Spring 2018

Principles of Physics I & II (VSU)

Francis Flaherty
Valdosta State University, flaherty@valdosta.edu

Dereth Drake
Valdosta State University, djdrake@valdosta.edu

Michael Holt
Valdosta State University, moholt@valdosta.edu

Grants Collection
Valdosta State University

UNIVERSITY SYSTEM OF GEORGIA

Francis Flaherty, Dereth Drake, and Michael Holt

Principles of Physics I & II

Affordable Learning Georgia

Georgia's Virtual Library GALILEO
An Initiative of the University System of Georgia

Grants Collection

Affordable Learning Georgia Grants Collections are intended to provide faculty with the frameworks to quickly implement or revise the same materials as a Textbook Transformation Grants team, along with the aims and lessons learned from project teams during the implementation process.

Each collection contains the following materials:

- Linked Syllabus
  - The syllabus should provide the framework for both direct implementation of the grant team's selected and created materials and the adaptation/transformation of these materials.
- Initial Proposal
  - The initial proposal describes the grant project's aims in detail.
- Final Report
  - The final report describes the outcomes of the project and any lessons learned.

Initial Proposal

Application Details

Manage Application: ALG Textbook Transformation Grants

Award Cycle:	Round 6
Internal Submission Deadline:	Monday, August 1, 2016

Application Title:	243
Application ID:	#001135
Submitter First Name:	Francis
Submitter Last Name:	Flaherty
Submitter Title:	Professor
Submitter Email Address:	flaherty@valdosta.edu
Submitter Phone Number:	229-333-5665
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Francis
Applicant Last Name:	Flaherty
Applicant Email Address:	flaherty@valdosta.edu
Applicant Phone Number:	229-333-5665
Primary Appointment Title:	Professor
Institution Name(s):	Valdosta State University
Submission Date:	Monday, August 1, 2016

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

Francis A Flaherty, Professor of Physics, Department of Physics, Astronomy, and Geosciences, flaherty@valdosta.edu

Dereth J. Drake, Assistant Professor of Physics, Department of Physics, Astronomy, and Geosciences, djdrake@valdosta.edu

Michael Holt, Assistant Professor and Reference Librarian, Odum Library, moholt@valdosta.edu

Sponsor, (Name, Title, Department, Institution):

Dr. Edward Chatelain, Chair, Department of Physics, Astronomy, and Geosciences, Valdosta State University

Proposal Title:	243

Course Names, Course Numbers and Semesters Offered:

2211K: Principles of Physics I, Spring 2017, Summer 2017, Fall 2017

Final Semester of Instruction:	Fall 2017
Average Number of Students per Course Section:	25
Number of Course Sections Affected by Implementation in Academic Year:	7
Total Number of Students Affected by Implementation in Academic Year:	175
List the original course materials for students (including title, whether optional or required, & cost for each item):	Fundamentals of Physics Extended, 10th Edition by David Halliday, Robert Resnick, Jearl Walker, J. Richard Christman (required);Bookstore cost: $352
Proposal Category:	No-or-Low-Cost to Students Learning Materials
Requested Amount of Funding:	$10,800
Original per Student Cost:	$352
Post-Proposal Projected Student Cost:	$0
Projected Per Student Savings:	$352
Projected Total Annual Student Savings:	$61,600

Creation and Hosting Platforms Used ("n/a" if none):

D2L OpenStax CNX

Project Goals:

1.1 PROJECT GOALS

Our goal is to offer low-cost, high quality learning materials for students in the introductory calculus based Principles of Physics I (PHYS 2111K) course at Valdosta State University. We will be switching from the current textbook to the Merlot Calculus Based Physics textbook by Jeffrey Schnick. The book will be adopted for all sections of this course. The average number of sections over the last 5 years was seven sections per year with an average enrollment of 25 students per section, and the projected annual savings for students would be $61,600.

Our goal is to create additional no-cost Open Educational Resources (OERs) to help supplement lecture and textbook material. While the textbook itself is excellent, the supplemental materials, and especially the problem sets, which are essential for mastery of the subject, are weak.

By offering this new free, open access textbook and OERs, we anticipate an improvement in enrollment and DFW (Drop, Fail, and Withdraw) rates.

We will measure the effectiveness of this transformation by comparing student's course success rates between the courses taught using the new OERs and those taught using the traditional material as well as through student feedback on surveys conducted periodically throughout each semester these courses are taught.

