

Mathematics Liaison Report prepared by Camelia Salajeon with Fernando Miranda-Mendoza

Department Buy-In and Outcome Definition

Starting this semester, spring 2017, the Mathematics Department decided to create an assessment for Math 118 – General Education Mathematics. This course is designed to fulfill general education requirements. It is not designed as a prerequisite for any other college mathematics course. This is also the first semester in which we offer Math 118 in all three formats: face-to-face, hybrid and online. At our college, this course is mainly taught by part time faculty. For all these reasons, Math 118 poses a particular challenge when it comes to creating a unified and relevant assessment.

Math 118 – General Education Mathematics is the only college level course for which the instructor selects 4 out of 12 topics to be taught. The Student Learning Outcomes for this course are specifically presented for each of the 12 possible topics of the course. This semester, a district wide committee formed of one faculty member from each of the City Colleges worked together to determine 3 common SLOs for Math 118 that students can meet no matter what topics are taught in the course. Our Mathematics Department Assessment Committee analyzed these common SLOs and selected “Interpret and draw inferences from mathematical models such as formulas, graphs, tables, and schematics.” to investigate during this assessment cycle.

Assessment Research and Design

At the heart of every assessment process is answering the questions: “Where do we want students to be at the end of a course or a program? How will we know if they get there?” This requires collecting and analyzing information about the student learning and performance in order to improve their education and our teaching techniques.

The Mathematics Department Assessment Committee researched and reviewed different assessment tools and processes for our specific student learning outcome. A Quantitative Reasoning Test available through Madison Assessment LLC caught our attention. This test is a computer-based assessment designed to be content-free, in other words correct responses to the questions do not require specific content knowledge of any domain of science but general quantitative reasoning that the course aims for.

In a similar line of thought, we created a pilot assessment tool in collaboration with the HWC Assessment Committee. This tool consists in three mathematical problems that are properly aligned with the targeted SLO (see Appendix).

For the design of this assessment we decided to create a “spring 2017 HWC Math 118 Survey” using Google Forms. This specific tool is convenient for collaboration and shareable process and outcome between the members of the committee. It is browser independent and especially

mobile friendly, which is a significant advantage for students. The responses are organized automatically into pie charts and bar graphs that are viewable dynamically as the survey progresses. As the sample size grows, we see the results evolving in time.

Pilot Assessment Tools and Processes

Before the end of the Spring 2017 semester this pilot assessment was administered to students with collaboration from instructors teaching Math 118 via various formats, face to face, hybrid and online. In the course of two weeks, we were pleasantly surprised to record about 170 responses!

We are eager to get into the analysis phase of the data from this pilot and we are looking forward to creating a proper assessment for our students in the fall 2017 semester. The Mathematics Department Assessment Committee is planning to examine patterns and determine if the students' results are influenced by the specific topics covered in the course. All this information will help us narrow down strategies to enhance our teaching, with the goal of improving our students' learning.

Administer Specific Assessment

In upcoming semesters, we plan to expand the assessment beyond this pilot into two parts: a pre-test and a post-test, in order to analyze and identify more accurately where students are struggling, and to address their problems more efficiently.

Data Analysis

In anticipation of a sufficient sample size of responses, we plan to conduct a test of significance on the data, and compare quantitatively how students interpret and draw inferences from the various mathematical models in the SLO.

Supporting Evidence-Based Change (Use of Findings)

This will be a continuing process that will identify the goals, develop valid and reliable questions, gather and interpret data that will inform and help the enhancement of Math 118 courses.

Success Factors

The number of responses already gathered from this pilot is extremely encouraging and promises improving results in the future.

This semester, the extent of faculty involvement in the math department was substantial. Half of the full time faculty have worked together and successfully collaborated towards the same goal.

Recommendations

After the upcoming analysis of the completed pilot, as well as discussions amongst the committee members, we will be able to draw conclusions and make pertinent recommendations for refining teaching of Math 118 and improving this specific SLO.

Appendix

Math 118 Pilot Assessment Tool

Spring 2017

1. Use the formula below that expresses the relationship between temperature in Celsius degrees, C, and Fahrenheit degrees, F, to answer the question below.

$$C = \frac{5}{9}(F - 32)$$

Water boils at 212°F. What is this temperature in Celsius degrees?

