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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Thirteen (Spring 2019-Spring 2020)
Category:	University System of Georgia
Award Cycle:	Round 13
Submission Deadline:	01/14/2019 at 11:59 PM

Application Information

Submitted By:	Cathy Hakes
Application ID:	2787
Application Title:	404
Date Submitted:	01/15/2019 at 7:31 AM

Personal Details

Institution Name(s):	Georgia Gwinnett College
Applicant First Name:	Sherly
Applicant Last Name:	Abraham
Applicant Email Address:	sabraham1@ggc.edu
Applicant Phone Number:	404-938-2530
Primary Appointment Title:	Assistant Professor Information Technology
Submitter First Name:	Cathy
Submitter Last Name:	Hakes
Submitter Email Address:	chakes@ggc.edu
Submitter Phone Number:	678-407-5875
Submitter Title:	Executive Director, Office of Research and Sponsored Programs

Application Details

Proposal Title

404

Final Semester of Project

Spring 2020

Requested Amount of Funding

\$10,800

Type of Grant

No-or-Low-Cost-to-Students Learning Materials

Course Title(s)

Introduction to Databases

Course Number(s)

ITEC 3200

Team Member 1 Name

Sherly Abraham

Team Member 1 Email

sabraham1@ggc.edu

Team Member 2 Name

Sonal Dekhane

Team Member 2 Email

sdekhane@ggc.edu

Team Member 3 Name

Team Member 3 Email

Team Member 4 Name

Team Member 4 Email

Additional Team Members (Name and email address for each)

Sponsor Name

Dr. Thomas Mundie

Sponsor Title

Dean

Sponsor Department

School of Science and Technology

Original Required Commercial Materials (title, author, price)

Database Concepts, David M. Kroenke, \$132.00

Average Number of Students per Course Section Affected by Project in One Academic Year

28

Average Number of Sections Affected by Project in One Academic Year

13

Total Number of Students Affected by Project in One Academic Year

364

Average Number of Students Affected per Summer Semester

28

Average Number of Students Affected per Fall Semester

168

Average Number of Students Affected per Spring Semester

168

Original Total Cost per Student

\$132

Post-Project Cost per Student

0

Post-Project Savings per Student

\$132

Projected Total Annual Student Savings per Academic Year

\$48,048

Using OpenStax Textbook?

No

Project Goals

A. Improve student success in ITEC 3200 (Introduction to Database) by creating no-cost online textbook and materials.

The transformed course will have materials that are aligned specifically with the objectives of the course, employ active learning strategies to keep learners engaged, and utilize a cooperative learning approach to enhance team building skills. This will include identifying and mapping open educational resources available to the course goals and objectives. The PIs will also be developing classroom notes, class assignments, lab material, and homework for the course.

B. Increase students' knowledge of different IT career areas by designing activities that provide career exposure.

The transformed course will include class discussions and follow on classroom reflective activities that engage students by examining different careers within the database career sector. We will collect and provide resources for students on the skills, experience, and connections of course contents to job titles and skills required.

C. Encourage the wider use of the free online textbook within the USG by disseminating the course materials and informing colleagues in the field of best practices and lessons learned.

The course materials developed will be made available to all students enrolled in the course in the D2L learning management system. We will also share the course contents on the GGC wiki page (http://wiki.ggc.usg.edu/wiki/Main_Page). The GGC wiki page is a publicly available web resource used by GGC faculty in the ITEC department to collaborate and share course contents. We plan to promote our approach among other faculty members by sharing the results of our study at discipline meetings and course coordinator meetings. The PIs also plan to share the pedagogical approaches and lessons learned from the transformation project at educational conferences.

Statement of Transformation

Textbook costs are always a big concern to the students at GGC. In the PIs' experience, the first question students ask at the beginning of the semester is, "Do we need to purchase the textbook?" Some students buy the textbook late due to financial issues, while a couple of students in every class do not buy the textbook at all. The current textbook used in the course costs a student \$132. However, this covers only the cost of the textbook and does not provide students with the technology tools to be used in the course. The book we currently use also covers an extensive number of chapters so that some of the chapters in the textbook are currently not used or covered primarily because they do not meet the learning objectives. Moreover, the labs in the textbook are more catered towards the use of Microsoft Access, a tool that is widely used as a personal database but does not meet the needs of larger enterprises.

There are around 1,350 students currently enrolled in the IT program at GGC. The introduction to database course is required for all students majoring in IT. This course is also required for students in the business program majoring in management information systems. Additionally, this is a required course for all students minoring in IT. The ACM curricula recommendations for IT identify databases as a required foundational skill in IT (ACM 2017). Therefore, this is a high impact course and plays an important role in student success in the IT program and is cross-disciplinary. By eliminating the textbook and using open educational resources, we propose to lower costs for students, deliver a more focused curriculum, and provide students with real-world applications and experience on a more powerful database management system. The DFW rate for this course in the past academic year was 24%. Through this project, we will be able to equip a broad spectrum of students with resources and activities that will improve their academic success.

