

Background

After pandemic restrictions were lifted, students were interested in retaining hybrid learning options. In response, the MD program offered a Virtual Discovery Learning (DL) stream during pre-clerkship. This study compares the learning outcomes of virtual vs in-person DL students in the Gastroenterology and Nutrition course.

Objectives

- Compare the achievement of learning outcomes between students who attended Discovery Learning (DL) in person vs students who attended DL virtually.
- Examine the learning experiences of students who attended DL virtually.
- Assess the effectiveness of Virtual DL and the benefits of offering students a choice between the two modes of delivery.

Methods

Quantitative Method:

Students were given the option to enroll into Virtual or In-person DL groups. Learning outcome data was collected and anonymized. Overall student performance for MCQ assessments and performance for DL specific questions in those assessments was compared between the two groups using two-tailed T-Test with two sample unequal variance.

Qualitative Method:

Focus groups were created where students provided feedback on their Virtual DL experience, their reasoning for choosing the Virtual DL stream and their impressions of the experience using the following questions:

- What prompted you to participate in the virtual DL stream?
- What benefits/drawbacks did you experience from virtual DL?
- How do you think virtual learning affects your learning? Why?
- Are there other learning activities/options/experiences that you would prefer having virtually?
- If the virtual DL stream continues, what can we do to improve the experience?

Results

Quantitative Results

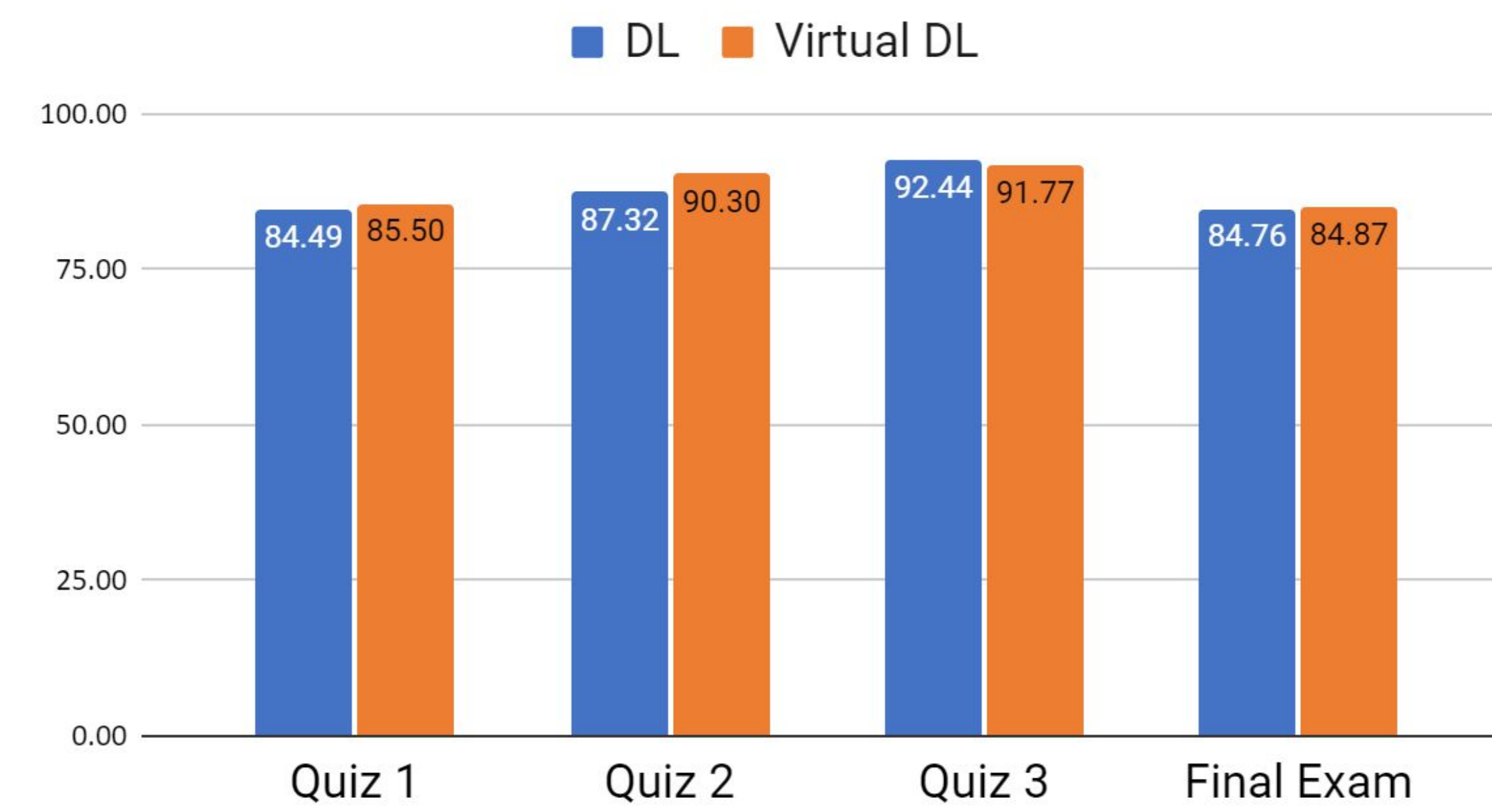
The total number of students in the Gastroenterology and Nutrition course was 163. 30 students took the virtual DL option and 133 took the in-person DL option.

