Affordable Materials Grants, Round 18:

Transformation Grants

(Fall 2020 – Fall 2021)

Proposal Form and Narrative

# Notes

* The proposal form and narrative .docx file is for offline drafting and for our review processes. Submitters must use the online Google Form for proposal submission.
* The only way to submit the official proposal is through the online Google Form. The link to the online application is on the [Round 18 RFP Page](https://www.affordablelearninggeorgia.org/about/rfp_r18).
* The italic text provided below is meant for clarifications and can be deleted.

# Applicant and Team Information

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| --- | --- |
| Requested information | Answer |
| Institution(s) | Columbus State University |
| Applicant name | Anastasia Angelopoulou |
| Applicant email  | angelopoulou\_anastasia@columbusstate.edu |
| Applicant position/title | Assistant Professor |
| Submitter name  |  |
| Submitter email  |  |
| Submitter position/title |  |

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

|  |  |  |
| --- | --- | --- |
| Team member | Name | Email address |
| Team member 1 | Anastasia Angelopoulou | angelopoulou\_anastasia@columbusstate.edu |
| Team member 2 | Suk Lee | lee\_suk@columbusstate.edu |
| Team member 3 | Rania Hodhod | hodhod\_rania@columbusstate.edu |
| Team member 4 | Linqiang Ge | ge\_linqiang@columbusstate.edu  |
| Team member 5 | Japheth Koech | koech\_japheth@columbusstate.edu |

If you have any more team members to add, please enter their names and email addresses in the text box below.

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# Project Information

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| --- | --- |
| Requested information | Answer |
| Priority Category / Categories*Projects in these categories will receive three extra points in the final score for fitting a priority of these particular rounds of Transformation Grants. The type of funding for the project is determined by the funding categories criteria above. As of Round 18, projects can be a part of more than one category. Note that the below categories only indicate priority, not which applications qualify for a grant. Select all that apply.* | *Priority categories:* * ***Collaborative Projects with Professional Support***
* ***Student Participation in Materials Evaluation and/or Development***
* *Departmental Scaling Projects*
* *Upper-Level Campus Collaborations*

*Otherwise, put “None.”*  |
| Requested Total Amount of Funding*$30,000 maximum total award per grant* |  |
| Final Semester of Project | *Fall 2021* |
| Using OpenStax Textbook?*This is to indicate to OpenStax that they can provide additional support and resources to your team during the adoption process.* | *No* |

# Impact Data

Please fill in the data below with impact data in below with *one course taught by one instructor* in each table, and only include courses and instructors that are specifically part of the scope of this grant proposal. Add or remove tables as needed. **Please only put a single averaged or totaled (as appropriate) number in each box. Do not put ranges or mathematical equations in any of these boxes.**

For a multi-course project, if a significant amount of students are assumed to take courses in a sequence and only one textbook is used for these courses, please take this into account in your total *(i.e. only include that book in the first course they would purchase it for OR adjust the number of students affected. Please explain in the notes section if making such adjustments).*

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course title and number | CPSC 5135 Programming Languages |
| N/A | Course instructor | Anastasia Angelopoulou |
| 1 | Average number of students enrolled per section | 25 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 0 |
| 4 | Average number of affected course sections scheduled in a spring semester | 1 |
| 5 | Total number of course sections scheduled in an academic year *Add up rows 2-4.* | 1 |
| 6 | Total number of student section enrollments per academic year*Multiply row 1 and row 5.* | 25 |
| 7 | Original required commercial materials*Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | “Programming Languages: Principles and Practices (3rd Edition, 2012)” by Kenneth C. Louden/Kenneth A. Lambert (ISBN: 9780357671351) $187.95 <https://www.cengage.com/c/programming-languages-principles-and-practices-3e-/9780357671351PF/> |
| 8 | Original cost per student section enrollment*Add up the cost of all materials in row 7.* | $187.95 |
| 9 | Average post-project cost per student section enrollment | $0 |
| 10 | Average post-project savings per student section enrollment*Subtract row 9 from row 8.* | $187.95 |
| 11 | Projected total annual student savings per academic year*Multiply row 10 and row 6.* | $4,698.75 |

