

Annual Assessment Report: Quantitative Skills (QS) Committee May 31, 2023

Introduction

The Quantitative Skills (QS) Committee consists of four faculty members drawn from across the disciplines that teach QS-coded courses: William Haden-Chomphosy (ECON), Lars Seme (MACS), Damon Spayde (PHYS), and Leslie Zorwick (PSYC). This report summarizes the findings of this year's assessment cycle. We met virtually on Wednesday, May 31 to discuss our findings. In attendance were William Haden-Chomphosy, Lars Seme, and Damon Spayde. Leslie Zorwick was absent.

Assessment of Program Learning Goal 1

According to the Student Assessment Plan and associated assessment cycle that was developed during the 2019-2020 academic year, the QS committee is tasked with assessing Program Learning Goal 1 (PLG1) during the 2022-2023 academic year:

"Upon successful completion of the requirements for the Quantitative Skills Capacity, students will be capable of interpreting quantitative ideas graphically, symbolically/algebraically, and/or numerically.."

Direct Assessment

As part of its work in 2019-2020, the QS committee developed direct assessment instruments to be completed by faculty teaching QS courses. (A copy of the direct assessment instrument can be found in the filed Student Assessment Plan.) This instrument asks each instructor to tally the number of students in their QS-coded course(s) achieving each of the following levels with respect to PLG1: Strong, Satisfactory, Needs Growth, Unsatisfactory, or Not applicable. PLG1 was also directly assessed in 2020-2021, and we will provide a comparison with that information. Please note that the Direct Assessment tool in 2022 asked the question as "Use mathematical/computing techniques to analyze and solve models."

In both the Fall and Spring semesters of 2022-2023, the direct assessment instrument was distributed to faculty teaching QS-coded classes. There were a total of 733 students enrolled in QS-coded courses during this academic year. Data was submitted for 340 students, most of which were in the Spring semester, most of which were in the Spring semester; information on how to fill out the direct assessment was not widely disseminated to our faculty teaching QS courses in the Fall, leading to only a few sections completing their response. We plan to develop a more comprehensive workflow to make sure this happens in future semesters.

When we last assessed PLG1, we broke down the data by individual course; however, this time, since Indirect Data came to us broken down by academic department, we chose to use that categorization as well. We had the following total number of students, per department:

- Economics & Business (ECBU) – 47 (14%)
- Mathematics & Computer Science (MACS) – 234 (69%)
- Physics (PHYS) – 59 (17%)

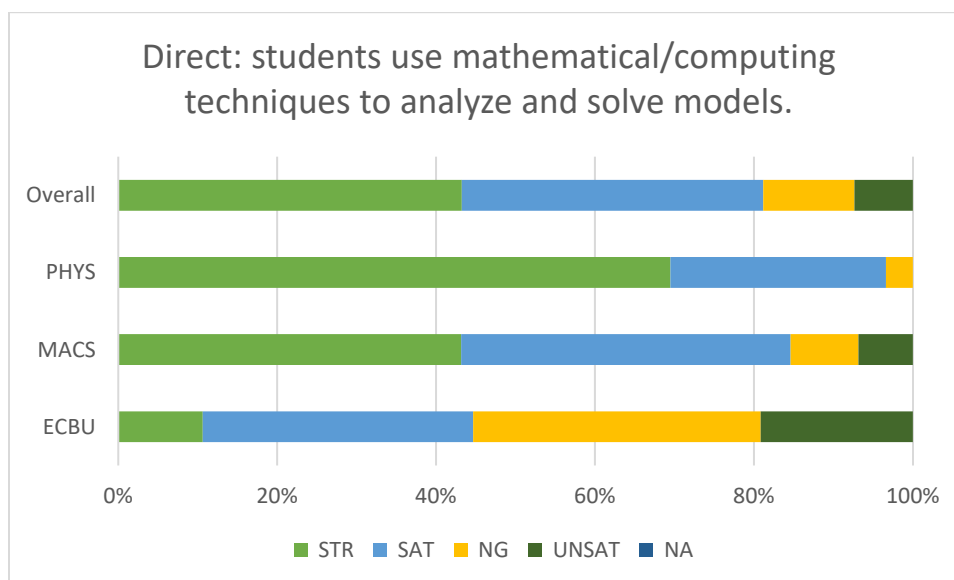


Figure 1. This stacked bar graph displays the results of the QS committee’s direct assessment of students’ capability to use quantitative techniques to solve problems, broken up by academic department. Each bar indicates the fraction of students achieving a given rating (Strong, Satisfactory, Needs Growth, Unsatisfactory, or Not Applicable) in each reported QS course, and overall.