Transformation description

To bring about the transformation of the ITEC 3200 course, we will develop materials that align specifically with the objectives of the course (Objective A). We plan to utilize a number of open educational resources (OER) in the database domain to provide learners with the required information needed to succeed in the course. The use of OER provides us with more leverage to customize the contents of the course so they align better with the objectives of the course. Database Technologies is identified as a core course in the Information Technology/Computer Science discipline (Yuelan et al. 2011) and recognized as an essential skill in broad career domains in IT (Shebaro 2018) that focuses on introducing students to the database design, technologies, SQL and management. The introduction to database course provides an excellent case to adopt OER due to the numerous reputable and credible OER resources that are available in this subject area.

Most introductory database courses at the college level require students to use a database management system such as Microsoft Access, Microsoft SQL server or MySQL. We plan to use MySQL Community Server. The MySQL community edition is an open source software that is available for students to use free of charge. The current lab exercises in the textbook used in the course at GGC is mainly geared towards the use of Microsoft Access. However, Microsoft Access is considered a personal database management system and is not as powerful and scalable as MySQL. For instructors who do not use Microsoft Access to teach the course, there is not much benefit from the Access Lab provided in the textbook. Therefore, we see an added advantage from a practice perspective in the use of OER resources in the course. Additionally, a recent study by Sherimon, et al. showed that use of OER in an introductory database course positively affected the student-learning process (Sherimon et al. 2018).

In planning our course materials, we will develop and incorporate active learning activities that engage students in hands-on classroom activities in order to accomplish Objective A. Current teaching methods in typical database courses consist of lecture-based, project-based or flipped classroom approaches (Shebaro 2018). Active learning is based on constructivist learning theory and involves instructional activities that engage students in doing things that make them think about what they are doing (Bonwell and Eison 1991). This includes making students engage in activities beyond regular classroom activities such as taking notes or following directions but making them participate in activities that construct new knowledge and build new scientific skills (Handelsman et al. 2007). Studies have shown that the use of active learning activities in introductory database courses has a positive impact on student performance (Shebaro 2018). We plan to create active learning activities that students will complete in class. The activities will not only require students to complete the activity but to discuss answers and reflect on their responses. We plan to use a combination of active learning techniques proposed by Brame (2016) such as:

- The pause procedure,
- Retrieval practice,
- Demonstrations,
- Think-pair share,
- Concept maps,
- Decision-making activities, and
- Case-based learning.

The use of open resource educational tools provides us with a diverse approach that is not confined to activities

covered in the prescribed textbook but enables us to create active learning assignments that keep learners actively involved during class time.

Aside from active learning, we will integrate cooperative learning approach to enhance team building skills of students. Teamwork is an important skill set to acquire and develop within the information technology domain. We plan to apply the theory of cooperative learning in examining methods to improve team building skills of students. Dietrich and Urban (1998) discuss the advantages in the use of cooperative learning approach in an introductory database course. Their study integrates elements of positive interdependence, face-to-face interaction, and individual accountability. In a cooperative learning context, learners work in small groups assisting each other to learn and develop communication and leadership skills. We believe that the open educational resource approach to teaching the introduction to database course will provide us with the ability to customize the course to merge the elements of cooperative learning and enhance team building and leadership skills of students.

IT employment continues to grow at a rapid pace. Because of the sustained need for IT personnel, our course will include career perspectives so that students may learn about different career areas in database technologies (Objective B). The database career sector is broad and includes job roles such as database programmers, database modeler, and database administrator. We will be including discussions on different job roles within the database career and examine skills needed within these areas. This will provide learners with a better understanding and appreciation for careers in database technologies. We plan to use videos from CandidCareer.com. This is a free resource available to GGC students from the GGC Career Services Center. The portal features career information and provides career guidance through videos.

The finished product, a transformed online textbook and materials, will reduce student expenses in textbook purchase to no cost and result in positive student learning, engagement and performance in the course. The transformed course materials, best practices, and lessons learned from the experience will be shared with other USG universities and colleges to impact more students at large. (Objective C). Specifically, we will make the learning materials developed freely available to all USG faculty. This can be used as a model to follow for similar courses taught in introductory database courses in a computer science or information technology program.

Stakeholders affected by the transformation

The main stakeholders affected by the transformation will be approximately 364 undergraduate students enrolled annually in the Introduction to Database course at GGC. The information technology program at GGC currently includes four majors. The introduction to database course is a required course for students to complete in all four majors. This course is also required in the Bachelor of Business Administration program at GGC for students majoring in management information systems. In addition, the Introduction to Databases course is a required course for students who choose a minor in information technology at GGC. Therefore, this transformation is cross-disciplinary and will also impact students majoring in MIS in the Business Administration program and students who minor in information technology at GGC. Additionally, all GGC faculty and other faculty in Georgia and across the nation who teach an introductory course in database can benefit from the materials developed and collected for this course.

Impact of this transformation on stakeholders and course success

First, the transformation provides a cost-effective approach to learners by eliminating the need for students to purchase the textbook for the course. Second, the transformation enables us, as instructors on record, to develop materials that align with the course objectives. Third, we will be creating active learning classroom activities that will help improve student success and engagement in the course. Finally, we will connect the topics covered to real-world database applications and scenarios. The materials developed in the course will be beneficial to faculty teaching similar courses at USG and other higher education institutions

Transformative impact on the program, department, institutions, access institution and/or multiple courses

ITEC 3200 is a foundational course required for all ITEC majors at GGC. This is generally the case for all information technology and computer science programs in the nation. We will be employing a no textbook model and this approach where applicable can be replicated in other technology courses at GGC. Given the rising cost of textbooks for students, we believe this model can serve as an example for other access institutions across the nation.

