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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Sixteen (Spring 2020 - Spring 2021)
Category:	University System of Georgia
Award Cycle:	Round 16
Submission Deadline:	01/13/2020 at 11:59 PM

Application Information

Submitted By:	Rebecca Rutherford
Application ID:	4004
Application Title:	519
Date Submitted:	01/14/2020 at 8:16 AM

Personal Details

Institution Name(s):	Kennesaw State University
Applicant First Name:	Rebecca
Applicant Last Name:	Rutherford
Applicant Email Address:	brutherf@kennesaw.edu
Applicant Phone Number:	470-578-7399
Primary Appointment Title:	Department Chair, Information Technology
Submitter First Name:	Rebecca
Submitter Last Name:	Rutherford
Submitter Email Address:	brutherf@kennesaw.edu
Submitter Phone Number:	470-578-7399
Submitter Title:	Department Chair, Information Technology

Application Details

Proposal Title

519

Requested Amount of Funding

30,000

Priority Category (if applicable)

Scaling Up OER

Final Semester:

Spring 2021

Course Title(s)

Intro to FinTech in IT; Machine Learning for Enterprise Applications; Infrastructure Defense; Web & Mobile Security

Course Number(s)

IT 4603; IT 4773; IT 4883; IT 4863

Team Member 1 Name

Rebecca H. Rutherford

Team Member 1 Email

brutherf@kennesaw.edu

Team Member 2 Name

Meng Han

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Team Member 3 Name

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yxie@kennesaw.edu

Team Member 4 Name

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Additional Team Members (Name and email address for each)

Hossain Shahriar

hshahria@kennesaw.edu

Sponsor Name

Rebecca H. Rutherford

Sponsor Title

Department Chair

Sponsor Department

Information Technology

Total Number of Student Section Enrollments Affected by Project in One Academic Year

360

Average Number of Student Section Enrollments Affected per Summer Semester

90

Average Number of Student Section Enrollments Affected per Fall Semester

135

Average Number of Student Section Enrollments Affected per Spring Semester

135

Original Required Commercial Materials (title, author, price, and bookstore or retailer URL showing price)

IT 4883: **Chained Exploits: Advanced Hacking Attacks From Start to Finish,**

Andrew Whitaker, Keatron Evans, Jack Voth

ISBN-10: 032149881X

ISBN-13: 978-0321498816

Edition: 1st, \$46.73

IT 4863: **Fundamentals of Web Development,**

Randy Connolly, Ricardo Hoar,

ISBN-13: 978-0133407150

ISBN-10: 0133407152

\$158.00

Web Application Security,

Bryan Syllivan, Vincent Liu

ISBN-13: 978-0071776165

ISBN-10: 0071776168

\$27.00

IT 4603: **FinTech, The Technology Driving Disruption in the Financial Services Industry,**

Parag Argunwadkar,

ISBN-13: 978-1138294790

ISBN-10: 1138294799

\$67.85

IT 4773: **Introduction to Machine Learning with Applications in Information Security**

Mark Stamp

ISBN: 13:98-1-130-62678-2

\$73.79

Original Total Cost per Student

346.34

Post-Project Cost per Student

0

Post-Project Savings per Student

346.34

Projected Total Annual Student Savings per Academic Year

49,593.60

Using OpenStax Textbook?

No

Project Goals

The Bachelor of Science and Bachelor of Applied Science programs in Information Technology at Kennesaw State University are very strong programs with a combined enrollment of over 800 students. In addition, many of our Information Technology courses are being used in the completely online Cyber Security major program that is a collaborative emajor with the Information Security & Assurance degree and the Criminal justice degree – this degree had 430 majors fall 2019. The high-quality of the curriculum, the flexibility of the offerings and affordability are the main enablers for the success of the BSIT/BASIT programs.

Much thanks to the supports of Affordable Learning Georgia in previous grants, we have transformed 16 out of 17 required courses and 15 of our 25 elective courses in the BSIT/BASIT curriculum with no-cost-to-student learning material and the responses from the students are overwhelmingly positive. In this project, we propose to continue our department-wide effort to replace the textbooks used in five more BSIT/BASIT courses with no-cost-to-students learning materials. We believe the impact of the proposed project will be significant given the scale of the BSIT/BASIT programs.