- a) 100°
- b) 85.78°
- c) 32°

2. Study the table below and answer the following 3 questions.

Table 5. Reasons for Retirement by Age at Retirement			
Reason for retirement	Age at Retirement		
	Under 62	Between 62-64	65 or older
Age	10.5	21.6	64.6
Ready to retire	10.5	50	14.6
Health problems	26.3	11.9	8.3
Plant closed	10.5	1.5	-
Benefits	10.5	3	-
Make way for younger workers	2.6	1.5	6.0
Bad work conditions/industry uncertainty	5.3	4.5	-
Family concerns	7.9	-	2.9
Enjoy life	7.9	1.5	2.1
Other	7.9	4.5	2.1
	100%	100%	100%
n =	76	66	48

2A. What is the total number of surveyed retirees on which Table 5 is based?

- a) 76
- b) 200
- c) 190
- d) 100

2B. For the surveyed retirees under age 62 from Table 5, what was the least mentioned reason for retirement?

- a) Family concerns
- b) Benefits
- c) Health problems
- d) Make way for younger workers

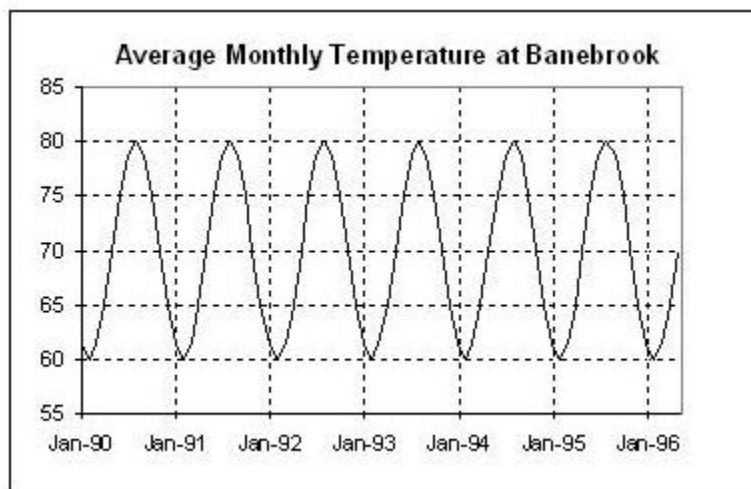
2C. How many of the surveyed retirees who were between 62 and 64 from Table 5 reported that their reason for retirement was that they were “Ready to retire”?

- a) 10.5
- b) 33
- c) 50
- d) 66

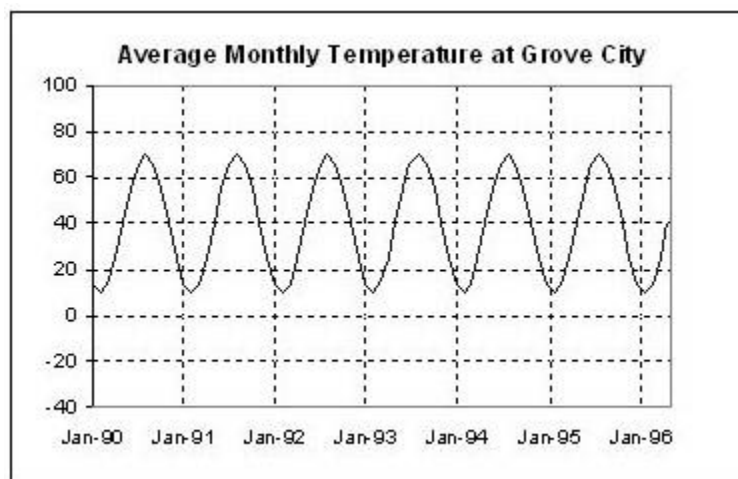
3. Regarding the two graphical displays given below, which of the following statements is correct?

- a) Banebrook (Graph 1) and Grove City (Graph 2) temperatures exhibit linear behavior through the year.
- b) Banebrook (Graph 1) has the largest changes in temperature than Grove City (Graph 2) through the year.
- c) Neither of the above.

Graph 1



Graph 2



Adopted from 2017 Madison Assessment LLC.