Heterogeneity to Homogeneity: A COVID-Proof Assessment Review

Two assessment reports were generated [1, 2] in Jun/Aug 2019 using current (at that time) WNC Canvas-derived anonymous student data to develop and apply an evidence-based grading scale for (at the very least) students in General Chemistry I, a college/university transfer, first semester major's, non-secondary, chemistry course and general education course. In addition, previous CHEM 121 course assessments were examined to develop and implement a two-part, pre- and post-course, assessment of the SLO's in CHEM 121 at WNC (as a group, rather than cherry picking one or two questions; more, by design, along the lines of the comprehensive ACS standardized exams).

Since the reports of 2019, CHEM 121 has been offered at WNC as an accelerated, 8-week long course four times: Fall 2109 (pre-COVID-19), Spring 2020 (peri-COVID-19-1), Fall 2020 (peri-COVID-19-2) and Spring 2021 (peri-COVID-19-3).

The outcomes/results of the assessments, pre-course and post-course, are illustratively summarized in this link: https://www.drcarman.info/121chemssmnt.png .

The assessments are grouped by semester in the linked image. Each semester is identified at the far right of the set of the four bar charts. The average NSHE letter grade assigned per the previously cited evidence-based grading scale is at the lower left of each post-course assessment (parts 1 and 2). The average course grade is cited at the lower right of each semester's sets of graphics.

Across all four offerings, and between pre- and post-course assessments, it's clear that students demonstrated learning/mastery of the material in all four sessions. In addition, all four class sections of CHEM 121 students performed at an average final course grade of a "C" level, which is a third of a grade point higher than what WNC has accepted as the lowest grade a successful college student obtains/earns. The average grade of "C", as noted/cited on the bottom of the graphic, is also in line with the NSHE Code.

The assessments were designed to consistently "hit" on an average grade of a "C". As shown in the image, that's exactly what it's doing … and it's doing it in spite of the three remote, peri-COVID-19 natures of the courses. Overall, there's no statistical difference between the pre-test scores in each section, nor are there any statistical differences between post-test scores.

Of interest is that the pre-COVID and peri-COVID-19-1 groups show substantial academic heterogeneity, pre- and post-test. The last two groups, peri-COVID-19-2 and peri-COVID-19-3, on the other hand, demonstrate a quite remarkable academic homogeneity, pre- and post-test. It's of interest that when eyeballing the 4 groups, one can almost visualize a "funneling" or "coning down" effect as heterogeneity slowly morphs/evolves into homogeneity across the 4 sections. Of even greater interest is that the members of the peri-COVID-19-2 and peri-COVID-19-3 groups ALL shifted to the right on the post-test, leaving no stragglers behind (unlike those in the face-to-face and peri-COVID-19-1 groups, which seemed to be more reflective of each other).

While the groups are small and the final average course grades are identical, the lack of academic diversity suggests greater effort, interaction/participation/engagement and output in/from/with the peri-COVID-19-2 and peri-COVID-19-3 groups of students. While it would be interesting to see what one more semester of the same conditions would do to a class' academic diversity, for a variety of reasons that will just have to be a philosophical discussion for another time.

In conclusion, the assessment and co-attached evidence-based grading scale appear to be COVID-proof and students, in terms of only the SLO's, are clearly advancing with their knowledge of the material to which they've been exposed.