

# Affordable Learning Georgia Textbook Transformation Grants

## Final Report

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**Institution Name:** Georgia Southwestern State University

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**Project Lead:** Ellen Cotter, Ph.D.

**Course Name and Course Number:** PSYC 2103, Human Growth and Development

**Semester Project Began:** Fall 2015

**Semester of Implementation:** Spring 2016

**Average Number of Students Per Course Section:** 40

**Number of Course Sections Affected by Implementation:** 3 (2 seated sections and 1 online section)

**Total Number of Students Affected by Implementation:** 122 (89 total in the seated sections, 33 in the online section)

### 1. Narrative

#### A. Key Outcomes

The goal of this project was to implement an open educational resource (OER) in PSYC 2103, Human Growth and Development, at Georgia Southwestern State University (GSW). This course is an Area F requirement for GSW students majoring in Psychology, Nursing, and Exercise Science and is also an Area F elective for Biology majors. Human Growth and Development is also one of the “Specific Top 50 Lower Division Courses” targeted by Affordable Learning Georgia. The team members began working on their

transformation plan during the Fall 2015 semester and implemented the OER in the Spring 2016 semester.

The selection of an OER was somewhat challenging because an open textbook for this course does not currently exist, unlike the options available for Introductory Psychology. Partial sources are available on several websites and repositories, such as MERLOT, Noba Psychology, and the Saylor.org website, but these are insufficient to carry an entire course, and we also wanted something more unified. Another challenge is that most of the students who take this course are freshmen and sophomores who may still be developing the self-discipline and organizational skills needed to succeed at the college level. Additionally, many of these students have little previous experience with Psychology courses (PSYC 2103 has no prerequisite). Thus, because we felt that requiring these developing scholars and relative novices to synthesize material from a variety of sources may be too demanding, we opted to use a source that was as self-contained as possible.

The OER we adopted was the “Human Development” chapter in the *Psychology* open textbook published by Boundless.com (<https://www.boundless.com/psychology/textbooks/boundless-psychology-textbook/human-development-14/>). This chapter is more comprehensive in both length and scope than its companion chapters in similar textbooks (such as the OpenStax *Psychology* textbook). It is divided into 28 brief sections that cover physical, cognitive, and socioemotional development throughout the lifespan, cultural and social influences on development at different ages, major theories of development, and research methods in developmental psychology. Thus, the topics and organization of the material in this chapter are comparable to a full-length textbook. However, because the chapter is not as long or detailed as a full-length textbook, we could not rely solely on it to provide all of the material we wanted our students to learn. We therefore supplemented the Boundless chapter with other sources (such as instructional videos) as well as activities (such as writing assignments) that enhanced and/or expanded on the textbook content.

During the Spring 2016 semester, three sections of PSYC 2103 were taught. Two of these sections were seated, and one was online. The two seated sections required the modification and/or creation of new PowerPoint presentations for in-class lectures, because the order and scope of topics covered in the OER did not always correspond to the PowerPoint presentations that had previously been used. Similarly, the online class required near-complete reorganization of the material in the weekly learning modules, and in some cases the creation of new content pages as well as writing and discussion assignments.

A significant undertaking for all three sections involved the creation of a test bank. While only one section was taught entirely online, all three sections incorporated weekly quizzes that were administered online. Due to the increased risk of cheating in online testing situations, the use of weekly quizzes necessitated either the availability of a large test bank from which quizzes could be randomly generated or the use of test proctoring services or lockdown browser software. Test proctoring services for weekly quizzes were deemed prohibitively expensive for students, and the instructors' previous experience with lockdown browser software had been frustrating for them and their students, so these options were ruled out. One of our team members (Gary Fisk) had learned Python programming for an unrelated purpose and volunteered to write a program to facilitate the creation of multiple-choice test questions. This program requires the user to look at the source text and select words, phrases, and appropriate distractors for multiple choice questions. Then the program scans the chapter text for sentences that contain the search keyword/phrase. When a sentence with the keyword/phrase is found, the software reformats the sentence as a question stem with the keyword/phrase removed from the sentence, the different distractors as possible answers, and the correct answer indicated by an asterisk. The program saves its output in a text file that can then be opened and edited in any text editor (e.g., NotePad). This edited text can then be cut and pasted in a question import tool (e.g., Respondus) and uploaded to the course management system. This technology proved invaluable for generating a large test bank (over 900 questions) from which random question sets for individual student tests could be created, which saved the instructors from having to either generate all these questions from scratch or attempt to retool existing test banks to reflect the material in the OER.

