

Summer 2017

## Essentials of Biology I & II (GSW)

Stephanie Harvey

*Georgia Southwestern State University, stephanie.harvey@gsw.edu*

Ian Brown

*Georgia Southwestern State University, ibrown@gsw.edu*

Otto Lorenz

*Georgia Southwestern State University, otto.lorenz@gsw.edu*

Thomas Wright

*Georgia Southwestern State University, thomas.wright@gsw.edu*

Anh-Hue Thi Tu

*Georgia Southwestern State University, anh-hue.tu@gsw.edu*

*See next page for additional authors*

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**Authors**

Stephanie Harvey, Ian Brown, Otto Lorenz, Thomas Wright, Anh-Hue Thi Tu, and Yonnie Williams

# Grants Collection

Georgia Southwestern State University



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Stephanie Harvey, Ian Brown, Tom Lorenz, Tommy Wright,  
Anh-Hue Thi Tu, Yonnie Williams

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# Essentials of Biology

## I & II

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## 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.



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# Initial Proposal

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## Application Details

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### Manage Application: ALG Textbook Transformation Grant

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**Award Cycle:** Round 4

**Internal Submission Deadline:** Monday, September 7, 2015

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**Application Title:** 145

**Submitter First Name:** Stephanie

**Submitter Last Name:** Harvey

**Submitter Title:** Professor and Chair of Biology

**Submitter Email Address:** stephanie.harvey@gsw.edu

**Submitter Phone Number:** 229-931-5034

**Submitter Campus Role:** Proposal Investigator (Primary or additional)

**Applicant First Name:** Stephanie

**Applicant Last Name:** Harvey

**Co-Applicant Name(s):** Dr. Otto Lorenz

**Applicant Email Address:** stephanie.harvey@gsw.edu

**Applicant Phone Number:** 229-931-5034

**Primary Appointment Title:** Professor and Chair of Biology

**Institution Name(s):** Georgia Southwestern State University

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

Stephanie Harvey, Ph.D., Chair & Professor of Biology, Georgia Southwestern State University, stephanie.harvey@gsw.edu

Tom Lorenz, Ph.D., Assistant Professor of Biology, Georgia Southwestern State University, otto.lorenz@gsw.edu

Ian Brown, Ph.D., Professor of Biology, Georgia Southwestern State University, ibrown@gsw.edu

Tommy Wright, Ph.D., Professor of Biology, Georgia Southwestern State University, thomas.wright@gsw.edu

Anh-Hue Thi Tu, Ph.D., Professor of Biology, Georgia Southwestern State University, anh-hue.tu@gsw.edu

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

Dr. Brian Adler, Vice President of Academic Affairs, Academic Affairs Office, Georgia Southwestern State University.

**Proposal Title:** 145

**Course Names, Course Numbers and Semesters Offered:**

BIOL 1107 – Essential of Biology I: Fall 2015 Pilot single section, Summer 2016 (compressed term), Fall 2016 – all sections

BIOL 1108 – Essential of Biology II: Summer 2016 (compressed term), Fall 2016 Pilot single section, Spring 2017 – all sections

(This will also change the textbooks for the associated lab sections BIOL 1107L and BIOL 1108L.)

**Final Semester of Instruction:** Spring 2017

**Average Number of Students per Course Section:** BIOL 1107 – 50; BIOL 1108 – 50; BIOL 1107L - 24; BIOL 1108L - 24

**Number of Course Sections Affected by Implementation in Academic Year:** At full Implementation: BIOL 1107 – 5; BIOL 1108 – 4; BIOL 1107L - 9; BIOL 1108L - 5

**Total Number of Students Affected by Implementation in Academic Year:** BIOL 1107 – 250; BIOL 1108 – 200; BIOL 1107L - 216; BIOL 1108L – 120; Total: 786

**List the original course materials for students (including title, whether optional or required, & cost for each item):** Campbell Biology: Concepts and Connections, 8th ed. Required \$220  
Note: To reduce cost to students taking both classes and the labs, the same textbook is used. Unfortunately, a significant number of students sell their books after the first course even after repeated announcements that the same textbook will be used for the next course in the sequence. When asked "Why?" the standard reply is "I needed the money for . . ." and they assume they will have financial aid to re-purchase it for the second course or lab.  
(Students are also required to purchase a student response device or "clicker" \$65 including one year license)

