

## STLF Report to CWSEI and Mathematics Department

**STLF:** Joseph Lo

**Period:** 2012-04-11 – 2012-07-20

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### Specific activities performed by STLF

#### 1) Professional development

- Attended STLF meetings (Apr 11, 25, July 4, 18)
- Attended reading group (Apr 12, 26)
- Attended Math Teaching Seminar (Apr 12, 26)
- Attended CWSEI end-of-year event (Apr 20)

#### 2) Math SEI general meetings/activities

- Met with Sarah and Math-SEI group to review current projects and discuss future plans (Apr 12, May 17)
- Met with Costanza to review current projects and discuss future plans (Apr 11, 25)
- Met with Math-SEI group to review current projects and discuss future plans (Apr 11, 18, 25, May 2, June 21, 27, July 3)
- Met with Jim Carolan to review current projects and discuss future plans (July 12)
- Met with Marc Fabbri from PSU to discuss about calculus workshops and basic skills test (July 16)

#### 3) Course-specific meetings/activities

##### MATH 184 – Differential Calculus for Social Science and Commerce

- I was the instructor of this course from May to June. Some new materials were developed:
  - Clicker questions with student responses
  - In-class activities
  - Graphical illustrations by GeoGebra
- These materials will be stored in the course archive.

##### MATH 210 – Introduction to Mathematical Computing

- The course-level and topic-level learning goals were revised after the course is completed.
- Brian Wetton will be the instructor next year. I will have weekly meeting with him during Fall to discuss plans for the course.
- Most of the topics in the curriculum and the course materials will be kept except for minor changes. More time will be devoted to MATLAB and some topics with Maple will be taken out. Programming techniques and applications will be emphasized more.
- Lectures on Mondays, Wednesdays and Fridays will be given in a classroom. Only workshops on Tuesdays will be held in a computer lab.
- Last year, the purpose of Tuesday workshops was to provide assistance for homework. Because of poor participation, Brian is planning to assign extra problems or activities similar to Math 152 labs which students need to complete and submit before the end of the workshops. Homework will be assigned separately.

##### MATH 110 – Differential Calculus

- Diagnostic test and remedial assignments
  - 144 out of 246 students completed both the pre-diagnostic (September) and the post-diagnostic (March). The average scores for the algebra and the non-algebra parts are given below.

	Overall (/16)	Algebra (/9)	Non-algebra (/7)
Pre-DT	7.13 ± 0.20	3.77 ± 0.13	3.36 ± 0.11
Post-DT	9.60 ± 0.26	5.21 ± 0.18	4.39 ± 0.13

- A total of 14 sets of algebra (or the non-algebra) remedial assignments were mandatory if students failed the algebra (or the non-algebra) part of the pre-diagnostic. These students were required to complete 75% of the remedial assignments in order to receive the completion mark.
- The following table compares the average scores of the pre- and post diagnostic between students who completed 75% of the remedial assignments and those who did not complete.

Groups	Algebra (/9)				Non-algebra (/7)			
	N	Pre-DT	Post-DT	Diff	N	Pre-DT	Post-DT	Diff
Remedial exercises required and completed	40	2.58 ± 0.16	4.58 ± 0.26	2.00 ± 0.26	34	1.79 ± 0.16	3.88 ± 0.25	2.09 ± 0.28
Remedial exercises required but not completed	30	2.67 ± 0.21	3.83 ± 0.35	1.17 ± 0.33	21	2.19 ± 0.22	4.19 ± 0.33	2.00 ± 0.25
Remedial exercises not required	35	6.00 ± 0.15	6.43 ± 0.33	0.43 ± 0.32	50	4.84 ± 0.15	4.64 ± 0.23	-0.20 ± 0.25

- Students who completed the remedial assignments had slightly greater improvement on the algebra part than those who did not complete. There was no difference for the non-algebra part.
- Remedial exercises might have helped weaker students improve their skills, but were not able to bring them to the level of stronger ones.
- Many students did not take the post-diagnostic. Their performance throughout the course was in general much worse than the rest.
- I will discuss with Fok next week about the results found from the attitudes and study habits survey. These results will be included in the final report.

### Math 305 – Applied Complex Analysis

- I have discussed with Michael Ward about the comparison between math and engineering physics students and the correlation between infinite series skills and course performance.
- It appears that math students in Math 305 performed considerably worse than engineering physics students. It is not because math students are weaker than engineering physics students, but because math students are recommended to take Math 300 rather than Math 305. In general, math and engineering physics students have comparable average grades in their lower division math courses. However, the math students in Math 305 performed worse in lower division math course. From the end-of-term survey, we found that the majority of these math students chose Math 305 because of scheduling. This could be a factor as the lecture time of Math 305 was at 11:00, whereas Math 300 is at 8:00.
- One of the questions Michael posted was the importance of the incoming knowledge of infinite series to this course. We found that those who did well in the series diagnostic performed better in the final exam, but the marks in series-related exam questions are not more closely correlated with the diagnostic scores than other exam questions. As a result,

we cannot conclude that merely having better knowledge in series in the beginning would help in this course.

#### Math 200 – Calculus III

- One of the instructors, Julia Gordon, is interested in developing some graphical illustrations and online reference materials next term. I will discuss the details with her next week. Details will be provided in the next report.

#### Math 265 – Linear Differential Equations

- One of the instructors, Daniel Coombs, is interested in developing some clicker questions for next term. If applicable, this work can be combined with the just-in-time teaching project in Math 215. Details will be provided in the next report.

#### Mathematics Attitudes and Perceptions Survey (MAPS)

- Warren, Sandi and I revised the survey based on student responses gathered in March and validations done in June. The revised version was given to more than 10 faculty members (1 from SFU) and 5 STLFS for comments. A further revised version will be done before another round of student validation. We aim to have the finalized version ready in early September.

### **Current project status (material prepared by either STLF or other members of the MATH SEI)**

#### MATH 110:

**Learning Goals:** 3<sup>rd</sup> draft of learning goals is complete.

**Assessments:** MAPS/Study Habit survey and Post-diagnostic was completed

**New Methods/Materials:** New problem-solving based workshops, remedial work on basic skills

#### MATH 210:

**Learning Goals:** Revised after the course is over. A possible new version will be created with the input of the new instructor

**Assessments:** End-of-term survey was done.

**New Methods/Materials:** The MATLAB module is new. Redevelopment of course materials on Maple is complete.

#### MATH 305:

**Learning Goals:** Complete

**Assessments:** Final exam done.

**New Methods/Materials:** None at this point

### **Plan for immediate future work**

#### MATH 110:

1. Discuss with Fok about the results of various surveys. Then write up the final report.

#### MATH 305:

1. Write up the final report.

#### MATH 200/265:

1. Meet with the instructors and discuss plans.

**Mathematics Attitudes and Perception Survey:**

1. Prepare the next version of the survey based on comments from faculties and STLFS.
2. Invite students for validation.