Our strategic plan is to have our BSIT and BASIT degree programs as “z-degrees” – zero cost to students for textbooks and materials by fall 2021 (using Round 16 and Round 17 to complete our course offerings with no textbook).

The objectives/goals of the proposed project are listed as follows.

- Make the BSIT/BASIT programs more affordable by eliminating the textbooks used in four IT courses. By doing so, the BSIT/BASIT programs can better support the lowering of costs for students at KSU.
- Develop free, up-to-date and well-designed learning material for the four proposed BSIT/BASIT courses.
- Teach the proposed courses using the developed learning material and validate those material offers equal or better learning effectiveness that textbooks do.
- Develop a sustainability plan to ensure the no-cost learning material will be continuously maintained and used in future course offerings.

- 2019 Enrollment Data

Course Name	Spring 19	Summer 19	Fall 2019	Sections offered	Total enrollment
IT 4603	20	20	20	3	60
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IT 4883	70	70	30	5	170
IT 4863	25	25	20	3	70

- 2020 Enrollment Data Prediction

Course Name	Course offering frequency	Sections to be offered	Avg. enrollment per section	Total enrollment	Textbook cost	Total Saving
IT 4603	Each semester	3	30	90	\$67.85	\$6106.50
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Total		13	32.5 (avg)	425	\$262.16	\$27037.75

Statement of Transformation

The quality of the BSIT/BASIT curriculum has been a goal of the Information Technology program since inception. Given the dynamic and fast-changing nature of information technology, we need to constantly update our courses or create new courses to stay in the cutting edge of technology and competition. Unfortunately, the traditional textbook model doesn't fit for IT courses: they are not only expensive, but also become outdated after being published. The instructors of IT courses have to constantly add new material to their courses in addition to what's covered in the textbook. The no-cost-learning-material model fits much better for the IT courses.

As matter of fact, the Department of Information Technology has been a big proponent of no-cost-learning material since round one of ALG. The faculty of the IT department have transformed over 30 IT courses at both undergraduate and graduate level with the support of ALG. Several of our ALG awards, e.g., round 2 award #119, round 8 award #302, round 10 award #334, round 11, award #365, round 13 #429 and Round 15 have been coordinated at the department level. Moreover, the responses for those renovated with no-cost-learning-material courses have been overwhelmingly positive from the students.

The positive responses from the students, our past successes, and the nature of the IT discipline allow us to aim to continue transforming more IT courses using no-cost learning material. This project aims to replace the textbooks used in the four proposed BSIT/BASIT courses with no-cost-to-students learning materials that offer equal or higher educational effectiveness. We have two newer concentrations that we are hoping to transform with ALG funding in Rounds 16 & 17. We believe the proposed transformation of four courses is an economical and viable solution to address the challenges imposed by the traditional textbook model. There are several reasons why we believe that using no-cost learning materials works well with IT courses.

First, the learning materials for the proposed BSIT/BASIT courses are widely and readily available on the World Wide Web today and, many of these resources are publicly accessible, free, or with an open license to use [1] [2]. These materials include open and free tutorials, books, videos, labs, software, and services.

Second, Web content can better reflect the latest trends and industrial development than the traditional textbooks as technology is changing rapidly, as is the content of Web resources. We are already using contents from the Web as supplemental materials to the course textbooks. For example, we have utilized open source resources to redevelop information security courses with the latest open source tools and systems (e.g., [3, 4]).

Third, the materials from the Web are generally more interactive. The interactive content will not only engage the students, but also improve their learning experience. As instructors, one of the key roles we play is to select, organize and deliver from the vast amount of information available from the web and open source resources to fit with the classroom learners background. Developing hands-on labs and assignments with tools and methods help ensure that students are well prepared for the job market and pursuing advanced courses. For example, there are books and manuals (e.g., [5, 6]) available on Financial Technologies (IT 4603 – Introduction to FinTech in IT) but, they may not directly apply to classroom students for effective hands-on learning.

Fourth, developing and assembling a set of learning materials ourselves allow us to better align the course contents not only with the outcomes of each course but also with the outcomes of BSIT/BASIT programs. Using the materials compiled by the instructor actually better serve the students in the class.

