Application Details

Manage Application: ALG Textbook Transformation Grants Round 8

Award Cycle:	Round 8
Internal Submission Deadline:	Sunday, December 11, 2016

Application Title:	302
Application ID:	#001299
Submitter First Name:	Lei
Submitter Last Name:	Li
Submitter Title:	Associate Professor
Submitter Email Address:	lli13@kennesaw.edu
Submitter Phone Number:	470-578-3915
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Lei
Applicant Last Name:	Li
Co-Applicant Name(s):	--
Applicant Email Address:	lli13@kennesaw.edu
Applicant Phone Number:	470-578-3915
Primary Appointment Title:	Associate Professor
Institution Name(s):	Kennesaw State University
Submission Date:	Monday, December 12, 2016

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

Zhigang Li, Instructional Technology Specialist & Part-Time Assistant Professor of Information Technology, zli8@kennesaw.edu

Lei Li, Associate Professor of Information Technology, li_lei@kennesaw.edu

Hossain Shahriar, Assistant Professor of Information Technology, hshahria@kennesaw.edu

Rebecca Rutherfoord, Interim Assistant Dean of the College of Computing and Software Engineering, Chair of the Department of Information technology, and Professor of Information Technology, brutherf@kennesaw.edu

Svetlana Peltsverger, Interim Associate Dean in the College of Computing and Software Engineering and Associate Professor of Information Technology, speltsve@kennesaw.edu

Dawn Tatum, Lecturer of Information Technology, dtatum7@kennesaw.edu

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

Department of Information Technology

College of Computing and Software Engineering

Kennesaw State University

Proposal Title: 302

Course Names, Course Numbers and Semesters Offered:

IT 6843 - Ethical Hacking: Network Security and Penetration Testing – Offered twice a year in summer & fall semesters.

IT 6833 - Wireless Security– Offered once a year in spring semesters. It's also offer in summer semesters when needed.

IT 6883 - Infrastructure Defense – Offered once a year in fall semesters.

CSE 3801 - Professional Practices and Ethics– Offered three times a year in spring, summer & fall semesters with multiple sections each semester

Average Number of Students per Course Section:	34
Number of Course Sections Affected by Implementation in Academic Year:	25
Total Number of Students Affected by Implementation in Academic Year:	855

List the original course materials for students (including title, whether optional or required, & cost for each item):	1. IT4843, Hands-On Ethical Hacking and Network Defense, 2nd Edition, by Michael T. Simpson, Kent Backman, James Corley, ISBN-13: 978-1435486096, 2011. Required. Cost: $202.30, enrollment:50, total cost: $10,115.00 2. IT6843,1) Hands-On Ethical Hacking and Network Defense, 2nd Edition, 2011, by Michael T. Simpson, Kent Backman, James Corley, ISBN-13: 978-1435486096.2) Gray Hat Hacking The Ethical Hackers Handbook, 3rd Edition, 2011, Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey, Terron Williams, McGraw Hill, ISBN-13: 978-0071742559. Required. Cost: 1) $202.30;2) $34.90, Total: 237.20, enrollment: 75, total cost: $17,790.00 3. IT6833, Praphul Chandra, 2005, Bulletproof Wireless Security: GSM, UMTS, 802.11, and Ad Hoc Security, Publisher: ELSEVIER, ISBN: 0-7506-7746-5. Required. Cost: $74.95, enrollment: 40, total cost: $2,998.00 4. IT6883, 1) Business Data Communications Infrastructure, Networking and Security (Edition 7th, 2012), William Stallings, Thomas Case, ISBN-10: 0-13-302389-3 ISBN-13: 978-0-13-302389-3; 2) Chained Exploits: Advanced Hacking Attacks From Start to Finish (Edition: 1st, 2009), Andrew Whitaker, Keatron Evans, Jack Voth, ISBN-13: 978-0321498816. Required. Cost: 1)$161.70, 2). $45.29, Total: $206.99, enrollment: 40, total cost: $8,279.60 5. CSE3801, A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology, 4th Ed., 2012, by Sara Baase, ISBN-13: 978-0132492676, Required. Cost: $115.70, enrollment: 680, total cost: $78,676.00.
Requested Amount of Funding:	$30,000
Original per Student Cost:	$836.94
Post-Proposal Projected Student Cost:	$0
Projected Per Student Savings:	$836.94

Projected Total Annual Student Savings: $117,843.60

Creation and Hosting Platforms Used ("n/a" if none):

Kennesaw State University D2L Brightspace

Proposal Category: No-Cost-to-Students Learning Materials

Final Semester of Instruction: Fall 2017

Project Goals:

In this project, we propose to take a department-wide effort to transform the five information security related courses using no-cost-to-students learning material. This project not only aims to reduce the financial burden imposed by high cost of textbooks, but also strives to develop free and open-access learning materials that offer equivalent or better educational effectiveness than traditional textbooks. We also plan to develop online offerings of proposed courses that meet the internationally recognized Quality Matters (QM) standards.