**Proposal Categories:** OpenStax Textbooks

**Requested Amount of Funding:** \$30,000

**Original per Student Cost:** \$220 (plus \$65 for clicker)

**Post-Proposal Projected Student Cost:** Cost\$0-\$25 (depends on what format the student selects for the textbook). (plus \$65 for clicker)

**Projected Per Student Savings:** \$220- \$195 (depends on what format the student selects for the textbook)

**Plan for Hosting Materials:** OpenStax CNX

### **Project Goals:**

Our goals for this project are to lower the cost for students taking our non-major introductory biology sequence and associated lab courses and to insure they have access to their textbook starting the first day of class, regardless of their financial situation. Sumter County, where GSW is located, and 12 out of the 14 surrounding counties represent an economically depressed region in which 24-40% of the population lives below the poverty level (2014 data, Carl Vinson Institute of Government and the Cooperative Extension Service, UGA). At full implementation, all Georgia Southwestern State University students taking the non-majors biology sequence will be using the OpenStax *Concepts of Biology* textbook and will continue to do so for the foreseeable future.

### **Statement of Transformation:**

- Lower cost and increase accessibility of course material to students with the adoption of the OpenStax Textbook.
- Improve retention/progression of students at risk due to economic concerns or at minimum at neutral impact on student success.



- This will impact the Biology department across the board. All faculty teach at least one of the non-majors introductory courses. Changing textbooks for our largest student group (non-majors) will require a significant redevelopment of the courses and recreation of ancillary materials for these courses.

### **Transformation Action Plan:**

- 1) The OpenStax textbook- Concepts of Biology will be adopted starting with a pilot section then for all subsequent section in the foreseeable future.
- 2) Redevelopment of courses as needed to match layout and content of new textbook
- 3) Identification or production of additional supportive OER
- 3) Development of syllabi to address issues that will arise with the use of this new textbook and its digital format: a) Instruction on how student access the material will have to be developed. b) Since students will be using computers, tablets, e-readers or their cell phones to access the textbook during class, how is misuse going to be handled.
- 4) Ancillary materials will need developing. A basic PowerPoint outline will be created that other instructors will be able to modify to fit their own lecture style. The department faculty as a whole will contribute ancillary material as needed from their areas of study. (The PowerPoint provided by OpenStax consist only of images from the textbook and many of the images are of poor quality.)
- 5) Development of protocols to inform students of their text and its available formats prior to the start of the term since GeorgiaView is unavailable to the student until the first day of class. Once class starts, Information on accessing the textbook website will be provided to the student via GeorgiaView. Additional supportive OER will be provided to the students through GeorgiaView.

**Quantitative & Qualitative Measures:** Project's success will be evaluated based on several criteria.

Comparative analysis of student scores on the first exam while using the Concepts of Biology (OER) versus the traditional textbook will be conducted. Justification: Prior to this project, a significant number of student struggled because they did not have the textbook due to financial limitations. If providing a more affordable alternative minimizes this effect, an increase in students' scores should be evident.

The frequency of withdraws at midterm will be compared to the control groups (groups prior to transformation)

Analytical comparison of W/WD/F at the end of each term using the new textbook and at the end of terms prior to new adoption.

Students' opinions of the OpenStax textbook will be collected by a required survey within the last 2 weeks of each term.

Assessments of Student Learning Outcomes. To be successful, the assessment should demonstrate no decrease in student achievement at minimum (new textbook is equivalent to old one, but saves the students money) or should demonstrate improvement due to better access of the textbook.

**Timeline:**

- August 2015 – Begin pilot section of BIOL 1107 – Essentials of Biology using the OpenStax textbook Concepts of Biology.
- October 12, 2015 – Attend required “Kick-Off” Meeting
- November 2015 – Formalize language for syllabi for both BIOL 1107 & 1108.
- December 2015 – Complete pilot section of BIOL 1107
- January 2016 -- Complete analysis of pilot section and make recommendations to team of any require changes that need to be address based on student outcomes and surveys.
- May 2016 – Completion of primary ancillary material for BIOL 1107 and BIOL 1108.
- June 2016 – Full implementation for BIOL 1107 compressed term
- July 2016 – Pilot implementation for BIOL 1108 compressed term. Analysis of Summer I data
- August – Full implementation for BIOL 1107 all sections. Analysis of Summer II data.
- January 2017 – Full implementation for BIOL 1107 & 1108 all sections. Analysis of normal term data for BIOL 1107.
- May 2017 – completion of analysis of Spring 2017 term. Submission of Final Report

**Budget:**

Department Wide – Multiple Courses with Multiple sections. Total Request: \$30,000.