Statement of Transformation:

1.2 STATEMENT OF TRANSFORMATION

The main stakeholders affected by this transformation will be the students who will gain access to a free open access textbook and educational resources starting on the first day of the semester. Many of our students come from economic backgrounds that can make the purchase of expensive textbooks and other resource materials difficult. It is not uncommon that students have to wait on financial aid payouts, and are not able to purchase their textbooks until the third week of classes, sometimes even later. Providing these free resources will reduce the financial burden of every student who enrolls in these courses and allow them access to course materials much sooner. Additionally, we project that since the textbook will be in pdf form it can be downloaded to a laptop, tablet, phone, or school computer, allowing students to study in spare moments and in places where it would be awkward to carry a large textbook. By offering these free and mobile resources we anticipate that students will better meet the learning objectives for these courses and thus have greater success in completing the course.

For this transformation, we will be converting from the current purchased textbook to the Merlot College Physics textbook. Since Engineering, Physics, Computer Science and Mathematics students predominantly take PHYS 2211K, this book should be an excellent choice. The text offers student many examples from each of the fields mentioned above, which helps students make the connection between what they are studying in physics to what they

are doing within their own major. Additionally the author gives very clear explanations of the concepts and does not distract students with side issues. We will also be providing students open access resources from various online sources as well as material that we produce in order to give the students a broader perspective so that they can better meet the learning objectives for these courses.

We believe that the implementation of the OERs and conversion from purchased textbooks will attract more students to taking this course within our department. The use of the book and resources will be mandated by the department. This will alleviate any discontinuity students experienced when going from the first semester of the course (PHYS 2211K) to the second semester of the course (PHYS 2212K) and from one instructor to another.

Transformation Action Plan:

1.3 TRANSFORMATION ACTION PLAN

Our action plan will have three parts: Identification and selection or creation of materials, adoption and course redesign, and implementation and evaluation.

Identification and selection or creation of materials

We have already chosen to adopt the Merlot Calculus Based Physics textbook and are in the process of identifying and locating no-cost, online resources, which can be used as supplemental materials for instruction in this course. These resources include material found on YouTube, HyperPhysics, Eric Mazur's website, GALILEO, and MERLOT. In addition, supplemental problems will be created by Dr. Flaherty.

Adoption and course redesign

During the Fall 2016 semester, we will be working to design modules on D2L, which correlate with each chapter in the Calculus Based Physics textbook. Each module will include a study guide, homework set, additional problems for extra practice, quick quizzes for checking knowledge of concepts, PowerPoint slides (if used for lectures), and links or copies of the chosen education resources, which may include demonstration videos and video sample problems.

All students will have access to these resources through D2L and public access will be available through Vtext Institutional Repository and LibGuides. Thus, students will have access to these materials anywhere they are able to access the internet. All instructors will also have open access to these materials. And since all instructors will be encouraged to use these resources for all sections of these courses, this will create continuity across the different sections of each course.

It will be Dr. Flaherty's role is to lead this project as subject matter expert and instructional

designer and will be listed as the instructor of record. He will be responsible for creating additional problem sets. Dr. Drake has experience as an instructional designer and will be helping to develop the D2L modules. Mr. Holt will organize the materials in LibGuides and Vtext.

Implementation and evaluation

We plan to start implementation of the new design during Summer 2017 with full course implementation for all sections of PHYS 2211K in Fall 2017. During this semester, we will be studying which resources students utilize most often through the “Completion Summary” report for each resource. Periodically, surveys will be provided to students to determine their perception of the helpfulness of each resource as well as suggestions from students on additional resources they would like to see added.

At the end of the Fall semester, data will be compiled to determine the students’ perception of the course along with the DFW rates for this course. These rates will be compared with those of the courses taught during the Spring 2017 and Summer 2017 semesters. Any suggestions or changes to the modules in D2L will be made at this time. The updated materials will be used during subsequent semesters. More information on specific evaluations is discussed in the next section of this application.