Statement of Transformation:

1. The Transformation Description

According to Priceonomics (http://priceonomics.com/which-major-has-the-most-expensive-textbooks/) an average undergraduate student annually spends $1,200 on textbooks. The price of textbooks is now leading students' course decisions (M. Parry, "Students Get Savvier About Textbook Buying," The Chronicle of Higher Education, 27-Jan-2013.). The cost of textbooks depends on the major, with computing textbooks being in the top most expensive, and, at the same time, having one of the smallest resale values (Priceonomics). This is more than true for textbooks in Cybersecurity. The content of Cybersecurity courses is constantly changing with various innovations, updates, and revisions needed to keep the information current. Textbook publishers cannot keep up with the fast-moving changes in Cybersecurity and the textbook price for Cybersecurity is very high.

Georgia was recently ranked 3rd in the nation for information security, home to more than 115 information security-related companies (Technology Association of Georgia). Furthermore, there is a significant shortage of trained cybersecurity professionals anticipated in Georgia (USG Cyber Education Committee, 2015). In 2014, Georgia had an estimated 8000 open positions in cybersecurity-related fields with additional shortfalls expected in future years (USG Board of Regents Meeting Minutes, 2015). USG does not produce enough graduates for Georgia's job market. One of the reasons is the cost of education including textbook costs.

The textbooks currently used in the five proposed security related IT courses are quite expensive. Some textbooks do not have the latest edition in the market available (e.g., IT 6833 textbook is from 2005) or, not frequently updated (IT 4843 is from 2011 with new edition just released at the end of 2016

http://www.cengage.com/search/productOverview.do?N=16+4294922389&Ntk=P_EPI&Ntt=15
299614671691324142564844329453982650&Ntx=mode%2Bmatchallpartial). The goal of our transformation is to replace the textbook used in the proposed courses with no-cost-to-students learning materials that offer equal or higher educational effectiveness and can be easily updated more frequently.

Four out of six team members were part of the round two of an "Affordable Learning Textbook Transformation Grant" in 2015 (round two, award #119). They designed and evaluated the effectiveness of no-cost-to-students learning materials for database courses in IT department, and saved students $110,419. The assessment results showed that the developed free material offered equivalent or better learning experience than the textbooks did. The preliminary results of the grant were published in the Proceedings of Southern Association for Information Systems Conference (SAIS 2016), the final results were published in the Proceedings of the ACM Special Interests Group in IT Education (SIGITE 2016), "Transforming IT Education with No-Cost Learning Materials". They also hosted a panel discussion on no-cost learning material in IT education, at SIGITE in October 2016. The panel attracted a lot of attention among computing faculty. Many colleagues from different states were impressed with the USG initiative and with course material developed by the team. Building on our past success and lessons learned from the prior ALG grant, we will continue our transformation efforts by developing no-cost learning material for five security related courses.

2. The Stakeholders of the Transformation

There are two primary sets of stakeholders for this proposal – the students taking the five security related IT classes (both in-class and online students), and the faculty developing and teaching those courses. The high cost of textbooks puts a large financial burden on students and may become a road block for students' ability to finish their education. Our team of investigators strives to make higher education more affordable to the students. The information security related learning materials are widely available on the World Wide Web today, and some of them have been created by our faculty members. Many of these resources are publicly accessible, free, or with an open license to use. These materials include open and free tutorials, books, videos, labs, software, and services. For example, the majority of the network protocol specifications are published as Request for Comments (RFC) by the Internet Engineering Task Force (IETF) and the Internet Society (ISOC), the principal technical development and standards-setting bodies for the Internet. Security protocols such as Wi-Fi Protected Access version 2 (WPA2) are part of the IEEE 802.X group of networking protocols and their specifications are freely available on the Internet. IT security courses include hands-on labs where software and tools get updated frequently and current set of textbooks are not at par with the rapid update. These textbooks (see table 2) contain links to tools or websites which may no longer be available or supported for students to access needed information. As soon as a new version of a tool or software package is released, the instructions in a textbook become obsolete. Therefore, we need to include the latest available tools to prepare hands-on labs.

Many of the textbooks become outdated as soon as they are published, while digital delivery of the learning materials makes it easier to keep the content up-to-date. Developing and assembling a set of learning materials for major security-related courses is a unique approach. It will allow us to better align the learning material not only with the outcomes of each course, but also with the outcomes of the Information Technology program.

Compared to traditional textbooks, the open source software and web resources have many benefits: 1) the Web resources are generally free to use; 2) they are constantly being updated and always reflect the latest trends and industrial development; and, 3) the materials from the Web are also more dynamic and interactive. The pitfalls of Web resources are that they are often disorganized and may contain inaccurate information. However, members of our team of investigators are not only subject matter experts in the information security field, but also proficient educators who on average have more than 10 years teaching experience. We will select, organize and integrate resources from the web and transform the information into instructionally sound learning materials for the proposed courses including content that the team members develop themselves. We strongly believe that the new learning materials will offer up-to-date, equivalent or better learning effectiveness compared to the original textbooks. Digital delivery also allows us to add interactive elements into the learning materials. The interactive content will not only engage the students, but also improve their learning experience. It will help to enhance the learning outcomes and learning satisfaction.