We will collect reputable open educational resources and link the materials with the course's objectives. In addition, we will develop materials that consist of course notes, PowerPoints, database labs, homework, and active learning activities. As a result, we will have a repository of materials that can be used by other USG faculty teaching courses in database. In addition, we believe the active learning method, coupled with a cooperative learning approach and real-world application integration, will result in improvements in student engagement and success.

The course materials will be collected from a number of online sources.

The following is a list of the resources that we mainly plan to use in the course. We will be creating weekly modules in D2L and will be including the links to the specific area within these sources that students can click on to gain access to the resource.

- GGC library resources (<http://www.ggc.edu/academics/library/>)
- Open Textbook Library (<https://open.umn.edu/opentextbooks>)
- BC Open Textbooks (<https://opentextbc.ca/>)
- Lynda.com
- Candid Careers (<http://www.candidcareer.com>)
- Merlot (<https://www.merlot.org/merlot/viewMaterial.htm?id=293413>)
- W3 Schools (<https://www.w3schools.com/sql/>)
- <https://www.khanacademy.org>
- Oracle Docs (<https://docs.oracle.com>)

The above will be augmented with the following created by the PIs:

- Custom materials (PowerPoint and Notes)
- Custom active learning exercises for classroom assignments
- Custom Homework assignments
- Custom lab exercises in the creation and management of MySQL

Course and syllabus instructional design/redesign necessary for the transformation

The instructional design of the course will center on organizing the contents into modules in the learning management system D2L. The syllabus, and all materials used in the course will be made available in D2L for the learners. There will be links that are set to open in a new browser window for all the OER resources used in the course. The course syllabus will be modified to reflect the no textbook format and will include a list of the major open educational resources that will be used in the course. The active learning class assignments and group project will be graded components. The contents covered in the course will be mapped to the course objectives of the course.

Team Member Roles

Team member: Sherly Abraham, Assistant Professor of Information Technology will serve as a subject matter expert and instructional designer in the course. She currently serves as the course coordinator for the course and has been teaching the course at GGC. She will lead the effort to identify, gather, and map OER resources to the course objectives. This effort will include developing active learning activities, homework and database labs, and real-world application connections to course materials. She will also work with disseminating the materials and lessons learned with stakeholders. She will assist Dr. Dekhane with the evaluation effort for the project. Dr. Abraham is an IT instructor on record.

Team member: Sonal Dekhane, Associate Professor of Information Technology will serve as a subject matter expert, instructional designer, and evaluator in the course. She regularly teaches this course at GGC and has been a course coordinator for it in the past. She is also the Chair of Faculty in Information Technology discipline. She will assist with identifying, gathering and developing custom course materials. She will lead the evaluation effort for this project. This will include obtaining IRB approval, creating assessment tools (surveys, common assessment questions for each goal), obtaining consents, administering surveys, collecting data (from students, faculty, and Banner) and conducting data analysis. She will work with Dr. Abraham to compile the necessary reports. She will also help Dr. Abraham in organizing the materials so that it can be easily shared with stakeholders at GGC and outside of GGC. Dr. Dekhane is an IT instructor on record.

Below is a breakdown of the major topics covered in the course and role of the PIs:

- Introduction to Databases- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Abraham]
- Relational Database Design- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Dekhane]
- SQL Programming- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Abraham]
- Database Modeling- Organizing Content, Develop custom notes, Develop Active learning assignments and

Homework [Dr. Dekhane]

- Database Implementation- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Abraham]
- Emerging Trends in Database technologies - Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Dekhane]

Plan for providing open access to the new materials

The course materials developed will be hosted in GGC's Brightspace (D2L) (<https://ggc.view.usg.edu/d2l/home>), and all the students who enroll in the course will have free access to the materials in the course. The PIs will also make the course materials available at the GGC Wiki page http://wiki.ggc.usg.edu/wiki/Main_Page. This will result in broader access of course materials for educators and students across the nation.

Quantitative & Qualitative Measures

Questionnaires will be administered using a surveying tool approved by the IRB committee at GGC. Data analysis will be done using tools such as Excel or SPSS.

GOAL A: Improve student success in ITEC 3200 (Introduction to Database) by creating no-cost online textbook and materials.

Quantitative Measures:

The PIs will collect the following data regarding students' performance in the course:

1. Student performance on common assessment questions in the final exam corresponding to each learning outcome of the course. This data will be gathered from faculty teaching the class.
2. Student grades on a final common assessment in all sections of the course. This data will be gathered from faculty teaching the class.
3. Grade distribution in all sections of the course. This data will be gathered from Banner and will be compared with existing historical grade distribution data for this class.

In addition, the PIs will compare the cost of the current textbook with the cost of the new learning materials (expected to be free).

Qualitative Measures:

To evaluate the effectiveness of the proposed open source resources, the active learning activities, and the cooperative learning activities, the PIs will survey the students at the end of each semester. The questionnaire will ask students to rate questions on a Likert scale of Strongly Disagree to Strongly Agree, and will consist of questions focusing on the following main ideas:

- The materials will be easily and reliably accessed at all times.
- The materials are well-organized so that the necessary information can be found quickly.
- The materials clearly explain concepts and are useful to learn the content.
- The materials have enough exercises and examples to support students' learning needs.
- The active learning activities were useful and engaging.
- The collaborative learning experience improved my ability to work in teams.