Finally, our project team is well prepared for the proposed transformation. The disadvantages of using Web resources include being disorganized, containing inaccurate information, may be changed or deleted without notices. However, our team members are not only subject matter experts in the IT fields, but also are proficient educators who on average have more than 10 years of teaching experience. We will select, organize and integrate resources from the Web and transform the information into instructional sound learning materials for the proposed courses. We also created a sustainable plan to periodically review the developed no-cost-to-student learning materials. All courses in the department are reviewed every three years as part of the continuous improvement process. In addition, all of the team members have successfully completed many ALG grants, to name a few, round 2 award #119, round 8 award #302, round 10 award #334, round 11 award #365,

round 13 #429 and round 15.

In summary, the faculty at IT department have transformed 18 BSIT/BASIT courses using no-cost-to-student learning material which are very well received by the students. Building on our previous success and lessons learned, we are well positioned to continue transformation efforts and further increase the cost-saving benefits to the students in our program.

References

- [1]. Li, L., Peltsverger, S. B., Colyar, N. N., Rutherford, R., Zheng, G., Li, Z. (2016). Transformation At Scale: The Experience Of Developing No Cost Learning Material For Database-Related Courses. 19th Annual Conference of the Southern Association for Information Systems. aisel.aisnet.org/sais2016/9/
- [2]. Rutherford, R., Peltsverger, S. B., Li, L., Zheng, G., Rutherford, J. (2016). Transforming IT Education with No-Cost Learning Materials. SIGITE'16. ACM Special Interest Group for IT Education.
- [3] H. Shahriar, Ethical Hacking for Effective Defense (Modules, Labs, and Lectures), 2018, <https://oer.galileo.usg.edu/compsci-ancillary/9/>
- [4] Shahriar, H., Peltsverger, S. (2018). Open Education Resource for Information Security Courses, USG Teaching and Learning Conference. <https://sched.co/DvNV>
- [5]<https://www.occ.gov/publications-and-resources/publications/comptrollers-licensing-manual/files/considering-charter-apps-from-fin-tech-companies.html>
- [6] <https://www.pwc.com/gx/en/financial-services/assets/pdf/technology2020-and-beyond.pdf>

Transformation Action Plan

Built on our previous experience of developing no-cost-to student learning material, our team of investigators plans to carry out following activities to transform the four proposed BSIT/BASIT courses.

- Research existing resources including ALG website for publicly available learning material that could be re-used or adapted.
- Research and identify no-cost readings for each of the learning modules in each course. The reading list includes both required readings and optional readings. All of these readings will be publicly accessible, free to use, or openly licensed.
- Research and identify no-cost materials that can be shared across the courses.
- Develop study guides and lecture notes for students' use to review course content and key learning points.
- Adopt or develop all assignments, exercises, and lab materials that are no cost to students to replace the ones in the textbooks.
- Develop test banks to replace the ones in the textbooks if necessary.
- Update the syllabus to include major resources and no-cost materials.
- Re-develop the proposed courses in our learning management system, D2L Brightspace.
- The developed course material will be organized based on the template provided by ALG and will be made available to the public for adoption The responsibilities of each investigator are listed as follows.
- Dr. Rebecca Rutherford, project Lead, subject matter expert, primary editor and quality management coordinator.
- Dr. Meng Han, subject matter expert, developer and instructor of record for IT 4603: Introduction to FinTech in IT
- Dr. Ying Xie, subject matter expert, developer and instructor of record for IT 4773: Machine Learning for Enterprise Applications
- Dr. Seyedamin Pouriye, subject matter expert, developer and instructor of record for IT 4883: Infrastructure Defense
- Dr. Hossain Shahriar, subject matter expert, developer and instructor of record for IT 4863: Web & Mobile Security

Quantitative & Qualitative Measures

We plan to assess the effectiveness of our transformation efforts in the following ways.

