

## STLF Report to CWSEI and Mathematics Department

STLF: Katya Yurasovskaya

Period: 07.01.2012 - 10.02.2012

Submitted: 10.02.2012

### Specific activities performed by STLF

#### 1) Professional development

- Attended **weekly STLF meetings** ( Jan 11, Jan 18, Jan 25, Feb1, Feb 8).
- Attended **weekly Reading Group meetings** (Jan 12, Jan 19 ,Jan 26 , Feb 9).
- Attended **NOJO meetings** (Jan 13, Jan 27, Feb3)
- Attended **Math Department Teaching Seminar** (Jan 26, Feb 2)
- Attended **CSWEI Math Lunch Series** ( Jan 31)
- Attended **TA accreditation seminar** (Math Dept): 'Designing effective clicker questions'

#### 2) Department meetings/activity

- None

#### 3) MATH SEI general meetings/activity

- Meeting with other Math STLFs (Jan 11, Jan 18, Jan 25, Feb 1, Feb 8)
- Attended Math STLF reading group (Feb 7)
- Held individual meetings with Math STLF director ( Jan 24 ,Feb 7)

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

##### **Math 230/335 – Finite mathematics course (Math for future elementary school teachers)**

- Present course instructor is John MacDonald. Math335 is different from Math230 in that it has a lab/workshop component- that is an extra, 4th, hour in addition to 3 weekly hours of lecture. Main attention this semester is focused on the workshop component.
- I attend Tuesday workshops for Math335, observe students' work and the running of the workshop. I also walk around students working in groups, help them with work and offer feedback, along with observing difficulties with mathematics and group dynamic.
- I conduct interviews with students after every workshop, following the interview format of the proofs course. Students largely find workshop useful and often offer insight into the details of the workshop running - those have been communicated to the instructor. I also gather data on students beliefs and expectations regarding the course and subject in general - this material has not been gathered before and is extremely interesting. It is useful for the department to have this data - as this set of beliefs and expectations is typical of this group of students, and will reappear in the future iterations of the course, affecting the course atmosphere, student performance, levels of frustration on the sides of both instructor and students, course outcome, etc.
- Instructor and I hold weekly meetings, to discuss the course, student feedback, and problem selection for the following workshop. I gather some selection of problems for the workshops

- and many of these can be archived and reused in the future iterations of the course, especially if the department decides to scrap Math 230 and move to math335 with its lab component.

- Students wrote diagnostic test at the beginning of the semester. I am planning to run the test again at the end of the semester - and go over the problems with students. Results of diagnostic test are comparable - and even somewhat worse - than the last semester, since more students have taken their last math course quite a while back. The issue of math anxiety was not reported on this test, perhaps due to changed wording. However, it is running high in the class and is affecting students.
- I have contacted Cynthia Nicol of the education department again - but have not yet received a response.

### **Math 220 – Introduction to proof**

- The present structure of Math220 course as of this semester is as follows: three lectures, and then a workshop every other Thursday. Homework is due at the beginning of workshop. Students get about 55 minutes to work on 7-10 problems, chosen on the theme of past lectures. After that the students write a quiz, on the subject of workshop, homework and past lectures. After the quiz, instructor goes over quiz solutions and/ or some of the workshop problems that may have caused difficulty or that illustrate a specific important point.
- After the workshop I conduct interviews with two students, from both sections of the course. Comments about workshops are positive, the main themes being: students like the workshops, they feel prepared for the work, they find quiz useful and also find useful the feedback they get immediately after the quiz. In reference with Sandi's findings last year: students do not find course difficult at present - even though quizzes and workshops communicate a higher level of difficulty and higher level of expectations. These findings parallel comments from Sandi's interviews last year - students did not find material difficult until they started on the topic of divisibility of numbers and first elementary proofs.
- Midterm 1 will take place next Tuesday. Instructors seem to have agreed to go over the midterm immediately after students are done with it.
- In addition to post-workshop interviews, I interview students after Thursday's lectures in Math220-201, asking similar question to the post-workshop interviews. The view of workshops and the course is largely the same as during workshops.
- Some interactive engagement comments have been given to instructor following lecture observation.
- There is a seeming drop in grades for students coming from Math105 background, as per diagnostic test and final exam data, as analyzed by Sandi in the past. During interviews I do ask for student majors and Calc 2 background - so far about half of the students I interviewed come from Math105 (Integral Calculus with applications to economics). So far the students I talked to make an impression of a fairly strong academic background. Data for Math105/Diagnostic test performance is discussed below.
- I am present at the weekly meeting of Math220 course instructors Andrew Rechnitzer and Rajiv Gupta. On the workshops weeks I bring a list of workshop problems to choose for the following workshops - these come from the assembly of problems from the last semester. On the non-

workshop weeks I listen to what is happening in the course, as well as report any useful findings and insights from student interview, as well as discuss learning goals - see below.