It should be pointed out that for the two seated sections of the course, the in-class exams included not only questions from the test bank but also questions based on material covered in class sessions that may not have appeared in the textbook. This was not the case for the online class, which is a problem that will be addressed in future semesters (see below).

There were three main transformative impacts on the instructional methods and strategies of the instructors. First, the instructors became more engaged in identifying possible sources of free materials for either themselves or students to use. Resources identified in this process included the magazine *Neurology Now*, the Society for Research on Adolescence "Teaching Resources" webpage, Khan Academy, the webpage for Harvard University's Center on the Developing Child, and videos available on the Annenberg Learner website. The instructors also became more adept in finding images that were free to use, share, and modify; these images were incorporated into PowerPoint presentations and online content pages.

The second transformative impact occurred in the seated sections, in which the instructors relied less on simply repeating material from the textbook during class sessions and instead focused on going beyond the textbook topics. In some cases, this involved providing more information and detail about the textbook material; in other situations, the instructors presented information that was relevant to, but not contained in, the textbook. Having a free textbook gave the instructors more freedom in choosing what to cover without feeling obligated to mirror the textbook for the sake of justifying the students' textbook expense.

A third transformative effect is the coordination of effort between the faculty members who are responsible for teaching this course. In previous semesters, we used the same textbook but otherwise worked separately on our own courses. The OER project inspired us to collaborate more and share resources we developed, such as PowerPoint presentations and test bank questions. We hope to continue this collaborative effort in future semesters.

Transformative impacts on our students and their performance are a little harder to identify. In relation to our comparison semester (Spring 2016), in which a traditional textbook was used, we had lower rates of students withdrawing from or not passing the course; more specific data are presented below. Anecdotally, we did not notice large numbers of students using the OER during class sessions; however, we did not receive any student complaints about accessibility, and in contrast to previous semesters, we had no students reporting that they were performing poorly because they could not afford the textbook. We had hoped that attendance in the seated sections would improve with the use of the OER, because students could not simply rely on reading the textbook to learn everything they needed to know to succeed on exams, but the attendance rate for the Spring 2016 semester was comparable to that for Spring 2015 (83.17% and 84.34% for Spring 2016 and Spring 2015, respectively, for Ellen Cotter's seated sections; attendance data were not available for Gary Fisk's seated sections).

## B. Lessons Learned

The main lesson we learned was that this experience could have been improved if we had waited longer to implement the transformation. Because we were not using a complete textbook with readily available ancillary materials, we had to retool or, in some cases, create new ancillaries with a somewhat limited time frame. This made certain aspects of the course not as effective as they could have been, as they were developed very quickly and with no piloting before their use.

One specific aspect of this reduced effectiveness involved the creation and use of test bank questions based on the textbook. Some of the multiple-choice questions

generated by the Python program needed revision due to factors such as ambiguous answer choices or awkward wording. Additionally, some questions within question sets were quite repetitive and therefore not very challenging for the students. More information regarding test scores in our sections is contained in Part 3 of this document.

Due to the short turnaround, we also lacked the time to create questions based on the online course content for the students in the online section. A better approach would involve testing the online students on both the content in the textbook and the content in the online learning modules, which would have not only been a better assessment of the students' knowledge but also increased student engagement with the online module content. The creation of additional test questions for this purpose is one of our next steps.

