



Students as Assessment Pioneers in STEM Education: Strategies for Successful Partnerships

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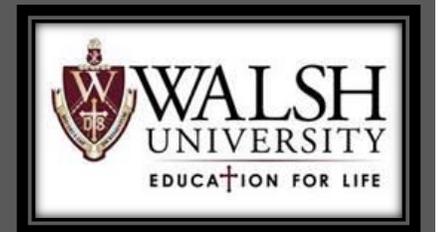
2023 Assessment Institute





My Vision

I want to dive deeper into assessment practices, but in a new way.





After today's session, you will be able to:

1. Identify ways in which assessment pioneers can create innovation in learner success and adapt these strategies for creating your own student partnerships
2. Discover the successes and challenges of an Honors project centered around student engagement in program assessment
3. Summarize the unique benefits of a student partnership in program assessment that can lead to positive change across your campus

University Program Assessment Committee (UPAC)

My work began during my role as Chair of UPAC, Fall 2022-Present

- New idea: explore student partnerships
- Personal reflection:
 - How can I design an Honors project unlike any other done before?
- If I created the right student experience, then this could be a new chapter in my **“assessment story”**.

Creating a Student Partnership

Honors Student served as an “Assessment Pioneer”

- Become Walsh University’s first student to contribute to program assessment in the Division of Math and Science.
- This idea started with a question:
- **How could I involve one Honors student in our annual assessment process and how would this provide valuable experience for career readiness?**
- Let’s explore my strategies in the assessment of learner achievement in Organic Chemistry I Laboratory.
- This serves as the next chapter in my **assessment story**.



Successes of this Student Partnership

- Data collection
- Rubric design

Student: _____ Lab: _____ Date: _____ Observer: _____

<p>Outcome: Operate the melting point apparatus to obtain accurate measurements of melting point. PSLO #4</p> <p>Question: What is the melting point of the solid obtained in the crystallization experiment? Did the student successfully conduct taking a melting point? Record the measurements and compare it to a normal melting point range.</p>	<p>Outcome: 3. Interpret the information given by the melting point apparatus by observing the temperature range at which the sample melts. PSLO #2</p> <p>Question: Did the student accurately record the temperature at the initial stage of melting and the temperature at which the entire sample changed from liquid to solid? Record both measurements.</p>	<p>Outcome: Employ correct measuring techniques to weigh out substances and obtain the volume of liquids. PSLO #4</p> <p>Question: Did the student accurately employ proper measuring techniques to weigh out substances?</p>	<p>Outcome: Choose the appropriate waste container for disposing organic waste products and perform the appropriate disposal. PSLO #4</p> <p>Question: Does the student choose the correct waste container and dispose of this waste in a safe and appropriate manner?</p>
<p>Outcome: Demonstrate the appropriate choice of clothing and shoes for safety in the lab. SLO #4</p> <p>Question: How the student is dressed in lab today? Does it follow the safety guidelines given by the instructor?</p>	<p>Outcome: Employ proper clean-up techniques in the lab. PSLO #4</p> <p>Question: Visual observation will be conducted here. I will record their clean up procedure.</p>	<p>Outcome: Assemble the equipment correctly to perform the 1-butanol reaction. PSLO #4</p> <p>Question: Describe your lab set up for the 1-butanol reaction. Also, visual observation will be conducted here.</p>	<p>Outcome: Demonstrate the appropriate use of goggles in the lab. PSLO #4</p> <p>Question: How and to what extent does the student wear his/her lab goggles.</p>

Learning Outcomes: Confirmation Rubric, Fall 2022

Date: 3/29/2022

Name: Myla Demko & Dr. Heston

Course Number: CHEM 201L

Title of Course: Organic Chemistry I Laboratory

Title of Exam/Assignment/Activity: Lab Activity – Crystallization

Description of Artifact: Post-Lab Questions and/or Evaluation of Lab Technique

Student Learning Outcome Assessed: (Indicate any that apply by Bold/Highlight)

*PSLO #1, *PSLO #2, *PSLO #3, *PSLO #4, *PSLO #5, or *PSLO #6

Interpretation Guide: 3 = Exceeds the standard (above 80% correct); 2 = Meets the standard (75-80% correct); 1 = Does not meet the standard (below 75% correct); 0 = No evidence (0% correct or no answer given)