- Overload Compensation/Summer Pay for team members: \$24,400.
- Touch Drafting Station for creation of needed illustrations: \$2,800.
- Pay for Student Worker(s): \$2000
- Require Travel for two members: \$800.

The team members has the expertise necessary to implement and complete this proposal.

Dr. Stephanie Harvey - Expertise: Botany, Ecology, Agriculture, Statistical Analysis, GeorgiaView, other computer software.

Dr. Ian Brown - Expertise: Ecology, Entomology, Genetics

Dr. Tom Lorenz - Expertise: Animal Behavior, Ichthyology, Vertebrate Zoology

Dr. Tommy Wright - Expertise: Cellular Biology, Developmental, Animal Physiology

Dr. Anh-Hue Thi Tu - Expertise: Molecular Biology, Microbiology

Yonnie Williams - Expertise: Laboratory practices and integration

**Sustainability Plan:**

At the completion of this project, all sections of BIOL 1107, BIOL 1108, BIOL 1107 L and BIOL 1108L will be using the Openstax Textbook "Concepts of Biology" at no, or minimal, cost to students.

Faculty will continue to update addition supportive material and make changes to content coverage as assessments and new discoveries dictate.

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Office of Academic Affairs  
229.928.1361 OFFICE  
229.931.5079 FAX

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800 Georgia Southwestern State University Drive  
Americus, Georgia 31709-4379

July 20, 2015

Dr. Michael S. Rogers  
Assistant Vice-Chancellor  
Academic Affairs  
Board of Regents  
270 Washington St. SW  
Atlanta, GA 30334

Dear Dr. Rogers and the ALG Textbook Transformation Grant Committee:

I am writing in support of the ALG Textbook Transformation Grant, Round Four, being proposed by Dr. Stephanie Harvey, Professor and Department Chair of Biology; and Dr. Otto Lorenz, Assistant Professor of Biology, and supported by additional Biology Department faculty members: Professors Dr. Tommy Wright, Dr. Ian Brown, and Dr. Anh-Hue Tu. Their proposal, "Reducing the Cost of the Non-major's Core Biology Sequence in an Economically Depressed Area of Georgia," involves the adoption of an **OpenStax Textbook** as the required textbook for Biology 1107 and Biology 1108 (Essentials of Biology, I and II); and Biology 1107 and 1108 Labs. These courses are classified as Area D science sequence courses (with or without labs) and additionally are required for other programs, including admission to our Nursing Program. Following the staggered piloting of a single section of each course using the OpenStax textbook, the new textbook will be used in all subsequent terms.

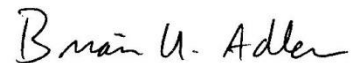
The cost of the current textbook is \$220.00 and thus with the movement toward the OpenStax Textbook would result in a significant saving to our students. This savings is particularly important in a county where 29% of the population is below the poverty level within our service region, up to 36% of the population is below the poverty level (2014 data – Carl Vinson Institute of Government and the Cooperative Extension Service, UGA). Financial considerations often prevent our students from purchasing their textbooks in a timely manner, or worse, not purchasing them at all, putting already at-risk students at a further disadvantage in the classroom. The Biology Faculty have seen the negative impact associated with students not being prepared for lectures and labs because the student "can't get the textbook until next week, or until my loan comes in." With the elimination of this financial barrier, student success should increase.

The faculty of the Biology Department, led by Dr. Harvey, are dedicated educators. Each faculty member has different specializations that will contribute to the development of critical supplemental material (made available to the students through GeorgiaView), as well as strong analytical skills to assess this project. The pilot sections will allow for identification of issues associated with the new textbooks' formats and to developed course material and ancillaries needed for these courses. A strength of this particular proposal is the assessment methodology which will be used to gauge the effectiveness of the open source materials as well as to extend the theory behind the open source movement. The team mentioned above are highly

trained researchers with good scholarly records, so they stand a very strong likelihood of achieving success with their project.