3. The Impact of the Transformation
The impact of our transformation efforts will be profound. By our estimates, more than 850 students will benefit from the no-cost learning material each year. Moreover, it has the potential to benefit more students when the proposed Bachelor of Science in Cybersecurity (eMajor) is approved by the Board of Regents.. The goal of eMajor is to reduce the cost of education by using prior learning assessments, lower tuition and potentially no-cost learning materials (https://emajor.usg.edu). The proposed project is expected to save current students $117,843.60 in textbook costs each year (more if the eMajor is approved). Because of the cost savings from not having to buy textbooks, students may be able to take a few more courses each year and graduate sooner. Having a series of security courses adopting no-cost-to-student material not only offers better and more consistent learning experience to students, but also makes our nationally renowned IT programs more affordable. As a result, our IT programs could recruit more students and produce more qualified IT professionals that Georgia needs. Our experience gained in this transformation project could be useful to other programs or departments who want to lower the cost of education to their students. In summary, we believe the proposed project will have a positive impact in students' retention, progression, and graduation at program, department and institution levels. (http://achievingthedream.org/press_release/15982/achieving-the-dream-launches-major-national-initiative-to-help-38-community-colleges-in-13-states-develop-new-degree-programs-using-open-educational-resources , http://affordablelearninggeorgia.org/documents/ALG_Flyer_Sept_2014.4.pdf.

Transformation Action Plan:

With a coordinated effort, our team of investigators plan the following activities to transform all information security related courses to completely use no-cost learning materials:

* Research and identify no cost reading materials 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 content, 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.
* Adopt open source or no-cost-to-student lab ware for students to gain hands-on experience.
* Update the syllabus to include major resources and no cost materials.
* Re-develop the proposed courses in our learning management system, D2L Brightspace, following Quality MattersTM standards

The responsibilities of each investigator is described as follows.

Dr. Lei Li, IT 6833, Project lead; Subject matter expert, course developer and instructor of record of IT 6833.

Dr. Rebecca Rutherfoord, CSE 3801, subject matter expert, course developer and instructor of record for CSE 3801.

Dr. Svetlana Peltsverger, IT 6843, subject matter expert, course developer and instructor of record for IT 6843.

Dr. Hossain Shahriar, subject matter expert, course developer and instructor of record for IT 4843.

Prof. Dawn Tatum, IT 6883, subject matter expert, course developer and instructor of record for IT 6883.

Dr. Zhigang Li, Provide Instructional Design Support to all five proposed courses.

All course design with the no-cost materials will be provided through D2L Brightspace for our students and on the ALG website for the public access.

Quantitative & Qualitative Measures: The investigators plan to assess the effectiveness of our proposal in two ways - in the middle and at the end of the semester. Qualitatively, we will design a survey and gather inputs from the students after they use the no-cost learning material. Quantitatively, we will compare students' performance data gathered from sections using traditional textbooks and sections using no-cost learning material.

The investigators will collect student performance data such as pass rates from the five proposed courses taught with a textbook by team members between fall 2015 and summer 2016. This data will be used as a baseline for comparison of student performance in courses with alternative no cost material. Our assessment plan can be summarized as follows.

1. Student performance measures. This data is from the overall class performance based on the grading of student works. Metrics include:

* Class average, grades distribution, pass rate for each grading item.

* Overall letter grades distribution, pass rate, withdraw rate, and fail rate.

* Percentage of students meeting or exceeding learning outcomes

2. Specific survey on no-cost learning materials. A web-based survey will be developed for all proposed courses and be distributed at the end of the semester to collect student feedback. It 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 comments and suggestions

3. Student evaluation of the instructor. Formal student evaluation of the instructor can also provide information about teaching effectiveness using no cost materials. This evaluation is based on standardized forms for every course.For each of the measurement, the investigators are going to conduct two levels of analysis: 1) Comparing the achievement levels of the course learning

outcomes - generally, 75% is the aimed passing rate in undergraduate courses and 80% in graduate courses. 2) Comparing the achievement levels to those from past offerings where costly textbooks were used. The investigators will use the data from the sections taught in the past 2 years.In addition, Kennesaw State University requires all online courses to be reviewed and approved following an internal review process using Quality Matters (QM) standards. This review will ensure the no-cost learning materials used or developed for the cyber security courses are instructionally sound. The College of Computing and Software Engineering will also conduct subject matter expert reviews for all developed courses to ensure the quality of the learning materials.

Timeline:

Spring 2017

* Collect baseline statistics on each course (course developers – those faculty who are in charge of the course for this study)

* Course modules redesigned to use the no cost materials. These include all new content, readings, lecture notes, video clips, exercises, labs, and assignments. The changes are reflected in the learning module study guides. (completed by course developers)

* Course level assessment and informational materials redesign. This includes quizzes, tests, and syllabus. (course developers and instructional designer)

* Submit the developed courses for instructional design review through Quality Matters. (instructional designer and KSU Distance Learning Center office)

* Submit the developed courses for subject matter expert review. (department Chair)

Summer 2017

* Develop a survey on effectiveness of the no cost materials (all course developers and instructional designer)

* Teach:

o IT 6833 - Wireless Security, Dr. Li

o IT 6883 - Infrastructure Defense, Prof. Tatum

* Survey two summer courses and give student course evaluation (course developers and instructional designer)

Fall 2017

* Teach:

o IT 4843 - Ethical Hacking for Effective Defense, Dr. Shahriar

o IT 6843 - Ethical Hacking: Network Security and Penetration Testing, Dr. Peltsverger

o CSE 3801 - Professional Practices and Ethics, Dr. Rutherfoord

* Survey three fall courses and give student course evaluation (course developers and

instructional designer)

* Complete final assessment data analysis and prepare a final report (all course developers and instructional designer)

Budget:

The funding mainly compensates our team of investigator's work and activity beyond normal teaching load or other job responsibilities in order to successfully complete the project. For each proposed course, course developers approximately will spend at least 80 hours in developing the no-cost learning material and be the instructor of record, and, will spend 20 hours in course assessment. Instructional support will devote at a minimum 50 hours in assisting course developers. Thus, we request the budget of this project as follows.

