

Affordable Learning Georgia Textbook Transformation Grants

Final Report

Date: December 18, 2015

Grant Number: 98

Institution Name(s): Georgia Highlands College (GHC)

Team Members (Name, Title, Department, Institutions if different, and email address for each):

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Project Lead: Dr. Soumitra Chattopadhyay, Professor of Physics, Natural Sciences and Physical Education

Course Name(s) and Course Numbers: Introductory Physics I, PHYS 1111

Semester Project Began: Spring 2015

Semester(s) of Implementation: Fall 2015

Average Number of Students Per Course Section: 12 (at the beginning of the semester), and 9 (at the end)

Number of Course Sections Affected by Implementation: 1

Total Number of Students Affected by Implementation: 12

1. Narrative

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

- Summary of your transformation experience, including challenges and accomplishments
 - The transformation experience was mixed, but overall positive. One of the reasons for this is that GHC is a State College with significant two-year access role within its mission. Hence, there are very few students who are genuinely interested in the subject of Physics. As a result, this semester, things got a bit more complex because a low enrollment in the PHYS 2211 course forced the Division, for budgetary reasons, to combine PHYS 1111 and PHYS 2211 so that the lecture meetings were within the same room at the same time. While the basic material covered in the two courses are the same, PHYS 1111 is an algebra-based course while PHYS 2211 is a calculus-based course.
 - While the Rice OpenStax text is in a PDF and Web forms, it also permits faculty to download the HTML files of each section. However, the file naming structure was confusing and does not let one easily determine which chapter or section is with the file. In addition, in order to effectively use these file within D2L (Brightspace), the file extensions of all photos, tables and links within all pages needed to be

reformatted. Furthermore, to allow for the concept questions and exercises to be more readily accessible to students, new files in the form of Web pages were created and placed in the course. We believe that the format of a section reading page and concept questions and exercises is most beneficial for students.

- Transformative impacts on your instruction
 - One thing that can be positively said is that all the materials are now stored in D2L for anyone teaching this course at the institution to use without having to buy or subscribe to additional expensive books and journals. Moreover, this makes the materials more easily adapted to online, hybrid, or lecture formats of the course.
- Transformative impacts on your students and their performance
 - The fact that the students did not have to purchase an expensive textbook was liked by the students very much. All the materials were made available to them either on D2L or via student e-mail. The students started performing a bit shaky at the beginning but progressively performed better in tests and quizzes. The overall performance of the students was comparable to the instructor's vast previous experience teaching the same course in a traditional class setting (requiring a textbook) even though no formal data analysis was done in this aspect.

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

- One of the things learned this semester is it is not a good idea to have the two sections combined (calculus-based and algebra-based) even though the basic material is the same, the level of mathematics used is different. This should not be repeated in the future.
- Additionally, we might consider giving some minimal amount of points to students for completing the surveys with the course.

2. Quotes

- Three quotes from students evaluating their experience with the no-cost learning materials. (Note, these are from the survey students took early in the course)
 - "Free online textbooks would be a great alternative to textbooks since the cost of education is already so high and the fact that students are so connected to technology."
 - "The books cost too much in every case."
 - "I usually find reading online resources are harder for me to read and focus on."

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: 12

- Positive: 60% of 5 number of respondents
- Neutral: 20% of 5 number of respondents
- Negative: 20% of 5 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?

The overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester of implementation over previous three Fall semesters was positive, see Table 2, below.

Drop/Fail/Withdraw Rate:

33 % of students, out of a total 12 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)

Supporting Data Tables

- Table 1 shows the results of a survey placed in the course early in the semester.
- Table 2 shows the results of select questions from the course evaluation.
- Table 3 displays the grade distribution of PHYS 1111 for four fall semesters.