1. Student performance data comparison. The course pass rate, average GPA, and Drop/Withdraw/Fail rate are used as a measurement of students' performance. We will only use aggregated data in the analysis and final report. So, no IRB approval is needed. The performance data will be collected after the no-cost learning material is implemented for a proposed course, which is referred as the current performance data. For each of the measurement, we plan to conduct two levels of analysis.
 - Compare the current performance data to a preset goal. For example, 80 % is the aimed passing rate as the courses involved are graduate courses. A letter grade of B or better will be considered as a passing grade.
 - Compare the current performance data to those from past offerings where the textbooks were used. The student performance data from the sections last taught using the textbooks will be used as the baseline.
1. Student survey on developed no-cost learning material. We will develop an anonymous web-based survey to collect students' feedback on the no-cost learning material. The survey will need the approval from the IRB board of Kennesaw State University before it can be distributed to the students. The proposed survey will be totally anonymous and voluntary and introduce minimum risk to the participants. As a result, the survey will qualify for the expedited review based on our previous experience. All proposed courses will use the same survey, and the survey will be distributed at the end of implementation semester for a proposed course. The proposed survey consists of a mixture of quantitative and qualitative measures including:
 - Student perception and attitude toward no-cost materials.
 - Quantitative ratings of the no cost materials used in this course.
 - Qualitative measures such as open-ended questions for comments and suggestions.
1. Official student course evaluation from the university. The student course evaluation can also provide some insights on the effectiveness of no-cost learning material used in the proposed BSIT courses.

Timeline

The major milestones of this proposal are listed as follows.

1. 02/01/2020 Receive confirmation of ALG grant funding
2. 02/24/2020. Attend ALG kick-off met in Macon
3. 03/15/2020 Faculty begin looking at external resources for their assigned course. The project lead will develop the student survey that will be used in all courses based upon previous surveys for consistency.
4. 05/01/2020. Faculty complete data collection for their course materials and create syllabus for their course. Project lead will approve all syllabi for content and consistency. Project lead prepares interim report.
5. 05/15/2020. Faculty begin putting together the content for their various courses and putting together links, readings, etc.
6. 08/01/2020. Complete course content, links, readings, etc. in D2L for all four courses.
7. 08/01/2020. Project lead checks each course for completeness, content, and quality.
8. 08/01/2020. Project lead completes interim report.
9. 08/15/2020. Teach IT 4603 and IT 4883 using new ALG D2L shell course approved by Project Lead.
10. 12/01/2020. Faculty administer student survey and sends results to Project Lead.
11. 12/01/2020. Project lead completes interim report, and analyzes student surveys from two classes.
12. 01/01/2021. Teach IT 4773 and IT 4863 spring term 2021 using new ALG D2L shell course approved by Project Lead.
13. 05/15/2020. Faculty administer student survey and send results to Project Lead.
14. 05/20/2020. Project lead analyzes student surveys from two classes and creates final report with data analysis of all 4 courses.
15. 05/20/2020. Compile and submit final project report.

Budget

The budget information for this project is listed as follows.

1. Individual Expense
 - Dr. Rebecca Rutherford, project Lead, primary editor and approval of courses for quality management. Prepares all reports and analyzes survey results. \$5000 for professional development.
 - Dr. Meng Han, developer and instructor of record for IT 4603, \$5000 for professional development.
 - Dr. Ying Xie, developer and instructor of record for IT 4773, \$5000 for professional development.
 - Dr. Seyedamin Pouriyeh, developer and instructor of record for IT 4883, \$5000 for professional development.
 - Dr. Hossain Shahriar, developer and instructor of record for IT 4863, \$5000 for professional development.
 - Subtotal: \$25,000.
1. Travel Expense: \$800 is reserved for two team members attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.
2. Conference paper presentation: \$4200 is budgeted for attending two peer-reviewed conferences to present work on this project as a team.
3. Total Budget requested: \$30,000

Sustainability Plan

The IT department at Kennesaw State University implements a course architect system for all courses. A faculty who is assigned to a course as the course architect, is responsible for the content of the course and teaches the course regularly. All of our investigators are a course architect for the proposed courses. Our team member will develop the no-cost-to-student learning material for the proposed courses and teach the courses for the first time using the new material. As a course architect, our team member will also make sure a course is continuously taught using developed no-cost learning material in the future semesters even the course might have a different instructor.

Moreover, the developed course content is not only available at the learning management system but also archived at the department server. It is also our department policy that there are at least two faculty who regularly teach a course. This further ensures the developed learning material will be continuously used and updated even there is a personnel turnover.

The IT department also has well-established course continual improvement plan. Each course is assessed each semester after being taught, and a course will be formally evaluated and updated every three years or earlier if the need arises. A course architect is in-charge of those assessment efforts. Thus, we are committed to continuously update the no-cost learning material in the proposed courses based on research, assessment results, and feedback from students and alumni. As shown in the support letter, our transformation efforts have strong support from our Department Chair which further ensure the sustainability of our transformation efforts.

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.