Dr. Lei Li, Project lead; course developer and instructor of record of IT 6833, $5,000

Dr. Rebecca Rutherfoord, course developer and instructor of record for CSE 3801, $5,000

Dr. Svetlana Peltsverger, course developer and instructor of record for IT 6843, $5,000

Dr. Hossain Shahriar, course developer and instructor of record for IT 4843, $5,000

Prof. Dawn Tatum, subject matter expert, course developer and instructor of record for IT 6883, $5000

Dr. Zhigang Li, Provide Instructional Design Support to all five proposed courses, $3,000

Travel: $2,000, for project team members to attend the ALG kickoff and subsequent meetings to bring back information to the team members. Our project team is also planning to submit a paper to reputable IT education conferences such as ACM SIGITE 2017 (Special Interest Group in IT Education).

Total Budget: $30,000

Only open source software or free software will be used in this project thus there is no additional spending on software or equipment purchasing.

Sustainability Plan:

The IT department implemented a course developer system for all courses. A course developer updates course content based on research, publications and feedback from students and alumni. Each of investigators except the instructional designer is a course developer for corresponding course. A course developer creates and maintains the course materials and teaching plans. He/she also teaches the course at least once a year to make sure all resources are valid and makes necessary changes and updates. This makes sure all no-cost materials and resources are highly sustainable in the future offerings of this course.
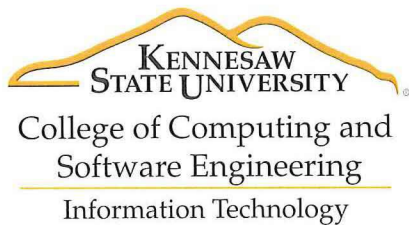
August 30, 2016

ALG Grant Committee
University System of GA

Dear Colleagues:

This letter is in support of the Proposal "Transformation at scale: Developing No-Cost-to-Student Information Technology Security Related Courses" 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.

Several faculty in the Information Technology Department at Kennesaw State University have successfully carried out one ALG grant for database courses in the curriculum. The current proposal addresses security related courses in the IT curriculum.   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.

I strongly support this proposal. This is a very sustainable proposal as we have a large Information Technology degree program. Many of our students take courses online as well as in-class. Creating the no-cost for textbook version of our security courses will allow students for many years to realize savings from not buying textbooks for both database and security courses.

This is a very solid proposal. All faculty participating in the first ALG grant completed their courses and offered them successfully. Papers for two conferences about the grant have been created and presented (one this end of September). I believe that this new ALG proposal will have the same student satisfaction and success that the first ALG grant did. This new proposal will have an even larger monetary impact on our students than the first grant. Thank you for your consideration for this proposal.

Sincerely,

Rebecca H. Rutherfoord, Ed.D.
Interim Assistant Dean of the College of Computing & Software Engineering, Department

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

College of Computing and
Software Engineering
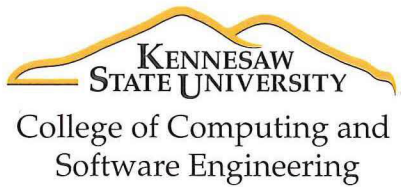
December 8, 2016

Dear Affordable Learning Georgia (ALG) Grant Reviewers,

It is my pleasure to write this letter in support of the proposal, "Transformation at scale: Developing No-Cost-to-Student Information Technology Security Related Courses", submitted by Dr. Li, Dr. Shahriar, Dr. Rutherfoord, Dr. Peltsverger, Dr. Li, and Ms. Tatum from our Information Technology (IT) Department at Kennesaw State University.

In this project, the primary investigators will work as a team to replace existing, costly textbooks in five information security related courses with no-cost-to-students learning materials. Their efforts will significantly lower the cost of education for students (saving over $100k per year at KSU alone) and generate a positive impact on the retention, progression, and graduation for the College of Computing and Software Engineering. Additionally, given the rapid change of the IT field, having digital materials available to students will improve the ability to keep them updated with the latest advances in the field of information security.

Four of the proposers have past experience with a successful ALG project, thus the quality and success of this new project is highly likely. The investigators in this project are also designated course architects who are responsible for the development and the maintenance of the to-be-transformed courses. The no-cost-to-students materials developed will be distributed using the course management system, GeorgiaView Desire2Learn. Thus, I believe the effort of this project will be sustainable over the long term and benefit students throughout Georgia.

In conclusion, I wholeheartedly support this effort. This proposal has the full support of the College of Computing and Software Engineering.