Georgia Southwestern State University and the Office of Academic Affairs endorse and support this project, which we see being easily scalable to the entire University System of Georgia. Thank you for your consideration.

Sincerely,

A handwritten signature in black ink that reads "Brian U. Adler". The signature is written in a cursive style with a large initial "B".

Vice President for Academic Affairs

# Syllabus

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# Biology 110X – Essentials of Biology Term/CRN:XXXX XXXX (CRN XXXXXX)

Professor: \_\_\_\_\_

Email: \_\_\_\_\_

Office: \_\_\_\_\_ Office Hours: See GaView

Class Time: \_\_\_\_\_ Class Room: \_\_\_\_\_

**Course Description:** This course is the first part of a two-semester course designed specifically for the non-science major. The class consists of a lecture. In this course you will be expected to acquire a basic understanding of the fundamental principles of biology including the structure and function of biologically important molecules; cell structure, function and reproduction; genetics and heredity, evolution, ecology, and the interrelationships between organisms and the environment.

**Objectives:** You will acquire an understanding of the fundamental principles of biology and the scientific methods. You will examine the fundamental mechanisms for critical analysis and problem solving. These objectives will be met, through use of lectures, readings, demonstration and use of audio visual aids.

**Core Student Learning Outcomes (Area D): Critical Thinking** (1) Students will be able to interpret symbolic representations of data relevant to the physical world. (2) Students will be able to evaluate the relationship between observation and inference in the natural sciences. This will be evaluated on one of the course exams.

## Required Text and Materials:

1. OpenStax Textbook – “Concepts in Biology.” The book is available in a wide variety of free online formats via the website listed below. An iBook version is available for about \$5.00. You can use the book in whichever format(s) you want. A printed copy is available for around \$25. (This is a savings of \$200 when compared to our previous text.)

Printed -- Concepts of Biology from OpenStax College, ISBN 1-938168-11-9

<https://openstaxcollege.org/textbooks/concepts-of-biology>

2. Turning Technologies QT Device – This is a response card or “clicker”. It is required for the course. It must be purchased along with a license (included with bookstore purchase – other sources may sell them separately). It runs about \$60. Needed by August 29<sup>th</sup> at latest.

3. This course is “Web Enhanced.” Students will be required to use their radar email and to have access to a computer with Internet access. GaView will be used to facilitate communication among students and with the professor, and for dissemination of supplemental material.

Please note that the GSW email account is the official method of communication between the student and the university. It is crucial that Radar accounts be checked frequently and box capacity be monitored.

**Requirements:** For successful completion of this course, students are required to:

- a) Demonstrate competencies through exams, on-line quizzes and in class clicker questions.
- b) Read the appropriate textbook chapters and other assigned readings.
- c) Write effectively on both exams and written assignments
- d) Adhere to safety regulations and instructions in classroom, laboratory or greenhouse.
- e) Completion of “End of Course Survey”.

**Attendance:** You will be held responsible for all information discussed in class including lecture material, quizzes and changes to the syllabus. You are strongly encouraged to attend. Make up exams will not be given except in the most extreme cases (hospitalization, death in immediate family, military orders, quarantine). Excessive tardiness and/or absences (>2) may result in drop of a letter grade.

**Turning Technologies – QT Device:** You are required to own this clicker device. **You must bring it with you to class each day.** You will need to respond via the clicker to in class questions which will be graded and constitute a component of your grade. You are responsible for registering the device in the course via GaView. There is a link in GaView on the course homepage. Unless told otherwise, clickers responses should be your independently derived response. **“Sharing” answers is academic dishonesty and will result in a failing grade.**

**Grading:** Course grade is based the standard grading scale: >90=A; 89-80=B; 79-70=C; 69-60=D; <60=F. Below are the graded assignments and their values:

- |                          |   |
|--------------------------|---|
| a) 4 Lecture Exams       | 18% each (required)                             |
| b) eQuizzes              | 5%  |
| c) Clicker Participation | 10% (your level of accuracy impacts this score) |
| d) Assignments           | 13% (3 assignments & syllabus quiz)             |
| e) Final *               | 18%   |

\*Final is comprehensive. It can replace your lowest exam grade.

