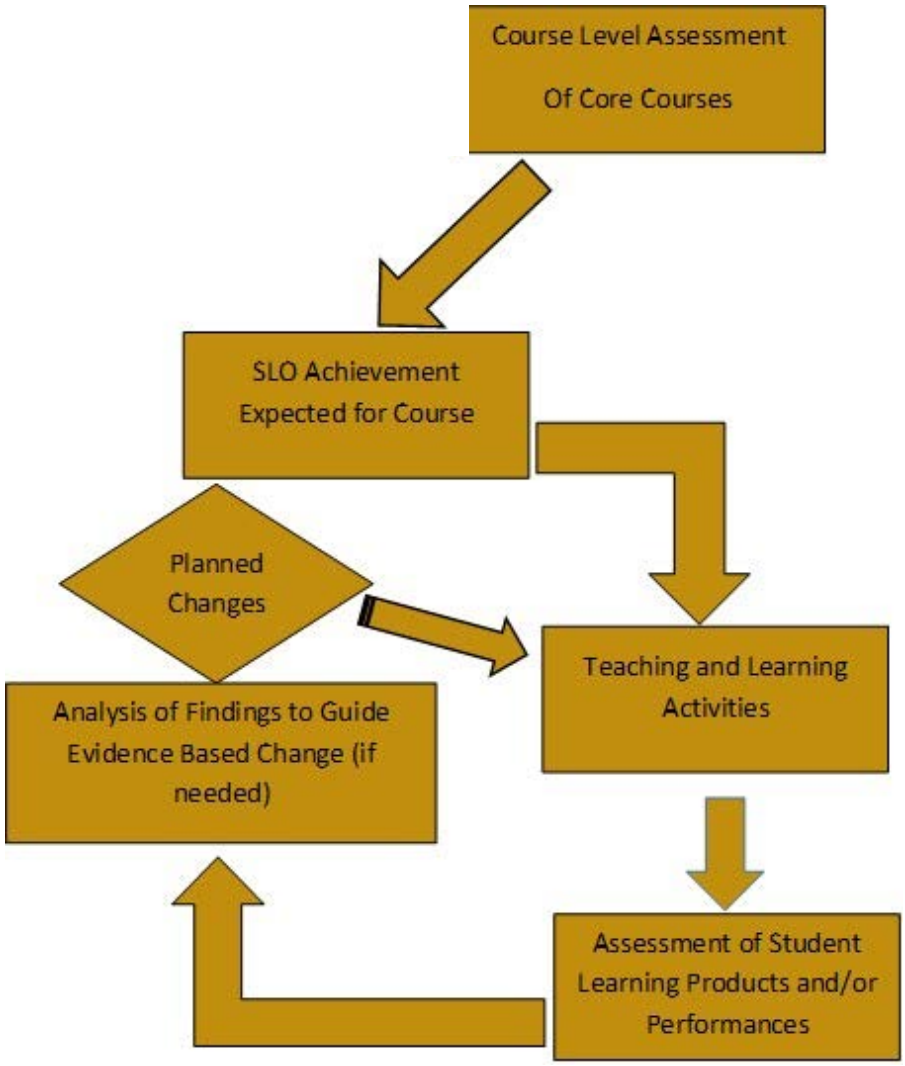
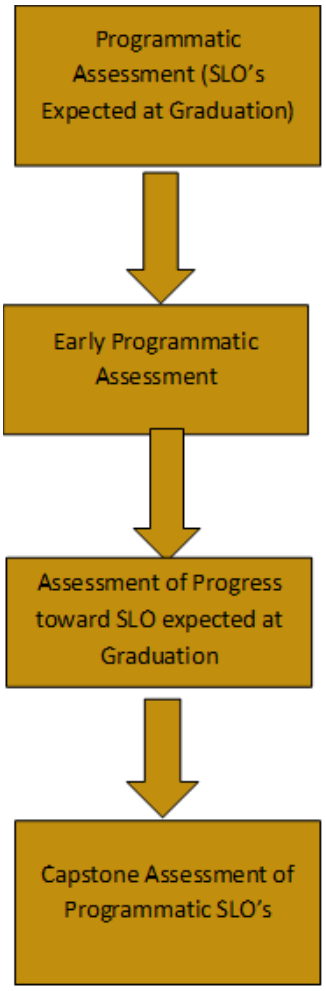


Figure 5: Milestones for Programmatic Assessment



The expansion of the model from Fulcher et. al. (2014) builds on their discussion of the model and its effectiveness. They observed that although the basic model "…sounds simple, evidence of using results in this way are surprisingly rare" (p. 5). They illustrate breakdowns in the application of the model and concluded that the challenge faced by faculty was a sense of how academic programs "…could use results to improve student learning" (p. 8). The conceptual model development and design of the PFW Assessment Plan seeks to address this disconnect.

> Mapping SLOs to common learning experiences at the course level and assessing embedded experiences in the curriculum provides information necessary to assess student learning in a manner that supports a learning improvement paradigm.
>
> Organizing the reporting by the level of expected learning at key points in the curriculum can be represented as a series of milestones (Figure 5). These curricular points also provide opportunities to supplement the course level assessments with external assessments (e.g. a departmental or disciplinary standardized test, an evaluation of products in a sample of student portfolios, assessments done by supervisors of practicums or clinical experiences, etc.).
>
> These curricular milestones also identify key reporting points in the context of the departmental assessment plan. The focus of reporting is communicating how students are developing relative to a programs stated SLOs, demonstrating how and to what extent planned learning experiences are contributing to student success, and describing how assessment findings are used to make changes intended to enhance student learning.

Conceptual Model Development and Design:

Assessment and programmatic improvement might be disconnected in part because of the way we conceptualize assessment. Often the driving question for assessment is "How, or to what extent did students achieve expected levels of performance relative to stated student learning outcomes". In other words, the measurement or observation (assessment or student achievement) is disconnected from the treatment or, as stated in the model, intervention. In the case of a formal student learning environment (i.e. a course, an academic program, or any variety of out of class experiences) treatments or interventions are the interactions between teaching and learning, faculty and students, students and other students. A more attuned perspective is that assessment is embedded within the relationships between faculty and students that comprise the learning environment or curriculum. That "assessment" is integrated in the act of teaching and learning, is not a new concept. Tyler (1950) stated the fundamental building blocks of curriculum in a series of questions:

- What is to be accomplished?
- What learning experiences help to accomplish the purpose>
- How can these learning experiences be effectively organized?
- How can the effectiveness of the learning be evaluated? (Ratcliff 1997; Johnson and Ratcliff, 2004)

