QEP Faculty Champion Reporting Template: Fall Semester 2014
Faculty Champion: Jing Kersey
Directions:
How did you teach critical thinking in your courses?

➢ **Critical thinking goals**

Critical Thinking is the ability to take in a problem, see the facts and come to a conclusion. Math is a keen example of this process. Students are expected to demonstrate the ability to (a) gather, (b) analyze, and (c) evaluate information to make effective decisions (Student Learning Outcome 2). In all my math courses (2 sections of college algebra, 2 sections of pre-calculus, and one section of introduction to statistics), my teaching goals for critical thinking are set as following:

1) Understand the basic terminology.

2) Know how to calculate and interpret the mathematic terms.

3) Know how to solve application problems with the concepts learned in the course.

Particularly in my math 1121 (Introduction to Statistics) course, besides the basic goals listed above, students are also expected to participate in more advanced critical thinking activities including collect data, statistical analysis, and interpretation to the results through group projects.

➢ **Teaching strategies**

I started each new lesson with a simple review of the concepts that we have learned in previous lessons. Then I asked some questions (normally one or two) that were modified from the previous lessons but could be solved with current knowledge. Students were happy to provide a kind of solutions. We analyzed each solution to see if it would work and kept those that might work. After students have tried to think it through, new concepts were introduced and used to solve those questions. In this way, students not only understood the new concept better, but also built up confidence with their mathematical ability. Once the new concepts were taught, students were asked to work on new problems under my assistance. They need show all their work and make sure that the connections among the steps are logical and reasonable. The next process in the lesson was to solve an application problem with what we have learned. In the end of each lesson, students would summary what we learned that day and review the new concepts.

I always ask the following questions to help my students think more critically:
- How did you know to do that/ to use that concept?
- Why did you decide to do it that way?
- Does that seem like a reasonable answer?
- Why does that work?
- Does that always work?
- Can you solve the problem in a different way?

➢ **Rubrics/other assessment methods**

In all the 5 courses I taught during Fall 2014, assessment methods were used including pretest/posttest, 4 tests over chapters, online quizzes, and online assignments. Students took a test (pretest) with ten multiple choice questions in the first day of class and then took the same test (posttest) in the last week of class. Scores of the students were took both tests were kept to analyze the learning outcomes and improvement. Online assignments acted as daily assessments (short term), while quizzes and tests assessed students' weekly and monthly progress (relatively long term assessments).

Besides those methods, a group project was also used as an assessment method in the course Introduction to Statistics. This assignment was designed to focus on assessing the students' critical thinking ability-gather, analyze, and evaluate information to make effective decisions. I provided students a list of project topics which are applications of the concept that students have learned in the course. Students worked in groups (total 5 groups, 5 students in each group) on one topic from the provided list. They need identify and explain the statistical concept, collect and analyze data while implementing the concept. Each group was required to give a 15-minute presentation in the end of semester. I also provide students the project instructions, deadlines, and a grading rubric as well.

What worked best for you in teaching critical thinking?

What worked best for me in my courses related to critical thinking is providing questions to guide student think through the problem. Showing students a lot of examples including pure math problems and applications also worked very well in my courses. Students definitely like to see that they can use math in solving real life problems.

Did you encounter any unanticipated problems in teaching critical thinking?

Yes, the biggest problem I encounter was the students' willingness to think and work on problems. One reason was that some students were not confident with their math skills and dared not to even try. The other reason was that some students were used to the teaching style that instructor fed students everything. It was frustrating to see that students were sitting quietly and waiting for me to give them solutions.

➢ **How you responded to these problems:**

I was frustrated at beginning, but I also know 'Rome was not built in one day'. So I tried to slow down my pace a little bit and encourage students to move a step by a step. I appreciated any progress that students made and helped them figure out what they need do more. I also introduced a lot of examples from real life to help students understand math better and become more interested in math.

How did the introduction of critical thinking affect student learning in your courses?

The introduction of critical thinking in my courses definitely have improved student learning. A course assessment report and a critical thinking assessment report are attached to this report to show more details.