**Final Time and Date: Thursday, Dec 1st at 8:00 to 10:00**

**eQuizzes:** Quizzes will be administered via GaView. Be sure to keep apprised of due dates. It is your responsibility to check daily for assignments, messages and class resources.

**Due Dates:** All due dates and exam dates will be posted on the GaView Calendar for this Course. Please be aware of these deadlines. The calendar will also be used to provide a tentative schedule of subjects to be covered.

## Academic:

Any form of academic dishonesty will be punished, in accordance with Department and University policy. Academic dishonesty will result in a grade of zero on that assignment/exam for all students involved, expulsion from the course, an F on his/her/their transcripts and possible additional disciplinary action from the University depending on the severity of the offence. See the GSW Weather Vane for what constitutes academic dishonesty and ask your instructor for clarification if needed.

To help insure academic integrity, it is possible that this course will involve the use of plagiarism-prevention technology. Submitted written assignments may be evaluated using a plagiarism-prevention service through GaView or independent of GaView. The written assignments may then be retained by the service for the sole purpose of checking for plagiarized content in future student submissions.



If students are required to sign-in or swipe ID cards for a course, signing-in or swiping for another student (physically or with clickers) constitutes Academic Dishonesty. Both involved parties will be subject to the disciplinary action such as, but not limited to, receiving a zero for participation, exam or other assignment associated with the day in question.

Use of electronic devices (including but not limited to: mobile phones, tablets, pagers, smart watches, calculators or any data access/holding device) are not allowed in the classroom unless specifically allowed by the instructor (or if required for an accommodation). Students using these devices during normal lecture will be asked to leave and will be marked as absent.

**Students found with these electronic devices turned on during exams will be charged with academic dishonesty and will receive a zero for the exam and an F for the course.**

**Electronics:** It is possible that the instructor may allow E-readers, and other electronic devices for access of textbook material. Any other use of these devices will not be tolerated in class. Non-approved use usage will result in expulsion from course and student will receive an F for the course. Students with these devices turned on during exams will be charged with academic dishonesty and will receive an F for the course.

**Student Support Services:** If you need accommodations for any portion of this class you must notify your instructor during the first two weeks of class. If you haven't done so already, you must go to Disabilities Services Office (DSO) and have them send the appropriate paperwork to your professors. If you have an accommodation in which DSO is to administer an exam, it is your responsibility to schedule and take the exam within 30 minutes of the class time slot. Remember this is not retroactive and if appropriate documentation is not in place, accommodations cannot be made.

**Conduct:** You are expected to attend all class sessions on time, and to show respect for your professors and your fellow students by maintaining SILENCE when instruction is being given. If you didn't hear what the professor said or can't read what the professor wrote, etc, raise our hand for clarification, or ask your neighbor after class . Disruptions will not be tolerated.

***The instructor reserves the right to modify/append any and all portions of this syllabus at anytime during the semester.***

# Final Report

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# Affordable Learning Georgia Textbook Transformation Grants

## Final Report

**Date:** May 10, 2017

**Grant Number:** 145

**Institution Name(s):** Georgia Southwestern State University

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

Stephanie Harvey, Ph.D., Chairperson and Professor of Biology, [stephanie.harvey@gsw.edu](mailto:stephanie.harvey@gsw.edu)

Ian Brown, Ph.D., Professor of Biology, [ibrown@gsw.edu](mailto:ibrown@gsw.edu)

Tom Lorenz, Ph.D., Assistant Professor of Biology, [otto.lorenz@gsw.edu](mailto:otto.lorenz@gsw.edu)

Tommy Wright, Ph.D., Professor of Biology, [thomas.wright@gsw.edu](mailto:thomas.wright@gsw.edu)

Anh-Hue Thi Tu, Ph.D., Professor of Biology, [anh-hue.tu@gsw.edu](mailto:anh-hue.tu@gsw.edu)

Yonnie Williams, Lab Technician, [pyw@gsw.edu](mailto:pyw@gsw.edu)

**Project Lead:** Dr. Stephanie G. Harvey and Dr. Tom Lorenz

**Course Name(s) and Course Numbers:** BIOL 1107 – Essential of Biology I; BIOL 1108 – Essential of Biology II; BIOL 1107L - Essential of Biology I LAB; BIOL 1108L – Essential of Biology II LAB

**Semester Project Began:** August 2015

**Semester(s) of Implementation:**

BIOL 1107 – Piloted Fall 2015, Full implementation Summer 2016 (same for BIOL 1107L).