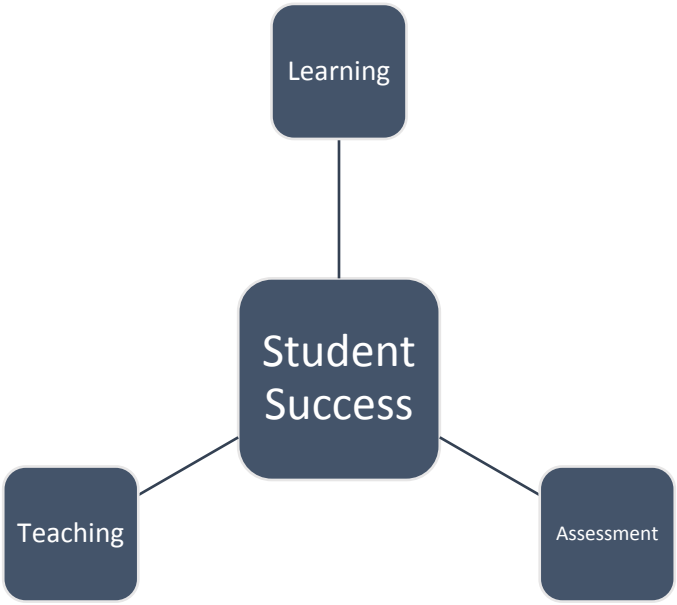
Stark and Lattuca (1997, 2009) expanded the scope of Tyler's basic framework adding three elements (learners, instructional processes, and adjustment) to define a college curriculum as containing specific elements:

1. Purposes
2. Content
3. Sequence
4. Learners
5. Instructional Processes
6. Evaluation, and
7. Adjustment

Both conceptualizations view the curriculum from the perspective of the faculty member as "constructor" of the curriculum. While Stark and Lattuca (2007, 2009) acknowledge the student and acknowledge that the curriculum can be seen both as the curriculum constructed by faculty and the curriculum received by students, their focus on academic planning differs from more constructivist paradigms. However, for the purposes of

assessing student learning, this limited view has some advantages. For example, if a learning environment is conceptualized as those elements intended to facilitate student learning then together the elements of communicated purpose, content, sequencing, and instructional processes comprise a "treatment"; assessment as a measure; students as learners the object of the treatment; and evaluation as the interpretation of findings. Holding this view as a constant does not preclude constructivist approaches to teaching and learning. Rather, it might be seen as a structural element in a larger constructivist environment. For this reason, the PFW Model might be simplified as it relates to formal student learning to conceptualize assessment as embedded in the teaching and learning process as illustrated in Figure 6.

Figure 6: PFW Integrated Teaching, Learning, and Assessment Model (Simplified)

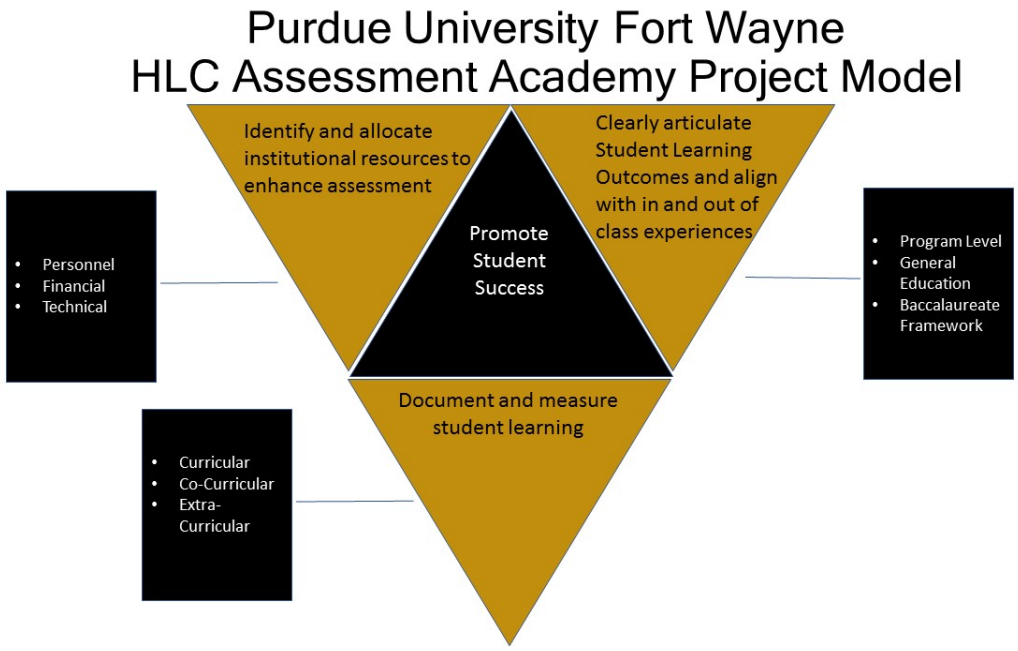


This integrated perspective suggests assessment might be conceptualized as embedded in a complex communicative network comprised of primary interactions between faculty and student, students and other students, and students with textual and digital resources that together form a curriculum. This broad definition is consistent with a view of coherent and meaningful learning environments that scaffold learning from the course, to program, to college and/or institutional levels. That assessment is represented in the model within the larger perspective of teaching and learning and supports the PFW Integrated Model's representation of assessment as integral to student learning and success.

Academic Assessment in the Context of Institutional Assessment

"The PFW Model for Integrating Course Level and Programmatic Assessment, Pedagogy, and Curriculum" fits within a larger institutional assessment framework (Figure 7: PFW Institutional Assessment Framework) developed by the HLC Academy Team in June 2015 to support a process of continuous improvement. The purpose of this broad institutional frame is to help align institutional resources in support of student success.

Figure 7: PFW Institutional Assessment Framework



Hersberger, Huffman, Johnson, McDonald, Price, Stoller, and Wilkinson (June 2015)

The perspectives presented in this introduction provide an overview of the integrated teaching, assessment, and learning model that grounds the assessment process. The manual describes how this model is operationalized through the PFW Assessment Plan and provides support for academic units in designing and implementing high quality assessment of student learning focused on improving student learning and success at PFW

Part 1: Developing Student Learning Outcomes

Introduction

Student Learning Outcomes Statements provide a foundation for integrating teaching, learning and assessment to promote student success. Maki (2004) summarized characteristics of institutional and program level outcomes, stating a learning outcome statement:

- describes what students should be able to demonstrate, represent, or produce based on their learning histories;
- relies on active verbs that identify what students should be able to demonstrate, represent, or produce over time – verbs such as *create, apply, construct, translate, identify, formulate,* and, *hypothesize*;
- aligns with collective program-and institution-level educational intentions for student learning translated into the curriculum and co-curriculum;
- maps to the curriculum, co-curriculum, and educational practices that offer multiple and varied opportunities for students to learn;
- is collaboratively authored and collectively accepted;
- incorporates or adapts professional organizations' outcome statements when they exist;
- can be quantitatively and/or qualitatively assessed during students' undergraduate or graduate studies (Maki, 2004, p. 60).

The PFW Academic Department Assessment Report (Appendix B) requirements build on Maki's (2004) definition of program level outcomes. The report includes:

- Clearly stated Programmatic Student Learning Outcomes (SLOs) defining the knowledge, skills and, where appropriate for specific academic departments, values expected of students completing the academic program.
- A description of how the SLOs align with the PFW Baccalaureate Framework.
- A Curricular Map identifying the level of achievement relative to the SLOs, expected of students in common courses or experiences within the curriculum and required co-curricular activities if specified by the department.
- A description of assessment activities and measures for the current academic year.
- A summary of student achievement relative to the expected SLOs for the current academic year including a summary of prior year assessment findings and a description of changes made as a

result of assessment findings and feedback from the College Assessment Committee and the Assessment Council.