The questionnaire will also include open-ended questions, such as:

- What did you like about the new course materials?
- How can the new course materials be improved?
- Did the availability of free online textbook help improve your success in the course? If so, how did it impact your learning and success in the course?
- Any other comments?

GOAL B: Increase students' knowledge of different IT career areas by designing activities that provide career exposure.

Quantitative Measures:

Students will be encouraged to seek the help of GGC's Career Development and Advising Center (CDAC). At the end of the project, we will ask students if they availed of the services offered by the Center, found the videos by candid career useful, and conducted additional research on the careers discussed in class. We will track this information in order to provide us with quantitative data on the effectiveness of this service.

Qualitative Measures:

The questionnaire mentioned in the evaluation of Goal A above will consist of additional statements for students to rate, such as:

- My knowledge of careers in the database field improved because of the career-focused activities in this class.

GOAL C: Encourage the wider use of the free online textbook within the USG by disseminating the course materials and informing colleagues in the field of best practices and lessons learned.

Goal C will result in presentations at conferences and sharing of materials online.

Quantitative Measures:

We will track the number of presentations we conducted to disseminate information on the project, as well as the number of faculty members who have expressed interest in utilizing our materials.

Qualitative Measures:

We will send a short questionnaire (1-2 questions) to faculty who have expressed interest or decided to use our materials. Our plan is to ask them about their experiences in utilizing the textbook and/or the resource materials.

Timeline

Program Start: Spring 2019

Spring 2019: The PIs will use Spring 2019 semester to identify, gather, and map OER resources to the course objectives. This will include developing active learning activities, homework, database labs, and real-world application connections to course materials. Evaluation plan and instruments will also be developed during this semester.

Summer 2019: The PIs expect to create supplemental materials for the course in summer 2019, including common assessment questions, quizzes, and other materials. The organization of all of these materials in D2L and on GGC Wiki will start in Spring 2019 and is expected to complete in Summer 2019. The materials developed in Spring 2019 will be piloted in Summer 2019 in one section with ~28 students. Initial feedback from students will be obtained.

Fall 2019: All of the learning materials are expected to be ready and organized by the end of summer 2019 and will be used in all sections of the class in Fall 2019, which will affect 168 students in six sections. More data will be collected at the end of Fall 2019.

Spring 2020: The PIs expect to continue using the new materials in Spring 2020 in six additional sections, affecting 168 students, and collect more data. There might be minor tweaks to the material during this time, based on student feedback from Fall 2019. Data analysis for summer and fall 2019 semesters will also happen during this time. A report will be created and submitted by the end of the grant period. Lastly, PIs expect to work on dissemination efforts this semester, by initially reaching out to on-campus faculty at course coordination meetings and discipline meetings.

Budget

Type of Project: Standard-scale transformation

Personnel: \$10,000.00

Funds are requested to cover the compensation and fringe (FICA/SS, FICA Med, Retirement) of Dr. Abraham and Dr. Dekhane at \$5,000 each.

Dr. Abraham will lead in the identification, gathering, and mapping of OER resources to the course objectives. She will also lead in developing active learning activities, homework and database labs and real-world application connections to course materials. She will assist Dr. Dekhane with the evaluation effort for the project.

Dr. Dekhane will lead assist with identifying, gathering and developing custom course materials. She will lead the evaluation effort for this project, including obtaining IRB approval, creating assessment tools, obtaining consents, administering surveys, collecting data, and conducting data analysis. She will assist with compiling reports and in organizing materials for dissemination purposes.

Travel: \$800.00

Funds are requested for the PIs to attend the kick-off meeting at \$400 each. Travel will cover mileage, lodging, per diem, and other travel requirements.

Total: \$10,800.00

Sustainability Plan

Introduction to Databases is a required course for all IT majors at GGC. This course is also required for students in the School of Business Administration majoring in Management Information Systems (MIS). Additionally, the course is required by all students who minor in Information Technology. There are about 12 sections taught each academic year (plus an additional section in summer). The PIs plan to test the proposed open source learning materials in all 6 sections that they teach each semester. Dr. Dekhane, being the chair of faculty can ensure that both PIs get to teach the necessary sections. The PIs expect that this project will impact student achievement by eliminating textbook and software costs, increase student engagement in the material inside and outside the classroom, improve academic performance, which in turn improve retention in this course. Considering these benefits, the PIs will propose to standardize these resources for future offerings of ITEC 3200. Both PIs' involvement in the discipline and the course (Dr. Abraham is the course coordinator and Dr. Dekhane is the chair of faculty) and the initial data collected during this project should help the PIs make a case for adopting these materials for long-term use. The materials will be made available for GGC faculty in a central and easy-to-access location such as D2L. The PIs, along with GGC faculty teaching the course in the future, will continue to maintain and update the learning materials created.

A centralized location such as the proposed wiki page, will allow non-GGC faculty and students to access the materials easily. The PIs also see an opportunity to request and use additional mini-grant funds in the future to add emerging technologies to the curriculum.

