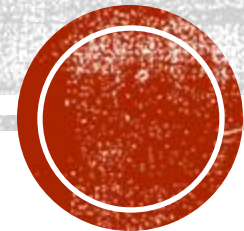

ENGAGING STUDENTS IN ASSESSMENT AND ACHIEVEMENT OF LEARNING OBJECTIVES IN ASYNCHRONOUS COURSES

A Pre and Post
Intervention of
Learning Objectives
Assessment

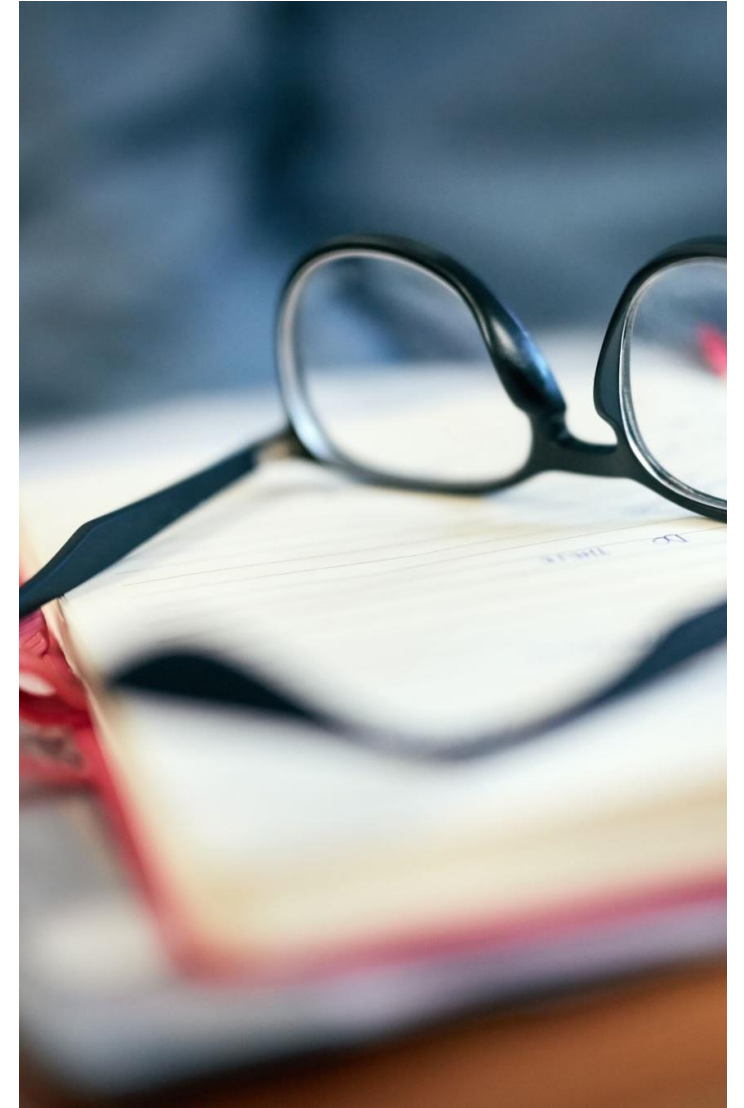
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BACKGROUND

- Post pandemic, the delivery and management of courses in higher education has been both positively and negatively affected.
- While systems capacities, usage and users have expanded into multiple possibilities never realized,
- authenticity of submitted work by students need to be revisited.
- With the advent of ChatGBT tagging clear attainment of learning objectives is becoming challenged like never before.
 - Or do we revise our learning objectives?
- As Academicians, we still must enforce success in the learning objectives, and take advantage of in-class interactions to ensure adequate level of understanding has been obtained.





- Asynchronous teaching gives us opportunity to get the technology gains for what is attainable virtually, take advantages of new technologies e.g. in AI among others
- Gives us a physical opportunity for the in-class engagement and interaction.
- How do we assess the existing learning objectives with the changes in the new dynamics??
- The significance this work is highlighting is the possibility to assign adequate proportion of the assigned tasks, and determine:
 - which ones can be fully attained by virtual assignments (e.g., lectures)
 - which ones should be best left to in-class times (learning objectives assessment)



We recorded “Scores” in the online environment as “homework” (HW), in-class assessment as “classwork” (CW) and repeated in three “rounds” of weekly assessments.



homework was treated as the pre assessment and designed an in-class post assessment of learning outcomes each week.