- A description of how results are disseminated to faculty and other stakeholders.
- A description of how assessment results will be used to improve the program. (PFW Assessment Council: "Proposed Restatement of 98-22 Assessment of Student Academic Achievement". April 2015).

This section of the manual provides academic departments' guidance in "collaboratively authoring" assessable student learning outcomes and mapping those outcomes to the PFW Baccalaureate Framework and to planned curricular and co-curricular experiences of students matriculating through a degree program. The Tables, Worksheets, and Exercises presented throughout the Guide are provided in a Workbook that supplements this publication.

Developing Assessable Student Learning Outcomes at the Program Level

Huba and Freed (2000) distinguish the process of creating learning outcomes at the course level as typically professor driven (the faculty member teaching the course) from the process of creating learning outcomes at the programmatic level as a collaborative effort of faculty across an academic department (p. 93). The fundamental question programmatic assessment seeks to answer is: "As a result of completing an academic program, what do the faculty expect graduates to know and be able to do". Developing high quality programmatic student learning outcomes provides a foundation for developing a high quality assessment plan that provides an academic department data for guiding programmatic change that increases student success.

Developing Common Expectations for Learning

The process of defining expectations for student learning at the end of a program helps department faculty organize the curriculum to ensure it provides clear pathways for students to achieve desired student learning outcomes that define high quality degrees. Typically, these are broad statements of expected learning. A typical program will define somewhere between six and ten programmatic student learning outcomes.

Table 1 (worksheet available in Appendix B and on the Assessment Website) is a tool for framing departmental conversations to clarify common student attributes expected of all program graduates. While completing the exercise, faculty need not worry about long formal statements, rather, the goal is to create a list of short statements describing an "ideal graduate".

Table 1: Common Expectations for Program Graduates

Knowledge: What do you expect students to **know** at graduation? (Maki's (2004) perspective of demonstrate or represent)	**Skill:** What do you expect students to **be able to do** with the knowledge they have developed at graduation? (Maki's (2004) perspective of produce)

The common expectations faculty members define for graduates are targets for stating programmatic student learning outcomes. Huba and Freed (2000) identified characteristics of effective student learning outcomes. Three of those characteristics, especially important in composing high quality assessable programmatic student learning outcomes are listed below.

1. High quality SLO's are student-focused rather than professor-focused
2. High quality SLO's focus on the learning resulting from an activity rather than on the activity itself, and
3. High quality SLO's focus on skills and abilities central to the discipline and based on professional standards of excellence (Huba, M.E. and Freed, J.E., 2000, p.98).

Carefully crafted Student Learning Outcomes clarify an academic department's expectations for students through defining levels of proficiency faculty determine necessary for success after graduation. The challenge is crafting statements in a manner that facilitates measuring student achievement. A common strategy for developing assessable student learning outcomes is to use specific "verbs" in relationship to the expected levels of learning. For example, you might expect students to "list" the steps in a procedure in an introductory course, to apply a procedure in a mid-level major course, or synthesize the procedure in the larger context of a project in a capstone course, senior project, or across assignments in required upper division courses.

Table 2 (Full version in Appendix C) draws from Anderson and Krathwohl's (2001, 2013) revision of Bloom's (1956) Taxonomy to list some of the potential verbs for designing measurable student learning outcomes. Specifying the level of outcome achievement expected of program graduates through carefully chosen descriptive verbs clarifies expectations for graduates and supports developing a pathway for supporting students in achieving expected outcomes.

Table 2: Sample Action Verbs for Student Learning Outcomes Statements (adapted from Anderson and Krathwohl, 2001, 2013)

Knowledge Dimension	**Cognitive Processes**					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual	List	Summarize	Respond	Outline	Rank	Categorize
Conceptual	Recall	Explain	Advise	Differentiate	Criticize	Modify
Procedural	Reproduce	Clarify	Conduct	Diagram	Judge	Design
Metacognitive	Identify	Interpret	Discover	Infer	Predict	Create

Once the expected level of learning is determined, a department is ready to begin drafting specific programmatic Student Learning Outcomes. The statement of a programmatic learning outcome can be expressed as a statement including these elements:

> *Upon Completion of the program, students will be able to* ***(action verb(s) denoting level of learning)*** + ***(object describing what students should be able to demonstrate or produce)***.

For example, across a number of disciplines, an expectation of graduates is an ability to use and analyze data to inform decisions. A generic programmatic student learning outcome for this expectation might be:

> Upon graduation, students will *analyze and interpret (action verb)* data *to produce meaningful conclusions and recommendations (product).*

The programmatic student learning outcome is broad but measurable. The action verbs (analyze, interpret, produce) used in the statement align with the higher cognitive processes in Anderson and Krathwohl's (2001, 2013) restatement of Bloom's (1956) Taxonomy.

Program faculty work collaboratively to construct statements that represent a consensus of what students should know, be able to represent, and do at graduation. One potential tool for collaboratively authoring programmatic student learning outcomes is illustrated below. The "Determining Programmatic Student Learning Outcomes Worksheet" (Appendix D) builds on Table 1 and the representation of knowledge and cognitive domains and action verbs from Table 2 to construct a programmatic SLO that meet the expectations of intentional student learning outcomes identified by Huba, M.E. and Freed, J.E. (2000). The italicized row is an example based on the programmatic student learning outcome illustrated in this section.

Table 3: Determining Programmatic Student Learning Outcomes Worksheet

Knowledge and skills expected of program graduates	Action verb suggesting expected level of knowledge and skill achievement at graduation	Statement of programmatic student learning outcome
Identify valid data. *Apply data* *Use data in context of a project*	*e.g. Analyze, interpret, produce*	*Upon graduation, students will analyze and interpret data to produce meaningful conclusions and recommendations.*

Student achievement of the sample programmatic student learning outcome (*Upon graduation, students will analyze and interpret data to produce meaningful conclusions and recommendations)* could be demonstrated through a student report produced in a capstone course and measured by applying a common rubric to analyze the report (Table 4).

Table 4: Sample Rubric for a Programmatic SLO

Programmatic SLO: Students will analyze and interpret data to produce meaningful conclusions and recommendations				
	Capstone 4	Milestones 3	Milestones 2	Benchmark 1
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/ or is unrelated to focus.
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.	States an ambiguous, illogical, or unsupportable conclusion from inquiry findings.

(Rubric developed from AAC&U's Inquiry and Analysis Value Rubric http://www.aacu.org/sites/default/files/files/VALUE/InquiryAnalysis.pdf. Accessed 06-29-2015.)

The rubric represents common expectations for a group of faculty. Therefore, programmatic rubrics gain utility as a group of faculty reach consensus on the level of student performance expected for their program. For illustrative purposes, AAC&U's Inquiry and Analysis Value Rubric is applied in Table 4 to demonstrate how student achievement of learning might be analyzed in a capstone research project.

Evaluation of a sample of student reports (or all reports if the population of students in the capstone is small) using the rubric would serve as a programmatic measure of student learning relative to the outcome.