Quantitative & Qualitative Measures:

1.4 QUANTITATIVE AND QUALITATIVE MEASURESThroughout the length of this project, we will be using quantitative and qualitative measures to determine the impact of this transformation on student success.Quantitative MeasuresWe will be examining two different measures throughout the length of this project: DFW rates and completion rates.DFW RatesThrough the department chair, we have access to the DFW rates for all students enrolled in PHYS 2211K during the last three years. At the end of each semester, we will be comparing the DFW rates for the course taught using the new format to those using the purchased textbook.Completion RatesThe last quantitative measure we are employing is to look at completion rates. As with the DFW rate, we have access to the completion rates for the past three years through our department chair. At the end of each semester, we will be accessing these reports to determine if the completion rate has improved by using these no-cost materials.Qualitative MeasuresWe will be examining two different qualitative measures throughout the length of this project: student feedback through surveys and completion summary reports through D2L.Student feedback through surveysSurveys will be randomly distributed throughout each semester to students in order to gauge their perception of how helpful the textbook and the other OERs available to them on D2L appear to be. These surveys will help us to gauge student interest as well as provide us with information on other resources the students may have found when they were studying for this course.Completion Summary reportsOne of the many reports available through D2L is the Completion Summary Report. These reports allow us to determine which students accessed specific materials and when they accessed it. Throughout each semester, we will be examining these reports in order to determine which resources the students utilize the most. Then at the end of the semester, we will replace any resources that students rarely use and add additional

resources similar to the ones they

Timeline:

1.5 TIMELINE

August 2016 - September 2016: Identify and locate no-cost, online additional course materials

September 2016 - January 2016: Design modules in D2L

August 2016 - November 2016: Create new supplemental problem sets

Fall 2016 Overload for Dr. Flaherty

Spring 2017: Release time/salary for Mr. Holt for designing LibGuides and uploading materials to Vtext.

May 2017 – June 2017: Compile data from Fall 2017 classes and revise course materials based on student feedback. Upload revised course materials to Vtext and LibGuides Fall 2017 Implementation begins.

Fall 2017: Implement new course materials, Data collection on student achievement begins.

Fall 2017: Overload for Dr. Drake for work on study guides and updates of the D2L modules.

June 2017 - July 2017: Continue implementation with revisions

Spring 2018: Co-investigators compile data and revise course materials based on student feedback

Budget:

1.6 BUDGET

Dr. Francis A Flaherty - $3333 for overload in Fall 2016

Dr. Dereth J. Drake - $3333 for overload in Fall 2017

Mr. Michael Holt - $3333 for salary/release time in Spring 2017

Travel for at least two team members to attend grant kick-off meeting - $800

Sustainability Plan:

1.7 SUSTAINABILITY PLAN

The overall goal for this project is to create a master course model, which include corresponding modules for each section of the textbook. All materials will be available to every instructor prior to the beginning of the semester through D2L and allow each instructor to customize the materials to the instructor's own teaching style. The master course and modules will be made available to faculty at all other USG institutions through Vtext Institutional Repository and LibGuides. Dr. Flaherty and Dr. Drake will be responsible for maintaining the course materials PHYS 2211K for the foreseeable future. Mr. Holt will be responsible for maintaining the Vtext and LibGuides sites for the foreseeable future. Dr. Flaherty will continue to develop new problem sets even after this ALG project is finished. It is possible that the textbook may be changed in the future to a different no cost textbook; OpenStax for instance is currently developing a calculus-based physics book. If the book is changed at a future date almost all of the resources that we develop will still prove very useful.

July 25, 2016

Dear Affordable Learning Georgia,

I am pleased to write this letter in rousing support of a new Affordable Learning Georgia Textbook Transformation Grant proposal submitted by Dr. Frank Flaherty (Professor of Physics) and Dr. Dereth Drake (Assistant Professor of Physics) in the Department of Physics, Astronomy, and Geosciences at Valdosta State University. I only wished that at this time of dwindling enrollments and soaring textbook costs in the State of Georgia that we had been able to perform this study earlier.

The cost of the Halliday and Resnick textbook used for both PHYS 2211 and PHYS 2212 classes at Valdosta State University is presently $352, which is excessively expensive.

As the first three weeks in these calculus-based physics courses are even more vital in determining student success because of the higher level mathematics required, the many students at this stage that have yet to purchase their textbook and laboratory materials are even more likely to be putting themselves at serious risk of failure, or resolved to play catch-up for the entire semester in that class. Not only does this new project eliminate the costs of textbooks, which for Biology, Engineering Studies, and Chemistry majors can be overwhelming, but also will provide each student with instant access to all course materials from the first day of class. Most of the course drops and withdrawals in the first few weeks of class would be prevented, and the rigor of these more complex courses can be embraced by all students equally and immediately. Therefore, the continuing challenges of retention for the university and graduation in a timely fashion for the student are resolved.