## Course 2

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| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course title and number | CPSC3125 Operating Systems |
| N/A | Course instructor | Linqiang Ge |
| 1 | Average number of students enrolled per section | 25 |
| 2 | Average number of course sections scheduled in a summer semester | 0 |
| 3 | Average number of course sections scheduled in a fall semester | 2 |
| 4 | Average number of course sections scheduled in a spring semester | 1 |
| 5 | Total number of course sections scheduled in an academic year *Add up rows 2-4.* | 3 |
| 6 | Total number of student section enrollments per academic year*Multiply row 1 and row 5.* | 75 |
| 7 | Original required commercial materials*Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Operating System Concepts By Abraham Silberschatz, Greg Gagne, Peter B. Galvin (10th Edition) ISBN: 978-1-119-32091-3 $84[https://www.wiley.com/en-us/Operating+System+Concepts%2C+10th+Edition-p-9781119320913](https://www.wiley.com/en-us/Operating%2BSystem%2BConcepts%2C%2B10th%2BEdition-p-9781119320913) |
| 8 | Original cost per student section enrollment*Add up the cost of all materials in row 7.* | $84 |
| 9 | Average post-project cost per student section enrollment | $0 |
| 10 | Average post-project savings per student section enrollment*Subtract row 9 from row 8.* | $84 |
| 11 | Projected total annual student savings per academic year*Multiply row 10 and row 6.* | $6,300 |

## Course 3

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course title and number | CPSC 2105 Computer Organization |
| N/A | Course instructor | Suk Lee |
| 1 | Average number of students enrolled per section | 30 |
| 2 | Average number of course sections scheduled in a summer semester | 0 |
| 3 | Average number of course sections scheduled in a fall semester | 2 |
| 4 | Average number of course sections scheduled in a spring semester | 3 |
| 5 | Total number of course sections scheduled in an academic year *Add up rows 2-4.* | 5 |
| 6 | Total number of student section enrollments per academic year*Multiply row 1 and row 5.* | 150 |
| 7 | Original required commercial materials*Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Digital Design and Computer Architecture (2nd edition) by David Money Harris and Sarah L. HarrisISBN 9780123944245$67.46<https://www.elsevier.com/books/digital-design-and-computer-architecture/harris/978-0-12-394424-5> |
| 8 | Original cost per student section enrollment*Add up the cost of all materials in row 7.* | $67.46 |
| 9 | Average post-project cost per student section enrollment | $0 |
| 10 | Average post-project savings per student section enrollment*Subtract row 9 from row 8.* | $67.46 |
| 11 | Projected total annual student savings per academic year*Multiply row 10 and row 6.* | $10,119.00 |

## Course 4

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course title and number | CPSC 2125 Internet Programming |
| N/A | Course instructor | Rania Hodhod |
| 1 | Average number of students enrolled per section | 21 |
| 2 | Average number of course sections scheduled in a summer semester | 0 |
| 3 | Average number of course sections scheduled in a fall semester | 1 |
| 4 | Average number of course sections scheduled in a spring semester | 1 |
| 5 | Total number of course sections scheduled in an academic year *Add up rows 2-4.* | 2 |
| 6 | Total number of student section enrollments per academic year*Multiply row 1 and row 5.* | 42 |
| 7 | Original required commercial materials*Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Web Development & Design Foundations with HTML5 (9th Edition)by Terry Felke-Morris Publisher: PearsonISBN-10: 0-13-480114-8ISBN–13: 978-0-13-480114-8Price $106.66https://www.pearson.com/store/p/web-development-and-design-foundations-with-html5/P100000878006 |
| 8 | Original cost per student section enrollment*Add up the cost of all materials in row 7.* | $106.66 |
| 9 | Average post-project cost per student section enrollment | $0 |
| 10 | Average post-project savings per student section enrollment*Subtract row 9 from row 8.* | $106.66 |
| 11 | Projected total annual student savings per academic year*Multiply row 10 and row 6.* | $4,479.72 |

If you have more courses to add, copy the table as many times as needed to complete all courses on the grant.

# Narrative Section

## 1. Project Goals

Student's educational choices are often affected by the cost of required textbook material in higher education. For example, students may delay or forgo the purchase of required course textbooks (Florida Virtual Campus, 2016; Martin, Belikov, Hilton, Wiley, & Fischer, 2017), take fewer courses, drop or withdraw from a course, all due to high textbook costs (Florida Virtual Campus, 2016). The use of Open Educational Resources (OER) provides a potential solution to reduce the textbook barrier for students in course settings and increase student success. Several published studies have generally shown significant financial benefits for students and cost savings on textbooks due to the implementation of OER in classes (Bliss, Robinson, Hilton, & Wiley, 2013; Fischer et al., 2015; Hilton, Gaudet, Clark, Robinson, & Wiley, 2013; Watson, Domizi, & Clouser, 2017).