Acknowledgment

Grant Acceptance

[Acknowledged] I understand and acknowledge that acceptance of Affordable Learning Georgia grant funding constitutes a commitment to comply with the required activities listed in the RFP and that my submitted proposal will serve as the statement of work that must be completed by my project team. I further understand and acknowledge that failure to complete the deliverables in the statement of work may result in termination of the agreement and funding.

To: Grant Review Committee

Affordable Learning Georgia, University System of Georgia

Re: Textbook Transformation Grant

Dear Committee,

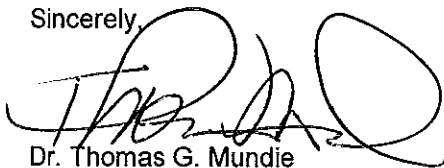
I am pleased to write this letter to support Drs. Sherly Abraham and Sonal S. Dekhane, application for the ALG Textbook Transformation Grant.

The proposal focuses on the creation of no-cost-to-students learning materials to replace current textbook for our IT required course ITEC 3200 Introduction to Databases. This will lower costs of students taking this course and will most likely increase our retention and success rates in the course.

Dr. Abraham and Dr. Dekhane have been teaching this course for a several semesters. They have the knowledge, skills and experiences needed to successfully perform the action plan and meet the obligations of the grant. If awarded the grant, I will work with them to coordinate the distribution of their award and provide necessary resources to facilitate their activities in developing the proposed learning materials.

Please let me know if you have any questions or need additional information.

Sincerely,



Dr. Thomas G. Mundie

Dean, School of Science and Technology
Georgia Gwinnett College



Textbook Transformation Grants, Round Thirteen (Spring 2019 –Spring 2020)

Proposal Form and Narrative

Applicant, Team, and Sponsor Information

Institution(s)	Georgia Gwinnett College
Applicant Name	Sherly Abraham
Applicant Email	sabraham1@ggc.edu
Applicant Phone #	404-938-2530
Applicant Position/Title	Assistant Professor Information Technology
Submitter Name	Cathy Hakes
Submitter Email	chakes@ggc.edu
Submitter Phone #	678-407-5875
Submitter Position	Executive Director, Office of Research and Sponsored Programs & Accreditation

Team Members

	Name	Email Address
Team Member 1	Sherly Abraham	Sabraham1@ggc.edu
Team Member 2	Sonal Dekhane	Sdekhane@ggc.edu

Other Members

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Sponsor (name, title, department, and institution)

Dr. Thomas Mundie, Dean, School of Science and Technology, Georgia Gwinnett College

Project Information and Impact Data

Title of Grant Project	No Text Transformation of an Introductory Database Course
Type of Grant	No-or-Low-Cost-to-Students Learning Materials
Requested Amount of Funding	\$10,800
Course Names and Course Numbers	ITEC 3200 Introduction to Databases
Final Semester of Project	Spring 2020
Average Number of Students Per Course Section Affected by Project	28
Average Number of Sections Affected by Project in One Academic Year	13
Total Number of Students Affected by Project in One Academic Year	364
Average Number of Students Affected per Summer Semester	28
Average Number of Students Affected per Fall Semester	168
Average Number of Students Affected per Spring Semester	168
Title/Author of Original Required Materials	Database Concepts, David M Kroenke
Original Total Cost Per Student	\$132
Post-Project Cost Per Student	0
Post-Project Savings Per Student	\$132
Projected Total Annual Student Savings Per Academic Year	\$48,048
Using OpenStax Textbook?	No

NARRATIVE SECTION

1. PROJECT GOALS

- A. Improve student success in ITEC 3200 (Introduction to Database) by creating no-cost online textbook and materials.

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The course materials developed will be made available to all students enrolled in the course in the D2L learning management system. We will also share the course contents on the GGC wiki page (http://wiki.ggc.usg.edu/wiki/Main_Page). The GGC wiki page is a publicly available web resource used by GGC faculty in the ITEC department to collaborate and share course contents. We plan to promote our approach among other faculty members by sharing the results of our study at discipline meetings and course coordinator meetings. The PIs also plan to share the pedagogical approaches and lessons learned from the transformation project at educational conferences.

2. STATEMENT OF TRANSFORMATION

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Moreover, the labs in the textbook are more catered towards the use of Microsoft Access, a tool that is widely used as a personal database but does not meet the needs of larger enterprises.

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Most introductory database courses at the college level require students to use a database management system such as Microsoft Access, Microsoft SQL server or MySQL. We plan to use MySQL Community Server. The MySQL community edition is an open source software that is available for students to use free of charge. The current lab exercises in the textbook used in the course at GGC is mainly geared towards the use of Microsoft Access. However, Microsoft Access is considered a personal database management system and is not as powerful and scalable as MySQL. For instructors who do not use Microsoft Access to teach the course, there is not much benefit from the Access Lab provided in the textbook. Therefore, we see an added advantage from a practice perspective in the use of OER resources in the course. Additionally, a recent study by Sherimon, et al. showed that use of OER in an introductory database course positively affected the student-learning process (Sherimon et al. 2018).

