

Writing Development Initiative 2021-2022 Final Report

Course Code
Instructor

MAT202H5 – Introduction to Discrete Mathematics
TJ Yusun (Assistant Professor, Teaching Stream, MCS)

	Final enrolment
Fall 2021 (1 section)	108
Winter 2022 (2 sections)	151

For background and rationale please see the [original proposal here](#). Last year's [final report is here](#). (Google Drive links) My overarching goal was to promote mathematical communication in *all aspects* of the course, not just in a single project or assignment. This generous WDI grant allowed me to provide TAs with extra hours for grading & delivering the writing-focused interventions for MAT202. Many thanks for this opportunity. I am interested in running this project again in the academic year 2022-2023.

What did we do?

My goal for this year was to implement the interventions from the prior year without making any significant changes. Some minor differences were:

- The elimination of regular assignments, as these were playing a similar role in the course as the portfolio, and students were confused about the difference.
- TA benchmarking meetings were introduced to make sure the instructional team was on the same page with respect to giving feedback.
- The introduction to LaTeX workshop was moved into a regular LEC meeting instead of outside class hours.

How did it work?

Ana Paixao-Fonseca conducted an assessment of a small sample of student writing in portfolio draft submissions and the final submission in the Fall and Winter terms, finding for the Fall that

Each of the students whose assignments were reviewed demonstrated an improvement in at least one of the writing criteria assessed, with the majority of students demonstrating improvement in three (3) or more categories. While the most improvement is seen in the level B, level C, and level D students, these results are indicative that all students likely benefit from the writing assignments in this course, despite of their level of achievement.

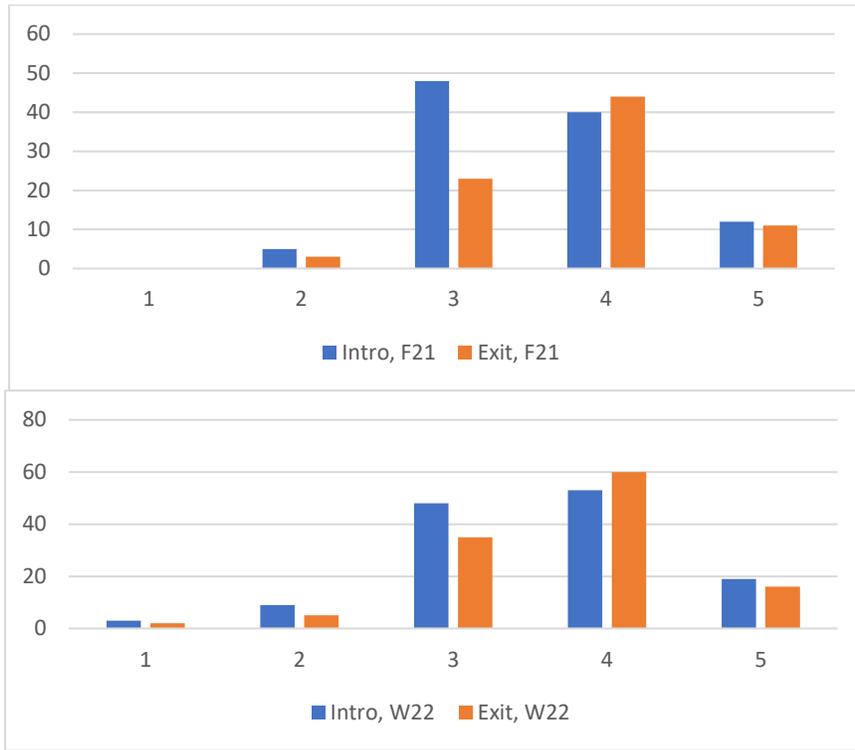
While for the Winter:

Each of the students whose assignments were reviewed demonstrated an improvement in at least two (2) of the writing criteria assessed by at least 0.5 point, with most students demonstrating improvement in three (3) or more categories.