Though there is a large amount of variation among departments we can see that overall, instructors rate approximately 80% of students as either Strong or Satisfactory on achieving PLG 1. We note that the ECBU data stands apart from this pattern, with only around 50% of students achieving the Strong or Satisfactory outcome for PLG1. The ECBU department is aware of this challenge and is currently taking steps to try and improve the outcomes, which we elaborate on below in the “Use of Evidence” section.

We also note that we did collect direct assessment information about PLG2 as well and will combine that data with next year’s as we look to assess PLG2 in 2023-2024.

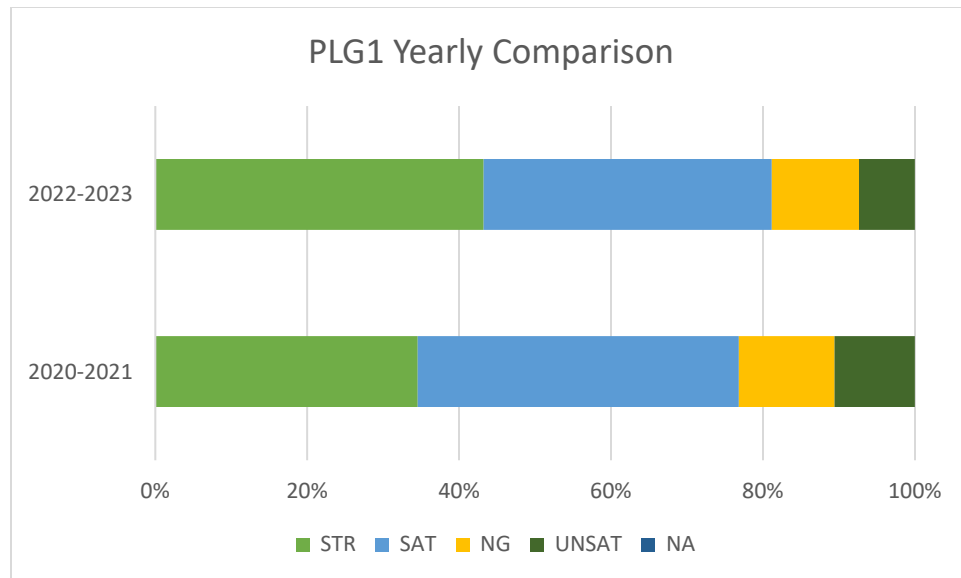


Figure 2. This stacked bar graph displays the results of the QS committee's direct assessment of students' capability to use quantitative techniques to solve problems comparing results from 2022-2023 to 2020-2021. Each bar indicates the fraction of students achieving a given rating (Strong, Satisfactory, Needs Growth, Unsatisfactory, or Not Applicable) in each reported QS course, and overall.

We see that the results are roughly equivalent between the two years. Between 75% and 80% of students are at least satisfactorily achieving PLG1.

Indirect Assessment

During the development of the QS SAP in 2019-2020, the committee also developed a question to be included on end-of-course evaluations for QS-coded courses to provide an indirect assessment of PLG2:

"This Quantitative Skills course has enhanced my ability to interpret quantitative ideas graphically, symbolically/algebraically, and/or numerically."