January 13, 2020

ALG Grant Committee University System of GA
Dear Colleagues:

This letter is in support of the Proposal "Continuing Progress on the Creation of a "Z-degree" for the BSIT and BASIT Degree Programs" submitted from Kennesaw State University, Information Technology department faculty. As Department Chair for Information Technology, I clearly see the need for bringing down costs for our students. The ALG grants assist faculty to prepare no-cost courses that allow students to take courses without the monetary burden of expensive textbooks. Our Information Technology Department has been pursuing and been awarded several previous ALG grants. Our strategic goal for our BSIT and BASIT degree programs is to create "Z-degrees" for both programs. We have almost reached our strategic goal. ALG rounds 16 and 17, if awarded to us, should allow us to complete transforming all of our IT courses as no-cost.

Several faculty in the Information Technology Department at Kennesaw State University have successfully carried out an ALG rounds #1, #2, #5, #8, #10, #11, #12, #13, #14 and #15. The savings already realized from the previous ALG grant encouraged our faculty to develop this new ALG grant proposal to help our students save even more money. The four courses proposed are all from our upper level concentrations in the degree. In, additional several of these courses are part of our interdisciplinary undergraduate BSCYBR degree.

I strongly support this proposal. This is a very sustainable proposal as we have a large Information Technology degree program. By creating these four new IT undergraduate courses as no-cost, will allow students for many years to realize savings from not buying textbooks for these courses.

This is a very solid proposal. The Project lead faculty member of this proposal has participated in previous ALG grants, completed their course development and offered them successfully. The Project Lead will oversee the content, quality and presentation of these courses. I believe that this new ALG proposal will have the same student satisfaction and success that the previous ALG grants have had. Thank you for your consideration of this proposal.

Sincerely,

A handwritten signature in blue ink that reads "Rebecca H. Rutherford".

Rebecca H. Rutherford, Ed.D.

Department Chair for Information Technology, Professor of Information Technology
brutherf@kennesaw.edu

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Department of Information Technology

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Textbook Transformation Grants, Round Sixteen (Spring 2020 – Spring 2021)

Proposal Form and Narrative

Proposal Title: Continuing Progress on the Creation of a “Z-degree” for the BSIT and BASIT Degree Programs.

Applicant, Team, and Sponsor Information

Institution(s)	Kennesaw State University
Applicant Name	Rebecca H. Rutherford
Applicant Email	brutherf@kennesaw.edu
Applicant Phone #	470-578-7399
Applicant Position/Title	Department Chair, Information Technology, Prof. of IT
Submitter Name	Rebecca H. Rutherford
Submitter Email	brutherf@kennesaw.edu
Submitter Phone #	470-578-7399
Submitter Position	Department Chair, Information Technology, Prof. of IT

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.

	Name	Email Address
Team Member 1	Rebecca Rutherford	brutherf@kennesaw.edu
Team Member 2	Meng Han	Mhan9@kennesaw.edu
Team Member 3	Ying Xie	Yxie2@kennesaw.edu
Team Member 4	Syedamin Pouriyeh	spouriye@kennesaw.edu
Team Member 5	Hossain Shahriar	hshahria@kennesaw.edu
Team Member 6		
Team Member 7		
Team Member 8		

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

Please provide the sponsor's name, title, department, and institution. The sponsor is the provider of your Letter of Support.

Rebecca Rutherford, Department Chair, Information Technology, Kennesaw State University

Project Information and Impact Data

Priority Category / Categories	<i>Scaling up OER</i>
Requested Amount of Funding	\$30,000
Course Names and Course Numbers	IT 4603 Intro to FinTech in IT IT 4773 Machine Learning for Enterprise Applications IT 4883 Infrastructure Defense IT 4863 Web & Mobile Security
Final Semester of Project	<i>Spring 2021.</i>
Total Number of Student Section Enrollments Affected by Project in One Academic Year	360
Average Number of Student Section Enrollments Affected per Summer Semester	90 IT 4603 20 IT 4773 20 IT 4883 30 IT 4863 20
Average Number of Student Section Enrollments Affected per Fall Semester	135 IT 4603 20 IT 4773 20 IT 4883 70 IT 4863 25
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Original Required Commercial Materials	<i>IT 4883: Chained Exploits: Advanced Hacking Attacks From Start to Finish, Andrew Whitaker, Keatron Evans, Jack Voth ISBN-10: 032149881X ISBN-13: 978-0321498816 Edition: 1st , \$46.73 IT 4863: Fundamentals of Web Development, Randy Connolly, Ricardo Hoar, ISBN-13: 978-0133407150</i>