Assessing programmatic student learning outcomes can be accomplished through a number of strategies. The strategy illustrated above utilizes an assignment at the capstone level to evaluate student learning at the end of the program. As will be discussed in the following section, the programmatic SLO could be reduced to a number of smaller more specific course level outcomes and assessed at the course level. Alternatively, the

rubric (or other scoring metric) could be applied to student products at curricular points leading up to the capstone. Under this type of strategy, the expected level of learning in an introductory course might be at a "Benchmark Level", at one of the "Most assessment plans will use multiple measures at multiple points in the curriculum to help faculty understand how student learning is progressing relative to the programmatic outcome. Broad programmatic student learning outcomes statements serve as an umbrella under which more detailed course level student learning outcomes are defined and assessed through the curriculum to provide evidence of student progress to the programmatic outcomes. Programmatic student learning outcomes can also be mapped up to institutional level outcomes such as those embedded in the language of the PFW Baccalaureate Framework. The following section discusses using curricular maps to shape, measure, and improve student learning at the programmatic level. A key aspect of carefully planned curricula is the process of building cognitive competency.

Part 2: Curricular Mapping and a Distinctive Common: Blending Programmatic Assessment and General Education Assessment in the Context of the PFW Baccalaureate Framework

The first section of this manual described programmatic outcomes as expectations for students at the conclusion of an academic program. The example of a programmatic student learning outcome expected at graduation was that students could conduct a study in which they "analyzed and interpreted" data to draw meaningful conclusions and recommendations which were stated in a final research project. This idea suggests a programmatic curriculum and by relationship programmatic assessment progresses from lower dimensions of "factual/remember" to higher order dimensions "metacognitive/create" as students matriculate through an academic program. Further, it suggests that student learning relative to programmatic learning outcomes progresses from lesson to units to courses to programs. Ultimately, student completion of a degree composed of general education, electives, and a major should result in a distinctive institutionally determined common learning experience in which students demonstrate achievement of a set of institutional level student learning outcomes. At PFW, the PFW Baccalaureate Framework states common institutional student learning outcomes expected of all graduates. It is PFW's collective faculty definition of the distinctive PFW Baccalaureate Degree.

The General Education Program provides a foundation for student achievement of Baccalaureate Framework outcomes that are further developed in academic departments as students matriculate through the major. Academic Departments determine how general education integrates into their majors. Further, in designing their curricula, faculty in academic departments determine how their graduates achieve the goals of the Baccalaureate Framework. The student learning outcomes in the program, therefore are the focal point of the PFW degree though which the outcomes of the general education program and achievement of the goals of the PFW Baccalaureate Framework are realized.

The PFW Assessment Plan builds from the outcomes of academic programs achieved as students matriculate through core courses in the major and general education to the PFW Baccalaureate Framework. The "middle out" design of the plan is informed by the work of AAC&U in the LEAP Initiative (http://www.aacu.org/leap) and Lumina Foundation's Degree Profile (http://www.luminafoundation.org/files/resources/dqp.pdf). In addition it draws on the research of Lisa Lattuca and Joan Stark discussed in the 2nd edition of their seminal work on academic plans (see Lattuca, L.R. and Stark, J.S., 2009 pp. 101-113).

While the course to program to baccalaureate framework describes how students' progress through the curriculum, the centrality of programs and their curricula is emphasized in the PFW Assessment Approach.

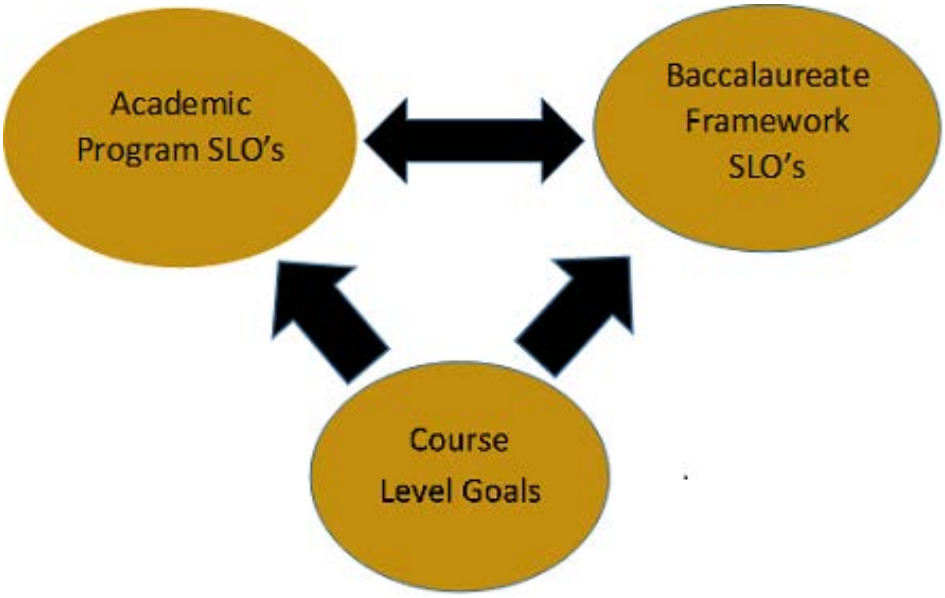
Faculty within programs determine how best to create coherent pathways for students to achieve a distinctive commonality that is defined by an academic program's interpretation of the Baccalaureate Framework.

The PFW Assessment Plan emphasizes:

- developing programmatic SLO's as the core of student learning defined by the program,
- contextualizing program specific SLO's within the broad common outcomes for all students defined by the Baccalaureate Framework
- defining expected levels of achievement relative to programmatic SLO's at specific points in the curriculum – usually common courses required of all students within the program but (as will be discussed) might be other experiences not specifically tied to a formal "course"

The integrated design facilitates departmental flexibility in assessing learning. Some departments might assess student learning through a coordinated plan that embeds programmatic assessment in key courses required of all program majors concluding with targeted assessment of the programmatic SLO at graduation. Other departments might identify specific curricular and/or co-curricular points to deliver common global assessments that are not embedded in a course. However, both approaches assume that student learning progresses from the course to program level to institutional level (Figure 8).

Figure 8: Designing and Assessing Student Learning from the Middle Out at PFW



This design paradigm (of determining programmatic outcomes and mapping them to key courses in the curriculum) is consistent with a curricular philosophy in which the academic program determines how to bring coherence to the baccalaureate degree as students matriculate through general education to the major and to provide meaning for the PFW Baccalaureate Framework in the context of the specific academic program. Planned student learning is "designed from the middle" bringing coherence to the curriculum and "delivered forward" helping students "make sense" of the curriculum.

Table 5 and Table 6 provide an example of how programmatic student learning outcomes are progressively developed (or delivered forward) through core courses in the discipline and contextualized to the common institutional outcomes defined by the Baccalaureate Framework using the hypothetical programmatic SLO introduced earlier. Table 5 describes how defining progressively complex course level SLO's at different points in the curriculum might be assessed. Table 6 describes how the programmatic SLO (and as a result the programmatic assessment) demonstrates alignment with and achievement of institutional level outcomes defined in the Baccalaureate Framework.