The goal of this Textbook Transformation Grant project is to design computer science courses that offer affordable open educational resources (OER) material and provide cost savings of $88.13 per student in four computer science courses: CPSC 5135 Programming Languages, CPSC 3125 Operating Systems, CPSC 2105 Computer Organization, and CPSC 2125 Internet Programming. The Computer Science faculty will replace the required textbooks in the four courses with no-cost OER.

The grant project will be implemented by Fall 2021. The Computer Science faculty will search for, select, and develop OERs as needed for these four courses in multiple formats (e.g. text, audio, video, webpages) following the University System of Georgia (USG) accessibility guidelines. The selected OERs are expected to make education more equitable by supporting the aggregation, creation and dissemination of high-quality reusable, affordable resources on the first day of class; improve student learning (Ashadevi and Muthamil Selvi, 2017; Dichev, Christo, et al, 2015); increase student engagement and retention in these classes (Young Mi and Carpenter, 2017); and increase usage of textbooks by all students enrolled in these classes to 100%.

The four target courses will be taught in Spring 2021 and Fall 2021 with the new OERs. At the end of Spring 2021 and Fall 2021, student survey data and student performance data will be collected from all sections of these courses to evaluate the impact of OER on student retention and success. Data related to students’ perceptions of the use and quality of OER will also be collected in order to improve and revise the selection of OERs.

## 2. Statement of Transformation

The TSYS School of Computer Science at Columbus State University has successfully eliminated textbook costs for students in Computer Science I (CPSC 1301), Computer Science II (CPSC 1302), Data Structures (CPSC 2108) and Information Security (CPSC 2106) during the past academic years. The current project aims to transform four additional Computer Science courses and eventually progress to offer no-cost or low-cost textbooks in all courses of the bachelor’s degree programs in Computer Science and Information Technology. The four target courses in the current project are: Computer Organization (CPSC 2105), Operating Systems (CPSC 3125), Internet Programming (CPSC 2125), and Programming Languages (CPSC 5135).

The Computer Organization (CPSC 2105) course is mandatory in all CS undergraduate programs. The current textbook is very general and includes lots of content that make students feel reluctant to read. Some contents are out of scope. Recently hands-on activities have been added to the course and the textbook does not cover all materials in our curriculum. Similarly to Computer Organization, the Operating Systems (CPSC 3125) course is mandatory in all CS undergraduate programs and the textbook includes lots of content that make students feel reluctant to read.

The Internet Programming (CPSC 2125) course is mandatory in 4 of the 7 undergraduate programs and is an elective in all the programs. The current textbook is quite expensive. The book covers most of the material needed in the course, but the students are reluctant to read the book. Other supplementary resources and external hands-on activities are usually designed by the instructor to fill any course material or experiential learning gaps that exist in the current textbook.

The Programming Languages (CPSC 5135) course is mandatory in 4 of the 7 undergraduate programs and is an elective in all the programs. The book is quite expensive and some of the students delay or forgo the purchase of the text, which results in failures in the weekly quizzes that are based on reading the assigned book chapters. The book is also outdated and does not include newer programming languages, such as Kotlin, Swift, or Rust that were introduced after 2010.

The project will involve the replacement of traditional textbooks with no-cost open educational resources and interactive online material. Students will also participate in the creation of material for the CPSC 5135 course as part of their class project. More specifically, students will be asked to work in teams to develop online tutorials for programming languages, including newer programming languages introduced after 2010. The instructor will introduce students to accessible design guidelines so that the created materials will follow the accessibility guidelines.

Apart from reducing the overall costs of education for Computer Science students, the textbook transformation project will eliminate the inequity in course material access among students and increase usage of textbooks by all students enrolled in these classes to 100%. The use of OER will also increase student engagement and retention in these classes (Young Mi and Carpenter, 2017) and improve student success and learning (Ashadevi and Muthamil Selvi, 2017; Dichev, Christo, et al, 2015). When students have access to free and accessible OER course material, student achievements and success rates increase (McGreal, 2013).

