Affordable Learning Georgia Textbook Transformation Grants
Final Report
FORT VALLEY STATE UNIVERSITY
Dr. Josephine D. Davis, Principal Investigator

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Course Names and Course Numbers: College Algebra, MATH 1111 AND Precalculus, MATH 1113

Semester Project Began: Summer, 2015
Semester of Implementation: Spring, 2016

Average Number of Students Per Course Section: 20.5 in MATH 1111 and 25 in MATH 1113
Number of Course Sections Affected by Implementation: 8 Course Sections
Total Number of Students Affected by Implementation: 173 Students Affected
Total Cost Savings of the Transformation Project to Students: $65,913
1. Narrative

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

- **Summary of the FVSU transformation experience, including challenges and accomplishments**

The Affordable Learning transformation experience at FVSU involved a complete redesign of two courses, college algebra and precalculus. Not only were a low-cost textbook and a new student support system utilized, but the content of these courses was redesigned so as to require, for future enrolled students, that college algebra will be a pre-requisite for precalculus. The Mathematics Faculty voted to support this re-alignment of content and course restructuring to bring the credit hour requirement for precalculus more in line with other institutions within the University System of Georgia, from 4- to a 3-hour credit precalculus course requirement.

The FVSU Affordable Learning Project Development Team met once every two weeks during the 2015 Summer Semester and twice monthly during the 2015 Fall Semester to develop and coordinate the curricular redesign and technology integration components of the project. Free course resources on the web were reviewed for adoption and the advantages and disadvantages of three classroom management systems were examined. These systems were needed to provide tutorial, homework and testing support. The team examined MyMathLab, WebWorks and WebAssign. After training for WebAssign was completed and after negotiations with MyMathLab representatives failed to result in lowered costs to students, our project team decided to adopt the WebAssign software system. We soon encountered a challenge. We discovered that substantial faculty effort was required with this system to develop sets of problems, quizzes and tests appropriate to the topics covered in the two proposed courses. By the time the team learned that this level of content development was required to use WebAssign, there was not enough time to perform the work by the proposed Spring, 2016 Semester of implementation.

Then, after examining the Open Stax Precalculus Textbook with which WebAssign would be used, the faculty agreed that the quality of the content and the exercise sets in this textbook was not appropriate to our needs. MyMathLab was already being used in the department; everyone was familiar with this course management system. Therefore, we negotiated again with our Pearson Book Company representative to lower the cost for MyMathLab. The Pearson representative introduced us to MathXL, an inexpensive version of MyMathLab System having comparable features. Therefore, we were able to meet our no-cost obligation by using the laboratory fee that students were already required to pay for these courses. This arrangement was approved by the Fort Valley State University administration and has proved highly successful in terms of implementation. We worked diligently with the information technology personnel to be prepared to launch the courses by the target date. By the start of the Spring 2016 Semester, all faculty members who had been assigned to teach college algebra and precalculus had been trained in the use of MATH XL. They were
knowledgeable of the redesigned curriculum and aware of the need to rely solely online resources to teach these courses. These redesigned courses fully utilized appropriate open resources.

- **Transformative impacts on your instruction**

The major impact that this grant had on instruction was rendering the classroom a more dynamic place. Faculty members used open resources more often than in previous semesters to highlight instruction. Additionally, a greater responsibility was placed on the learner to be more accountable for preparing for class in advance. These instructors found it useful to be more innovative with their pedagogy. The e-book facilitated more readily the use of the “Flipped” Classroom instructional strategy.

- **Transformative impacts on your students and their performance**

Overall, it was noted that students were more attentive in class since technology enabled everyone in the class to have immediate access to the e-textbook. A greater responsibility was placed on students to read the course content online in preparation for their online homework assignments. Students were also tasked to read the course content prior to coming to class and be prepared to engage in class discussions. This approach resulted in students engaging more deeply into the course content by asking questions and using appropriate math language. Students also took advantage of the videos embedded in the lessons.

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

The major lesson learned was that students are using computer aids to enable them to solve homework problems to the extent that the aids are becoming a “crutch.” For this reason, it appears that the transference of knowledge to novel situations is not occurring. This lack of grasping the material at a level to promote transfer of knowledge evidences itself in the large gap between the homework grades and the quiz grades online. As faculty, we have discussed the possibility of gradually restricting the aids that students can use in completing their homework on line to ensure that at some point, they are capable of performing more tasks independently. Based on the item analysis of objectives not mastered, more emphasis will be placed on the use of graphs to render the concepts more meaningful. Also, more time will be spent enabling today’s learners to improve their memory skills. Students are increasingly not able to remember formulas as was past tradition. With the advent of the cell phone, students are more prone to look up needed information rather than rely on their memory. Little information is being stored for later retrieval purposes.
In terms of the no-cost resources used, the faculty is extremely pleased with all of the educational resources that were adopted for use.

2. Quotes

These are sample student responses to using the “free” resources:

- “I think it’s great that we don’t have to pay considering that we have other books to buy. I wouldn’t like carrying a book to class everyday also – purchasing a book does not mean the student will learn more.”
- “The free book gave us very easy access to materials instead of our having to wait for financial aid refunds to buy our textbook - then we are so far behind in the class.”
- “I felt as if I could focus on my studies more without having to worry about money. This way, no one can use the excuse that they don’t have a textbook or they have to wait until their refunds drop to buy a book.”
- “I enjoy the free-cost, but prefer the ease of using a physical textbook.”