I am pleased with the clarity and simplicity of the project design, and am most certain that its results will yield recommendations for essential change in how calculus-based Physics course materials are accessed by students in the USG.

Sustainability of this project at Valdosta State University is particularly vital, as student enrollment and retention in these courses provide our gateway for majors into our Physics program. This transformation of the calculus-based PHYS 2211 and PHYS 2212 courses in the department, taught by Dr. Frank Flaherty and Dr. Dereth Drake, will serve as a model to transformation of additional course series within the department such in ASTR 1010 and ASTR 1020, as well as in other departments within the College of Arts and Sciences at Valdosta State University. I see this study as a springboard to success for both students and departments in the USG.

Your consideration on this matter is greatly appreciated. Thank you.

Sincerely,

Edward E Chatelain, Head
Physics, Astronomy, and Geosciences

DEPARTMENT *of PHYSICS*, ASTRONOMY & GEOSCIENCES
PHONE 229 333 5752 • FAX 229 219 1201 • WEB www.valdosta.edu/phy • ADDRESS 1500 N Patterson St. • Valdosta GA 31698 - 0055

Affordable Learning Georgia Textbook Transformation Grants

Rounds Three, Four, and Five

For Implementations Beginning Summer Semester 2015

Running Through Spring Semester 2017

Proposal Form and Narrative

Submitter Name	Francis A Flaherty
Submitter Title	Professor of Physics
Submitter Email	flaherty@valdosta.edu
Submitter Phone Number	229-333-5665
Submitter Campus Role	Proposal Investigator (Primary or Additional)
Applicant Name	Francis A Flaherty
Applicant Email	flaherty@valdosta.edu
Applicant Phone Number	229-333-5665
Primary Appointment Title	Professor of Physics
Institution Name(s)	Valdosta State University

Team Members	Francis A Flaherty, Professor of Physics, Department of Physics, Astronomy, and Geosciences, flaherty@valdosta.edu Dereth J. Drake, Assistant Professor of Physics, Department of Physics, Astronomy, and Geosciences, djdrake@valdosta.edu Michael Holt, Assistant Professor and Reference Librarian, Odum Library, moholt@valdosta.edu				
Sponsor, Title, Department, Institution	Dr. Edward Chatelain, Chair, Department of Physics, Astronomy, and Geosciences, Valdosta State University				
Proposal Title	Developing New Open Educational Resources for Principles of Physics I students.				
Course Names, Course Numbers and Semesters Offered	PHYS 2211K: Principles of Physics I, Spring 2017, Summer 2017, Fall 2017				
Final Semester of Instruction	Fall 2017				
Average Number of Students Per Course Section	25	**Number of Course Sections Affected by Implementation in Academic Year**	**7**	**Total Number of Students Affected by Implementation in Academic Year**	175
Award Category (pick one)	☒ No-Cost-to-Students Learning Materials ☐ OpenStax Textbooks ☐ Specific Top 50 Lower Division Courses				
List the original course materials for students (including title, whether optional or required, & cost for each	**Fundamentals of Physics Extended**, 10th Edition by David Halliday, Robert Resnick, Jearl Walker, J. Richard Christman (required); Bookstore cost: $352.				

item)	
Original Per Student Cost	$352 per student Calculus based
Post-Proposal Projected Per Student Cost	$0 per semester
Projected Per Student Savings	$352
Plan for Hosting Materials	☐ OpenStax CNX ☒ D2L ☒ LibGuides ☒ Other _MERLOT download
Requested Amount of Funding	$10,800

NARRATIVE

1.1 PROJECT GOALS

Our goal is to offer low-cost, high quality learning materials for students in the introductory calculus based Principles of Physics I (PHYS 2111K) course at Valdosta State University. We will be switching from the current textbook to the Merlot *Calculus Based Physics* textbook by Jeffrey Schnick. The book will be adopted for all sections of this course. The average number of sections over the last 5 years was seven sections per year with an average enrollment of 25 students per section, and the projected annual savings for students would be $61,600.