On the assessment front, our decisions about our implementation timeline also prevented us from assessing its effectiveness as thoroughly as we would have liked. For example, while we conducted a pre-semester and post-semester content knowledge assessment of our students, we did not have similar data from a previous traditional textbook semester to compare those results to. Thus, our conclusions about how much information our students learned using the OER compared to a traditional textbook are somewhat limited. We also, in our desire to reach as many students as possible, did not have a traditional textbook comparison group this semester, a choice which simplified this project in some ways but which further creates limitations when attempting to evaluate the effectiveness of the OER we used.

There were also some content areas we would have liked to cover in more detail – specifically, material related to brain development across the lifespan and the educational system in childhood and adolescence. Judy Orton Grissett and Gary Fisk worked to develop the content in these areas, and this content will be incorporated the next time the course is taught.

Another lesson learned involves the format of the OER and availability of ancillaries for students. The Boundless.com textbook does not come in an easily printable form such as a PDF; the content can be printed from the website, but this process is cumbersome because the user must select and print only the desired text in order to prevent extraneous material such as menu links from being printed as well. A PDF is available only if the instructor creates a class on Boundless.com and assigns the textbook, which will also give students access to ancillaries such as flash cards and quizzes; however, this costs the students \$29.99. Additionally, the Boundless.com textbook is not available for free download, although an electronic copy can be downloaded for \$9.99 through Amazon or iTunes. While none of our students reported any significant inconveniences related to these limitations, these issues are worth considering when evaluating potential OERs for use.

Overall, however, we regard this project as a success on two dimensions. First, we reduced textbook costs and increased accessibility for our students. Using a textbook with brief readings also allowed our students to target their reading efforts, and having the class sessions focus less on simply parroting the readings increased at least the potential for class sessions to be more interesting and better attended, although we did not have data to support this.

Second, we updated and retooled some of our instructional materials to be more streamlined and current, and we developed a technique for creating large numbers of multiple-choice questions from text sources. As we regard teaching as a continual work in progress and are always looking for the opportunity to develop our skills in this area, we consider ourselves to have benefited from this project as well.

## 2. Quotes

- I really liked having the book online, it made things easier than carrying a book around.
- I liked the online book which saved money and made the information easier to comprehend and find.
- The Boundless book the class used online was easy to understand and made it easier to take the online quizzes.

## 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: 122

- Positive: 97 % of 64 number of respondents
- Neutral: 0 % of 64 number of respondents
- Negative: 2 % of 64 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:

- 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:**

Eleven percent of students, out of a total 122 students affected, failed or withdrew from the course in the final semester of implementation. It should be noted that early-semester drops are not included in here because we were unable to track those data, and that “failed” includes grades of both D and F because most of the students who take PSYC 2103 need a C for a passing grade.

Choose One:

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

### **3b. Narrative**

One-hundred and twenty two students took PSYC 2103 in Spring 2016. Of these students, 88 took the course in a seated environment and 34 took the course online. In order to measure the effectiveness of the OER compared to traditional copyrighted materials, we compared student grades, including DFW rates, from the current semester (Spring 2016) to student grades of a previous semester with a traditional textbook (Spring 2015). Although the course was also taught in Summer and Fall 2015, final course grades and DFW delta rates are reported from Spring 2015 and Spring 2016 because the instructors and course formats were identical and would therefore yield a more valid comparison. We were also interested in comparing student grades across online and seated environments to learn of any possible differences across course formats.

In addition to examining student grades, we were also interested in students' perceptions of OERs. Specifically, we were interested in whether students' perceptions of OERs would

change after using OERs. Therefore, we asked students to complete a brief survey at the beginning and end of the semester. Ninety students completed the pre-test survey and 64 completed the post-test survey. Only seven online students completed the pre-test survey and none completed the post-test survey, so we were unable to draw any meaningful comparisons about perceptions between course formats.

In both Spring 2015 and Spring 2016, 122 students were enrolled across three sections of the course. In Spring 2015, 21 students (17.2%) of students received a D, F, or W as a final course grade. In Spring 2016, 14 students (11.5%) received a D, F, or W as a final course grade. When comparing DFW rates across course formats, we found that DFW delta rates were fairly consistent between seated and online course formats, with a change from 14 DFWs among seated students in Spring 2015 to 11 in Spring 2016 ( $\Delta = -3$ ), and from seven DFWs among online students in Spring 2015 to three students in Spring 2016 ( $\Delta = -4$ ).