In planning our course materials, we will develop and incorporate active learning activities that engage students in hands-on classroom activities in order to accomplish Objective A. Current teaching methods in typical database courses consist of lecture-based, project-based or flipped

classroom approaches (Shebaro 2018). Active learning is based on constructivist learning theory and involves instructional activities that engage students in doing things that make them think about what they are doing (Bonwell and Eison 1991). This includes making students engage in activities beyond regular classroom activities such as taking notes or following directions but making them participate in activities that construct new knowledge and build new scientific skills (Handelsman et al. 2007). Studies have shown that the use of active learning activities in introductory database courses has a positive impact on student performance (Shebaro 2018). We plan to create active learning activities that students will complete in class. The activities will not only require students to complete the activity but to discuss answers and reflect on their responses. We plan to use a combination of active learning techniques proposed by Brame (2016) such as:

- The pause procedure,
- Retrieval practice,
- Demonstrations,
- Think-pair share,
- Concept maps,
- Decision-making activities, and
- Case-based learning.

The use of open resource educational tools provides us with a diverse approach that is not confined to activities covered in the prescribed textbook but enables us to create active learning assignments that keep learners actively involved during class time.

Aside from active learning, we will integrate cooperative learning approach to enhance team building skills of students. Teamwork is an important skill set to acquire and develop within the information technology domain. We plan to apply the theory of cooperative learning in examining methods to improve team building skills of students. Dietrich and Urban (1998) discuss the advantages in the use of cooperative learning approach in an introductory database course. Their study integrates elements of positive interdependence, face-to-face interaction, and individual accountability. In a cooperative learning context, learners work in small groups assisting each other to learn and develop communication and leadership skills. We believe that the open educational resource approach to teaching the introduction to database course will provide us with the ability to customize the course to merge the elements of cooperative learning and enhance team building and leadership skills of students.

IT employment continues to grow at a rapid pace. Because of the sustained need for IT personnel, our course will include career perspectives so that students may learn about different career areas in database technologies (Objective B). The database career sector is broad and includes job roles such as database programmers, database modeler, and database administrator. We will be including discussions on different job roles within the database career and examine skills needed within these areas. This will provide learners with a better understanding and appreciation for careers in database technologies. We plan to use videos from CandidCareer.com. This is a free resource available to GGC students from the GGC Career

Services Center. The portal features career information and provides career guidance through videos.

The finished product, a transformed online textbook and materials, will reduce student expenses in textbook purchase to no cost and result in positive student learning, engagement and performance in the course. The transformed course materials, best practices, and lessons learned from the experience will be shared with other USG universities and colleges to impact more students at large. (Objective C). Specifically, we will make the learning materials developed freely available to all USG faculty. This can be used as a model to follow for similar courses taught in introductory database courses in a computer science or information technology program.

Stakeholders affected by the transformation

The main stakeholders affected by the transformation will be approximately 364 undergraduate students enrolled annually in the Introduction to Database course at GGC. The information technology program at GGC currently includes four majors. The introduction to database course is a required course for students to complete in all four majors. This course is also required in the Bachelor of Business Administration program at GGC for students majoring in management information systems. In addition, the Introduction to Databases course is a required course for students who choose a minor in information technology at GGC. Therefore, this transformation is cross-disciplinary and will also impact students majoring in MIS in the Business Administration program and students who minor in information technology at GGC. Additionally, all GGC faculty and other faculty in Georgia and across the nation who teach an introductory course in database can benefit from the materials developed and collected for this course.

Impact of this transformation on stakeholders and course success

First, the transformation provides a cost-effective approach to learners by eliminating the need for students to purchase the textbook for the course. Second, the transformation enables us, as instructors on record, to develop materials that align with the course objectives. Third, we will be creating active learning classroom activities that will help improve student success and engagement in the course. Finally, we will connect the topics covered to real-world database applications and scenarios. The materials developed in the course will be beneficial to faculty teaching similar courses at USG and other higher education institutions

Transformative impact on the program, department, institutions, access institution and/or multiple courses

ITEC 3200 is a foundational course required for all ITEC majors at GGC. This is generally the case for all information technology and computer science programs in the nation. We will be employing a no textbook model and this approach where applicable can be replicated in other technology courses at GGC. Given the rising cost of textbooks for students, we believe this model can serve as an example for other access institutions across the nation.

We will collect reputable open educational resources and link the materials with the course's objectives. In addition, we will develop materials that consist of course notes, PowerPoints, database labs, homework, and active learning activities. As a result, we will have a repository of materials that can be used by other USG faculty teaching courses in database. In addition, we believe the active learning method, coupled with a cooperative learning approach and real-world application integration, will result in improvements in student engagement and success.

3. TRANSFORMATION ACTION PLAN

The course materials will be collected from a number of online sources.

The following is a list of the resources that we mainly plan to use in the course. We will be creating weekly modules in D2L and will be including the links to the specific area within these sources that students can click on to gain access to the resource.