Sincerely,

Dr. Jon A. Preston
Interim Dean
College of Computing and Software Engineering
Kennesaw State University

Hello Textbook Transformation Grant Winners!

You are receiving this email because you have dedicated your time and expertise to reducing the student debt load at KSU. Please see your names and accomplishments listed below. In total, you have reduced at least $1,048,545 from the KSU student debt load each year. Please see the attached and submit your information for the SPSU L.V. Johnson Library Annual Authors Reception. And please let me know if there are any corrections or changes to the information below, as I would like to write up an article celebrating this incredible achievement. Thank you for all your hard work. Tammy

Camille Payne and Rachel Myers (Nursing) student savings, $30,468
Seneca Vaught and Griselda Thomas (AADS) $20,840
John Isenhour, Ophelia Santos, Charles Marvil (Culinary Studies) $13,875
Lake Ritter, Shangrong Deng (Math) $157,865
Guangzhi Zheng and Zhigang Li (Information Technology) $16,833
Lu Kang and Zhigang Li (Chemistry) $184,320
Lei Li, Rebecca Rutherford, Svetlana Peltsverger, Jack Zheng, Zhigang Li, Nancy Colyar (Computer Science/IT) $110,419
Ginny Zhan, May Gao, Yumin Ao (Asian Studies) $11,249
Carlton Usher and Linda Lyons (First Year Studies) $67,250
Daniel Farr and Tiffani Reardon (Sociology) $13,963.80
Tamara Powell, Jonathan Arnett, Monique Logan, Cassandra Race, Tiffani Reardon (DWMA/English) $51,615
Sharon Pearcey, Chris Randall, Jen Willard, Beth Kirsner, Adrienne Williamson, Tricia Mahaffey (Psychology) $345,912
Chi Zhang and Bob Brown (Information Technology) $23,936

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"My job is not to prop the door of opportunity open. It is to take that door off its hinges once and for all."
Former Massachusetts Lt. Gov. Evelyn Murphy

Dr. Tamara Powell
Director of Distance Education, College of Humanities and Social Sciences
Associate Professor of English
Kennesaw State University
CHSS Dean's Suite, 42 Bartow Avenue NW
MD 2201   Bldg. 22   Rm 5008
Kennesaw, GA 30144-5591
470-578-2911

Affordable Learning Georgia Textbook Transformation Grants
Rounds Six, Seven, and Eight
For Implementations beginning Fall Semester 2016
Running Through Fall Semester 2017

Proposal Form and Narrative

Submitter Name	*Lei Li*
Submitter Title	*Associate Professor of Information Technology*
Submitter Email	*lli13@kennesaw.edu*
Submitter Phone Number	(470) 578-3915
Submitter Campus Role	*Primary Investigator* *Select: Proposal Investigator (Primary or Additional); Sponsored Programs Office; Grants Office, Business Office; Provost/Academic Affairs Office; Other*
Applicant Name	*Lei Li* Primary Investigator/Team Lead
Applicant Email	*lli13@kennesaw.edu*
Applicant Phone Number	(470) 578-3915
Primary Appointment Title	*Associate Professor of Information Technology*
Institution Name(s)	Kennesaw State University
Team Members	Zhigang Li, Instructional Technology Specialist & Part-Time Assistant Professor of Information Technology, zli8@kennesaw.edu Lei Li, Associate Professor of Information Technology, li_lei@kennesaw.edu

Hossain Shahriar, Assistant Professor of Information Technology, hshahria@kennesaw.edu Rebecca Rutherfoord, Interim Assistant Dean of the College of Computing and Software Engineering, Chair of the Department of Information technology, and Professor of Information Technology, brutherf@kennesaw.edu Svetlana Peltsverger, Interim Associate Dean in the College of Computing and Software Engineering and Associate Professor of Information Technology, speltsve@kennesaw.edu Dawn Tatum, Lecturer of Information Technology, dtatum7@kennesaw.edu *(Name, Title, Department, Institutions if different, and email address for each)*	

Sponsor, Title, Department, Institution	*Department of Information Technology*

Proposal Title	Transformation at scale: Developing No-Cost-to-Student Information Technology Security Related Courses

Course Names, Course Numbers and Semesters Offered	*IT 4843 - Ethical Hacking for Effective Defense – Offered twice a year in summer & fall semesters.* *IT 6843 - Ethical Hacking: Network Security and Penetration Testing – Offered twice a year in summer & fall semesters.* *IT 6833 - Wireless Security– Offered once a year in spring semesters. It's also offer in summer semesters when needed.* *IT 6883 - Infrastructure Defense – Offered once a year in fall semesters.* *CSE 3801 - Professional Practices and Ethics– Offered three times a year in spring, summer & fall semesters with multiple sections each semester.*

Final Semester of Instruction	*Fall 2017*

Average Number of	34	**Number of Course Sections Affected by Implementation**	25	**Total Number of Students Affected by Implementation**	855