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1.3 TRANSFORMATION ACTION PLAN

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At the end of the Fall semester, data will be compiled to determine the students' perception of the course along with the DFW rates for this course. These rates will be compared with those of the courses taught during the Spring 2017 and Summer 2017 semesters. Any suggestions or changes to the modules in D2L will be made at this time. The updated materials will be used during subsequent semesters. More information on specific evaluations is discussed in the next section of this application.

1.4 QUANTITATIVE AND QUALITATIVE MEASURES

Throughout the length of this project, we will be using quantitative and qualitative measures to determine the impact of this transformation on student success.

Quantitative Measures

We will be examining two different measures throughout the length of this project: DFW rates and completion rates.

DFW rate

Through the department chair, we have access to the DFW rates for all students enrolled in PHYS 2211K during the last three years. At the end of each semester, we will be comparing the DFW rates for the course taught using the new format to those using the purchased textbook.

Completion rates

The last quantitative measure we are employing is to look at completion rates. As with the DFW rate, we have access to the completion rates for the past three years through our department chair. At the end of each semester, we will be accessing these reports to determine if the completion rate has improved by using these no-cost materials.

Qualitative Measures

We will be examining two different qualitative measures throughout the length of this project: student feedback through surveys and completion summary reports through D2L.

Student feedback through surveys

Surveys will be randomly distributed throughout each semester to students in order to gauge their perception of how helpful the textbook and the other OERs available to them on D2L appear to be. These surveys will help us to gauge student interest as well as provide us with information on other resources the students may have found when they were studying for this course.

Completion Summary reports

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Dr. Dereth J. Drake - $3333 for overload in Fall 2017

Mr. Michael Holt - $3333 for salary/release time in Spring 2017

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based physics book. If the book is changed at a future date almost all of the resources that we develop will still prove very useful.

1.8 REFERENCES & ATTACHMENTS

Syllabus

PRINCIPLES OF PHYSICS I PHYSICS 2211 Fall 2017

INSTRUCTOR: Dr. Frank Flaherty Flaherty@valdosta.edu

LECTURE: NH 1061 Tues, Thurs 8:00 am - 9:15 am

RECITATION: NH 1061 Tues 9:30 am - 10:20 am

LAB: NH 3044 Mon 8:00 am - 9:50 am A SECTION
NH 3044 Weds 10:00 am - 11:50 am B SECTION
NH 3044 Weds 1:00 pm - 2:50 pm C SECTION

OFFICE HOURS: NH 3029 Mon 10:00 am -11:00 am
Tues 10:30 am - 12:10 pm , Weds 12:00 - 12:30 pm 3:00 - 4:00 pm
Thurs 9:30 - 10:50 am

Corequisite - Prerequisite: Math 2261

Calculators: The use of a programmable or a data storage calculator is forbidden during tests. If in doubt about your calculator consult Dr. Flaherty.

TEXT: University Physics Volume 1 by Ling, Sanny, and Moebs Open Stax
The book is available for download in the combined Physics 2211 section in D2L.

Grades: The final Grade will be determined by:

Four Tests	15% each exam
Labs	20%
Final Exam	20%

Grade Criteria:

90% - 100% A
80% - 89% B
70% - 79% C
60% - 69% D
0% - 59% F

Attendance: A student who has more than 20% unexcused absences may receive an F. Attendance at tests is mandatory. A scheduled doctor's appointment is not a valid excuse for missing a test. Students are not allowed to leave the room during an exam.

Title IX Statement: Valdosta State University (VSU) is committed to creating a diverse and inclusive work and learning environment free from discrimination and harassment. VSU is dedicated to creating an environment where all campus community members feel valued, respected, and included. Valdosta State University prohibits discrimination on the basis of race, color, ethnicity, national origin, sex (including pregnancy status, sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, national origin, disability, genetic information, or veteran status, in the University's programs and activities as required by applicable laws and regulations such as Title IX. The individual designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning nondiscrimination policies is the University's Title IX Coordinator: Maggie Viverette, Director of the Office of Social Equity, titleix@valosta.edu, 1208 N. Patterson St., Valdosta State University, Valdosta, Georgia 31608, 229-333-5463.

Access Statement: Students with disabilities who are experiencing barriers in this course may contact the Access Office for assistance in determining and implementing reasonable accommodations. The Access Office is located in Farbar Hall. The phone numbers are 229-245-2498 (V), 229-375-5871 (VP) and 229-219-1348 (TTY). For more information, please visit VSU's Access Office or email: access@valdosta.edu.