**List any 4 evidences of outcome(left) and provide a score(right) for each student (demonstrates knowledge of content, understands a concept, uses critical thinking by demonstrating ability to recognize the components of a problem, applies knowledge to execute a solution, etc.)	3	2	1	0
1. Identify when a substance has reached supersaturated concentration. PSLO #2				
2. Operate the melting point apparatus to obtain accurate measurements of melting point. PSLO #4				
3. Interpret the information given by the melting point apparatus by observing the temperature at which the first drop of liquid melts and the temperature at which the last drop of liquid melts. PSLO #2				
4. Employ correct measuring techniques to weigh out substances and obtain the volume of liquids. PSLO #4				

*PSLO = program student learning outcome as given in your Curriculum Map

** This data may be reported as part of the annual assessment report for Walsh University.

More Successes of this Student Partnership

- Student voice and choice
 - Organic Chemistry I Lab
- Layout of the thesis
 - Initial work enhanced final thesis
- Increasing diversity
 - Empowering a young woman in STEM assessment



Some Challenges Along the Way

- IRB approval process
 - Advanced planning was “tricky”
- Formulating a plan for continuous improvement
 - Guiding undergraduate student in how to create her own plan

ECN Script:

Assessment Title: (Name of Lab) Research Questions

Description: Thank you for agreeing to participate in Myla Demko's Senior Thesis Research Project. Please answer the following questions pertaining to the (Name of Lab) performed in the lab today. Answer each question to the best of your ability. Do not receive or give help on this assessment. This assessment will not be counted for a grade. You may withdraw from the study at any time without penalty. Also included will be the ECN generated script for assessment time (unlimited), number of attempts (1), and the due date which will be at the end of the lab session.

Introduction Script:

Hello everyone! My name is Myla Demko, and I am a senior here at Walsh. I am in the Honors Program, and as some of you may know, honors students have to complete a senior thesis project during their final year in the program. As I am a senior, I am partaking in that process right now.

For my thesis project, I have chosen to study two of the labs performed in this organic chemistry 1 laboratory: the *Crystallization Lab* and the *Competitive Nucleophiles with 1-Butanol Lab*. The goal of the study is to determine how well the labs help learners to achieve the chemistry program student learning outcomes, also known as PSLOs. If you choose to

A Hidden Gem! These Challenges Served as Valuable Learning Experiences with Mutual Benefits

Challenges became valuable learning experiences for both the thesis advisor(me) and the student



My 1st IRB application:

Involved a student who was set to evaluate peers

Required careful planning and design



Guiding a student in creating a plan for continuous improvement



Strategies: After evaluating cohorts from both the first and second 8-week terms:

Student self-efficacy in assessment increased

Allowed student to identify learning trends

Summarizing Unique Benefits: A Student View



Incorporating student voice and choice

Student chose her favorite labs to evaluate

Safety protocols were evaluated due to importance in chemistry



Developing student leadership skills

Assessment innovator for Division of Math & Science = great skills for future job as high school STEM educator



Increasing diversity in STEM assessment

She can utilize assessment strategies with future students & guide STEM teachers embarking on their assessment journey

Summarizing Unique Benefits: A Faculty View

This can make a positive impact to curriculum design, thereby promoting continuous improvements in learner success.

The student's involvement also increased diversity within STEM assessment.

As a young woman, her contribution served to complement my work in assessment. I am Walsh University's only female faculty member in chemistry.

Collectively, these unique benefits paved the way for positive change in assessment and promoted student success.

Future Plans

- Creating a cycle by which faculty can repeat this study with a new cohort of students next year.
- This second study will include the addition of the new strategies in pedagogy to support learner success in Organic Chemistry I Laboratory.
- Additionally, this project can serve as a flagship assessment model for other chemistry courses so that my “assessment story” can continue to make a positive impact to student success.

Never underestimate the power of student partnerships because they can make your assessment dreams come true.



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Q & A



Please contact me!

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This presentation is posted on the
Assessment Institute website:

<https://assessmentinstitute.iupui.edu/>