➢ **Qualitative assessment results**

Firstly, students understood the concepts much better. Secondly, students learned to apply what they have learned in class to solving application problems. Last but most to me, students have developed more and more positive attitude in learning math. A number of students said that they did not feel math courses were boring any more. Students used to think that math courses are just a necessary

requirement of their major, and they would not use math after that. Now they can see that math courses not just help them meet academic requirement, but also train their mind to think more critically and creatively. Most students have built the confidence in learning math. Math courses may still be hard, but they are brave enough to work through.

➢ **Quantitative assessment results**
The following tables show the quantitative results of assessments.
Pre/post test results:

Semester	Course	CRN	Pre-Test Average	Post-Test Average	change	percent change	Success Rate
Fall 2014	Math1111	80383	26.8%	77.3%	50.5%	188.4%	72.7%
Fall 2014	Math1111	80385	22.0%	68.0%	46.0%	209.0%	65.6%
Fall 2014	Math1113	80387	18.8%	85.3%	66.5%	353.7%	76.5%
Fall 2014	Math1113	80531	28.0%	91.0%	63.0%	225.0%	100%

Semester	Course	CRN	Pre-Test Average	Post-Test Average	SLO 2 Average	SLO 3A Average	SLO 3B Average	SLO 3C Average
Fall 2014	Math1111	80383	26.8%	77.3%	68.2%	77.3%	76.1%	68.2%
Fall 2014	Math1111	80385	22.0%	68.0%	65.0%	66.4%	67.5%	67.5%
Fall 2014	Math1113	80387	18.8%	85.3%	85.3%	87.1%	85.3%	76.5%
Fall 2014	Math1113	80531	28.0%	91.0%	91.00%	94.0%	90.0%	80.0%

Group project results for course Introduction to Statistics (CRN: 80535)

Grading Criteria	Max Points	Class Average
1. Participation	10 points	9.4
2. Presentation	90 points	
1) Overview of the project	5 Points	5
2) Identifying the statistical concept	5 Points	4.4
3) Explanation to the statistical concept	15 Points	15
4) Analysis of the data	40 Points	30.8
5) Conclusion	20 Points	16.8
6) Presenting skills	5 Points	4.4
Total	100 points	85.8

How will being a faculty champion for critical thinking impact your approach to teaching?
I have been teaching math with the method that I called 'think it through' for years, but I did not put it in the height of 'Critical Thinking' until I became a faculty champion for critical thinking. I am motived to learn more theories and methods about critical thinking. I am also eager to apply what I learn to my daily teaching activities.

If you worked with a faculty mentor, who did you work with and how did the mentor assist you?
Dr. Val Czerny has been sharing a lot of information about critical thinking with me. She helped understand the concepts of QEP so much better and explained one of her assessment example to show me how to use a survey as an assessment. We discussed my group project and she gave me very useful ideas about how to make grading rubric and track students' progress. Mr. Bob Marsh and Dr. Sandra Sharman also assisted me by sharing their experiences.

Appendix 1: Critical Thinking Assessment Report_Fall 2014_80535

EGSC Critical Thinking Semester Assessment Report Fall 2014

Faculty Name: Jing Kersey

Course Number and Title: Math 1121 Introduction to Statistics

(Use a separate copy of the template for each course taught.)

Semester/Year: Fall 2014

Course CRN: 80535

Student Learning Outcome
Students will demonstrate the ability to (a) gather, (b) analyze, and (c) evaluate information to make effective decisions.
Course Objective (place your critical thinking course objective in the box below)
1. Understand the basic statistical terminology.   2. Know how to calculate and interpret a variety of statistics.   3. Know how to gather and organize data and draw meaningful conclusions from it.   4. Know how to analyze data.   5. Know how to evaluate the data and draw meaningful conclusion from it.

Directions: Click on each line below a header and type response. Describe the assessment method used and the findings based on the assessment. Indicate what, if any, benchmark was used. Also, if teaching changes based the assessment findings were made in the same semester, describe the changes made and the impact those changes had on student learning. If changes are not to be made until a subsequent semester, describe actual results from the changes in following semester's report.

