

Affordable Learning Georgia Open Mathematics in Action

Final Report

Date: 06/20/2017

Grant Number: 17555

Institution Name: Abraham Baldwin Agricultural College

Participant: April Abbott

Course Name(s) and Course Number(s): College Algebra (MATH 1111)

Average Number of Students Per Course Section: 27

Number of Course Sections Affected by Implementation: 2

Total Number of Students Affected by Implementation: 54

1. Narrative

Summary of your transformation experience, including challenges and accomplishments

I really didn't notice many differences with teaching a pilot course and teaching a regular ABAC M1111. The only real challenge I had was making sure to keep all my classes on the same material. That meant the pilot course did not go linearly in their book; there was a lot of skipping back and forth between chapters. No one seemed to have a problem with it though.

I think the best accomplishment of the class was how so much more relaxed the students were. They didn't have to wait until the end of add/drop to enroll in their WebAssign like the MML students do. They had instant access to their ebook and could start on their homework the first day. They just didn't stress over homework like my other classes did.

Transformative impacts on your instruction

Overall, I don't believe the pilot had any impact on my instruction. Everything I did in the pilot course, I did in all my other classes. I pull up the ebook no matter which book it is and I do problems from the book and online. There was no difference.

Transformative impacts on your students and their performance

Describe lessons learned, including any things you would do differently next time.

I think the pilot went fantastically. I think the only thing I would do different is to encourage all of my faculty to switch to the low/no cost materials.

2. Quotes

- Provide three quotes from students evaluating their experience with the no-cost learning materials.
 - 1) “Loved it. Wish it was in more subjects. Average student may find it difficulty in understanding mathematical terminology but it’s an excellent tool. The Web Assign was more affordable.”
 - 2) “The material was harder to understand because it didn’t explain the steps it only showed them. The pdf on D2L usually took a very long time to load so I usually used the free copy in the library. The web-assign problems always seemed harder than the book work. The examples were also sometimes hard to understand. Still I’d rather use online resources such as e-book and web assign. I believe that both resources made it easy to make a good grade.”
 - 3) “It was there when I needed it. The web assigned worked good and way better than spending so much on MML. But I don’t think it affected my grade. It boils down to the effort put in the work.”

3. Quantitative and Qualitative Measures

3a. Overall Measurements

Student Opinion of Materials

Was the overall student opinion about the materials used in the course positive, neutral, or negative?

Total number of students affected in this project: 54

- Positive: 55.6 % of 30 number of respondents
- Neutral: 33.3 % of 18 number of respondents
- Negative: 11.1 % of 6 number of respondents

Student Learning Outcomes and Grades

Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Choose One:

- Positive: Higher performance outcomes measured over previous semester(s)
- Neutral: Same performance outcomes over previous semester(s)
- Negative: Lower performance outcomes over previous semester(s)

Student Drop/Fail/Withdraw (DFW) Rates

Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Drop/Fail/Withdraw Rate:

26 % of students, out of a total 54 students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- Negative: This is a higher percentage of students with D/F/W than previous semester(s)

3b. Narrative

- *In this section, summarize the supporting impact data that you are submitting, including all quantitative and qualitative measures of impact on student success and experience. Include all measures as described in your proposal, along with any measures developed after the proposal submission.*

DFW Rates

My pilot courses had a 26 % DFW rate where ABAC's M1111 Fall of 2015 overall DFW rating was 47%.

However, it should be noted that my personal DFW rate is far lower than ABAC's average. My fall 2015 DFW for M1111 was 24%.

Course Retention/Completion Rates

14 people out of 54 were part of the DFW rates. The breakdown is as follows:

- 2 Withdrew
- 6 stopped attending after midterms
- 6 made D/Fs from low grades

Average GPA

The class average GPA after this Fall and Spring was 2.80.

Pre-and post-transformation DFW comparison

There was no relevant data from pre-and post-DFW comparison.

Student success in learning objectives

All ABAC MATH courses have their final assessed. MATH 1111 is assessed on 6 outcomes taken from the learning objections. The six outcomes are listed below. After the outcomes is a table on how the pilot class scored on the assessment as compared with the overall MATH 1111 average from fall 2015 and fall of 2016.