	<p>ISBN-10: 0133407152 \$158.00</p> <p>Web Application Security, Bryan Syllivan, Vincent Liu ISBN-13: 978-0071776165 ISBN-10: 0071776168 \$27.00</p> <p>IT 4603: FinTech, The Technology Driving Disruption in the Financial Services Industry, Parag Argunwadkar, ISBN-13: 978-1138294790 ISBN-10: 1138294799 \$67.85</p> <p>IT 4773: Introduction to Machine Learning with Applications in Information Security Mark Stamp ISBN: 13:98-1-130-62678-2 \$73.79</p>
<p>Average Price of Original Required Materials Per Student Section Enrollment</p>	<p><i>These books are all part of 3 different concentrations that students may choose from. There are 800+ majors in the IT program. The first two books are from the Information Security concentration – the savings would be: \$204.70. This concentration is our most popular – about 50% of the students take this concentration (around 400 students); the second book is from our FinTech in IT concentration – the savings would be \$67.85; the last book is part of our Data Analytics concentration – the savings would be \$73.79.</i></p> <p>The Information Security concentration has been part of the program for several years. The FinTech and Data Analytics concentrations are newer. We expect quite a bit of growth in the FinTech and Data Analytics concentrations over the next 3 years.</p>
<p>Average Post-Project Cost Per Student Section Enrollment</p>	<p>0</p>
<p>Average Post-Project Savings Per Student Section Enrollment</p>	<p><i>From \$67.85 – 204.70 (depending upon concentration)</i></p>

Projected Total Annual Student Savings Per Academic Year	<i>If we use the multiplier of 50% for the security concentration and 25% each for the FinTech and Data Analytics concentrations we get the following:</i> Security concentration: 360 students in sections X 50% = 180 students 180 students X \$204.70 = \$ 36, 846 savings FinTech concentration: 360 students in sections X 25% = 90 students 90 students X \$67.85 = \$6106.50 savings Data Analytics concentration: 360 students in sections x 25% = 90 students 90 students X \$73.79 = \$6641.10 savings Total across 3 concentrations = \$\$49,593.60 savings
Using OpenStax Textbook?	No

Narrative Section

1. Project Goals

The Bachelor of Science and Bachelor of Applied Science programs in Information Technology at Kennesaw State University are very strong programs with a combined enrollment of over 800 students. In addition, many of our Information Technology courses are being used in the completely online Cyber Security major program that is a collaborative emajor with the Information Security & Assurance degree and the Criminal justice degree - this degree had 430 majors fall 2019. The high-quality of the curriculum, the flexibility of the offerings and affordability are the main enablers for the success of the BSIT/BASIT programs.

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2. Statement of Transformation

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The positive responses from the students, our past successes, and the nature of the IT discipline allow us to aim to continue transforming more IT courses using no-cost learning material. This project aims to replace the textbooks used in the four proposed BSIT/BASIT courses with no-cost-to-students learning materials that offer equal or higher educational effectiveness. We have two newer concentrations that we are hoping to transform with ALG funding in Rounds 16 & 17. We believe the proposed transformation of four courses is an economical and viable solution to address the challenges imposed by the traditional textbook model. There are several reasons why we believe that using no-cost learning materials works well with IT courses.

First, the learning materials for the proposed BSIT/BASIT courses are widely and readily available on the World Wide Web today and, many of these resources are publicly accessible, free, or with an open license to use [1] [2]. These materials include open and free tutorials, books, videos, labs, software, and services.

Second, Web content can better reflect the latest trends and industrial development than the traditional textbooks as technology is changing rapidly, as is the content of Web resources. We are already using contents from the Web as supplemental materials to the course textbooks. For example, we have utilized open source resources to redevelop information security courses with the latest open source tools and systems (e.g., [3, 4]).

Third, the materials from the Web are generally more interactive. The interactive content will not only engage the students, but also improve their learning experience. As instructors, one of the key roles we play is to select, organize and deliver from the vast amount of information available from the web and open source resources to fit with the classroom learners background. Developing hands-on labs and assignments with tools and methods help ensure that students are well prepared for the job market and pursuing advanced courses. For example, there are books and manuals (e.g., [5, 6]) available on Financial Technologies (IT 4603 – Introduction to FinTech in IT) but, they may not directly apply to classroom students for effective hands-on learning.