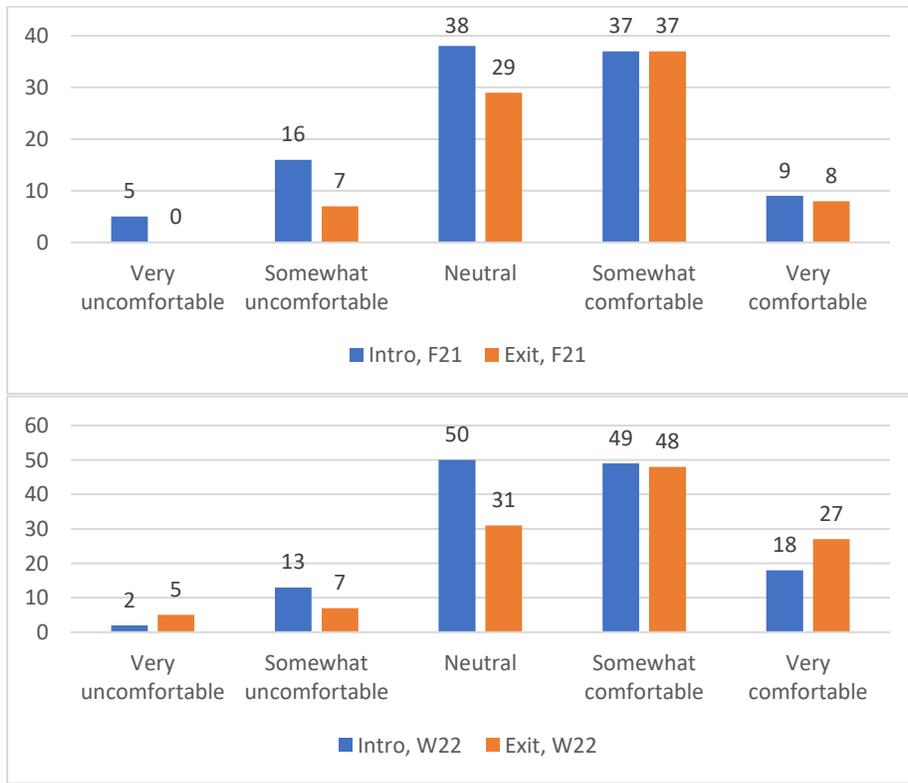
The full assessments are attached to this report.

Students also responded to a number of prompts about their perception of their writing ability, comfort with writing proofs, and the value of communication to mathematics. The graphs below show the aggregated responses of students who answered both the pre- and post-survey. (Intro / Exit Surveys)

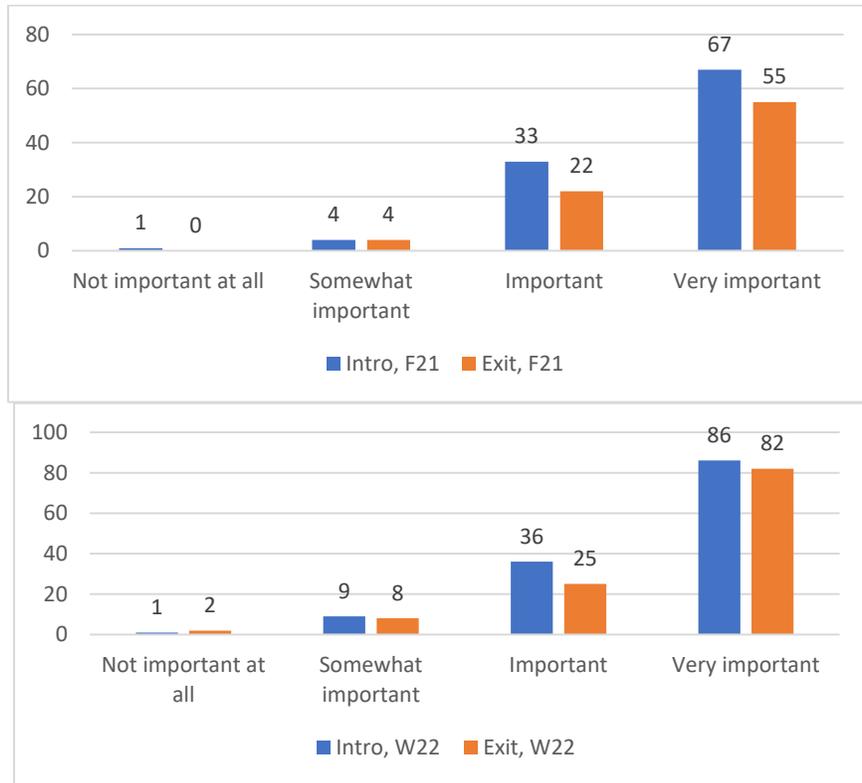
The results for Q1 and Q2 indicate that students perceived their writing to have improved after the course in both semesters. (Note the smaller sample size in the Exit Surveys.) Also, students generally became more comfortable with proof-writing. Finally, Q3 shows that students appreciated the importance of communication for the practice of mathematics.