The post assessment was a two to three question quiz around the learning objectives followed by an engaging discussion.



Results were analysed in RStudio

METHODOLOGY



STATISTICAL ANALYSIS

- We visualized the three rounds of scores: Round 1,2,3
- Conducted a paired sample T Test of HW and CW
- ANOVA to study the difference of assessment scores between HW and CW assignments and if engaging students will improve the learning objectives.
- **Hypotheses:**
 1. Online homework is hindering us to capture the extent which learning objectives have been obtained and
 2. In class revision and discussion-based assessment of learning objectives can improve their overall assessment of learning objectives.



RESULTS

1. DATA VISUALIZATION

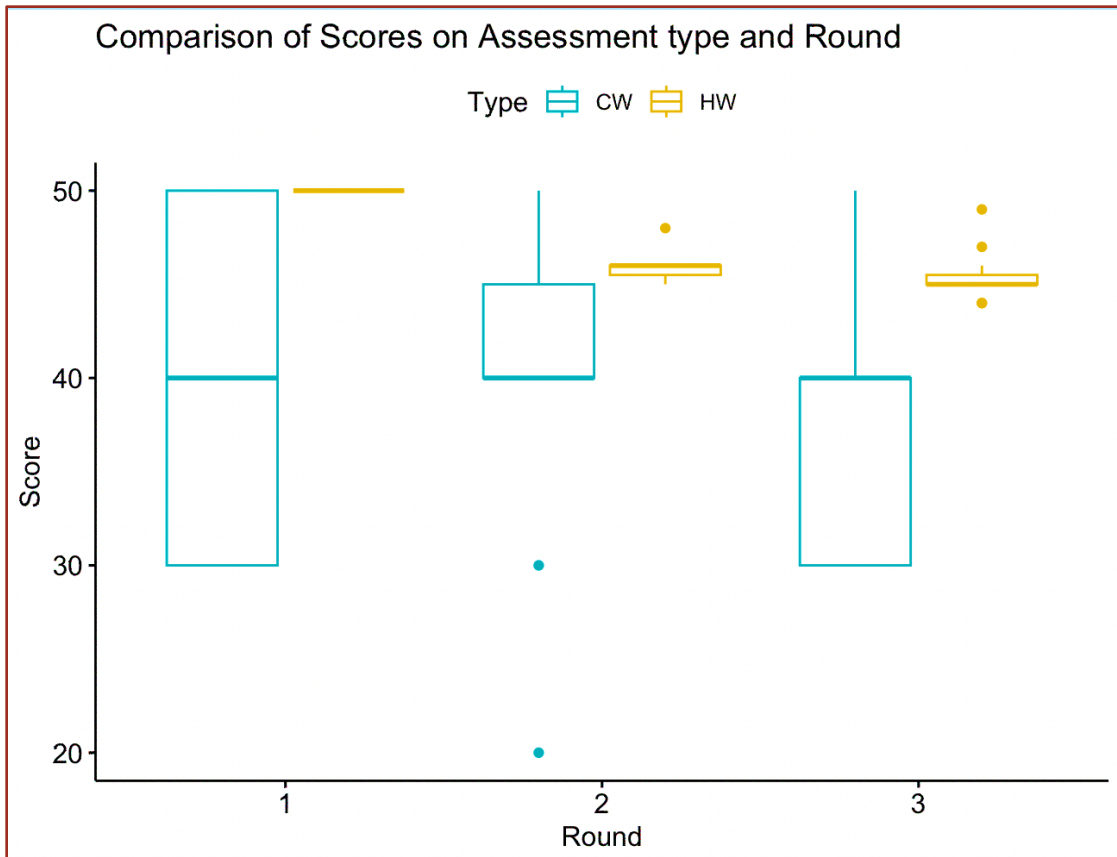


Fig 1a. Scores Boxplot versus Round and type

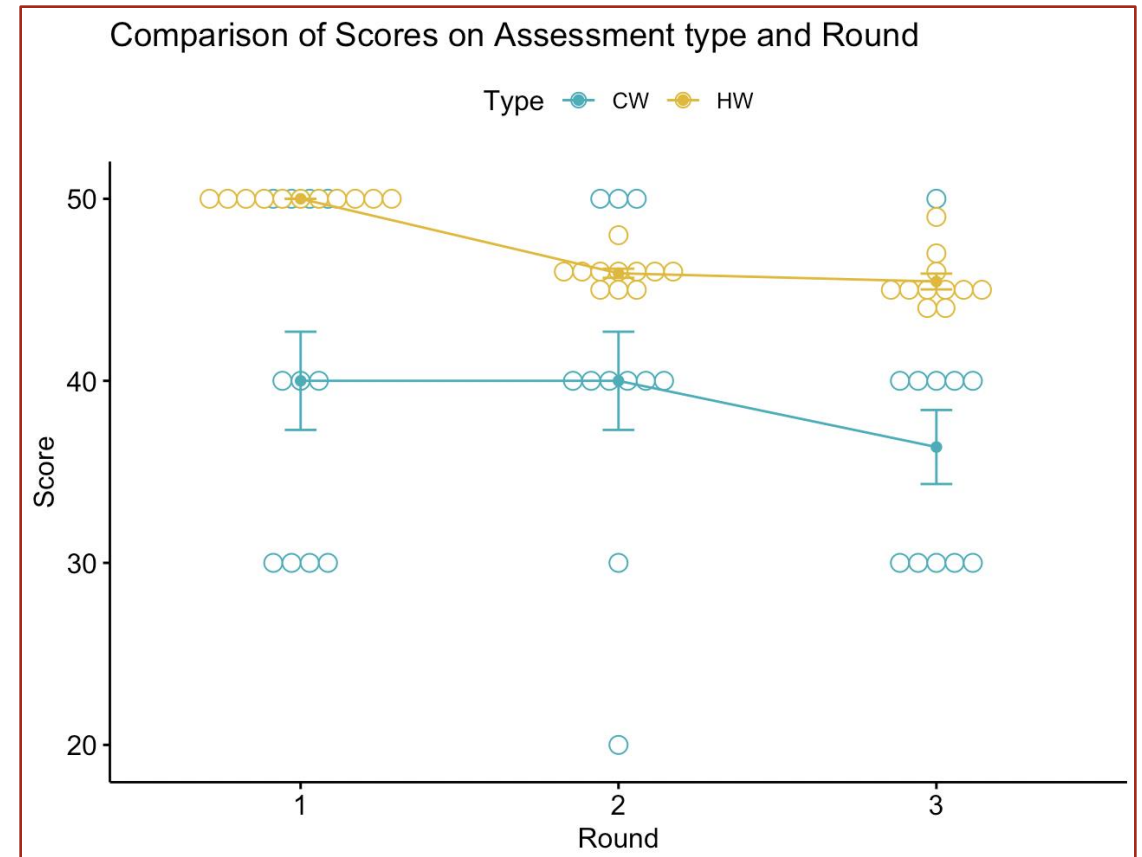


Fig 1b. Line plot versus Round and Type



RESULTS

2. TWO-WAY T TEST

- To estimate the difference of scores performance we conducted the T-test of the pre and post scores.
- The mean difference was 16.67% lower for in-class assessment and the 95% confidence interval as [10.8, 22.5] significant at 1.8e-06

Paired t-test

- data: Rounding\$AL1 and Rounding\$IE1
- $t = 5.8168$, $df = 32$, $p\text{-value} = 1.846e-06$
- alternative hypothesis: true mean difference is not equal to 0
- 95 percent confidence interval:
 - 10.83037 22.50297
- sample estimates:
 - mean difference 16.66667



RESULTS

3. TWO-WAY ANOVA

- To Test the effect of type and round on scores we conducted a Two-Way ANOVA
- Type of assignment had a P value of $2.16e-07$
- Round was also significant with P value of 0.023.

```
summary(res.aov2)
```

```
      Df Sum Sq Mean Sq F value Pr(>F)
Round   1  184.1   184.1    5.437  0.0229 *
Type    1 1145.8  1145.8   33.844 2.16e-07 ***
Residuals 63 2132.9    33.9
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
>
```



DISCUSSION

This shows that :

- the high scores obtained in on online environment are not fully depicting the attainment of the learning objectives as the in-class assessment.
- However even with the significant probabilities between the three rounds, seem to be insufficient to test if the gap of scores between the two assignments is being minimized with time or it is affected by the content type per week.





CONCLUSION:

- These results support while there is a very clear outcome learning difference in the two performances, the variability of these scores would improve in a long run

Improvement to the intervention:

1. Including all weeks in a semester
2. administering self-assessments





THANK YOU FOR LISTENING

Any Questions..?