Assessment Method:

Math 1121 Introduction to Statistics is designed to assist students with mastering the basics of statistics. It provides the basic tools that students needed to understand and apply statistics throughout their educational and professional careers. A project assignment was given in this course to assess the students' critical thinking ability-gather, analyze, and evaluate information to make effective decisions. The instructor provided students a list of project topics which are applications of the concept that students have learned in the course. Students worked in groups (total 5 groups, 5 students in each group) on one topic from the provided list. They need identify and explain the statistical concept, collect and analyze data while implementing the concept. Each group was required to give a 15-minute presentation in the end of semester. I also provide students the project instructions, deadlines, and a grading rubric as well.

Assessment Findings:

The assignment was graded by students' performance in participation (10%) and presentation (90%). The class average for this project assignment is <u>85.8</u> which is higher than the class success rate (71.0%). 3 group received an 'A'; 1 group received a 'B' and the other group received a 'C'. The grading criteria and class average are listed below.

Overview of the result:

Grading Criteria	Max Points	Class Average
3. **Participation**	**10 points**	**9.4**
4. **Presentation**	**90 points**	
6) Overview of the project	5 Points	5
7) Identifying the statistical concept	5 Points	4.4
8) Explanation to the statistical concept	15 Points	15
9) Analysis of the data	40 Points	30.8
10) Conclusion	20 Points	16.8
6) Presenting skills	5 Points	4.4
Total	100 points	85.8

Participation Part:

Students' participation rate is 25/29=86.2% in this assignment (not including the two students who withdrew from the class). 3 groups out of total 5 groups have met all four deadlines. 1 groups were late for 1 deadline. 1 group was late for two of the four deadlines. 1 point for each late submission was deducted for the students in the group. The class average is 9.4 out of 10.

Presentation Part:

1) Overview of the project

In this part, students were asked to give a simple introduction about their project, used data, and questions. 4 of the 5 groups chose the data provided by the book and the other group collected their own data. All the 5 groups have given a clear overview of their projects and all received 5 points out of 5.

2) Identifying the statistical concept

Each project listed covers one or more statistical concepts. Students identified the main statistical concept easily. The group who used the topic 'Constructing a Confidence Interval for a Population Mean' started with the statistical concept 'confidence interval for a population mean' and then collected data. Average for this part is 4.4 out of 5. Students' feedback showed that the questions in each project were very useful to guide them to obtain information from the given scenario.

3) Explanation to the statistical concept

Students were supposed to give some explanation to the identified concept, including background, definition, how to calculate and interpret it. All the groups received full credits since they did explain the

statistical concepts well. However, what the students presented were 100% from our textbook. This result was a little disappointing to me. I expected that students would seek for more information besides what they got from the textbook.

4) Analysis of the data

This is the most important part of the assessment. Students were expected to use the statistical concepts they have learned in the course to solve application problems. In each project, 8-10 questions were provided to students as guidelines to analyze the data. Before students presented their projects, each group had submitted a draft of answers to the given questions. I worked with each group individually and assistant students to correct any exiting mistake. So there were only a few mistakes in the presentations. 3 of the 5 group have appropriately integrated the questions into the analysis process (scored 40, 36, and 32). 1 group simply presented answers to all the questions (scored 20). 1 group did not cover all the asked questions which resulted in an uncompleted analysis (scored 26). The class average was 30.8 out of 40.

5) Conclusion

I expected students would present some creative ideas which are beyond the course and intended to assign high points in this part. Students interpreted the results from their data analysis and talked about their thoughts about their project and related statistical concepts. I was very pleased to see students giving a lot of application examples which were not directly from our textbook to indicate how to apply the concepts learned in class to real life.

6) Presenting skills

Scores were 5, 5, 5, 4, 3 which gave an average of 4.4.

Changes made or to be made based on assessment findings:

Each project in this assignment was provided a lot of questions as guidelines. It was helpful to guide students to think through the problems. But it may also limit students' creativity. I would like to modify some of the questions and add more open answer questions as new guidelines.

This was my first time to introduce group project as an assignment format. So I tended to get involved of students' progress too much and in some sense interrupted students' work. The other change I want to make in the future is to relax my mind and let students do their own work.

Results or expected results of changes implemented:

Students did good job in this assignment and they appreciated this kind of assignment much more than a test. The results showed that students were learning the concepts when they worked on the projects. I expect students will think more critically and solve problems more creatively.