Table 5: Example of Programmatic Student Learning Outcome in a Curricular Scaffold

Programmatic Outcome: Upon graduation students will analyze and interpret data to produce meaningful conclusions and recommendations		
Course Level	**Course Outcome(s)**	**Sample Assessment Measures**
200 (introduced)	Student will list characteristics of valid data	Listing exercise on an exam
	Student explain data collection strategies used in a lab assignment	Section of a Lab Report
300 (reinforced and expanded)	Student will analyze a data set	Homework assignment
	Student will interpret findings from a research project	Standardized instrument item response analysis (e.g. Field Based Exams)
400 (mastered at capstone level)	Student will analyze and interpret data to produce meaningful conclusions and recommendations.	Original research report produced at the conclusion of a capstone course, class presentation, and digital representation of research on the "web".

Table 6: Program Level to PFW Baccalaureate Framework Map

Programmatic Student Learning Outcome	PFW Baccalaureate Framework Domain
Student will analyze and interpret data to produce meaningful conclusions and recommendations	*Application of Knowledge*: Students will demonstrate the ability to integrate and apply knowledge, and, in so doing, demonstrate the skills necessary for life-long learning.
	Critical Thinking and Problem Solving: Students will demonstrate facility and adaptability in their approach to problem solving. In so doing, students will demonstrate critical thinking abilities and familiarity with quantitative and qualitative reasoning.
	Communication: Students will demonstrate the written, oral, and multimedia skills necessary to communicate effectively in diverse settings.

In this particular example, the capstone assignment includes producing a "paper", presenting findings to the class in an oral presentation, and producing a web page that summarizes findings. Through these three curricular design elements, the capstone project demonstrates student competency across at least three domains of the Baccalaureate Framework as illustrated below in Table Three. This allows the programmatic assessment in the capstone to serve a second purpose to demonstrate student achievement relative to the PFW Baccalaureate Framework.

The design of the PFW Academic Assessment Plan ensures that programmatic student learning is defined by program faculty and supports a process in which academic departments determine how the academic program supports student achievement of the goals and broad outcomes communicated in the PFW Baccalaureate Framework. This process allows departments to identify and determine how to address potential curricular gaps relative to the PFW Baccalaureate Framework. Curricular mapping is a process in which an academic department critically examines how student learning develops as students matriculate through an academic program to graduation.

Curricular Mapping to Improve Curricular Quality, Coherence, and Student Learning

Stark and Lattuca (1996) argued that faculty plan coherence and students create meaning in undergraduate education. The process of faculty planning coherence is facilitated as departments

determine curricular pathways for student development relative to stated student learning outcomes. A curricular map is a tool for communicating planned curricular pathways. Jankowski & Marshall (2014) identified three important considerations for developing curricular maps:

1. Curricular mapping is a process of consensus building around what outcomes mean, where in the curriculum and co-curriculum they are addressed, and what the agreed-upon criteria are for determining whether students have demonstrated the requisite proficiencies.
2. Mapping, while useful to outline the intended structure of the educational program, needs to be coupled with students' actual paths through institutions. Thus, overlaying the actual course-taking patterns of students onto a curriculum map will provide a picture of how students move through and experience the curriculum, where there might be misalignment of sequential or developmental paths, and where course prerequisites are being implemented in meaningful ways.
3. Mapping provides a lens such that what is mapped is what is seen, but what is not included in the map may not be noticed as readily. Utilizing curriculum mapping as one piece in a larger conversation on student development and scaffolded learning can be helpful to ensure that the placement of various learning experiences as well as their assessment, are appropriate, students are well supported, and that the curriculum builds over time (p. 18).

Curricular maps reflect departmental faculty perspectives of how their academic program structures learning to help students develop relative to the student learning outcomes defining a successful graduate. Table 7 (reproduced in Appendix E) illustrates a traditional approach to curricular mapping.

Curricular mapping is a process for academic departments to ensure that the educational pathway students' experience builds intentional opportunities to develop the knowledge and skills. A curriculum map identifies the level of achievement expected of students relative to a programmatic SLO as they progress through the curriculum. Because they identify levels of learning or performance relative to the stated programmatic SLO at specific points in the curriculum, curricular maps serve as a roadmap that help students understand how their learning should progress relative to the expectations of their degree at specific points in their matriculation. They also serve as a tool for departmental faculty members to evaluate how the planned curricular experiences are contributing to students successfully achieving the expected outcomes for an academic program. Table 8 illustrates the points and levels at which the sample programmatic SLO might be measured in a curriculum.

Table 7: Traditional Programmatic Curriculum Map

	Student Learning Outcomes by Course and Level Achieved **I=Introduced, E= Expanded, R=Reinforced, M=Mastered, A=Assessed**																			
	Programmatic SLO 1					Programmatic SLO 2					Programmatic SLO 3					Programmatic SLO 4				
Course	**I**	**E**	**R**	**M**	**A**	**I**	**E**	**R**	**M**	**A**	**I**	**E**	**R**	**M**	**A**	**I**	**E**	**R**	**M**	**A**
200 Level Courses																				
3oo Level Courses																				
400 Level Courses																				

Table 8: Traditional Programmatic Curriculum Map for Sample Programmatic SLO

	Student Learning Outcomes by Course and Level Achieved **I=Introduced, E= Expanded, R=Reinforced, M=Mastered, A=Assessed**				
	Programmatic SLO 1: ***Upon graduation students will analyze and interpret data to produce meaningful conclusions and recommendations***				
	I	**E**	**R**	**M**	**A**
200 Level Courses	x				x
3oo Level Courses		x			x
400 Level Courses			x	x	x

A challenge inherent in a traditional approach is identifying the level of performance expected relative to the SLO in lower division courses. One method for addressing this challenge is to define the student competencies needed to achieve the programmatic SLO. These types of course level outcomes were illustrated earlier in Table 5.

Table 9 (reproduced as Appendix F) is an alternative curricular mapping strategy that aligns with the scaffold approach for assessing student learning illustrated in Table 5. It uses AAC&U's LEAP framework to define levels of learning (i.e. benchmark to milestones to capstone).

Table 9: Mapping Course Level Outcomes to Programmatic Level Outcomes using Levels from AAC&U Value Rubrics

Programmatic SLO 1: Students will analyze and interpret data to produce meaningful conclusions and recommendations				
Course Level Expectation relative to Programmatic SLO	Capstone 4	Milestones 3	Milestones 2	Benchmark 1
200 Level A – List characteristics of valid data				X
200 Level B - explain data collection strategies used in a lab assignment			x	
300 Level – analyze a data set		x		
400 Level – analyze and interpret data to produce a ….	x			

In this example, the programmatic SLO is expressed through a progression of course level SLOs that build in cognitive complexity. Using the Anderson Krathwohl (2013) Taxonomy presented in Table 2, students are expected to move from "Remember/Understand" (expressed in the verbs list/explain) in the 200 level courses to

"Apply/Analyze" (analyze a data set) in the 300 level course and finally to "Create" (analyze/interpret/produce) in a late 400 level course.

Part 3: Developing a Plan to Assess Student Learning at the Course and Program Level

In this section, **three** assessment strategies are presented. The first two align with the two strategies for mapping SLO's in Chapter 1. The third assesses student achievement relative to programmatic SLO's through a portfolio approach. While these are broad templates for designing an assessment strategy, faculty within academic units should devise a plan that best fits their program. The examples are provided because they are the three more common approaches academic programs use. The PFW Assessment Plan is designed to afford faculty flexibility in designing their assessment plan.