Table 1: Beginning-Survey Questions

Question	Response % (number)				
	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree
1. The cost of a required textbook influences my decision to purchase it.	20% (1)	0% (0)	20% (1)	20% (1)	40% (2)
2. I prefer to rent my textbooks instead of buying them.	80% (4)	0% (0)	20% (1)	0% (0)	0% (0)
3. Having a free, online textbook would significantly increase my use of the textbook of assigned readings.	20% (1)	20% (1)	20% (1)	20% (1)	20% (1)
4. I prefer having a printed textbook to write in instead of one completely online.	20% (1)	80% (4)	0% (0)	0% (0)	0% (0)
5. I feel most printed textbooks are not relevant to today's college student	0% (0)	20% (1)	20% (1)	20% (1)	20% (1)
6. I have purchased a required textbook that was never used in the course.	60% (3)	20% (1)	0% (0)	20% (1)	0% (0)
7. I prefer to read information from a printed textbook than reading online information.	20% (1)	20% (1)	20% (1)	40% (2)	0% (0)
8. In future courses, I prefer to use free online materials to a printed textbook.	60% (3)	0% (0)	20% (1)	20% (1)	0% (0)
9. I feel I can be just as prepared for a course using free online materials compared to a printed textbook.	40% (2)	40% (2)	0% (0)	20% (1)	0% (0)
10. I am more likely to sign up for a course based on using free online materials as opposed to a printed textbook.	20% (1)	0% (0)	40% (2)	20% (1)	20% (1)
11. I prefer informational videos to printed texts.	20% (1)	0% (0)	60% (3)	0% (0)	20% (1)
12. I prefer accessing materials online so that I do not have to carry a textbook to class.	20% (1)	60% (3)	20% (1)	0% (0)	0% (0)
13. I would prefer that the college roll the cost of the textbook and materials into the tuition or fees.	20% (1)	20% (1)	60% (3)	0% (0)	0% (0)

Table 2 End of Course Evaluation questions

Question	Response % (number)				
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. The required text complements the instructors' lectures/presentations. *	0.0% (0)	0.0% (0)	0.0% (0)	33.3% (1)	33.3% (1)
2. Handouts and/or other audio-visual aids used during the course helped clarify subject matter	33.3% (1)	0.0% (0)	33.3% (1)	0.0% (0)	33.3% (1)

*Of those who responded, one did not answer this question. Therefore, 33.3% did not respond.

Table 3: Grade Distribution

Semester	Grade Distribution in Percent (number)			Dropped Percent (number)
	A, B, or C	D	F	W
Fall 2012	37.5 % (4)	12.5 % (2)	0.0% (0)	62.5% (10)
Fall 2013	35.7% (5)	7.1 % (1)	14.3 % (2)	42.9% (6)
Fall 2014	40.0% (6)	13.3% (2)	13.3% (2)	33.3% (5)
Fall 2015	58.3% (7)	8.3% (1)	8.3% (1)	25.0% (3)

3b. Narrative

This project used both qualitative and quantitative instruments to measure the effectiveness of the project. Qualitatively, a survey was posted in the Brightspace (D2L) course offering at the beginning of the course to find out whether the students preferred a traditional textbook or the OpenStax text and associated materials used in the course. In addition, the survey sorted to find out the likeability of online resources usage, and student opinions as to the likely role the materials might play in their success. Students were encouraged to take this survey by the Project Lead who taught the class. However, it was a self-selecting survey with no points or credit incentives given for taking it. As a result, only 5 of 12 students participated. Table 1, in Section 3a above, displays the results of the Likert-scale questions within the survey.

From this beginning survey, it was revealed that 60% of the respondents disagreed or strongly disagreed that the cost of require textbooks influence their decision to purchase the book. This result is not surprising since 80% strongly agreed that they prefer to rent textbooks instead of buying them. However, it was surprising that there was no clear preference by the respondents as to the statement, "having a free, online textbook would significantly increase my use of the textbook of assigned readings", as each of the 5 response options received 20% of the replies. With regard to a preference to having a printed textbook to write in instead of one completely online, 20% strongly agreed and 80% agreed. In addition, 60% at some level, agreed that they preferred to read information from a printed textbook than reading online information. Furthermore, 60% strongly agreed and 20% agreed that they had purchased a required textbook that was never used in the course. However, the respondents were

equally split as to agreeing or disagreeing that most printed textbooks are not relevant to today's college students. Moreover, only 20% strongly agreed and 60% somewhat agreed to preferring informational videos to printed texts, but 20% strongly disagreed.