Q1. "How would you rate your ability to write clearly and directly? (1 lowest – 5 highest)"

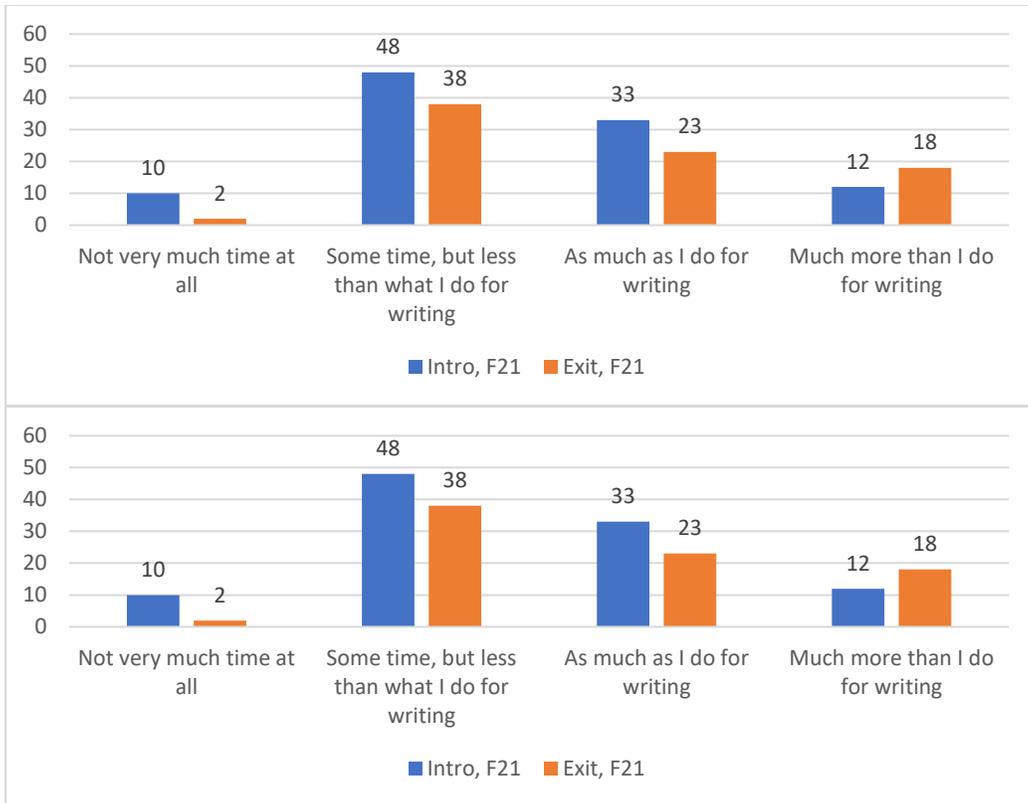


Q2. "How comfortable are you with writing proofs?"