BIOL 1108 – Piloted Summer 2016, Full implementation Spring 2017 (same for BIOL 1108L).

**Average Number of Students Per Course Section:** BIOL 1107 & 1108 = 50; BIOL 1107L & 1108L = 22

**Number of Course Sections Affected by Implementation:** BIOL1107 = 8; BIOL 1107L = 15; BIOL 1108 = 5; BIOL 1108L = 7

**Total Number of Students Affected by Implementation:** 1255

### 1. Narrative

The team overall was not pleased with the quality of the textbook adopted – the OpenStax: *Concepts of Biology*. After using the textbook for several course sections, many of the faculty felt the book was released prematurely. There were significant errors and overall many subject areas were not covered at the depth of the lectures. The courses, BIOL 1107 and 1108 are critical service courses for Georgia Southwestern State University’s nursing program and pre-nursing student regularly represent 60-80% of the class. So while it is classified as a “non-majors” course, the depth and quality of these courses is beyond that of a traditional non-majors introductory biology course. Student must be prepared for the rigors of the nursing program and have the foundational information necessary to succeed in their program. The department agrees that the *Concepts of Biology* from OpenStax does not provide a comprehensive coverage for our courses.

Some members felt despite the issues with textbook, that for students struggling with the basic information, it was a good economic value. They also believe that students benefitted from the readability of the text and that lectures could compensate for the shallowness of the textbook.

Since lectures were not directly linked to the *Concepts of Biology*, some students were concerned. They felt insecure about not having every topic outlined in the text. Several complained that they didn’t like that they could not just highlight their text during lectures.

New lecture presentations were created for both BIOL 1107 and BIOL 1108. This included incorporation of new images as well as some from *Concepts of Biology*. The final product consisted of lecture materials significantly more detailed, and in some areas broader, than that provided by the textbook, *Concepts of Biology*.

One of our goals with the adoption of the OpenStax textbook was help ensure that all students, regardless of their economic situation, had access to their textbook by the first day of class. Historically, some students reported not having their textbooks until midterm due to financial limitations while other did not purchase the textbook at all. This produced an unacceptable bias in the classroom. The availability of the zero cost textbook eliminates this bias and helped ensure that all students have equal access to required materials.

The financial impact for GSW students was significant. Full implementation of the adoption for BIOL 1107 was in place for only two terms and for BIOL 1108 on this spring. Despite the limited time scale of this report, 1255 students served in these courses and the use of the OpenStax text resulting in a cumulative savings of over \$250,000.

Another important aspect to study with the adoption of a new text was its impact on student success. It was necessary to verify that the change did not, at minimum, negatively impact students. Despite the concerns of faculty that the *Concepts of Biology*

textbook was not adequate, analysis of DWF for classes using the traditional text versus the Open-Stax edition did not detect a significantly different ( $P>0.1$ ). Mean % of DWFs was lower for courses using the *Concepts of Biology* but the level of variability from course section to course section made detection of true difference impossible.

The two lab courses, BIOL 1107L and BIOL1108L were excluded in the analysis for this project. Student in the labs must be concurrently enrolled in the lecture or have successfully complete the lecture during a prior term. Since students that withdraw from the lecture course are forcibly withdrawn from the lab courses, use of said data would have introduced a confounding element that would have minimized student success in the labs.

There is a biology major's textbook, just called *Biology*, available through Open-Stax and in hindsight it would have been a better fit for how we teach our non-major's class. Several faculty members had looked at it with for our major's sequence and found it wanting in breadth and depth. However, for our non-major's it might be acceptable and we will look at it in the future. Unfortunately a significant amount of work went into creating the lecture slides for the new textbook and questions database for use with the *Concepts of Biology* text and swamping to *Biology* would require much of that to be tossed aside. With our current loads in the department, this is unlikely to happen in the near future.