An end of course survey containing questions identical, in content, to that in the beginning course survey was placed in a similar manner in the D2L course site. As with the beginning survey, this was a self-selecting survey with no point value toward the course grade given for completion. Unfortunately, none of the students who completed the course chose to participate in the survey. Therefore, the team decided to look at specific questions from the GHC student evaluations of the course. Table 2 contains the questions and responses from the three students who chose to complete this evaluation. The first question was, "the required text complements the instructors' lectures/presentations". Of those who responded, 33.3% disagreed with the statement, 33.3% strongly disagreed with the statement and 33.3% did not respond. The second relevant question was, "handouts and/or other audio-visual aids used during the course helped clarify subject matter". The responses to this question revealed that 33.3% strongly agree, 33.3% not sure, and 33.3% strongly disagree with the statement. The distribution of the responses to these two questions is very concerning to the team. However, the result may be contributed, at least in part, to the fact that the calculus-based and algebra-based physics sections were combined into one class, and the learning objectives of each course were slightly different. In addition, if the students would have taken the post-course survey, the answers may have been different

Quantitatively data was collected in the form of the grade distribution and is displayed in Table 3. This data was for Introduction to Physics for fall 2015, the semester the OER material was used, and the three most recent past fall semesters, namely, fall 2014, fall 2013, and fall 2012. As seen in Table 3, the percentage of students earning grades of A, B, or C during the fall 2015 was 58.3%. This percentage was greater than that of fall 2014, fall 2013, and fall 2012 which had rates of 40.0%, 35.7%, and 37.5%, respectively. In addition, at 25%, the withdraw rate of students during the semester the OER materials were used was lower than that of fall 2014, fall 2013, and fall 2012 which had rates of 33.3%, 42.9% and 62.5%, respectively. While the percentage of students earning a grade of D in fall 2013, 7.1%, was lower than fall 2015, 8.3%, only one student earned this grade in each year. Finally, one student or 8.3% of the students earned a grade of F during fall 2015, this exceed the fall 2012 value of 0.0%. However, the fall 2015 percentage of students earning the F grade was lower than that of fall 2014 and fall 2013 which were 13.3% and 14.3% respectively.

Co-factors that might have influenced the outcomes

As a result of low enrollment, both the Calculus-based and Algebra-based Physics course were taught within the same classroom as if one section. The prerequisite for this course is Pre-Calculus, MATH 1113. Therefore, students' experiences in that course and the length of time between taking PHYS 1111 might have been factors. These are factors the team believes are worth further study.

4. Sustainability Plan

As part of this project, a Master Course was developed for PHYS 1111 with our D2L instance. GHC faculty will be able to request access to course so that they can import it to their D2L course offerings.

At the present time, students and faculty of other institutions can access course information at <https://www.highlands.edu/site/faculty-jlinek-oer-physics>. The team will work with the GHC ALG Library Coordinator, Elijah Scott, to place these materials with a Lib-Guide or other central GHC location for OER materials.

Moreover, the team will meet at least once a year, most likely in June, to examine new or updated materials and establish a timeline for modifying the course. In addition, other faculty and instructional designers will be consulted for additional ideas for continued development and to research the concerns the team has about possible influence of the co-factors mentioned above.

5. Future Plans

The team believes that it would be beneficial to use these materials in PHYS 1111 the next time it is taught and compare the results to those of this initial offering. In addition, the team realized that it might be beneficial for the prerequisite course, Precalculus (MATH 1113), to utilize a free textbook and other materials. Therefore, the team hopes to encourage colleagues in the Division of Mathematics at GHC to look at the outcomes of this ALG grant which involved that course, and its prerequisite. Additionally, the team hopes to redesign Introductory Physics II (PHYS 1112) about OER materials as PHYS 1111 is a prerequisite for that course.

Finally, the team plans to submit a proposal to make a presentation at the 2016 USG Teaching & Learning Conference (April 13-14, 2016) to share our experiences, research, and insight on promoting engaged student learning.

6. Description of Photograph



Left: Dr. Jeffrey Linek, technical and online methodology expert.
Right: Dr. Soumitra Chattopadhyay, Project Lead and content expert.