In terms of course retention and completion rates, only two out of 122 students (1.6%) withdrew from the course in Spring 2016. Comparatively, five out of 122 students (4.1%) withdrew from the course in Spring 2015. Both students who withdrew in Spring 2016 were in the seated sections, and in Spring 2015 three were in the seated sections and two were in the online section. Overall, this is a marked improvement in course retention in both course formats. Again, we do not have records of students who dropped the class before the beginning of the semester or within the add-drop period; however, there were identical numbers of students in each section during both semesters, so we can reasonably conclude that these drop rates were likely similar.

Related to course grades, Spring 2016 students performed somewhat better compared to those in Spring 2015. Grade distributions from both semesters are reported below:

Spring 2015 (Copyrighted text)	Spring 2016 (OER)
A = 15	A = 27
B = 47	B = 46
C = 38	C = 23
D = 12	D = 7
F = 4	F = 5
W = 5	W = 2

As can be seen in the above table, the number of A's increased, whereas the number of C's and D's decreased. These results reflect a positive change in the final grade outcomes with the OER. It should be noted, however, that this difference did not quite reach statistical significance,  $\chi^2(5, n = 231) = 9.34, p = .096$ .



As illustrated in the chart below, improvements in student grades spanned across both seated and online sections, with a higher number of A's and lower number of C's, F's, and W's in both course formats. When the students were divided based on course format type, both instructional formats showed statistically significant improvements in the final grades (seated:  $\chi^2(5, n=175) = 12.27, p = .031$ ; online:  $\chi^2(5, n = 67)=13.51, p = .019$ )

Spring 2015 (Copyrighted text)		Spring 2016 (OER)	
Seated	Online	Seated	Online
A = 11	A = 4	A = 23	A = 15
B = 32	B = 15	B = 35	B = 11
C = 30	C = 8	C = 19	C = 4
D = 10	D = 2	D = 4	D = 3
F = 1	F = 3	F = 5	F = 0
W = 3	W = 2	W = 2	W = 0

In addition to final grades, we also examined student performance on weekly quizzes in both semesters. Material covered on the quizzes comes exclusively from the textbook and should therefore indicate what students were learning solely through reading course materials. Our results were very revealing. Students in Gary Fisk's seated section averaged 80.6% on weekly textbook quizzes, compared to 66.9% in Spring 2015. These results were statistically significant,  $t(41) = 3.67, p < .001$ . Similarly, students in Ellen Cotter's seated section averaged 94.1%, compared to 83.8% in Spring 2015. These results were also statistically significant,  $t(41) = 5.64, p < .001$ . Finally, students in Ellen Cotter's online section averaged 92.2%, compared to 76.5% in Spring 2015,  $t(31) = 5.66, p < .001$ .

Overall, students using the OER performed significantly better on weekly quizzes than students who used a copyrighted textbook. One interpretation is that the OER we used was more streamlined and therefore easier to read than the traditional textbook. It is also worth noting that having a free textbook that was accessible from any computer at any time of day or night may also have increased student access to and use of the textbook, therefore improving quiz performance. However, another possibility is that it may have been easier for students to look up answers for the quiz questions because the online text can be easily searched for key terms. This may have helped students perform better on the quizzes. In the future we will work to incorporate additional, possibly more rigorous materials, which may affect future student performance.

In addition to weekly quizzes, students also completed a 10-question not-for-credit assessment at the beginning and end of the Spring 2016 semester to measure content knowledge. Questions covered a broad range of topics from the course. Across all sections, students answered 4.15 questions correctly at the beginning of the semester and 4.85 questions correctly at the end of the semester. This was a significant increase in student performance,  $t(148) = -2.535$ ,  $p = .012$ . Students taking the course in Spring 2015 did not complete the questionnaire, so we are unable to compare results to the results of that semester.