- **Outcome 1:** Students shall demonstrate the ability to graph, compute with, and solve application problems with the set of real numbers, and be able to use the basic field properties to simplify expressions and solve problems.
- **Outcome 2:** Students shall graph and operate with 14 basic functions including +, -, *, /, composition translations, reflections over the axes and over the line $y = x$, and graphing transformations, and shall demonstrate the ability to use the field properties of identities, inverses, and commutativity for these operations.
- **Outcome 3:** Students shall demonstrate the ability to use the remainder theorem, factor theorem, and the Fundamental Theorem of Algebra to solve polynomial and rational equations and inequalities.
- **Outcome 4:** Students shall determine coordinates and interpret uses for the following functional notations: zeros, relative maximums, relative minimums, and intervals of increasing or decreasing values.
- **Outcome 5:** Students shall use a graphing calculator to model real life problems with functions by organizing, analyzing, interpreting, and making inferences from ordered pairs of data. This will include modeling with both polynomial and exponential regression analysis and use of correlation coefficients; using symmetry, vertical and horizontal asymptotes; and writing clear, logical, and concise solutions to problems that can be solved by the use of mathematics.
- **Outcome 6:** Students shall use exponential and logarithmic functions, solve exponential and logarithmic equations, and solve application problems using exponential and logarithmic functions.

| | Pilot Course S16 | Pilot Course F16 Scores | M1111 Avg. F16 Scores | M1111 Avg. F15 Scores |
|-----------|-------------------------|--------------------------------|------------------------------|------------------------------|
| Outcome 1 | 75.0% correct | 77.2% correct | 73.4% correct | 68.5% correct |
| Outcome 2 | 77.8% correct | 77.2% correct | 66.3% correct | 68.4% correct |
| Outcome 3 | 69.0% correct | 72.0% correct | 70.3% correct | 72.1% correct |
| Outcome 4 | 78.2% correct | 70.9% correct | 73.6% correct | 85.7% correct |
| Outcome 5 | 56.3% correct | 50.1% correct | 56.3% correct | 61.5% correct |
| Outcome 6 | 72.9% correct | 73.0% correct | 69.8% correct | 72.1% correct |

Co-factors that might have influenced the outcomes

The above grades and assessment outcomes are influenced by the fact that I am a very sought after instructor. My DWF rates and assessments are often among the top of my colleagues in any given semester. Several students will try to enroll into my class based off of recommendations of other students and faculty members. Dr. You's results will also be influenced by the fact she also has superior DWF rates and assessments.

4. Sustainability Plan

- I will keep a close eye on WebAssign assignments and make sure they are questioning the students on objectives we want them to know.
- I will still make handouts for subjects the book doesn't cover: circles and symmetry of functions.
- I will consider creating and using Power Points.

5. Future Plans

- I believe that education can and should be affordable. Far too many textbooks are outrageously expensive. Students really like having a low cost of web-assign and textbook, especially when I bring up how much the other students have to pay. If I have a chance to use an Openstax book again, I think I will.
- I do not have any plans to write paper based on this project result. Dr. You and I will probably present the findings to our department though.

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Final Report

Instructions:

A. *Your final report submission must include three separate component files:*

1. *Completed report form. Please complete per inline instructions. The italicized text is provided for your assistance; please delete the italicized text before submitting your report.*
2. *Syllabus with learning outcomes and links to the materials as used per day, week, or unit, organized chronologically.*
 - a. *For each resource, give the title, author, Creative Commons licenses (if appropriate), and freely accessible URL to the material. Include all open-access links to all adopted, adapted, and newly created course materials.*
3. *Supporting data on the impact of your Textbook Transformation (survey, analyzed data collected, etc.)*

B. *Go to http://affordablelearninggeorgia.org/site/final_report_mathematics to submit these components of your final report. Follow the instructions on the webpage for uploading your documents. You will receive a confirmation email. Based on receipt of this report, ALG will process the final payment for your award. ALG may follow up with additional questions or to request your participation in a publication, presentation, or other event.*

Date: 5/04/2017

Grant Number: 17555

Institution Name: Abraham Baldwin Agriculture College

Participant: Eunkyung You

Course Name(s) and Course Number(s): MATH 1111 (20440) College Algebra

MATH 1111 (30472) College Algebra

Average Number of Students Per Course Section: 20

Number of Course Sections Affected by Implementation: 2

Total Number of Students Affected by Implementation: 39

1. Narrative

A. Describe the key outcomes, whether positive, negative, or interesting, of your project. Include:

Pros:

- 1) Students can use Web-assign and textbook from the first day (It takes one week to use MyMathLab)
- 2) Students love using free textbook: Same contents and no cost.
- 3) Web-assign and textbook are easy to use.
- 4) MOWR students can get free software and hardcopy textbook under \$75.
- 5) I can use textbook (pdf file) during class without web-assign.