Fourth, developing and assembling a set of learning materials ourselves allow us to better align the course contents not only with the outcomes of each course but also with the outcomes of BSIT/BASIT programs. Using the materials compiled by the instructor actually better serve the students in the class.

Finally, our project team is well prepared for the proposed transformation. The disadvantages of using Web resources include being disorganized, containing inaccurate information, may be changed or deleted without notices. However, our team members are not only subject matter experts in the IT fields, but also are proficient educators who on average have more than 10 years of teaching experience. We will select, organize and integrate resources from the Web and transform the information into instructional sound learning materials for the proposed courses. We also created a sustainable plan to periodically review the developed no-cost-to-student learning materials. All courses in the department are reviewed every three years as part of the continuous improvement process. In addition, all of the team members have successfully completed many ALG grants, to name a few, round 2 award #119, round 8 award #302, round 10 award #334, round 11 award #365, round 13 #429 and round 15.

In summary, the faculty at IT department have transformed 18 BSIT/BASIT courses using no-cost-to-student learning material which are very well received by the students. Building on our previous success and lessons learned, we are well positioned to continue transformation efforts and further increase the cost-saving benefits to the students in our program.

References

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- [3] H. Shahriar, Ethical Hacking for Effective Defense (Modules, Labs, and Lectures), 2018, <https://oer.galileo.usg.edu/compsci-ancillary/9/>
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- [5] <https://www.occ.gov/publications-and-resources/publications/comptrollers-licensing-manual/files/considering-charter-apps-from-fin-tech-companies.html>
- [6] <https://www.pwc.com/gx/en/financial-services/assets/pdf/technology2020-and-beyond.pdf>

3. Transformation Action Plan

Built on our previous experience of developing no-cost-to student learning material, our team of investigators plans to carry out following activities to transform the four proposed BSIT/BASIT courses.

- Research existing resources including ALG website for publicly available learning material that could be re-used or adapted.
- Research and identify no-cost readings for each of the learning modules in each course. The reading list includes both required readings and optional readings. All of these readings will be publicly accessible, free to use, or openly licensed.
- Research and identify no-cost materials that can be shared across the courses.
- Develop study guides and lecture notes for students' use to review course content and key learning points.
- Adopt or develop all assignments, exercises, and lab materials that are no cost to students to replace the ones in the textbooks.
- Develop test banks to replace the ones in the textbooks if necessary.
- Update the syllabus to include major resources and no-cost materials.
- Re-develop the proposed courses in our learning management system, D2L Brightspace.
- The developed course material will be organized based on the template provided by ALG and will be made available to the public for adoption

The responsibilities of each investigator are listed as follows.

- Dr. Rebecca Rutherford, project Lead, subject matter expert, primary editor and quality management coordinator.
- Dr. Meng Han, subject matter expert, developer and instructor of record for IT 4603: Introduction to FinTech in IT
- Dr. Ying Xie, subject matter expert, developer and instructor of record for IT 4773: Machine Learning for Enterprise Applications
- Dr. Seyedamin Pouriyeh, subject matter expert, developer and instructor of record for IT 4883: Infrastructure Defense
- Dr. Hossain Shahriar, subject matter expert, developer and instructor of record for IT 4863: Web & Mobile Security

4. Quantitative and Qualitative Measures

We plan to assess the effectiveness of our transformation efforts in the following ways.

1. *Student performance data comparison.* The course pass rate, average GPA, and Drop/Withdraw/Fail rate are used as a measurement of students' performance. We will only use aggregated data in the analysis and final report. So, no IRB approval is needed. The performance data will be collected after the no-cost learning material is implemented for a proposed course, which is referred as the current performance data. For each of the measurement, we plan to conduct two levels of analysis.