The project will also benefit the course instructors as they will be able to review, revise, and update OERs easier and more frequently than the traditional textbook. Traditional textbooks face difficulties in keeping up with the dynamic nature of technology and evolution of computer science topics. The use and update of the OER on a regular basis will increase student employability after graduation since students will acquire the most recent and updated knowledge and skills in Computer Science. The quality of instruction in the four courses is expected to improve since the instructors will have a variety of material available to them that will cover the topics in the desired order. Faculty members in the University System of Georgia will also be able to access and use these resources for their classes. OERs will be available in multiple formats and will follow accessibility guidelines from the USG, thus accommodating students with disabilities and different learning styles.

## 3. Action Plan

##

The following steps will take place to successfully achieve the goals of this project:

* The team will update their current IRB application by the end of Fall 2020. The team has already received IRB approval for collecting demographic, income background, and past achievement data as well as surveying the students about the use and perceptions of OER material. The IRB application will be updated to receive approval for collecting D/F/W and grade data in order to evaluate student achievements. **Personnel in charge:** Dr. Angelopoulou
* The faculty will search and document current open educational materials that are available under open licenses to be used for the transformation. **Personnel in charge:** Dr. Angelopoulou (CPSC 5135 and CPSC 3125), Dr. Lee (CPSC 2105), Dr. Hodhod (CPSC 2125), Dr. Ge (CPSC 3125).
* The faculty will work along with the instructional designer to adapt and transform the OER materials that cover the material included in the curriculum and align with the course objectives. The faculty will create new OER for the classes to be transformed as needed. These materials will follow accessibility guidelines. **Personnel in charge:** Dr. Angelopoulou (CPSC 5135 and CPSC 3125), Dr. Lee (CPSC 2105), Dr. Hodhod (CPSC 2125), Dr. Ge (CPSC 3125); Instructional Designer: Dr. Koech.
* The students in the CPSC 5135: Programming Languages course will be asked to work in teams to create tutorials for newer programming languages of their choice as part of the class project. Each student team will develop tutorials for different languages. The tutorials will be hosted on websites that the students will create. Students will also be introduced to universal and inclusive design principles for creating their materials and websites according to the accessibility guidelines. **Personnel in charge:** Dr. Angelopoulou; Instructional Designer: Dr. Koech.
* The team will use the developed/adapted OER materials in the proposed courses. The team will also collect data according to the evaluation plan described in this proposal. **Personnel in charge:** Dr. Angelopoulou (CPSC 5135 and CPSC 3125), Dr. Lee (CPSC 2105), Dr. Hodhod (CPSC 2125), Dr. Ge (CPSC 3125); Instructional Designer: Dr. Koech.
* The team will prepare and deliver the final report of the transformation of the materials to the sponsoring agency. The faculty will also publish the adapted materials as required by the agency in the corresponding databases/systems. In addition to sharing these resources via GALILEO, we will share resources internally via a shared Google Drive. **Personnel in charge:** Dr. Angelopoulou (CPSC 5135 and CPSC 3125), Dr. Lee (CPSC 2105), Dr. Hodhod (CPSC 2125), Dr. Ge (CPSC 3125); Instructional Designer: Dr. Koech.

## 4. Quantitative and Qualitative Measures

The team has adopted surveys from the Open Education Group and Digital Textbook toolkit and revised them as needed: <http://openedgroup.org/toolkit>. More specifically, the sample student survey based on Bliss et al. (2013) has been adopted and revised to include questions related to motivation to learn.

**Quantitative Measures:**

The team plans to collect data for all students enrolled in the four target courses during the Spring 2021 and the Fall 2021 semesters through surveys and the CSU Banner SIS:

* Demographic information such as gender, ethnicity and age
* Income background and financial aid eligibility.
* GPA (semester, mid-term and institutional GPA).
* Credit hours attained towards degree completion
* Number of credit hours remaining for graduation
* Motivation to learn
* Perceptions and frequency of use of the adopted OER

In order to compare student performance with traditional textbook requirements, the team will collect the following data for the target courses from the last three years until the Fall 2021 semesters:

* Number of students enrolled in each of the courses - from CSU Banner SIS.
* D/F/W rates of each of the courses - CSU Banner SIS.
* Grade earned by each student in each of the courses - CSU Banner SIS.