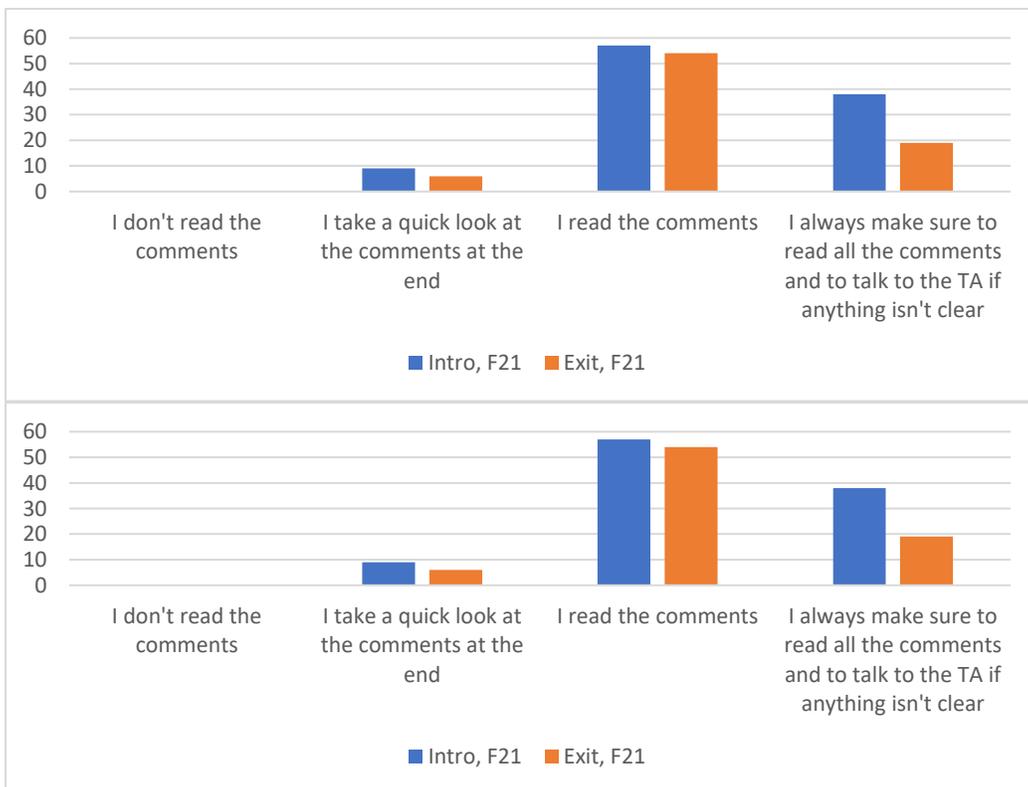


Q3. “How important do you think it is for a mathematician to be able to write clearly and directly?”

Results for Q4 and Q5 speak to students’ writing practice and approach to feedback. These indicate an increased focus on revising and editing, as well as a more careful consideration of grader comments, though not necessarily to the extent of seeking out the grader for additional clarifications.



Q4. "How much time do you spend on editing or revising your work?"



Q5. "How much attention do you pay to TA feedback on your writing?"

Some student comments from the course exit surveys in both Fall 2021 and Winter 2022 terms:

<i>I felt I had completed almost all personal goals. During this course, I had improved my mathematical writing skills especially in explaining the details. It is important to write out some detail information about how to get these solutions correctly. However, I also got struggled with typing in LaTeX since it is hard to adjust the structure in the beginning.</i>
<i>I think I definitely improved my mathematical writing skills through completing the portfolio drafts. I think I could put more time than I did into improving my writing skills since I believe the more I put in, the better the result. I am sure that I improved, but not as much as I have expected.</i>
<i>I feel I have made great progress in this class. The goal I initially set is to understand the content and use the Latex proficiently fully. I went from someone who had never touched Latex to someone who could master primary usage of it. And now I'm not afraid to write mathematical proofs anymore.</i>
<i>I believe that I was able to make progress on my goal of improving my mathematical communication skills. In particular, I feel that my proofs/justifications now have a better flow of ideas, whereas before taking this course they sometimes felt disconnected. I have also learned that choice of vocabulary/terminology in a proof is very important, which has allowed me to articulate my ideas more appropriately.</i>
<i>This course really made me appreciate the importance of communication in Mathematics. You always strive to help us learn and improve on our weak areas in math.</i>
<i>Before I enroll in this course, I just want to get the correct answer for math problems. After taking several lectures, I realize mathematicians need to write clearly and directly. So, I decided to improve my writing proofs skill. For now, I believe I improved my mathematical communication skills a lot. And I skilled use Latex to show my idea and steps. Now, I think Latex become a useful tool for me.</i>
<i>I am now more confident in my ability to express mathematical concepts in a written manner and that was a huge improvement for me. It will impact my future in many new courses and my worklife as well.</i>

From these comments and from other conversations, I believe that this WDI project and the various interventions implemented were successful, and that the instructional team was able to provide students with the formative support they needed to reflect and improve on their writing.

What have I learned? and What would I change?

We ran into some similar issues as in the previous year, in terms of TA grading and burnout. This was eased in the Winter 2022 term by the fact that five TAs were hired for the course, resulting in fewer TUTs per TA, but more leeway to distribute the additional WDI hours. This is something I would request in the following year if this project were continued.

I would also try to tweak the introduction to LaTeX – next year being fully in-person will facilitate this better, since we will be in the ALCs in MN. Students could bring their own laptops and type up sample documents on the spot, in groups.