1. Traditional Programmatic Assessment: Under this approach a program typically identifies broad programmatic SLO's, maps SLO's to a core group of courses, and assesses the programmatic outcome using a metric that describes student development relative to the outcome at graduation at specific points in the matriculation through a major. For example a common assessment might be given at the introductory level in the major, at some program midpoint, and toward the end of a particular program. The primary distinction of traditional programmatic assessment is that assessment of learning students achieve in primarily measured outside of the formal requirements for any course.

2. Alternative Course-Program Scaffold Assessment: This approach begins with broad programmatic outcomes (4-10). These programmatic outcomes are further articulated through developing specific course level outcomes that scaffold to the programmatic outcome. The approach encourages assessing student learning developmentally as students matriculate through a sequence of courses in the core and a capstone or culminating experience in an upper division course. Scaffolded approaches will typically include multiple performance assessments embedded at the course level. This approach is distinguished by its emphasis on "authentic" assessment integrated into formal requirements for courses, its facility in identifying how changes in curriculum and pedagogy potentially improve student learning, and its emphasis on measuring student progress to outcome achievement as they progress to degree completion.

3. Portfolio Programmatic Assessment: Student Portfolios are growing in use for programmatic assessment. While primarily designed to help track an individual student's matriculation through a degree and to measure individual performance, they can be used for programmatic assessment. Portfolios offer an advantage of allowing incorporation of both "in course" assessments and "out-of-class" experiences to demonstrate student learning. An academic unit can assign a rubric to evaluate student learning as demonstrated through the portfolio. Careful sampling, faculty communication, well-constructed programmatic rubrics, and faculty development to create a degree of reliability and validity in the measurement of student work using rubrics is critical to the quality of this approach.

Often programs use a hybrid approaches that combines aspects of the three strategies listed above. For example many academic programs base their programmatic assessment on a process in which teams of faculty evaluate

samples of student work presented in a portfolio. This might be supplemented by course based assessment of common assignments in the major core or common assessments at specific points in the curriculum.

The following section discusses strategies for designing and delivering student learning assessment at the Course and Program level, provides examples of assessment designs, and a framework for a departmental assessment plan as defined in SD 15-6.

Purposing and Structuring Current Assignments, Tests, and other Course Level Activities for Programmatic Assessment

Faculty assess student learning as a routine part of the teaching and learning process. The purpose of this activity (commonly referred to as grading) is to communicate to an individual student their level of performance relative to the expectation for performance by a particular faculty member. The judgement of that performance is traditionally communicated through a "grade". As the grade is an aggregate measure of individual student performance, a simple aggregation of grades across students fails to provide sufficient information for examining how or the extent to which students are achieving the student learning outcomes expected at a particular point in time in a class or curriculum. This is the reason a faculty member will often hear the statement from assessment professionals that "grades are not assessment". However, student assignments, tests, and other student performances are the most accurate snapshot of what a student knows and can do at a particular point in their matriculation through a course or program.

The most common strategy for using course level assignments for programmatic assessment is to design a common assignment (often a test) to assess student learning at a particular time in a particular course. Some departments will develop a test and use a form of item analysis to align questions to expected levels of performance relative to an outcome as a strategy to assess the extent to which students have achieved expected outcomes. In these cases a department might report student achievement as a summary of performance relative to expectations for each outcome assessed as illustrated in Table 10:

Table 10: Summarizing Student Achievement by SLO

Student Learning Outcome	Number of students who fully met outcome	Number of students who partially met outcome	Number of students who did not meet outcome

Student products (including assignments, tests, papers, projects, etc.) can be used to assess learning at the programmatic level. Typically, this type of assessment is referred to as an embedded assessment approach. These types of approaches are facilitated as faculty deconstruct student products to determine the level of

learning expected across a range of outcomes as demonstrated through student performance. This is where the type of rubric described in Table 10 can be particularly valuable.

The AAC&U Value Rubric Project is an example of a national effort to use rubrics to provide a common assessment of student learning across a broad range of student performances. Early findings from the project suggest that developing good rubrics and calibrating groups of faculty on applying the rubrics to evaluate student work provides a reliable method for assessing student learning across a diverse set of assignments.

The PFW Assessment Council has been working on a set of rubrics based on the AAC&U rubrics to evaluate student learning across the oral communication, written communication, and quantitative reasoning SLO's for the general education program.

These rubrics provide an example of how an academic unit might construct a rubric to evaluate student work. Table 11 provides an example of the rubrics developed by the Assessment Council for PFW's General Education SLO 1.1 (written communication). Appendix G provides the full set of rubrics developed by PFW's Assessment Academy Team and the Assessment Council for written communication, oral communication, and quantitative reasoning.

The assessment process for using this type of approach would consist of several steps:

1. Select the courses and sections from which a sample of student work would be gathered
2. Train a group of faculty (some institutions are using senior majors to assess products gathered in lower division courses) to apply the rubric consistently across a range of student products, and
3. Have each product from the sample evaluated by faculty members

Alternatively, some faculty are using these types of rubrics to evaluate all students work and sharing their ratings with other faculty in the department. In these cases the evaluation can be summarized by learning level achieved and discussed in the assessment report. Appendix G provides the set of rubrics developed by assessment council for written and oral communication and quantitative reasoning.

While the samples provided illustrate how a department might approach assessing student learning, they are not intended as the only allowable options. Academic Departments should design assessment strategies that best fit their departmental culture and that provide the most meaningful information for helping improve student success. This process of examining how assessment results inform the continuous improvement of the academic plan to improve student success is the most important aspect of the assessment process as discussed in Part 4 of the Manual.

Table 11: Sample Rubric Developed for Assessing Written Communication

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics)			
PFW General Education Student Learning Outcomes	**Capstone** **4**	**Milestones**		**Benchmark** **1**
		3	**2**	
1.1. Produce texts that use appropriate formats, genre conventions, and documentation styles while controlling tone, syntax, grammar, and spelling.	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the assignment has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage.

Table 11 and its associated worksheets in Appendix H might be used to organize assessment findings to plan changes.

Program Level- Courses leading up to Programmatic Assessment	Assessment	Findings	Intervention/ Innovation	Assessment
Course Level- Learning activities prior to performance assessment at the course level	Assessment	Findings	Interaction/ Innovation	Assessment

Programmatic interventions might include actions such as realigning the sequence of courses to improve the likelihood students develop to the expected level of competency to demonstrate the expected level of learning, identifying gaps in the curriculum relative to expected outcomes, adding or deleting core courses, redesigning courses, or increasing the frequency and/or intensity of out-of-class learning experiences to ensure students reach expected learning levels. At the course level, interventions might be assigning more readings, changing the instructional strategy from a lecture to a problem or inquiry based activity, adding additional assignments or homework activities to provide more time on task, etc. Once the changes are made, the focus on the analysis of assessment data shifts to examining the extent to which the changes in curriculum improved student learning and performance. Over time the types of interventions might become smaller and smaller in scale; however, other changes in expected outcomes might require curricular changes to meet changing needs future graduates. From this perspective the assessment process is continuous.