Statistical analysis of student performance data concluded that there were no statistically significant differences in grade averages between the Virtual and In-person DL groups for the Gastroenterology and Nutrition course assessments including the final exam (p=0.929).

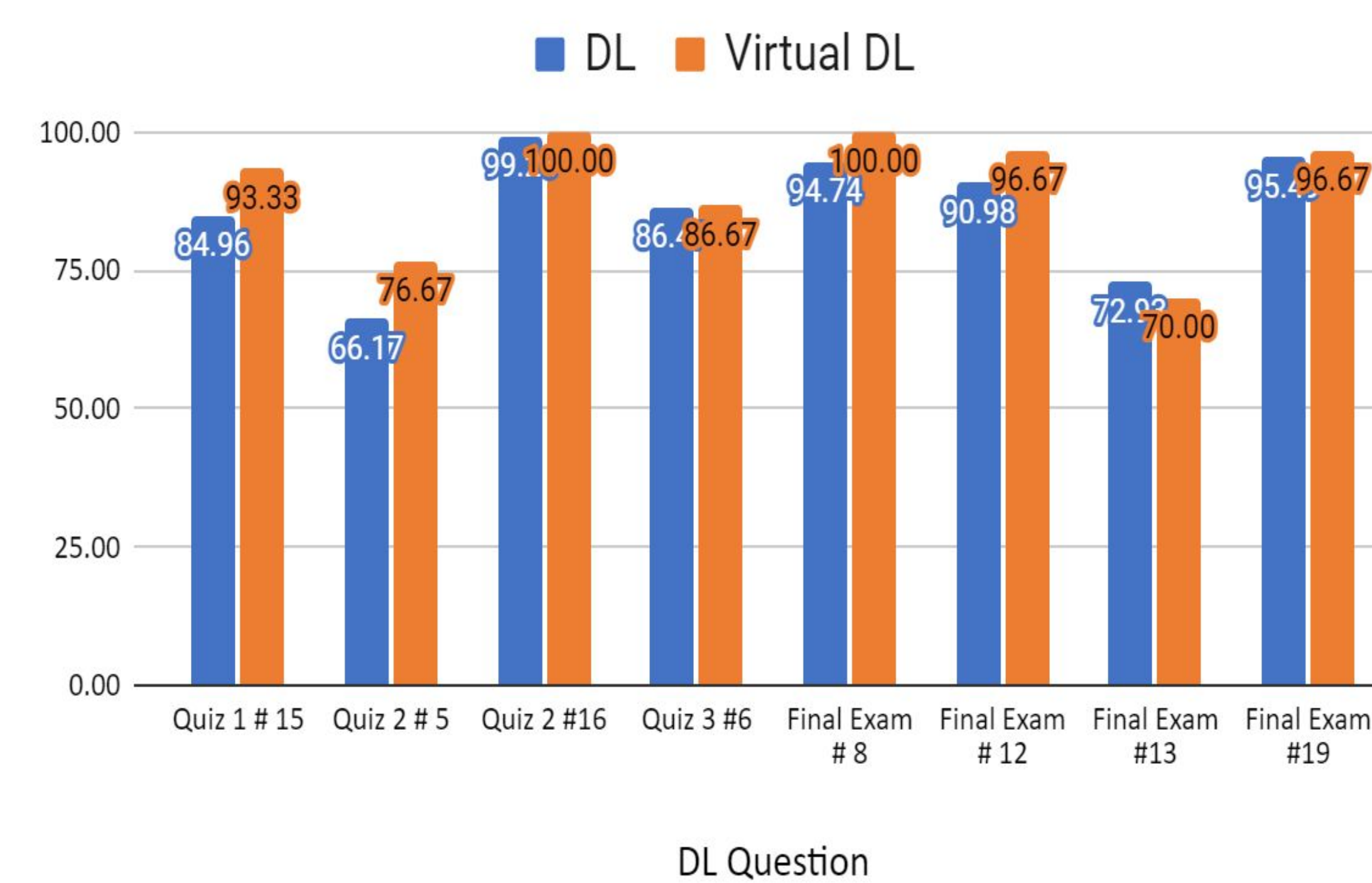
The only statistical difference observed was for one DL specific question on the final exam where the virtual DL group outperformed the in person DL group (Question #8) with p=0.008. The rest of the DL specific questions did not show statistically significant difference.