Cons:

- 1) Some materials can be found in textbook (circle)
- 2) I wish that I can assign more diverse problems in web-assign. Sometime, I cannot find proper problem or diverse problems.
- 3) Students did not use textbook as much as I expect

B. Describe lessons learned, including any things you would do differently next time.

- 1) I could not use textbook as much as I can in this semester. I have to reorder textbook and use this in class time: School use a different textbook and I have to following the order of that textbook.
- 2) During class time, I use PowerPoint but I have to choose more diverse examples to enhance students' understanding.

2. Quotes

- 1) "I enjoy not paying for a textbook"
- 2) "It helped me out a lot in this course"
- 3) "The free textbook made it easier to access the information whenever I needed it. I didn't have to always carry it around"
- 4) "it provided me with the proper information most of the time. However, there were a few times I had trouble when looking for certain topic"
- 5) "This access to take textbook is awesome! Knowing it was there and it was free gave me a great deal of security. I applaud this method. Specially it was good for me as a non-traditional student"

3. Quantitative and Qualitative Measures

3a. Overall Measurements

Student Opinion of Materials

Was the overall student opinion about the materials used in the course positive, neutral, or negative?

Total number of students affected in this project: 39

- Positive: 62 % of 21 number of respondents
- Neutral: 24 % of 21 number of respondents
- Negative: 14 % of 21 number of respondents

Student Learning Outcomes and Grades

Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Student outcomes should be described in detail in Section 3b.

Choose One:

- Positive: Higher performance outcomes measured over previous semester(s)
- Neutral: Same performance outcomes over previous semester(s)
- Negative: Lower performance outcomes over previous semester(s)

Student Drop/Fail/Withdraw (DFW) Rates

Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Drop/Fail/Withdraw Rate:

28 % of students, out of a total 39 students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- Negative: This is a higher percentage of students with D/F/W than previous semester(s)

3b. Narrative

- 1) The class exam scores is in the figure. The tests are similar form and same number of problems.

| | 2016 Fall | 2017 Fall |
|--------|-------------------|-------------------|
| Test 1 | 82.8 | 71.8 |
| Test 2 | 88.6 | 76.9 |
| Test 3 | 84.2 | 80.9 |
| Test 4 | 86 | 71.3 |
| Test 5 | 78.3 | 71.8 |
| Final | 81.13 | 82 |
| DFW | 2-D 1-F 1-W | 2-D 1-F 3-W |

The scores are higher than the other two my classes. But I could not say that open source is really helpful or not and the reasons are following:

- (A) I have 26 MOWR students and they usually are hardworking students. Since I do not have data of same class in last year and I have very weird class 2017 (very small size and half of them was sick or did not show up), I could not decide whether open source is effective or not.
- (B) In this semester, one of MOWR students passed away by car accident. It is hard to encourage them to study for two weeks.

- 2) I almost do not hear any complains about Web-assign. They easily access Web-assign and they love its low cost. But some students have syntax problems and they thought there are no solution in some problems.
- 3) I could not find proper contents about circles, quadratic inequalities, higher degree inequalities, and one rational inequalities. I made chapter and I taught this content by using my lecture note. (<http://www.abac.edu/academics/schools/math-science/faculty-staff/eyou> or D2L)
Lots of students (you can see that unit 5 exam average is lower than the other unit exam averages) still have difficulties to understand exponential and logarithmic functions and equations. They tried to practice more problems but they cannot find enough problems in textbook.
- 4) When I compared DWF rate in 2015 regular class, 2016 open source class, 2017 open source class, the percentages are 4.3%, 6%, 46% respectively. In 2017 spring semester case, three students were sick and

three students did not show up after two weeks. I can say that 2017 spring is not like the other semester. Overall, I could not say that it became worse or better than the other classes.

- 5) When I created Web-assign, I do not have time to create my own problems. So I tried to choose pre-exist problems but I hope that it has more diverse problem set.

4. Sustainability Plan

- First, I have to recreated web-assign problem set to enhance student performance: Choose more problems and consider the complexity level.
- Second, I have to reordered the textbook contents. So students easily follow the contents.
- Third, I usually use PowerPoint but I need to create PowerPoint more effectively.

5. Future Plans

- I do believe that education can be affordable and lots textbooks are really expensive. Students love low cost of web-assign and textbook. Lots of students love to no cost textbook. If I have a chance to use open stax textbook, I definitely do that again. I hope that I have better result in next semester.
- So far, I do not have plan to write paper based on this project result. But I hope that I could write textbooks (college algebra, Calculus I and so on).