Appendix 2: EGSC Semester Assessment Report Fall 2014_80383

EGC Semester Assessment Report Fall 2014

Faculty Name: Jing Kersey

Course Number and Title: Math1111 College Algebra

(Use a separate copy of the template for each course taught.)

Course CRN: 80383

Check General Education Student Learning Outcome number assessed:

Check	No.	Student Learning Outcome
	1	Students will demonstrate the ability to (a) read, (b) write, (c) speak, and (d) listen with the competence necessary to succeed in higher education.
√	2	Students will demonstrate the ability to (a) gather, (b) analyze, and (c) evaluate information to make effective decisions.
√	3	Students will demonstrate the ability to solve problems (a) algebraically, (b) numerically, and (c) graphically at the level necessary to succeed in higher education.
√	4	Students will demonstrate effective use of the scientific method.
	5	Students will demonstrate the ability to analyze effectively works of (a) literature, (b) art, or (c) music.
	6	Students will demonstrate the ability to analyze human behavior from a variety of perspectives.
	7	Students will take responsibility for their (a) health and (b) physical activity.

Directions: Click on each line below a header and type response. Each assessment should be linked to a course objective. Describe the assessment method used and the findings based on the assessment. Indicate what, if any, benchmark was used. Also, if teaching changes based the assessment findings were made in the same semester, describe the changes made and the impact those changes had on student learning. If changes are not to be made until a subsequent semester, describe them in that semester's report.

Course Objective:

1. Master the fundamental concepts of algebra.
2. Understand how algebraic concepts are applied to a variety of fields, including the natural sciences, economics, and others.
3. Cultivate an appreciation for the role of mathematics in our world.
4. Cultivate the habit for rigorous mathematical thought.
5. Acquire a basis for more advanced study in mathematics.

Assessment Method:

Assessment Method 1: Pre-test and Post-test

The pre-test was given during the first class meeting, and the post-test was given on the first day of the last week class meets. 22 students took both the pre-test and the post-test. The result is listed below:

Pre-Post Test Results and Success Rate

Course	Course No.	CRN	Pre-test Average	Post-test Average	Change	Percent Change	Success Rate
Math	1111	80383	26.8%	77.3%	50.5%	188.4%	72.7%

Pre-Post Test Result with linkage to SLOs

Course	Course No.	CRN	Pre-test Average	Post-test Average	SLO2 Average	SLO3A Average	SLO3B Average	SLO3C Average
Math	1111	80383	26.8%	77.3%	68.2%	77.3%	76.1%	68.2%

Assessment Method 2: In Class Practice:

Students work on practice problems immediately following and similar to each example solved in class. Instructor walks around in the classroom and observes students' work.

Assessment Findings: Students had a difficult time with calculations and the concept of function, domain and range of a function.

Changes made based on Assessment Findings:

1) Adjust the teaching pace,
2) Review the topics which are needed for present topic,
3) One-to-one instruction.
4) Appreciate students' work and encourage student to show their work on the board.
5) Set up learning groups.

Results of changes implemented:

Students enjoyed working in groups and working on the board for bonus points.

Assessment Method 3: Online Assignments (online homework and online quizzes)

Homework was assigned in **Mymathlab** (online) after each lecture. 2 online quizzes were assigned in **Mymathlab** (online) to test students' knowledge at *solving equations and inequalities, graphs.*

Assessment Findings:

1) Students had difficulty solving certain problems.

2) Students had difficulty understanding some of the material.

Changes made based on Assessment Findings:

1) **A**djust the due date and homework questions for each individual student.

2) Review homework problems in the next class meeting.

3) Adjust the teaching pace.

Assessment Method 4: In Class Tests

4 in class tests were given. Test1 is for chapter 1, Test 2 is for chapter 2, Test 3 is for chapter 3 and 4, Final exam for chapter 1,2,3,4 and 6.

Assessment Findings: The mean of the class's test results and understanding of the material could improve. The variance in individual scores was significant.

Changes made based on Assessment Findings:

1) Instructor prepared review material and added more review sections before tests.

2) Students were encouraged to work in groups and to see instructor.

Results of changes implemented:

Students were doing better with their tests and getting more confident. The success rate of this section is 72.7% (24 out of 33).