Description and Methodology

The Life Sciences Assessment (LSA) is a tool built in Canvas. Creating the assessment in Canvas has allowed us to set up the parameters (time, question randomization etc) to keep it as standard as possible over many sections. Students have 40 minutes to complete the assessment. There are 24 broadly relevant content questions, and one demographic question. In some sections students take the assessment during class or lab time, and in some sections they do it as homework. The same assessment is used in online, hybrid, in person, 16wk and 8wk courses. We have not been tracking course modality, or disaggregating data by course modality, but that might be possible in the future since data is collected by section.

The LSA is included in all our Canvas Master courses, and is also available on Canvas Commons so it can be easily imported into Canvas shells.

The assessment is set up as a Practice Quiz so the scores do not impact the Gradebook. Instructors have the option to offer extra credit for completing Assessment and a sample assignment is shared out to all instructors to help them incorporate the LSA into their Canvas course or course schedule. In the Life Sciences division we rely heavily on Course Lead instructors and they have been instrumental in coordinating the roll out of this assessment and the collection of the data from all sections of their course.

Item Analysis data is exported from Canvas Quizzes. How-to Videos and QRG's were created to assist Adjunct instructors with this step. The Item Analysis from Canvas provides a question by question breakdown of each course section's performance. The resulting .csv files are collected and the data is aggregated. To allow us to do a pre/post comparison of students moving through our pathways we looked at our Allied Health pathway courses and our STEM pathway courses and determined if a course was a "beginning-of-pathway" or "end--of-pathway" course. Then we aggregated data together accordingly.

Table 1

Pathway	**Beginning of Pathway courses**	**End of Pathway courses**
Allied Health	BIO156 + BIO201	BIO202 + BIO205
STEM	BIO181	BIO182

Each pathway has a set of PLO's

STEM Pathway PLO's

Table 2

PLO#1	At the end of the pathway students will be able to analyze given scientific information to answer empirical questions

PLO#2	At the end of the pathway, students are able to interpret information displayed in a line and bar graphs.
PLO#3	At the end of the pathway, students are able to analyze information displayed in a diagram to draw conclusions about a process.
PLO#4	At the end of the pathway, students are able to deconstruct the information provided in written questions in order to correctly answer the question

Allied Health Pathway Draft PLO's (currently under revision)

Table 3

PLO#1	At the end of the pathway students will be able to analyze given scientific information to answer empirical questions
PLO#2	At the end of the pathway, students are able to interpret information displayed in a line and bar graphs.
PLO#3	At the end of the pathway, students are able to analyze information displayed in a diagram to draw conclusions about a process.
PLO#4	At the end of the pathway, students are able to deconstruct the information provided in written questions in order to correctly answer the question

Questions in the LSA were aligned to particular PLOs

Table 4

	Allied Health	**STEM**
PLO#1	Measured by overall score	Measured by overall score
PLO#2	Aligns to Q3, 6, 9,13	Aligns to Q3, 6, 9,13
PLO#3	Aligns to Q1,12,14,23	Aligns to Q1,12,14,23
PLO#4	Aligns to Q5, 10	Aligns to Q5, 10

Data was summed across all sections of all grouped courses (per Table 1) so that the total number of students who got the questions aligned to each PLO correct could be calculated. The results were as follows:

STEM Pathway PLO analysis

Spring 2021 n=100

	BIO181	BIO182
PLO1	0.488	0.576
PLO2	0.716	0.724
PLO3	0.438	0.530
PLO4	0.364	0.586

Fall 2021 n=117

	BIO181	BIO182
PLO1	0.510	0.607
PLO2	0.696	0.765
PLO3	0.494	0.617
PLO4	0.381	0.629

For example, in Spring 2021, 48.8% of students had met PLO1 at their entry to the STEM pathway, and 57.6% had met PLO1 upon their exit of our STEM pathway. This shows a 10% increase in students meeting PLO#1 at the end of the BIO181/BIO182 course sequence.

Allied Health Pathway PLO analysis

Spring 2021 n=384

	156/201	202/205
PLO1	0.550	0.566
PLO2	0.691	0.722
PLO3	0.494	0.516
PLO4	0.552	0.532

Fall 2021 n=446

	156/201	202/205
PLO1	0.547	0.615
PLO2	0.720	0.758
PLO3	0.494	0.546
PLO4	0.541	0.574

Analysis and Discussion

We have figured out a reasonably efficient way to collect large assessment data sets and to analyze it in a way that is meaningful for our division.

We developed the LSA prior to drafting our PLO's, and so the tool does not line up perfectly with our outcomes. We are in the process of modifying the tool so that the questions will be better aligned to our new PLO's It might be a challenge to update all the LSA's across all the canvas shell that are now "out in the wild" with our adjunct instructors, but we are going to attempt to.

FT faculty who teach in each pathway are working together to modify their curriculum to target the PLO's that saw minimal increase in the pre/post analysis.

Now we have a methodology, we would like to extend this assessment to our Non-Majors courses. PLO's are currently being drafted for this pathway within Life Sciences (it includes BIO100, BIO105, BIO145 and BIO160 courses) and we plan on administering the tool at the beginning (before the end of wk 3) of the courses in Fall semesters and at the end (after week 14) of the courses in Spring semesters to create a similar pre/post comparison methodology, since there isn't a specific sequence of courses that our non-majors students take.

The constant evolution and refinement of this large scale division-wide assessment evidences closing the loop of assessment as we have learned from our experiences and sequentially modified our methodology. In addition we now have some meaningful data that we can use to change our instruction and modify our curriculum to meet our stated program learning outcomes.