Our current compromise in the department is to continue to "Require" the *Concepts of Biology* textbook and recommend the *Concepts and Connection* textbook for serious readers. Thus everyone has a textbook regardless of financial situation and students desiring a book with more depth can pick up the recommend textbook as well.

## 2. Quotes

- A few students expressed their concern about the textbook. "The textbook [Concepts of Biology, Openstax] was like a high school textbook and didn't go into enough detail."
- Student comments were generally not positive for the use of a digital only textbook:
  - "I like to write it my books and have hands on experiences"
  - "I prefer a printed copy"
  - "I suggest the hard copy of the book"

## 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: 1255

- Positive:   2   % of  60  number of respondents
- Neutral:  62  % of  60  number of respondents
- Negative:  37  % of  60  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)
- X  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:**

 33.5  % of students, out of a total  245  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)
- 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)

### **3b. Narrative**

Analysis of various student outcomes demonstrated that there were no significant impact to student learning outcomes. A comparison of the DWF rates for the transformed course to pre-transformed course showed no significant differences ( $P > 0.35$ ). An analysis of outcomes by letter grade across courses showed that the only category that changed significantly was that of student receiving Fs ( $P < 0.05$ ) with 15.2 % of student prior to

transformation earning Fs and only 10.0% after transformation. All other categories were not significant ( $P > .05$ ). Similarly, a comparison between mean student GPAs for the transformed (GPA = 2.13) and the pre-transformed (GPA = 1.73) course sections revealed no significant differences ( $P > 0.35$ ). While a significant positive change was not seen, it is equally important that there was no negative change. There was a risk involved in moving from a commercial textbook with many more resources for instructors and students to a lesser vetted textbook with very limited resources. So despite the instructors' concern about the new textbook quality, it did not significantly impact student success and in fact the trend was in the positive direction.

As one of the goals of the project was to get textbooks into the hands of student more quickly, a survey was conducted to determine if the use of the OpenStax textbook achieved this goal. For course sections using the traditional textbook (pre-transformation) only 64.3% had their textbook by the end of the 1<sup>st</sup> week as compared to 90% for the transformed course sections. Technically all students had access from before the start of class for the transformed course sections since there was not cost barrier. However, 73% of the students in the transformed courses chose to purchase the hardback edition of the OpenStax Concepts of Biology instead of using the free online versions. This created a small delay as the students needed to get to the bookstore or order the textbook from an online vendor.

Based on survey responses, over all students are reluctant to embrace a digital textbook with 45% stating that they would not or were unlikely to use such a textbook. An additional 14% indicated that they might but it would depend on publisher/format. Considering that the OpenStax textbook is free and in several formats, these rather strong opinions are telling. In personal conversations, several student commented that they would rather pay the full cost of the traditional book than to only have a digital version. This sentiment was reflected in the student response to the survey question concerning their perception of using of a digital-only textbook. Thirty-seven percent thought that their grade would be negatively impacted. An additional 18% did not think it would impact their grade but were general uncomfortable with the idea.

#### **4. Sustainability Plan**

Our current plan for sustainability is to continue using the OpenStax: Concepts of Biology as the minimum required textbook. However, it will be suggest to students that, depending on their individual learning style, they might benefit from having a more comprehensive textbook. For example, an international student that can read English better than interpreting it in a lecture situation would benefit from a more comprehensive textbook.

Other than the normal updates any faculty does annually, we have no plans to update the lectures and questions created for this project. This is due to the faculty member's concern about the textbook in question.

## **5. Future Plans**

The "free" textbook concept is great and we will re-evaluate the textbook as new editions become available, but the need for a more comprehensive textbook is critical. The department would like to evaluate the OpenStax major's biology text to determine if it is more in line with our needs. The use of OER materials has excited some of the faculty and they are investigating their use in other courses.

## **6. Description of Photograph**

(Left-Right) Dr. Tom Lorenz, co-team lead and creator of BIOL 1108 presentations; Dr. Anne Jacobs, instructor of record; Yonnie Williams, lab technician and author of questions database; Dr. Stephanie, co-team lead and creator of BIOL 1107 presentations. (Missing from photo: Dr. Tommy Wright, instructor of record; Dr. Ian Brown, instructor of record; Dr. Anh-Hue Tu, instructor of record.)