Students Per Course Section		in Academic Year		in Academic Year	

Award Category (pick one)	☒ No-or-Low-Cost-to-Students Learning Materials ☐ OpenStax Textbooks ☐ Interactive Course-Authoring Tools and Software ☐ Specific Top 100 Undergraduate Courses
List the original course materials for students (including title, whether optional or required, & cost for each item)	1. IT4843, Hands-On Ethical Hacking and Network Defense, 2nd Edition, by Michael T. Simpson, Kent Backman, James Corley, ISBN-13: 978-1435486096, 2011. Required. Cost: $202.30, enrollment:50, total cost: $10,115.00 2. IT6843,1) Hands-On Ethical Hacking and Network Defense, 2nd Edition, 2011, by Michael T. Simpson, Kent Backman, James Corley, ISBN-13: 978-1435486096.2) Gray Hat Hacking The Ethical Hackers Handbook, 3rd Edition, 2011, Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey, Terron Williams, McGraw Hill, ISBN-13: 978-0071742559. Required. Cost: 1) $202.30;2) $34.90, Total: 237.20, enrollment: 75, total cost: $17,790.00 3. IT6833, Praphul Chandra, 2005, Bulletproof Wireless Security: GSM, UMTS, 802.11, and Ad Hoc Security, Publisher: ELSEVIER, ISBN: 0-7506-7746-5. Required. Cost: $74.95, enrollment: 40, total cost: $2,998.00 4. IT6883, 1) Business Data Communications Infrastructure, Networking and Security (Edition 7th, 2012), William Stallings, Thomas Case, ISBN-10: 0-13-302389-3 ISBN-13: 978-0-13-302389-3; 2) Chained Exploits: Advanced Hacking Attacks From Start to Finish (Edition: 1st, 2009), Andrew Whitaker, Keatron Evans, Jack Voth, ISBN-13: 978-0321498816. Required. Cost: 1)$161.70, 2). $45.29, Total: $206.99, enrollment: 40, total cost: $8,279.60 5. CSE3801, A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology, 4th Ed., 2012, by Sara Baase, ISBN-13: 978-0132492676, Required. Cost: $115.70, enrollment: 680, total cost: $78,676.00.
Requested Amount of Funding	$30,000

Original Per Student Cost	$836.94
Post-Proposal Projected Per Student Cost	$0.
Projected Per Student Savings	$836.94
Projected Total Annual Student Savings	*$117,843.60*
Creation and Hosting Platforms Used	*Kennesaw State University D2L Brightspace*

NARRATIVE

1.1 PROJECT GOALS

In this project, we propose to take a department-wide effort to transform the five information security related courses using no-cost-to-students learning material. This project not only aims to reduce the financial burden imposed by high cost of textbooks, but also strives to develop free and open-access learning materials that offer equivalent or better educational effectiveness than traditional textbooks. We also plan to develop online offerings of proposed courses that meet the internationally recognized Quality Matters (QM) standards.

1.2 STATEMENT OF TRANSFORMATION

The Transformation Description

According to Priceonomics (http://priceonomics.com/which-major-has-the-most-expensive-textbooks/) an average undergraduate student annually spends $1,200 on textbooks. The price of textbooks is now leading students' course decisions (M. Parry, "Students Get Savvier About Textbook Buying," The Chronicle of Higher Education, 27-Jan-2013.). The cost of textbooks depends on the major, with computing textbooks being in the top most expensive, and, at the same time, having one of the smallest resale values (Priceonomics). This is more than true for textbooks in Cybersecurity. The content of

Cybersecurity courses is constantly changing with various innovations, updates, and revisions needed to keep the information current. Textbook publishers cannot keep up with the fast-moving changes in Cybersecurity and the textbook price for Cybersecurity is very high.

Georgia was recently ranked 3rd in the nation for information security, home to more than 115 information security-related companies (Technology Association of Georgia). Furthermore, there is a significant shortage of trained cybersecurity professionals anticipated in Georgia (USG Cyber Education Committee, 2015). In 2014, Georgia had an estimated 8000 open positions in cybersecurity-related fields with additional shortfalls expected in future years (USG Board of Regents Meeting Minutes, 2015). USG does not produce enough graduates for Georgia's job market. One of the reasons is the cost of education including textbook costs.

The textbooks currently used in the five proposed security related IT courses are quite expensive. Some textbooks do not have the latest edition in the market available (e.g., IT 6833 textbook is from 2005) or, not frequently updated (IT 4843 is from 2011 with new edition just released at the end of 2016 http://www.cengage.com/search/productOverview.do?N=16+4294922389&Ntk=P_EPI&Ntt=15299614671691324142564844329453982650&Ntx=mode%2Bmatchallpartial). The goal of our transformation is to replace the textbook used in the proposed courses with no-cost-to-students learning materials that offer equal or higher educational effectiveness and can be easily updated more frequently.

Four out of six team members were part of the round two of an "Affordable Learning Textbook Transformation Grant" in 2015 (round two, award #119). They designed and evaluated the effectiveness of no-cost-to-students learning materials for database courses in IT department, and saved students $110,419. The assessment results showed that the developed free material offered equivalent or better learning experience than the textbooks did. The preliminary results of the grant were published in the Proceedings of Southern Association for Information Systems Conference (SAIS 2016), the final results were published in the Proceedings of the ACM Special Interests Group in IT Education (SIGITE 2016), "Transforming IT Education with No-Cost Learning Materials". They also hosted a panel discussion on no-cost learning material in IT education, at SIGITE in October 2016. The panel attracted a lot of attention among computing faculty. Many colleagues from different states were impressed with the USG initiative and with course material developed by the team. Building on our past success and lessons learned from the prior ALG grant, we will continue our transformation efforts by developing no-cost learning material for five security related courses.