- GGC library resources (<http://www.ggc.edu/academics/library/>)
- Open Textbook Library (<https://open.umn.edu/opentextbooks>)
- BC Open Textbooks (<https://opentextbc.ca/>)
- Lynda.com
- Candid Careers (<http://www.candidcareer.com>)
- Merlot (<https://www.merlot.org/merlot/viewMaterial.htm?id=293413>)
- W3 Schools (<https://www.w3schools.com/sql/>)
- <https://www.khanacademy.org>
- Oracle Docs (<https://docs.oracle.com>)

The above will be augmented with the following created by the PIs:

- Custom materials (PowerPoint and Notes)
- Custom active learning exercises for classroom assignments
- Custom Homework assignments
- Custom lab exercises in the creation and management of MySQL

Course and syllabus instructional design/redesign necessary for the transformation

The instructional design of the course will center on organizing the contents into modules in the learning management system D2L. The syllabus, and all materials used in the course will be made available in D2L for the learners. There will be links that are set to open in a new browser window for all the OER resources used in the course. The course syllabus will be modified to reflect the no textbook format and will include a list of the major open educational resources that will be used in the course. The active learning class assignments and group project will be graded components. The contents covered in the course will be mapped to the course objectives of the course.

Team Member Roles

Team member: Sherly Abraham, Assistant Professor of Information Technology will serve as a subject matter expert and instructional designer in the course. She currently serves as the course coordinator for the course and has been teaching the course at GGC. She will lead the effort to identify, gather, and map OER resources to the course objectives. This effort will include developing active learning activities, homework and database labs, and real-world application connections to course materials. She will also work with disseminating the materials and lessons learned with stakeholders. She will assist Dr. Dekhane with the evaluation effort for the project. Dr. Abraham is an IT instructor on record.

Team member: Sonal Dekhane, Associate Professor of Information Technology will serve as a subject matter expert, instructional designer, and evaluator in the course. She regularly teaches this course at GGC and has been a course coordinator for it in the past. She is also the Chair of Faculty in Information Technology discipline. She will assist with identifying, gathering and developing custom course materials. She will lead the evaluation effort for this project. This will include obtaining IRB approval, creating assessment tools (surveys, common assessment questions for each goal), obtaining consents, administering surveys, collecting data (from students, faculty, and Banner) and conducting data analysis. She will work with Dr. Abraham to compile the necessary reports. She will also help Dr. Abraham in organizing the materials so that it can be easily shared with stakeholders at GGC and outside of GGC. Dr. Dekhane is an IT instructor on record.

Below is a breakdown of the major topics covered in the course and role of the PIs:

- Introduction to Databases- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Abraham]
- Relational Database Design- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Dekhane]
- SQL Programming- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Abraham]
- Database Modeling- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Dekhane]
- Database Implementation- Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Abraham]
- Emerging Trends in Database technologies - Organizing Content, Develop custom notes, Develop Active learning assignments and Homework [Dr. Dekhane]

Plan for providing open access to the new materials

The course materials developed will be hosted in GGC's Brightspace (D2L) (<https://ggc.view.usg.edu/d2l/home>), and all the students who enroll in the course will have free access to the materials in the course. The PIs will also make the course materials available at the GGC Wiki page http://wiki.ggc.usg.edu/wiki/Main_Page. This will result in broader access of course materials for educators and students across the nation.

4. QUANTITATIVE AND QUALITATIVE MEASURES

Questionnaires will be administered using a surveying tool approved by the IRB committee at GGC. Data analysis will be done using tools such as Excel or SPSS.

GOAL A: Improve student success in ITEC 3200 (Introduction to Database) by creating no-cost online textbook and materials.

Quantitative Measures:

The PIs will collect the following data regarding students' performance in the course:

1. Student performance on common assessment questions in the final exam corresponding to each learning outcome of the course. This data will be gathered from faculty teaching the class.
2. Student grades on a final common assessment in all sections of the course. This data will be gathered from faculty teaching the class.
3. Grade distribution in all sections of the course. This data will be gathered from Banner and will be compared with existing historical grade distribution data for this class.

In addition, the PIs will compare the cost of the current textbook with the cost of the new learning materials (expected to be free).

Qualitative Measures:

To evaluate the effectiveness of the proposed open source resources, the active learning activities, and the cooperative learning activities, the PIs will survey the students at the end of each semester. The questionnaire will ask students to rate questions on a Likert scale of Strongly Disagree to Strongly Agree, and will consist of questions focusing on the following main ideas:

- The materials will be easily and reliably accessed at all times.
- The materials are well-organized so that the necessary information can be found quickly.
- The materials clearly explain concepts and are useful to learn the content.
- The materials have enough exercises and examples to support students' learning needs.
- The active learning activities were useful and engaging.
- The collaborative learning experience improved my ability to work in teams.

The questionnaire will also include open-ended questions, such as:

- What did you like about the new course materials?
- How can the new course materials be improved?
- Did the availability of free online textbook help improve your success in the course? If so, how did it impact your learning and success in the course?
- Any other comments?

GOAL B: Increase students' knowledge of different IT career areas by designing activities that provide career exposure.

Quantitative Measures:

Students will be encouraged to seek the help of GGC's Career Development and Advising Center (CDAC). At the end of the project, we will ask students if they availed of the services offered by the Center, found the videos by candid career useful, and conducted additional research on the careers discussed in class. We will track this information in order to provide us with quantitative data on the effectiveness of this service.

Qualitative Measures:

The questionnaire mentioned in the evaluation of Goal A above will consist of additional statements for students to rate, such as:

- My knowledge of careers in the database field improved because of the career-focused activities in this class.

GOAL C: Encourage the wider use of the free online textbook within the USG by disseminating the course materials and informing colleagues in the field of best practices and lessons learned.