- I have started work on the second draft of the learning goals for Math220 course. Current version of learning goals present a comprehensive and detailed list of topics covered in the proofs course, as defined by the department at present. I am adding headings to each list of subtopics; the goal of each heading is to communicate the reason for studying a given topic and communicate instructor expectation as to how the knowledge of each item in the list fits together into a larger picture. At each of weekly meetings with instructors, I try to get a set of instructor expectations and a 'larger picture' or knowledge structure of the topic that is presently covered in class. I get input from other instructors in the department as well - but that rather in the course of informal conversations. Second version of the learning goals will be completed by the end of this semester.
- Students wrote diagnostic test at the beginning of this semester in both sections of the course. Reports have been put together and submitted to instructors. We see some repeat of historical trends: among the two sections, one has slightly lower diagnostic test average, as well as a more diverse student population. Math 105 students show somewhat lower diagnostic test average. Precise numbers are available in a separate report. The numbers have been given to instructors. 23 out of 52 students in one of the sections have Math 105 background. 13 out of 47 have Math 105 background in the other section, though this is the section with a lower diagnostic test average.
- Attendance numbers for last semester's workshop have been analyzed. Students who have attended workshops were a self-selected group of good students, with ranges of course marks from C to A. None of them seemed to have been familiar with material in advance, or to come to grips with it easily and instantaneously - so there workshops have played a role in the increase of their mark, along with a range of other factors such as hard work and varied studies methods for at least some of the students. Conversation with the course instructor supports this point.
- I have looked for patterns among the students who did not pass the course last semester (course grade F or D). There are no clear patterns as to selection of major: in one of the sections 7 out of 13 failed students were in the BA program, however only 3 out of 10 failed students were in the BA program. Further trends are analyzed at present.

### **Current Project Status (material prepared STLF and/or other members of MATH SEI group)**

#### **Math 220 – Introduction to proof**

**Learning Goals:** 'Introductions' have been added to two subtopics, with the work continuing. Second draft of learning goals will be finished by the end of this term.

#### **Assessments:**

- Instructors put together post-workshop quizzes for each workshop. These can be saved for next iteration of workshops.

#### **New Methods/Materials:**

- Workshop sets are put together from existing workshop problems. The selection should be noted as it reflects instructor's views as to what problems they deem particularly important or enlightening.

### **Math 230/335 – Finite Mathematics**

**Learning Goals:** Topics for the present version of the course are being recorded.

**Assessments:**

- Modify diagnostic test slightly, adding one or two problems to the current version - the problems are not to be multiple choice. It would be useful to have insight into the students' thinking.
- Change diagnostic test wording back to the way it was before: this group of students seems to respond better to a less structured type of questioning

**New Methods/Materials:**

- I am putting together selections of problems for instructor - on various topics for the course. The problems are used in the workshop and can later be re-used.

## **Plan for immediate future work**

### **Math 220 – Introduction to Proof**

- 1 Continue data analysis of the past failure trends for the students in the course. We will pull up students past grades in Calculus 2 (Math105 included) and look at performance of these students in the present Math 220 course. A point to take into consideration: department has added a large selection of material (series) to Math105, thus making it more difficult. Weak students are now less likely to enroll in the course
- 2 Continue work on the second draft of the learning goals.
- 3 Get opinion and feedback of various faculty members on the selection of workshop problems as put together last semester. The main goal is to determine if the given selection will bring Math220 students closer to matching instructor expectations in following courses for which Math220 is a prerequisite.
- 4 Design and run student surveys in some of mathematics courses for which Math220 is a prerequisite. At present I am corresponding with Sandi to determine precise nature of expectations that she witnessed in the interviews with instructors last fall. At present I am mainly interested in student mathematical (and potentially other scientific) background in addition to Math220 - to see which courses, activities, skills, and knowledge help students succeed in subsequent math courses. It is not quite possible to expect all of these skills to be acquired in Math220, for the lack of time - if nothing else.
- 5 Conduct 'intervention activity' following the setup of Mary Nelson at University of Colorado, Boulder: before Midterm 2, meet with students who are potentially at risk of doing badly (but are willing to work hard!) and run an 'oral examination', worth no marks. This activity can be conducted in one section, the other one being a 'control group'. If successful, the same activity can be run before final exam.

**Math 230 / Math 335 – Finite Mathematics**

- 1 The work on the project has been scaled back, pending department's decision as to course goal, as well as need to continue course improvement.
- 2 Contact students who expressed willingness to participate in a discussion panel. Write interview questions; run the panel.
- 3 Put together more problems for workshops.