- Compare the current performance data to a preset goal. For example, 80 % is the aimed passing rate as the courses involved are graduate courses. A letter grade of B or better will be considered as a passing grade.
 - Compare the current performance data to those from past offerings where the textbooks were used. The student performance data from the sections last taught using the textbooks will be used as the baseline.
2. *Student survey on developed no-cost learning material.* We will develop an anonymous web-based survey to collect students' feedback on the no-cost learning material. The survey will need the approval from the IRB board of Kennesaw State University before it can be distributed to the students. The proposed survey will be totally anonymous and voluntary and introduce minimum risk to the participants. As a result, the survey will qualify for the expedited review based on our previous experience. All proposed courses will use the same survey, and the survey will be distributed at the end of implementation semester for a proposed course. The proposed survey consists of a mixture of quantitative and qualitative measures including:
 - Student perception and attitude toward no-cost materials.
 - Quantitative ratings of the no cost materials used in this course.
 - Qualitative measures such as open-ended questions for comments and suggestions.
 3. *Official student course evaluation from the university.* The student course evaluation can also provide some insights on the effectiveness of no-cost learning material used in the proposed BSIT courses.

5. Timeline

The major milestones of this proposal are listed as follows.

1. 02/01/2020 Receive confirmation of ALG grant funding
2. 02/24/2020. Attend ALG kick-off met in Macon
3. 03/15/2020 Faculty begin looking at external resources for their assigned course. The project lead will develop the student survey that will be used in all courses based upon previous surveys for consistency.
4. 05/01/2020. Faculty complete data collection for their course materials and create syllabus for their course. Project lead will approve all syllabi for content and consistency. Project lead prepares interim report.
5. 05/15/2020. Faculty begin putting together the content for their various courses and putting together links, readings, etc.
6. 08/01/2020. Complete course content, links, readings, etc. in D2L for all four courses.
7. 08/01/2020. Project lead checks each course for completeness, content, and quality.
8. 08/01/2020. Project lead completes interim report.

9. 08/15/2020. Teach IT 4603 and IT 4883 using new ALG D2L shell course approved by Project Lead.
10. 12/01/2020. Faculty administer student survey and sends results to Project Lead.
11. 12/01/2020. Project lead completes interim report, and analyzes student surveys from two classes.
12. 01/01/2021. Teach IT 4773 and IT 4863 spring term 2021 using new ALG D2L shell course approved by Project Lead.
13. 05/15/2020. Faculty administer student survey and send results to Project Lead.
14. 05/20/2020. Project lead analyzes student surveys from two classes and creates final report with data analysis of all 4 courses.
15. 05/20/2020. Compile and submit final project report.

6. Budget

The budget information for this project is listed as follows.

1. Individual Expense

- Dr. Rebecca Rutherford, project Lead, primary editor and approval of courses for quality management. Prepares all reports and analyzes survey results. \$5000 for professional development.
 - Dr. Meng Han, developer and instructor of record for IT 4603, \$5000 for professional development.
 - Dr. Ying Xie, developer and instructor of record for IT 4773, \$5000 for professional development.
 - Dr. Seyedamin Pouriyeh, developer and instructor of record for IT 4883, \$5000 for professional development.
 - Dr. Hossain Shahriar, developer and instructor of record for IT 4863, \$5000 for professional development.
 - Subtotal: \$25,000.
2. Travel Expense: \$800 is reserved for two team members attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.
 3. Conference paper presentation: \$4200 is budgeted for attending two peer-reviewed conferences to present work on this project as a team.
 4. Total Budget requested: \$30,000

7. Sustainability Plan

The IT department at Kennesaw State University implements a course architect system for all courses. A faculty who is assigned to a course as the course architect, is responsible for the content of the course and teaches the course regularly. All of our investigators are a course architect for the proposed courses. Our team member will develop the no-cost-to-student learning material for the proposed courses and teach the courses for the first time using the new material. As a course architect, our team member will also make sure a course is continuously taught using developed no-cost learning material in the future semesters even the course might have a different instructor.

Moreover, the developed course content is not only available at the learning management system but also archived at the department server. It is also our department policy that there are at least two faculty who regularly teach a course. This further ensures the developed learning material will be continuously used and updated even there is a personnel turnover.

The IT department also has well-established course continual improvement plan. Each course is assessed each semester after being taught, and a course will be formally evaluated and updated every three years or earlier if the need arises. A course architect is in-charge of those assessment efforts. Thus, we are committed to continuously update the no-cost learning material in the proposed courses based on research, assessment results, and feedback from students and alumni. As shown in the support letter, our transformation efforts have strong support from our Department Chair which further ensure the sustainability of our transformation efforts.

Note: Letter of Support

A letter of support is attached from Dr. Rebecca H. Rutherford, Department Chair, Information Technology.