We asked students about their perceptions of OERs in survey about textbook use and perceptions at the beginning and end of the semester. Ninety students completed the pre-test questionnaire, and 64 completed the post-test questionnaire. The lower number of post-test responses was largely due to lack of responses among students in the online section. Questions pertaining to the OER and a summary of student responses are as follows:

- “Have you ever heard of open educational materials before this semester?”
  - Sixty-six out of 154 students (about 43%) reported that they had previously heard of open educational materials before, 22 (about 14%) reported they had not, and two (over 1%) reported they were not sure.
- “Have you used open educational materials in a previous class?”
  - Fifty-five out of 154 students (about 36%) reported that they had previously used open educational materials before, 29 (about 19%) reported they had not, and six (about 4%) reported they were not sure.
- “To what extent do you agree or disagree with this statement: 'I like the idea of open educational materials.'” (Scored on a 7-point Likert scale with 1 = Strongly agree and 7 = Strongly disagree)
  - Average student responses at the beginning and end of the Spring 2016 semester were 2.13 and 1.50 respectively,  $t(152) = 3.03$ ,  $p = .003$ . This demonstrates an increase in students’ positive attitudes regarding OERs.
- “To what extent do you agree or disagree with this statement: 'I like using a traditional paper textbook.’” (Scored on a 7-point Likert scale with 1 = Strongly agree and 7 = Strongly disagree)
  - Students responded very similarly to this question at the beginning ( $M = 2.68$ ) and end of the semester ( $M = 2.67$ ;  $t(152) = .023$ ,  $p = .981$ ). Essentially, students’ attitudes toward traditional paper textbooks did not change over the course of the semester.

- “To what extent do you agree or disagree with this statement: 'I would like to have a traditional paper textbook to use in this class in addition to the open educational materials.’” (Scored on a 7-point Likert scale with 1 = Strongly agree and 7 = Strongly disagree)
  - Like the previous question, students responded very similarly to this question at the beginning ( $M = 3.06$ ) and end of the semester ( $M = 3.02$ ),  $t(150) = .139$ ,  $p = .890$ . Again, this reflects that student attitudes toward traditional paper textbooks did not change over the course of the semester.
- “What do you see as the advantage(s) of open educational materials? (check all that apply)” (Students could choose from Cost, Ease of reading, Weight, Convenience, Ability to highlight and take notes, Ability to quickly find a topic, Can keep it as a reference book for future use, and Other)
  - Students reported on average significantly more advantages of open educational materials at the end of the semester ( $M = 4.11$ ) than the beginning of the semester ( $M = 3.38$ ;  $t(152) = -2.74$ ,  $p = .007$ ). One explanation is that students’ use of open educational materials positively influenced their perceptions of the advantages these materials can offer.
  - In terms of specific advantages, the following number of students selected each advantage of open educational materials at the beginning of the semester (out of 90 responses): Cost ( $N = 80$ ; 88.9%), Ease of reading ( $N = 29$ ; 32.2%), Weight ( $N = 50$ ; 55.6%), Convenience ( $N = 57$ ; 63.3%), Ability to highlight and take notes ( $N = 14$ ; 15.5%), Ability to quickly find a topic ( $N = 44$ ; 48.9%), Can keep it as a reference book for future use ( $N = 29$ ; 32.3%), and Other ( $N = 1$ ; 1.1%). The student who selected “Other” reported that the materials are “Cheaper,” which is in line with the first advantage, Cost.
  - Alternately, the following number of students selected each of the following advantages of open educational materials at the end of the semester (out of 64 responses): Cost ( $N = 63$ ; 98.4%), Ease of reading ( $N = 34$ ; 53.1%), Weight ( $N = 36$ ; 56.2%), Convenience ( $N = 49$ ; 76.6%), Ability to highlight and take notes ( $N = 8$ ; 12.5%), Ability to quickly find a topic ( $N = 40$ ; 62.5%), Can keep it as a reference book for future use ( $N = 32$ ; 50%), and Other ( $N = 1$ ; 1.6%). The student who selected “Other” reported that another advantage was the “ability to access anywhere.”
- “What do you see as the advantage(s) of a traditional paper textbook? (check all that apply)” (Students could choose from Cost, Ease of reading, Weight, Convenience, Ability to highlight and take notes, Ability to quickly find a topic, Can keep it as a reference book for future use, and Other)