Learning Outcomes:

Students will demonstrate knowledge of scientific and mathematical principles and proficiency in laboratory practices. Gen Ed 5
Students will use computer and information technology when appropriate Gen Ed 3
Students will express themselves clearly, logically. and precisely in writing and in speaking, and they will demonstrate competence in reading and listening Gen Ed 4
Students will apply the techniques of mathematical analysis (algebra, geometry, trigonometry, and calculus) to physical problems Physics 3
Students will effectively use computers and calculators for scientific calculation, programming, and word processing. Physics 4

Link to textbook:
TEXT: University Physics Volume 1 by Ling, Sanny, and Moebs Open Stax
https://openstax.org/details/books/university-physics-volume-1

Material Covered

Ch 1 Units and Measurement
Ch 2 Vectors
Ch 3 Motion Along a Straight Line
Ch 4 Motion in Two and Three Dimensions
Ch 5 Newton's Laws of Motion
Ch 6 Applications of Newton's Laws
Ch 7 Work and Kinetic Energy
Ch 8 Potential Energy and Conservation of Energy
Ch 9 Linear Momentum and Collisions
Ch 10 Fixed-Axis Rotation
Ch 11 Angular Momentum
Ch 12 Static Equilibrium and Elasticity
Ch 13 Gravitation
Ch 15 Oscillations
Ch 16 Waves

TEST SCHEDULE

Sept 5	**TEST 1**
Sept 28	**TEST 2**
Oct 26	**TEST 3**
Nov 16	**TEST 4**
Dec 5	**FINAL EXAM** 8:00 am

Final Report

Affordable Learning Georgia Textbook Transformation Grants

Final Report

Date: December 13, 2017

Grant Number: 243

Institution Name: Valdosta State University

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

Francis Flaherty, Professor of Physics, Department of Physics, Astronomy, and Geosciences, flaherty@valdosta.edu

Dereth J. Drake, Associate Professor of Physics, Department of Physics, Astronomy, and Geosciences, djdrake@valdosta.edu

Michael Holt, Assistant Professor and Reference Librarian, Odum Library, moholt@valdosta.edu

Project Lead: Francis Flaherty

Course Name(s) and Course Numbers:

PHYS 2211K: Principles of Physics I

PHYS 2212K Principles of Physics II

Semester Project Began: Fall 2015

Semester(s) of Implementation: Fall 2016 / Spring 2017/Fall 2017

Average Number of Students Per Course Section: 26.8

Number of Course Sections Affected by Implementation: 5

Total Number of Students Affected by Implementation: 134

1. Narrative

This grant was motivated by a constant increase in the price of the physics textbook we had been using for our calculus based physics 2211 course. When the price of the textbook reached $350 we found that many of the students were not purchasing a copy, and their performance had decreased compared to previous years. As a result we decided to adopt an open source textbook. We applied for an affordable learning Georgia grant to help with the implementation of this course transformation. Originally the open source Merlot book Calculus Based Physics by Schnick was chosen, but soon after the start of the semester the Open Stax University Physics was completed. In testing books the University Physics book seems to be much easier for students to understand and we switched to this text and will use it from now on. The University Physics textbook had one weakness which was that the problem sets in some chapters were not very comprehensive, and had a narrow range of difficulty. In order to address this Dr. Flaherty created additional physics problems. These problems are designed to broaden the ability of our students at Valdosta State University. In addition to these problems Dr. Drake developed study guides to help our students to learn the concepts covered in this course. These items were uploaded to the Vtext Repository housed by the Valdosta State University and maintained by Dr. Holt.

2. Quotes

- "The textbook was clear on most subjects. I also appreciated not having to spend a small fortune for the textbook"

- "I liked not having to carry a heavy book with me when I flew home during the break. I could study and work out problems in my spare time"

- "The text book and homework sets were very helpful. I would encourage any student who will be taking this class to download the online version. It was handy to have all of the material on my laptop"

- "The homework problems helped me to understand the topics and to do well on the tests "

3. Quantitative and Qualitative Measures

3 a. 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: 134

Positive: 71 % of 105 respondents
Neutral: 29 % of 105 respondents
Negative: 0% of 105 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:

- _X_ 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:

Choose One:

- ___ Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- _X_ 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)

39% of students dropped/failed/withdrew from the course in the final semester of implementation. This compares to 41% before the implementation.