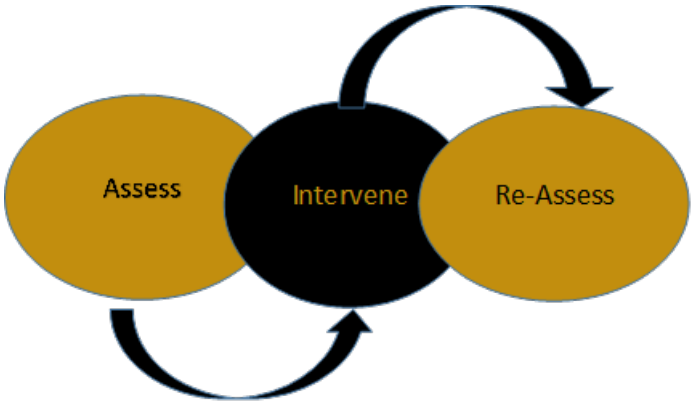
These examples represent a small fraction of the types of changes a department might envision to improve student learning. The assess-intervene-reassess model integrated into a teaching and learning model that clearly identifies what students should know and be able to do, constructs and maps a series of educational experiences that specify how students are performing relative to learning expectations, and continually seeks to construct curricula that improve the likelihood students achieve learning expectations.

Part 4: Integrating Assessment within Teaching and Learning to Improve Student Success – "alternative title – assessing as if student learning and success matters"

"The purpose of assessment is not achieved simply through the collection of vast amounts of valid and reliable data. Rather, assessment's purpose is to answer questions, shape better policies, make better decisions – all designed to improve student success and strengthen institutional performance" (Kinzie, Hutchings, and Jankowski, 2015, p. 56).

The assessment effort at PFW was redesigned to emphasize the potential assessment holds to improve student learning and success. Consistent with current trends in assessment, the PFW Model integrates assessment within the teaching and learning process suggesting that it is part of a "Culture of Learning". Part of the reason for the emphasis on the learning culture is that conceptualizations of a "Culture of Assessment" are often associated with the perspective of a compliance culture as discussed in Part 1 of this manual. While compliance is one aspect of assessment, the more valuable aspect is the capacity of assessment to contribute to the capacity of academic units to support student success and matriculation through an academic program to graduation.

The Assessment Process Model presented in the first section of the manual is replicated below. It describes the process within the PFW Assessment Model that focuses on using assessment data to plan interventions or innovations in the learning environment. The re-assess step emphasizes assessing how or to what extent changes in the learning environment improved student learning. This type of process highlights the inter-connectedness of assessment, teaching, learning, and curricular design. At the program level, the curricular mapping process is designed to direct the use of assessment findings to curricular change as the map identifies the level of learning a program expects of students relative to a specific outcome at different points in the curriculum. In this case the initial assessment would identify the points in the program curriculum where interventions might be made to improve student learning and success. Similarly, if the emphasis is on a "course level" student learning outcome, the specific activities leading to the specific student performance or assessment would represent the point at which an intervention might be made to help improve student learning.



A simple way to conceptualize connections between teaching, assessment and learning is to view assessment as a continuous cycle. The data collection occurs after an instructional intervention (from a program level perspective this might be a series of core courses while at the course level this might be the specific learning activity that is the culminating assignment at the end of a unit of instruction). Once the data is collected, it is analyzed (for a test the analysis might be an item analysis of outcome achievement by groups of questions, for an essay this might be the summary of performance across multiple papers based on a rubric, in a lab this might be a lab report, in music or art it might be a summary of a sample of juried performances or productions). The analyzed data is then shared with relevant constituents who plan and implement curricular changes and assess the impact of those changes over time. (Figure 9).

Figure 9: The Assessment Cycle

Concluding Thoughts

The ongoing development of meaningful assessment at PFW has the potential to impact institutional performance as we increase the likelihood students succeed. Integrated in the teaching learning process, assessment helps faculty identify relationships between instructional strategies, course designs, and student development that influence how best to deliver instruction that supports student learning.

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Appendix A: Departmental Assessment Report Outline

Department/Program Assessment Report Outline:

Section 1: Student Learning Outcomes for the Program (SD 98-22 rev. Appendix D Section I)

Section 2: Curricular Maps

A. Map of Programmatic SLO's to Baccalaureate Framework (Appendix D, Section II)

B. Map of Programmatic SLO's to Identified "core courses" in the curriculum (Appendix D, Section III)

Section 3: Assessment Plan

A. Description of Department's Assessment Model (see Workshop 1) – How is the department assessing student progress to Programmatic SLO at key common points in matriculation to degree (Appendix D, Section IV)

B. Measures Used (Appendix D, Section IV)

C. Rubrics or Evaluation Metrics Descriptions

D. Description of Plan for Disseminating and Using Findings for Programmatic Learning Improvement

Section 4: Assessment Results

A. Current Year Assessment Findings (Appendix D, Section V)

B. Proposed Changes to Address Findings (Appendix D, Section V)

C. Prior Year Assessment Findings and Description of Changes Made (Appendix D, Section IV)

D. Assessment Findings for Curricular Changes Made Appendix D, Section V)

Section 5: Conclusions, Next Steps, and Communication (Appendix D, Section V and Section VI)

Appendix B: Expectations for Program Graduates

Knowledge: What do you expect students to **know** at graduation? (Maki's (2004) perspective of demonstrate or represent)	**Skill:** What do you expect students to **be able to do** with the knowledge they have developed at graduation? (Maki's (2004) perspective of produce)

Appendix C: Anderson and Krathwohl (2001) Action Verbs

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

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Appendix D: Determining Programmatic Student Learning Outcomes

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Knowledge and skills expected of program graduates	Action verb suggesting expected level of knowledge and skill achievement at graduation	Statement of programmatic student learning outcome

Appendix E: Traditional Curricular Map

Course Name	Student Learning Outcomes by Course and Level Achieved I= Introduced, E= Expanded and Emphasized, R=Reinforced, M=Mastered, A=Assessed																			
	Outcome 1					Outcome 2					Outcome 3					Outcome 4				
	I	E	R	M	A	I	E	R	M	A	I	E	R	M	A	I	E	R	M	A

Appendix F: Alternative Curricular Map Based on AAC&U Value Rubric

Programmatic SLO:				
Course Level Expectation relative to Programmatic SLO	**Capstone 4**	**Milestones 3**	**Milestones 2**	**Benchmark 1**