**Qualitative Measures:**

The surveys will include free-form questions to seek student feedback on the quality, content and organization of the required OERs. Some sample discussion forum questions are:

* What differences do you find in traditional CS textbooks and the open educational resources (OERs) used in the course in terms of lesson contents?
* What are your thoughts on the quality of the OERs?
* What are your thoughts on the organization of the OERs?
* In what ways did the cost savings from not purchasing a textbook in this course help you?
* In your opinion, how could the supporting material and activities be improved to better support student learning?

**Data Collection**

The team will collect survey data using the Qualtrics online system (which employs TLS encryption for data transmitted over the Internet). Survey participants will be provided with an informed consent statement before taking the survey and collected data will be anonymized before data is shared and stored. Student data collected from SIS Banner and will be stored in a password protected Excel file. No student data with personally identifiable features will be shared with anyone outside the team members. All project data will be stored for two years after the Fall 2021 semester. The data will be permanently deleted from the computer’s hard drive after the Fall 2022 semester.

**Data Analysis**

Quantitative data analysis will include:

* Descriptive statistics to understand the impact of OERs on student success and overall academic performance
* Comparison of performance and D/F/W rates in OER courses vs previous non-OER courses
* Independent-samples t tests, chi-square tests, linear regression and multivariate statistical analysis to understand the causal relationships among variables such as: age, gender, income background, prior academic achievements, motivation to learn, quality of OER, and frequency of using OER material.
* Qualitative data will be analyzed using narrative analysis and discourse analysis to obtain causal explanations of the impact of OERs in the four target courses.

**IRB application**

The team will need to update their current IRB approval for including collection of D/F/W rates and students’ grades.

## 5. Timeline

**Fall 2020**

* Dr. Angelopoulou will attend the Open Education Conference 2020 (Registration is covered by her OER Research Fellowship <https://openedgroup.org/fellowship>)
* Completion of asynchronous training modules by all team members
* Update IRB application
* Set up questionnaires on Qualtrics
* Create shared Google folder to internally share course materials
* Finalize selection of free and open courseware from collected materials for CPSC 5135
* Deploy OER course materials for CPSC 5135
* Attendance by at least two team members at the required online kick-off meeting

**Spring 2021**

* Teach CPSC 5135 using OER materials
* Administer surveys (worth extra credit) to all students enrolled in CPSC 5135
* Write and submit Spring 2021 Semester project status report

**Summer 2021**

* Conduct extensive research on all available free and open resources and make a collection of these resources for the rest of the courses
* Collect open and freely available textbooks that align with the course objectives, evaluate them based on established criteria and make a shortlist of them
* Finalize selection of free and open courseware from collected materials and create additional materials as needed. These material will follow accessibility guidelines and will be made accessible to the public through OpenALG and the GALILEO Open Learning Materials repository
* Modify syllabi
* Write and submit Summer 2021 Semester project status report

**Fall 2021**

* Teach CPSC 2125, 2105, and 3125 using OER materials
* Team members meet to share and discuss students’ initial reactions to the OERs used in their courses
* Administer surveys (worth extra credit) to all students enrolled in these courses
* Analyze student survey data
* Re-evaluate selected OERs and make modifications as needed (including updating syllabi)
* Write and submit final project report

## 6. Budget

**PERSONNEL:**
Anastasia Angelopoulou $4654.16

Suk Lee $4654.16

Rania Hodhod $4654.16

Linqiang Ge $4654.16

Japheth Koech $4654.16

**Total Personnel $23,270.80**

**FRINGE BENEFITS:**

6.20% (FICA) Angelopoulou $280.29
1.45% (FICA Medicare) Angelopoulou $65.55

6.20% (FICA) Lee $280.29
1.45% (FICA Medicare) Lee $65.55

6.20% (FICA) Hodhod $280.29
1.45% (FICA Medicare) Hodhod $65.55

6.20% (FICA) Ge $280.29
1.45% (FICA Medicare) Ge $65.55

6.20% (FICA) Koech $280.29
1.45% (FICA Medicare) Koech $65.55

**Total Fringe Benefits $1,729.20**

**TOTAL PROJECT $25,000**

## 7. Sustainability Plan

The team will work with instructional designers and librarians to maintain the compiled OERs using the following locations and resources:

* LibGuides hosted by the CSU library to host links and any other web content on CSU Library [site](https://columbusstate.libguides.com/);
* All grants artifacts, reports, and supporting applications will be hosted by the ALG and Galileo Open Learning Materials [website](https://oer.galileo.usg.edu/) ;
* Some resources may be shared via other OER applicable sites that the team may find;
* Course materials will also be maintained on a shared Google drive by the PIs.