The Stakeholders of the Transformation

There are two primary sets of stakeholders for this proposal – the students taking the five security related IT classes (both in-class and online students), and the faculty developing and teaching those courses. The high cost of textbooks puts a large financial burden on students and may become a road block for students' ability to finish their education. Our team of investigators strives to make higher education more affordable to the students. The information security related learning materials are widely available on the World Wide Web today, and some of them have been created by our faculty members. Many of

these resources are publicly accessible, free, or with an open license to use. These materials include open and free tutorials, books, videos, labs, software, and services. For example, the majority of the network protocol specifications are published as Request for Comments (RFC) by the Internet Engineering Task Force (IETF) and the Internet Society (ISOC), the principal technical development and standards-setting bodies for the Internet. Security protocols such as Wi-Fi Protected Access version 2 (WPA2) are part of the IEEE 802.X group of networking protocols and their specifications are freely available on the Internet. IT security courses include hands-on labs where software and tools get updated frequently and current set of textbooks are not at par with the rapid update. These textbooks (see table 2) contain links to tools or websites which may no longer be available or supported for students to access needed information. As soon as a new version of a tool or software package is released, the instructions in a textbook become obsolete. Therefore, we need to include the latest available tools to prepare hands-on labs.

Many of the textbooks become outdated as soon as they are published, while digital delivery of the learning materials makes it easier to keep the content up-to-date. Developing and assembling a set of learning materials for major security-related courses is a unique approach. It will allow us to better align the learning material not only with the outcomes of each course, but also with the outcomes of the Information Technology program.

Compared to traditional textbooks, the open source software and web resources have many benefits: 1) the Web resources are generally free to use; 2) they are constantly being updated and always reflect the latest trends and industrial development; and, 3) the materials from the Web are also more dynamic and interactive. The pitfalls of Web resources are that they are often disorganized and may contain inaccurate information. However, members of our team of investigators are not only subject matter experts in the information security field, but also proficient educators who on average have more than 10 years teaching experience. We will select, organize and integrate resources from the web and transform the information into instructionally sound learning materials for the proposed courses including content that the team members develop themselves. We strongly believe that the new learning materials will offer up-to-date, equivalent or better learning effectiveness compared to the original textbooks. Digital delivery also allows us to add interactive elements into the learning materials. The interactive content will not only engage the students, but also improve their learning experience. It will help to enhance the learning outcomes and learning satisfaction.

The Impact of the Transformation

The impact of our transformation efforts will be profound. By our estimates, more than 850 students will benefit from the no-cost learning material each year. Moreover, it has the potential to benefit more students when the proposed Bachelor of Science in Cybersecurity (eMajor) is approved by the Board of Regents.. The goal of eMajor is to reduce the cost of education by using prior learning assessments, lower tuition and potentially no-cost learning materials (https://emajor.usg.edu). The proposed project is expected to save current students $117,843.60 in textbook costs each year (more if the eMajor is approved). Because of the cost savings from not having to buy textbooks,

students may be able to take a few more courses each year and graduate sooner. Having a series of security courses adopting no-cost-to-student material not only offers better and more consistent learning experience to students, but also makes our nationally renowned IT programs more affordable. As a result, our IT programs could recruit more students and produce more qualified IT professionals that Georgia needs. Our experience gained in this transformation project could be useful to other programs or departments who want to lower the cost of education to their students. In summary, we believe the proposed project will have a positive impact in students' retention, progression, and graduation at program, department and institution levels. (http://achievingthedream.org/press_release/15982/achieving-the-dream-launches-major-national-initiative-to-help-38-community-colleges-in-13-states-develop-new-degree-programs-using-open-educational-resources , http://affordablelearninggeorgia.org/documents/ALG_Flyer_Sept_2014.4.pdf.

1.3   TRANSFORMATION ACTION PLAN

With a coordinated effort, our team of investigators plan the following activities to transform all information security related courses to completely use no-cost learning materials:

- Research and identify no cost reading materials 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 content, 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.
- Adopt open source or no-cost-to-student lab ware for students to gain hands-on experience.
- Update the syllabus to include major resources and no cost materials.
- Re-develop the proposed courses in our learning management system, D2L Brightspace, following Quality Matters^{TM} standards

The responsibilities of each investigator is described as follows.

Dr. Lei Li, IT 6833, Project lead; Subject matter expert, course developer and instructor of record of IT 6833.
Dr. Rebecca Rutherfoord, CSE 3801, subject matter expert, course developer and instructor of record for CSE 3801.
Dr. Svetlana Peltsverger, IT 6843, subject matter expert, course developer and instructor of record for IT 6843.
Dr. Hossain Shahriar, subject matter expert, course developer and instructor of record for IT 4843.
Prof. Dawn Tatum, IT 6883, subject matter expert, course developer and instructor of record for IT 6883.
Dr. Zhigang Li, Provide Instructional Design Support to all five proposed courses.

All course design with the no-cost materials will be provided through D2L Brightspace for our students and on the ALG website for the public access.