3 b. Narrative

As shown in figure 1, over 76% of students surveyed consider the cost of textbooks prior to buying the book. Considering only 38% of the students said that they then buy all required books, this indicates that some students (approximately 40%) may not purchase a textbook because of the cost of the book. Additionally, less than half the students knew that there was a free version of the textbook available prior to registering for courses.

Figure 2 shows that 70% of the students found the textbook to be helpful, the remaining 30% were neutral about it being helpful. None of the students disagreed with the statement that the textbook was helpful. Approximately half of the students were unaware that a free version of the textbook was available online. We intend to publicize the availability of the free textbook more so that the students can begin studying even before the course starts. The students found the homework problem sets very helpful with 80% agreeing that they were helpful, and no one disagreed with the statement that they were helpful. This is why special emphasis was placed in this grant to widening the range of problems available to students. We plan to continue to increase the number of problems in the future. Students also found online resources available through Valdosta state or on the web to be useful also. As a result of this survey result we plan to make more of these resources easily available to the students. Figure 3 shows that on average students use the physics textbook more often than they use their textbooks for other courses. Part of the explanation for this may be that they have ready access to the book on their phone, tablet, or laptop. This allows them to study in their spare time without having to carry around an extremely heavy textbook.

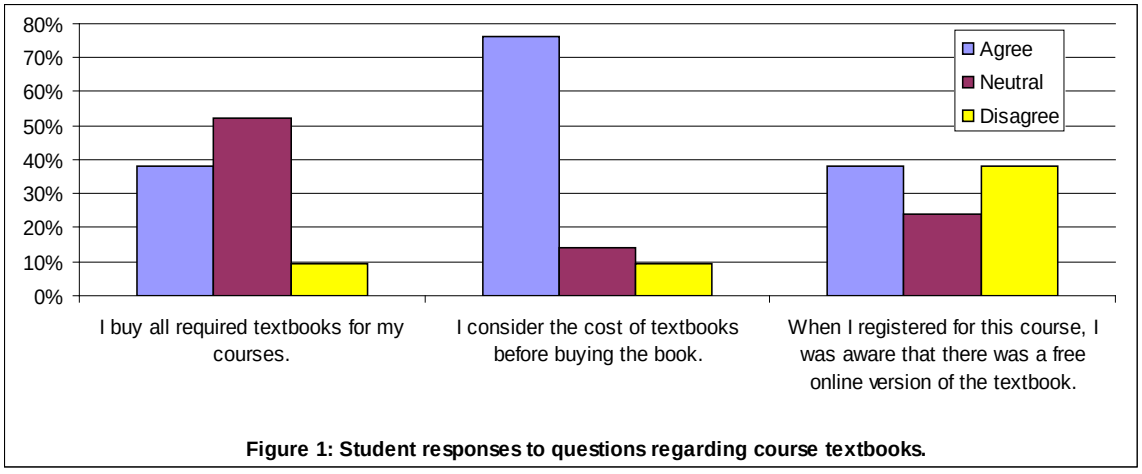

Figure 1: Student responses to questions regarding course textbooks.