- Unlike students' perceived advantages of open educational materials, students' perceived advantages of traditional paper textbooks did not change over the course of the semester ( $M_{Pre-Test} = 2.76$ ;  $M_{Post-Test} = 2.81$ ),  $t(152) = -.284$ ,  $p = .777$ .
- Specifically, the following number of students selected each of the following advantages of traditional paper textbooks at the beginning of the semester: Cost (N = 2; 2.2%), Ease of reading (N = 57; 63.3%), Weight (N = 3; 3.3%), Convenience (N = 39; 43.3%), Ability to highlight and take notes (N = 63; 70.0%), Ability to quickly find a topic (N = 26; 28.9%), Can keep it as a reference book for future use (N = 56; 62.2%), and Other (N = 2; 2.2%). One student who selected "Other" reported that another advantage was "not having to sit in front of a computer." The second student wrote "N/A" as the Other response.
- Alternately, the following number of students selected each of the following advantages of traditional paper textbooks at the end of the semester (out of 64 responses): Cost (N = 3; 4.7%), Ease of reading (N = 43; 67.2%), Weight (N = 3; 4.7%), Convenience (N = 26; 40.6%), Ability to highlight and take notes (N = 48; 75.0%), Ability to quickly find a topic (N = 19; 29.7%), Can keep it as a reference book for future use (N = 34; 37.8%), and Other (N = 4; 6.2%). Of the students who selected "Other," one reported that s/he just "way prefer(s) to read out of a book." Another student reported that, "If there's no wi-fi, I can still read the book." The third student reported that the traditional book was "in hand, kind of forcing you to work." The last student reported, "Traditional." It was unclear what the last student meant by his/her response.

#### 4. Sustainability Plan

Because our textbook source is hosted on the Boundless.com website, we do not have a sustainability plan in place apart from monitoring it for significant modifications. We plan to continue to use this OER and its associated materials for the foreseeable future. We did not notice any significant negative effects of using it, and the amount of work we put in to developing this resource justifies its continued use.

We should note here that the PowerPoints, test bank questions, and online learning module content we developed for this implementation are "in-house" and are not being made freely available at this time. We have not yet explored the process of making these resources more widely available, partly because we do not feel this content is developed enough for that purpose. We have described in previous sections some of our plans for improving this content and will address the issue of sharing it when we feel it is ready.

#### 5. Future Plans

In general, this project has encouraged us to think more creatively about textbook options for our courses – not just this course, but others as well. Not having a pre-prepared textbook with ancillaries forced us to draw on our own knowledge and become more alert to identifying and seeking out possible sources of information for our courses. We developed some new materials for our own use and, in the case of the Python program for creating multiple-choice test questions, created a new technology that we could use again and share with others.

Related to publications, presentations, and other professional activities stemming from this project, we have several items to report.

- In April 2016, Ellen Cotter gave a pecha kucha presentation about the OER implementation at the University System of Georgia Teaching and Learning Conference.
- We have plans to write a manuscript detailing the Python program for test question generation and submit that to a journal that focuses on teaching-related topics and strategies (such as *Teaching of Psychology*).
- We are also considering submitting a proposal to the National Institute on the Teaching of Psychology conference, possibly for a resource exchange or a poster presentation.
- A possible direction for the future involves the creation of an open textbook tailored to the study of lifespan development. We have begun efforts to learn more about this process and are hoping to make some progress toward this endeavor before the end of the calendar year.

## **6. Description of Photograph**

(left to right) Dr. Ellen Cotter, team lead and instructor of record; Dr. Gary Fisk, test bank creator and subject matter expert; Dr. Judy Orton Grissett, assessment coordinator and subject matter expert.