Our sustainability plan aligns with the TSYS School of Computer Science’s effort to continuously improve the quality of teaching by providing affordable and accessible textbooks. The team is committed to transforming their courses by adopting, adapting and creating OERs that align with their courses’ learning objectives and can improve student motivation and academic success. After the end of the project, the course coordinators will meet at the end of each semester to review and revise the OERs based on student feedback and performance, thus maintaining/improving course quality and continuing the effort to enhance student learning. The team plans to share the results of the textbook transformation project through presentations at educational conferences and journal publications to promote the use of open educational resources in the field of Computer Science.

**References:**

Ashadevi, B., and P. Muthamil Selvi. "Open Educational Resources in Computer Science: Opportunities and Challenges." International Journal of Computer Science Issues (IJCSI) 14.5 (2017): 42-49. Retrieved from: http://www.ijcsi.org/papers/IJCSI-14-5-42-49.pdf

Bliss, T. J., Robinson, J. T., Hilton III, J., & Wiley, D. A. (2013). An OER COUP: College teacher and student perceptions of open educational resources. Journal of Interactive Media in Education, 25.

Choi, Young Mi, and Cathy Carpenter. "Evaluating the Impact of Open Educational Resources: A Case Study."portal: Libraries and the Academy 17.4 (2017): 685-693. Retrieved from: https://preprint.press.jhu.edu/portal/sites/ajm/files/17.4choi.pdf

Dichev, Christo, et al. "Trends and opportunities in computer science OER development." Cybernetics and Information Technologies 15.3 (2015): 114-126. Retrieved from: <https://www.wssu.edu/profiles/dichevc/trendsopportunities-in-cs-oer.pdf>

Fischer, L., Hilton III, J., Robinson, T. J., & Wiley, D. A. (2015). A multi-institutional study of the impact of open textbook adoption on the learning outcomes of post-secondary students. Journal of Computing in Higher Education, 27(3), 159–172.

Florida Virtual Campus. (2016). 2016 Florida student textbook survey. Retrieved from<https://florida.theorangegrove.org/og/file/3a65c507-2510-42d7-814cffdefd394b6c/1/2016%20Student%20Textbook%20Survey.pdf>

Hilton III, J. L., Robinson, T. J., Wiley, D., & Ackerman, J. D. (2014). Cost-savings achieved in two semesters through the adoption of open educational resources. International Review of Research in Open and Distributed Learning, 15(2), 67-84.

Hilton III, J. L., Gaudet, D., Clark, P., Robinson, J., & Wiley, D. (2013). The adoption of open educational resources by one community college math department. International Review of Research in Open and Distributed Learning, 14(4). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/152 3/2652

Hilton III, J. L., Fischer, L., Wiley, D., & Williams, L. (2016). Maintaining momentum toward graduation: OER and the course throughput rate. International Review of Research in Open and Distributed Learning, 17(6), 18–27. Retrieved from<http://www.irrodl.org/index.php/irrodl/article/download/2686/3942>

Martin, M., Belikov, O., Hilton, J., Wiley, D., & Fischer, L. (2017). Analysis of student and faculty perceptions of textbook costs in higher education. *Open Praxis*, 9(1), 79-91.

McGreal, R. (2013). Creating, using and sharing open education resources. Retrieved from https://www.fosteropenscience.eu/sites/default/files/pdf/514.pdf

Watson, C. E., Domizi, D., & Clouser, S. (2017). Student and faculty perceptions of OpenStax in high enrollment courses. International Review of Research in Open and Distance Learning, 18(5).

# Creative Commons Terms

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# Accessibility Terms

*I understand that any new materials or revisions created with Affordable Learning Georgia funding must be developed in compliance with the specific accessibility standards defined in the* [*Request for Proposals*](https://www.affordablelearninggeorgia.org/about/rfp_r18)*.*

# Letter of Support

Dr. Shamim Khan (Interim Department Chair of TSYS School of Computer Science)

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# Grants or Business Office Letter of Acknowledgment

Erika Cottingham (Director of the Office of Sponsored Programs)

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