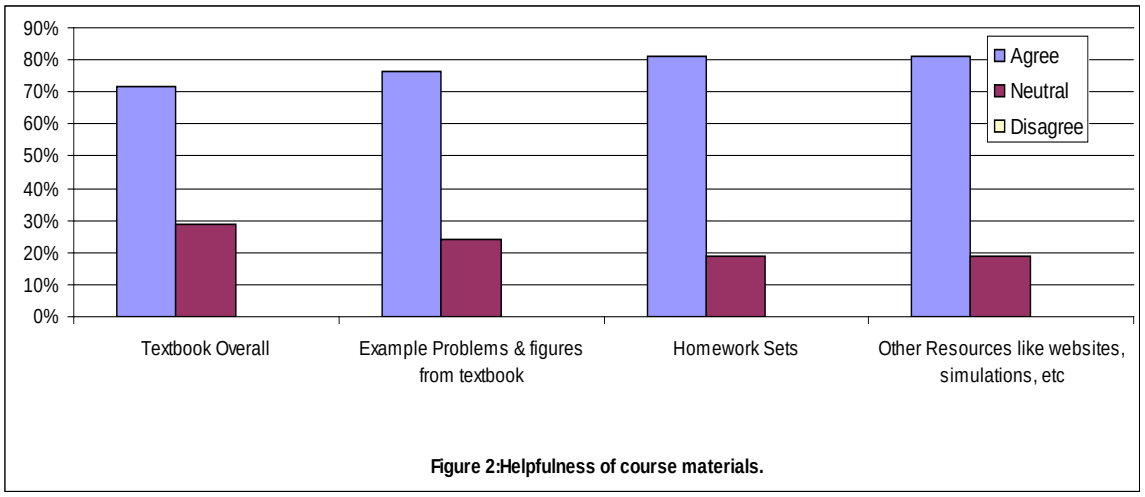

Figure 2:Helpfulness of course materials.

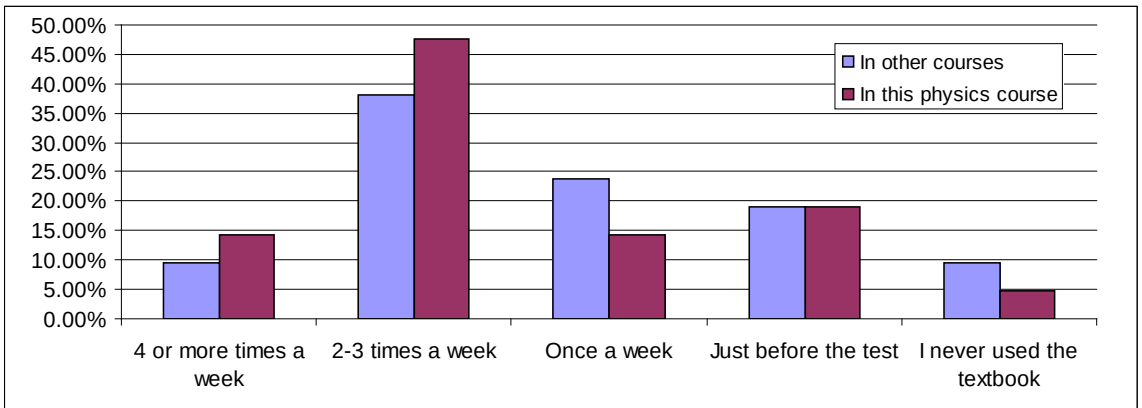

Figure 3: How often students use the texbook in this course in comparison to other courses.

Impact on Student Performance

The impact on student performance was somewhat mixed, but the average GPA increased from 2.13 to 2.35 which is a statistically significant improvement. The number of students getting an A grade decreased from 25% to 15%. However, the number of students getting a grade of B increased from 9% to 23%. The other noticeable change in grades was that the number of students failing the course went from 21% to 9%. We believe that fewer students are getting an A grade because Georgia Institute of Technology has drastically raised their criteria for admission. At the same time the University system of Georgia has opened new engineering programs at institutions such as Georgia state and Georgia Southern. As a result many of the brightest students are now enrolling directly in these new engineering programs because they have a much higher acceptance rate, and they can get their degree more quickly.

The drop fail withdrawal rate was almost unchanged, however the percentage of F grades was cut in half going from 21% to 9%. The number of withdrawals went from 20% to 30%. It is certainly preferable for students to withdraw rather than getting an F. Almost all of these students withdraw very early in the course because they realize that their mathematics background is too weak for a calculus based physics course.

4. Sustainability Plan

All materials were uploaded to D2L at the beginning of each semester for students to use. The materials have since been uploaded to the Vtext Institutional Repository and converted into LibGuides for each course. These guides are freely available to any faculty member at the other USG Institutions. The homework sets were originally indexed to the chapters in the University physics textbook we are using, but we're renaming them to reference the content of the material. This will make it easier for faculty and students at other institutions to make use of this material. We to maintain and expand all of the course materials and the LibGuides for the foreseeable future.

5. Future Plans

Dr. Flaherty plans to continue to add more problems to the homework sets in order to give students more practice working out problems involving a wider range of concepts. Dr. Drake plans to add more study guides and other explanatory material. Dr. Holt will continue to convert this material into Libguides and upload them to the Vtext Institutional Repository. In addition we plan to survey students to find out what online resources such as Khan Academy they find to be useful. We will then provide links to make this material easily accessible to students who may not be aware of its existence.

6. Description of Photographs

- Pictures of some of the students in the PHYS 2211K lecture course at VSU.


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