Students answered this question using a 5 point Likert scale from Strongly Agree to Strongly Disagree. Data was collected for both semesters; a total of 457 students responded, roughly even across both semesters. This data was broken down by department:

- Economics & Business (ECBU) – 84 (18%)
- Mathematics & Computer Science (MACS) – 210 (46%)
- Physics (PHYS) – 81 (18%)
- Psychology (PSYC) -- 82 (18%)

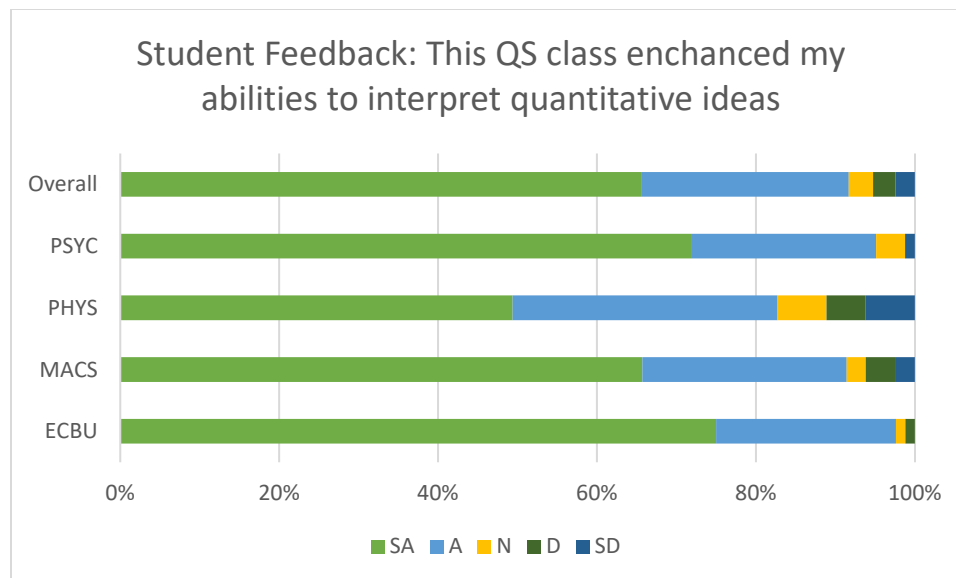


Figure 3. Stacked bar chart, by department and total, showing the results of the student self-assessment from end-of-course student feedback forms

Students rate themselves highly on this question – though we should note that the question asks whether the course “enhanced” their quantitative abilities, not whether they believe that they have mastered this PLG 1 directly.

We also note the inclusion here of Psychology. Most QS-coded PSYC courses were taught in the Fall, where we did not appropriately disseminate information to instructors to directly assess their students. However, the students themselves did have an opportunity respond to the QS-centered question on student feedback, and did so.

Use of Evidence

As evidenced by the direct assessment data, the 2022-2023 assessment results generally indicate that students mostly achieve PLG 1. Instructors rate approximately four fifth of students as either “Strong” or “Satisfactory”, with the exception of ECBU professors teaching QS-coded courses, and students themselves believe that their experiences in their QS courses have improved their abilities to work quantitatively.

The ECBU department recognizes that many of their students require additional support in meeting the learning goals for the Quantitative Skills capacity. They also recognize, based on the indirect assessment data, that students feel that the courses are helping them improve their Quantitative Skills. In the fall semester of 2022, the ECBU department began offering a new course focused on developing the skills and understanding needed for success in the equations-based Microeconomics and Macroeconomics courses, and we believe this extra practice with quantitative processes would also help prepare students

for Business Statistics. The results of that effort may not be observable in this direct assessment data, since the offering is so new.

In the next academic year, 2023-2024, the QS committee will assess PLG2. This will be our first opportunity to compare assessment from a prior cycle (since we assessed PLG 2 first only in 2021-2022). We will have direct assessment data from four total years.

Changes and Updates

As evident here, we will commit to being better at making sure QS-course instructors know when it is time to directly assess their courses. In addition, we need to consider carefully the wording of the direct assessment tied to PLG1 – it does not quite match the language in the learning goal or in the student feedback/indirect assessment. Is it asking what we want to ask? We expect that as we gather more data, we will have a better understanding of QS achievement of Hendrix students.

It would be our recommendation that the Assessment Office take control of sending notifications to directly assess courses to *all* affected faculty, rather than relying on individual Learning Domain or Capacity Committees. The Disco Tray platform already centralizes the data collection, and so a single source could streamline the collection of the data.