Goal C will result in presentations at conferences and sharing of materials online.

Quantitative Measures:

We will track the number of presentations we conducted to disseminate information on the project, as well as the number of faculty members who have expressed interest in utilizing our materials.

Qualitative Measures:

We will send a short questionnaire (1-2 questions) to faculty who have expressed interest or decided to use our materials. Our plan is to ask them about their experiences in utilizing the textbook and/or the resource materials.

5. TIMELINE

Program Start: Spring 2019

Spring 2019: The PIs will use Spring 2019 semester to identify, gather, and map OER resources to the course objectives. This will include developing active learning activities, homework, database labs, and real-world application connections to course materials. Evaluation plan and instruments will also be developed during this semester.

Summer 2019: The PIs expect to create supplemental materials for the course in summer 2019, including common assessment questions, quizzes, and other materials. The organization of all of these materials in D2L and on GGC Wiki will start in Spring 2019 and is expected to complete in Summer 2019. The materials developed in Spring 2019 will be piloted in Summer 2019 in one section with ~28 students. Initial feedback from students will be obtained.

Fall 2019: All of the learning materials are expected to be ready and organized by the end of summer 2019 and will be used in all sections of the class in Fall 2019, which will affect 168 students in six sections. More data will be collected at the end of Fall 2019.

Spring 2020: The PIs expect to continue using the new materials in Spring 2020 in six additional sections, affecting 168 students, and collect more data. There might be minor tweaks to the material during this time, based on student feedback from Fall 2019. Data analysis for summer and fall 2019 semesters will also happen during this time. A report will be created and submitted by the end of the grant period. Lastly, PIs expect to work on dissemination efforts this semester, by initially reaching out to on-campus faculty at course coordination meetings and discipline meetings.

6. BUDGET

Type of Project: Standard-scale transformation

Personnel: \$10,000.00

Funds are requested to cover the compensation and fringe (FICA/SS, FICA Med, Retirement) of Dr. Abraham and Dr. Dekhane at \$5,000 each.

Dr. Abraham will lead in the identification, gathering, and mapping of OER resources to the course objectives. She will also lead in developing active learning activities, homework and database labs and real-world application connections to course materials. She will assist Dr. Dekhane with the evaluation effort for the project.

Dr. Dekhane will lead assist with identifying, gathering and developing custom course materials. She will lead the evaluation effort for this project, including obtaining IRB approval, creating assessment tools, obtaining consents, administering surveys, collecting data, and conducting data analysis. She will assist with compiling reports and in organizing materials for dissemination purposes.

Travel: \$800.00

Funds are requested for the PIs to attend the kick-off meeting at \$400 each. Travel will cover mileage, lodging, per diem, and other travel requirements.

Total: \$10,800.00

7. SUSTAINABILITY PLAN

Introduction to Databases is a required course for all IT majors at GGC. This course is also required for students in the School of Business Administration majoring in Management Information Systems (MIS). Additionally, the course is required by all students who minor in Information Technology. There are about 12 sections taught each academic year (plus an additional section in summer). The PIs plan to test the proposed open source learning materials in all 6 sections that they teach each semester. Dr. Dekhane, being the chair of faculty can ensure that both PIs get to teach the necessary sections. The PIs expect that this project will impact student achievement by eliminating textbook and software costs, increase student engagement in the material inside and outside the classroom, improve academic performance, which in turn improve retention in this course. Considering these benefits, the PIs will propose to standardize these resources for future offerings of ITEC 3200. Both PIs' involvement in the discipline and the course (Dr. Abraham is the course coordinator and Dr. Dekhane is the chair of faculty) and the initial data collected during this project should help the PIs make a case for adopting these materials for long-term use. The materials will be made available for GGC faculty in a central and easy-to-access location such as D2L. The PIs, along with GGC faculty teaching the course in the future, will continue to maintain and update the learning materials created.

A centralized location such as the proposed wiki page, will allow non-GGC faculty and students to access the materials easily. The PIs also see an opportunity to request and use additional mini-grant funds in the future to add emerging technologies to the curriculum.

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LETTER OF SUPPORT

(Also included as a separate attachment)



Office of the Dean
School of Science & Technology

1000 University Center Lane
Lawrenceville, GA 30043
Phone: 678-407-5602
www.ggc.edu

To: Grant Review Committee
Affordable Learning Georgia, University System of Georgia
Re: Textbook Transformation Grant

Dear Committee,

I am pleased to write this letter to support Drs. Sherly Abraham and Sonal S. Dekhane, application for the ALG Textbook Transformation Grant.

The proposal focuses on the creation of no-cost-to-students learning materials to replace current textbook for our IT required course ITEC 3200 Introduction to Databases. This will lower costs of students taking this course and will most likely increase our retention and success rates in the course.

Dr. Abraham and Dr. Dekhane have been teaching this course for a several semesters. They have the knowledge, skills and experiences needed to successfully perform the action plan and meet the obligations of the grant. If awarded the grant, I will work with them to coordinate the distribution of their award and provide necessary resources to facilitate their activities in developing the proposed learning materials.

Please let me know if you have any questions or need additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Thomas G. Mundle'.

Dr. Thomas G. Mundle
Dean, School of Science and Technology
Georgia Gwinnett College