Assessment	DL	STDEV.S	Virtual DL	STDEV.S	TTEST
Quiz 1	84.49	9.12	85.50	8.28	0.556
Quiz 2	87.32	10.29	90.30	8.53	0.103
Quiz 3	92.44	7.42	91.77	9.30	0.711
Final Exam	84.76	6.04	84.87	5.89	0.929

Learning Outcomes



DL Specific Questions Outcomes



DL Question	DL	STDEV.S	Virtual DL	STDEV.S	TTEST
Quiz 1 #15	84.96	35.88	93.33	25.37	0.139
Quiz 2 #5	66.17	47.49	76.67	43.02	0.242
Quiz 2 #16	99.25	8.67	100.00	0.00	0.319
Quiz 3 #6	86.47	34.34	86.67	34.57	0.977
Final Exam #8	94.74	22.41	100.00	0.00	0.008
Final Exam #12	90.98	28.76	96.67	18.26	0.176
Final Exam #13	72.93	44.60	70.00	46.61	0.755
Final Exam #19	95.49	20.83	96.67	18.26	0.757

Qualitative Results

The focus groups aimed at the Virtual DL students identified 4 different Themes for the students' preference in their choice of Virtual DL:

- Theme 1: Covid-19 – Students within this theme either had immunocompromised family member or worked with vulnerable people.
- Theme 2: Flexibility – Students within this theme appreciated the flexibility in saving travel time and expenses, as well as the ability to address other obligations in their life.
- Theme 3: Accessibility and Learning Styles – Students within this theme found that they were able to retain information better in a virtual setting.
- Theme 4: Mental Health – Students within this theme were able to study remotely and receive support from their support system in cases where their family and friends did not live in the city. Students also indicated that they were able to achieve a better work/life balance.

Discussion

Students who chose to attend Discovery Learning virtually did not experience any academic advantage or disadvantage in learning compared to students who attended DL in-person, and psychosocial benefits of virtual attendance were identified. In addition, students who chose the Virtual DL option identified several positive themes in terms of mental health, accessibility, flexibility and security. Therefore, the study suggests that an optional hybrid model for DL is potentially beneficial to students without impacting learning outcomes.

Limitations of this study include lack of randomization, which makes it impossible to know if baseline academic performance, learning style, or other academic factors were equal between the two groups. The total number of specific exam items blueprinted to DL content were small, and may have been covered in other instruction such as lecture or other small group teaching, which could have minimized a difference between the two groups.

The next steps in this study would be to first expand the analysis to other courses within the same academic year. Second to continue offering the two options for DL delivery and monitoring the comparability of student performance between the two modes of delivery.

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