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? **Extremely positive.**

Total number of students affected in this project: **173**

- Positive: **82** % of **146** number of respondents
- Neutral: **0** % of **146** number of respondents
- Negative: **18** % of **146** 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?

The outcomes were positive in terms of students’ attitudes towards learning, but negative in terms of their performance rates. The limiting factor is that more students who are course repeaters are enrolled in these courses in the Spring semester than in the Fall.

*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)
- ___X 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? **Slightly negative.**

**Drop/Fail/Withdraw Rate:**

\[ \frac{55}{173} \% \] of students, out of a total \( 173 \) 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)
- ___X Negative: This is a higher percentage of students with D/F/W than previous semester(s) (That rate was 40%)

**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.** Quantitative data used in this study consisted of the Pre-and Post-surveys that were administered to students. Students were also given common final examinations that were analyzed using item analyses. T-tests of the means were analyzed based on Fall 2015 and Spring 2016 grades. The average GPA was calculated and the pre- and post DFW comparisons were completed.*

  - *Include measures such as: Drop, fail, withdraw (DFW) delta rates (Pre- and Post)*

<table>
<thead>
<tr>
<th>Course</th>
<th>Total Fall ’15 DWF</th>
<th>Percent Fall ’15 DWF</th>
<th>Total Spring ’16 DWF</th>
<th>Percent Spring ’16 DWF</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLLEGE ALGEBRA</td>
<td>68</td>
<td>N: 154 ( 44% )</td>
<td>64</td>
<td>N: 123 ( 52% )</td>
</tr>
<tr>
<td>PRECALCULUS</td>
<td>38</td>
<td>N: 109 ( 35% )</td>
<td>31</td>
<td>N:50 ( 62% )</td>
</tr>
<tr>
<td>Overall Impact</td>
<td>106</td>
<td>N: 263 ( 40% )</td>
<td>95</td>
<td>N:173 ( 55% )</td>
</tr>
</tbody>
</table>
- **Course retention and completion rates**
  With regards to the course completion rates, in the 2015 Fall Semester, 243 of 263 enrolled students completed the course at a rate of 92%. During the Spring 2016 Semester, 146 of 173 enrolled students completed the course for a course completion rate of 84%.

- **Average GPA**
  The average GPA in College Algebra was 1.8 and in Precalculus it was 1.6.

- **Surveys, interviews, and other qualitative measures**
  (See Attached)

  - Indicate any co-factors that might have influenced the outcomes for better or worse.

  The 15 percentage point difference in the fall to spring DWF rates is worth noting. Further analysis of the pre-test showed that 96% of enrolled students scored below the 70% proficiency threshold. This performance level showed that the students were underprepared for these courses. Generally, in the spring semester these courses enroll a large number of students who are repeaters. The high dropout rates are also reflective of poor attendance.

  The majority of those students with WFs amassed more than 15 days of unexcused absences. The low overall GPAs for students in these courses are indicative again of the distance that students had to advance to meet the course expectations in a 15 week semester. When asked what improvements could be made in the course, a common student response was to limit the number of homework exercises required. One student indicated feeling “overwhelmed.” Again, these expressions basically highlight students’ general need for more developmental mathematics in order to be prepared for the rigor of these courses. We are continuing this study by examining the SAT Math scores of our Spring 2016 enrollees to better understand the students’ preparedness for college-level mathematics courses.

  An interesting contrast to these performance outcomes are the pre-and post-survey data that showed high student excitement and interest in having and using the free course resources. Students indicated that the use of free materials motivated them to want to learn and enabled them to have a more positive attitude towards the course. However, their achievement data reflect the opposite – high failure rates.

  - When submitting your final report, as noted above, you will also need to provide the separate file of supporting data on the impact of your Textbook Transformation (surveys, analyzed data collected, etc.)
4. Sustainability Plan

- Describe how your project team or department will offer the materials in the course(s) in the future, including the maintenance and updating of course materials.

Future plans include the continuation of the model that has been implemented this Spring 2016 Semester. In fact, plans are underway to incorporate MATHXL into Bright Space to make it easier for students to access the system. Also, this integration will enable faculty to have their grades in a single file. Plans are also underway to transform the Calculus I course in a similar manner. Course materials will be maintained by members of this development team. We will meet monthly throughout the semester to compare notes and to make proper revisions as needed. Too, the team will work during the opening week of school to update the website containing open resources.

5. Future Plans

- Describe any impacts or influences this project has had on your thinking about or selection of learning materials in this and other courses that you will teach in the future.

We will continue with this transformed course in subsequent semesters. The project team has been positively impressed with the ease in which the MathXL system has been integrated into the portal here at FVSU. We have had formidable support from the Pearson Team in terms of training us on the use of the system and explaining the details of the data that the system collects on students’ performances. As stated above, the next course to be transformed is Calculus I.

- Describe any planned or actual papers, presentations, publications, or other professional activities that you expect to produce that reflect your work on this project.

- Two papers are being prepared for publication in refereed journals. We assisted Dr. Toppin with the two presentations that he made for Affordable Learning. Two of us have received undergraduate research funding to mentor students through a research project for this summer. This funding requires the student researchers to make presentations at Research Day, 2017. This local program is sponsored by the Office of Undergraduate Research at Fort Valley State University.

6. Description of Photograph

- List the names of the people in the separately uploaded photograph and their roles.
- Left to Right:

  Dr. Josephine Davis, Professor, Subject matter expert
Mrs. Bhavana Burell, Senior Lecturer, Subject matter expert

Dr. Samuel Cartwright, Subject matter expert

Dr. Shadreck Chitsonga, Subject matter expert