1.4   QUANTITATIVE AND QUALITATIVE MEASURES

The investigators plan to assess the effectiveness of our proposal in two ways - in the middle and at the end of the semester. Qualitatively, we will design a survey and gather inputs from the students after they use the no-cost learning material. Quantitatively, we will compare students' performance data gathered from sections using traditional textbooks and sections using no-cost learning material.

The investigators will collect student performance data such as pass rates from the five proposed courses taught with a textbook by team members between fall 2015 and summer 2016. This data will be used as a baseline for comparison of student performance in courses with alternative no cost material. Our assessment plan can be summarized as follows.

1. Student performance measures. This data is from the overall class performance based on the grading of student works. Metrics include:
    * Class average, grades distribution, pass rate for each grading item.
    * Overall letter grades distribution, pass rate, withdraw rate, and fail rate.
    * Percentage of students meeting or exceeding learning outcomes
2. Specific survey on no-cost learning materials. A web-based survey will be developed for all proposed courses and be distributed at the end of the semester to collect student feedback. It 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 comments and suggestions
3. Student evaluation of the instructor. Formal student evaluation of the instructor can also provide information about teaching effectiveness using no cost materials. This evaluation is based on standardized forms for every course.

For each of the measurement, the investigators are going to conduct two levels of analysis: 1) Comparing the achievement levels of the course learning outcomes - generally, 75% is the aimed passing rate in undergraduate courses and 80% in graduate courses. 2) Comparing the achievement levels to those from past offerings where costly textbooks were used. The investigators will use the data from the sections taught in the past 2 years.

In addition, Kennesaw State University requires all online courses to be reviewed and approved following an internal review process using Quality Matters (QM) standards. This review will ensure the no-cost learning materials used or developed for the cyber security courses are instructionally sound. The College of Computing and Software Engineering will also conduct subject matter expert reviews for all developed courses to ensure the quality of the learning materials.

1.5   TIMELINE

Spring 2017
- Collect baseline statistics on each course (course developers – those faculty who are in charge of the course for this study)
- Course modules redesigned to use the no cost materials. These include all new content, readings, lecture notes, video clips, exercises, labs, and assignments. The changes are reflected in the learning module study guides. (completed by course developers)
- Course level assessment and informational materials redesign. This includes quizzes, tests, and syllabus. (course developers and instructional designer)
- Submit the developed courses for instructional design review through Quality Matters. (instructional designer and KSU Distance Learning Center office)
- Submit the developed courses for subject matter expert review. (department Chair)

Summer 2017
- Develop a survey on effectiveness of the no cost materials (all course developers and instructional designer)
- Teach:
  - IT 6833 - Wireless Security, Dr. Li
  - IT 6883 - Infrastructure Defense, Prof. Tatum
- Survey two summer courses and give student course evaluation (course developers and instructional designer)

Fall 2017
- Teach:
  - IT 4843 - Ethical Hacking for Effective Defense, Dr. Shahriar
  - IT 6843 - Ethical Hacking: Network Security and Penetration Testing, Dr. Peltsverger
  - CSE 3801 - Professional Practices and Ethics, Dr. Rutherfoord
- Survey three fall courses and give student course evaluation (course developers and instructional designer)
- Complete final assessment data analysis and prepare a final report (all course developers and instructional designer)

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1.6   BUDGET

The funding mainly compensates our team of investigator's work and activity beyond normal teaching load or other job responsibilities in order to successfully complete the project. For each proposed course, course developers approximately will spend at least 80 hours in developing the no-cost learning material and be the instructor of record, and, will spend 20 hours in course assessment. Instructional support will devote at a minimum 50 hours in assisting course developers. Thus, we request the budget of this project as follows.

Dr. Lei Li, Project lead; course developer and instructor of record of IT 6833, $5,000
Dr. Rebecca Rutherfoord, course developer and instructor of record for CSE 3801, $5,000

Dr. Svetlana Peltsverger, course developer and instructor of record for IT 6843, $5,000
Dr. Hossain Shahriar, course developer and instructor of record for IT 4843, $5,000
Prof. Dawn Tatum, subject matter expert, course developer and instructor of record for IT 6883, $5000
Dr. Zhigang Li, Provide Instructional Design Support to all five proposed courses, $3,000
Travel: $2,000, for project team members to attend the ALG kickoff and subsequent meetings to bring back information to the team members. Our project team is also planning to submit a paper to reputable IT education conferences such as ACM SIGITE 2017 (Special Interest Group in IT Education).

Total Budget: $30,000

Only open source software or free software will be used in this project thus there is no additional spending on software or equipment purchasing.

1.7 SUSTAINABILITY PLAN

The IT department implemented a course developer system for all courses. A course developer updates course content based on research, publications and feedback from students and alumni. Each of investigators except the instructional designer is a course developer for corresponding course. A course developer creates and maintains the course materials and teaching plans. He/she also teaches the course at least once a year to make sure all resources are valid and makes necessary changes and updates. This makes sure all no-cost materials and resources are highly sustainable in the future offerings of this course.

1.8 REFERENCES & ATTACHMENTS

Two letters of support from the Dean of College of Computing and Software Engineering and the chair of Information Technology Department are attached. In addition, a letter of recognition from the director of Distance Learning at Kennesaw State University.