Appendix G: Rubrics for WC, OC, and QR Based on AAC&U Value Rubrics

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Written Communication			
PFW General Education Student Learning Outcomes	**Capstone 4**	**Milestones**		**Benchmark 1**
		3	**2**	
1.1. Produce texts that use appropriate formats, genre conventions, and documentation styles while controlling tone, syntax, grammar, and spelling.	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error- free.	Uses straightforward language that generally conveys meaning to readers. The language in the assignment has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage.
1.2. Demonstrate an understanding of writing as a social process that includes multiple drafts, collaboration, and reflection.	Builds on the ideas of others to advance the work of the writing.	Offers solutions or courses of action that advance the work of the writing.	Offers/accepts suggestions to advance the work of the writing.	Communicates ideas but does not advance the work of the writing.
	Completes at least two drafts that show significant changes and reflects on what was learned through the drafting process.	Completes at least two drafts that show significant changes and reflects on their significance.	Completes at least two drafts that show changes and reflects on the changes.	Completes at least two drafts that show changes and reflects on the writing.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Written Communication			
PFW General Education Student Learning Outcomes	**Capstone** **4**	**Milestones**		**Benchmark** **1**
		3	**2**	
1.3. Read critically, summarize, apply, analyze, and synthesize information and concepts in written and visual texts as the basis for developing original ideas and claims.	Communicates, organizes and synthesizes information from sources to fully achieve a specific purpose, with clarity and depth	Communicates, organizes and synthesizes information from sources. Intended purpose is achieved.	Communicates and organizes information from sources. The information is not yet synthesized, so the intended purpose is not fully achieved	Communicates information from sources. The information is fragmented and/or used Inappropriately (misquoted, taken out of context, or incorrectly paraphrased, etc.), so the intended purpose is not achieved.
1.4. Demonstrate an understanding of writing assignments as a series of tasks including identifying and evaluating useful and reliable outside sources.	Demonstrates skillful use of high quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing.	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing	Demonstrates an attempt to use sources to support ideas in the writing
1.5. Develop, assert and support a focused thesis with appropriate reasoning and adequate evidence.	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Written Communication			
PFW General Education Student Learning Outcomes	**Capstone 4**	**Milestones**		**Benchmark 1**
		3	**2**	
1.6. Compose texts that exhibit appropriate rhetorical choices, which include attention to audience, purpose, context, genre, and convention.	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content,	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Written Communication			
PFW General Education Student Learning Outcomes	**Capstone 4**	**Milestones**		**Benchmark 1**
		3	**2**	
1.7. Demonstrate proficiency in reading, evaluating, analyzing, and using material collected from electronic sources (such as visual, electronic, library databases, Internet sources, other official databases, federal government databases, reputable blogs, wikis, etc.).	Accesses information using effective, well designed search strategies and most appropriate information sources.	Accesses information using variety of search strategies and some relevant information sources. Demonstrates ability to refine search.	Accesses information using simple search strategies, retrieves information from limited and similar sources.	Accesses information randomly, retrieves information that lacks relevance and quality.
	Chooses a variety of information sources appropriate to the scope and discipline of the research question. Selects sources after considering the importance (to the researched topic) of the multiple criteria used (such as relevance to the research question, currency, authority, audience, and bias or point of view).	Chooses a variety of information sources appropriate to the scope and discipline of the research question. Selects sources using multiple criteria (such as relevance to the research question, currency, and authority).	Chooses a variety of information sources. Selects sources using basic criteria (such as relevance to the research question and currency).	Chooses a few information sources. Selects sources using limited criteria (such as relevance to the research question).

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Oral Communication			
PFW General Education Student Learning Outcomes	**Capstone** **4**	**Milestones**		**Benchmark** **1**
		3	**2**	
2.1 Use appropriate organization or logical sequencing to deliver an oral message.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation
2.2 Adapt an oral message for diverse audiences, contexts, and communication channels.	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
2.3 Identify and demonstrate appropriate oral and nonverbal communication practices.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Oral Communication			
PFW General Education Student Learning Outcomes	**Capstone**	**Milestones**		**Benchmark**
	4	**3**	**2**	**1**
2.4 Advance an oral argument using logical reasoning.	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
2.5 Provide credible and relevant evidence to support an oral argument.	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Oral Communication			
PFW General Education Student Learning Outcomes	**Capstone** **4**	**Milestones**		**Benchmark** **1**
		3	**2**	
2.6 Demonstrate the ethical responsibilities of sending and receiving oral messages.	Student can independently apply ethical perspectives/concepts to an ethical question, accurately, and is able to consider full implications of the application.	Student can independently (to a new example) apply ethical perspectives/ concepts to an ethical question, accurately, but does not consider the specific implications of the application.	Student can apply ethical perspectives/concepts to an ethical question, independently (to a new example) and the application is inaccurate.	Student can apply ethical perspectives/ concepts to an ethical question with support (using examples, in a class, in a group, or a fixed-choice setting) but is unable to apply ethical perspectives/concepts independently (to a new example.).
2.7 Summarize or paraphrase an oral message to demonstrate comprehension.	Recognizes possible implications of the oral message for contexts, perspectives, or issues beyond the assigned task within the classroom or beyond the speaker's explicit message (e.g. might recognize broader issues at play, or might pose challenges to the speaker's message and presentation).	Uses the spoken message, general background knowledge, and/or specific knowledge of the speaker's context to draw more complex inferences about the speaker's message and attitude.	Evaluated how oral features (e.g. speech structure or tone) contribute to the speaker's message, draws basic inferences about context and purpose of message.	Apprehends speech appropriately to paraphrase or summarize the information communicated.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics) – Quantitative Reasoning			
PFW General Education Student Learning Outcomes	**Capstone** **4**	**Milestones**		**Benchmark** **1**
		3	**2**	
3.1. Interpret information that has been presented in mathematical form (e.g. with functions, equations, graphs, diagrams, tables, words, geometric figures)	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.	Provides accurate explanations of information presented in mathematical forms. For instance, accurately explains the trend data shown in a graph.	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. For instance, accurately explains trend data shown in a graph, but may miscalculate the slope of the trend line.	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.
3.2. Represent information/data in mathematical form as appropriate (e.g. with functions, equations, graphs, diagrams, tables, words, geometric figures).	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding	Competently converts relevant information into an appropriate and desired mathematical portrayal.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics)– Quantitative Reasoning			
PFW General Education Student Learning Outcomes	**Capstone** **4**	**Milestones**		**Benchmark** **1**
		3	**2**	
3.3. Demonstrate skill in carrying out mathematical (e.g. algebraic, geometric, logical, statistical) procedures flexibly, accurately, and efficiently to solve problems.	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.)	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem.	Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem.	Calculations are attempted but are both unsuccessful and are not comprehensive.
3.4. Analyze mathematical arguments, determining whether stated conclusions can be inferred.	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.
3.5. Communicate which assumptions have been made in the solution process.	Explicitly describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.	Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate.	Explicitly describes assumptions.	Attempts to describe assumptions.

	PFW General Education Rubric (Grounded in AAC&U Value Rubrics)– Quantitative Reasoning			
PFW General Education Student Learning Outcomes	**Capstone**	**Milestones**		**Benchmark**
	4	**3**	**2**	**1**
3.6. Analyze mathematical results in order to determine the reasonableness of the solution.	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.
3.7. Cite the limitations of the process where applicable.	Explicitly describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.	Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate.	Explicitly describes assumptions.	Attempts to describe assumptions.
3.8. Clearly explain the representation, solution, and interpretation of the math problem.	Uses quantitative information in connection with the argument or purpose of the work, presents it in an effective format, and explicates it with consistently high quality.	Uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven.	Uses quantitative information, but does not effectively connect it to the argument or purpose of the work.	Presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. (May use quasi-quantitative words such as "many," "few," "increasing," "small," and the like in place of actual quantities.)

Appendix H: Program and Course Level Worksheets for Planning Interventions and Innovations Based on Analysis of Assessment Data

Worksheet 1: Program Level

Program Level- Courses leading up to Programmatic Assessment	Assessment	Findings	Intervention/ Innovation	Assessment

Worksheet 2: Course Level

Course Level- Learning activities prior to performance assessment at the course level	Assessment	Findings	Interaction/ Innovation	Assessment