Grants Collection
Kennesaw State University

UNIVERSITY SYSTEM OF GEORGIA

Meng Han, Lei Li, Zhigang Li, Svetlana Peltsverger, Ming Yang, and Guangzhi Zheng

Data Communication and Networking

Affordable Learning Georgia

Georgia's Virtual Library GALILEO
An Initiative of the University System of Georgia

Grants Collection

Affordable Learning Georgia Grants Collections are intended to provide faculty with the frameworks to quickly implement or revise the same materials as a Textbook Transformation Grants team, along with the aims and lessons learned from project teams during the implementation process.

Each collection contains the following materials:

- Linked Syllabus
  - The syllabus should provide the framework for both direct implementation of the grant team's selected and created materials and the adaptation/transformation of these materials.
- Initial Proposal
  - The initial proposal describes the grant project's aims in detail.
- Final Report
  - The final report describes the outcomes of the project and any lessons learned.

Initial Proposal

Application Details

Manage Application: Textbook Transformation Grants: Round Ten

Award Cycle:	Round 10
Internal Submission Deadline:	Friday, September 29, 2017

Application Title:	334
Application ID:	001886
Submitter First Name:	Meng
Submitter Last Name:	Han
Submitter Title:	Assitant Professor
Submitter Email Address:	mhan9@kennesaw.edu
Submitter Phone Number:	4049077586
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Meng
Applicant Last Name:	Han
Co-Applicant Name(s):	Lei Li
Applicant Email Address:	mhan9@kennesaw.edu
Applicant Phone Number:	4049077586
Primary Appointment Title:	Assitant Professor
Institution Name(s):	Kennesaw State University
Submission Date:	Monday, October 2, 2017

Proposal Title:	334
Proposal Category:	No-Cost-to-Students Learning Materials
Are you using an OpenStax textbook?:	No
Final Semester of Instruction:	Fall 2018

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

Meng Han, Assistant Professor of Information Technology, mhan9@kennesaw.edu

Lei Li, Professor of Information Technology, lli13@kennesaw.edu

Zhigang Li, Instructional Designer & Part-Time Assistant Professor of Information Technology,

zli8@kennesaw.edu

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

Ming Yang, Professor of Information Technology, myang8@kennesaw.edu

Guangzhi Zheng, Associate Professor of Information Technology, gzheng@kennesaw.edu

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

Department of Information Technology, Kennesaw State University

Course Names, Course Numbers and Semesters Offered:

CSE 3203 - Overview of Mobile Systems - Offered twice a year in spring & fall semesters.

IT 4323 - Data Communication and Networking - Offered three times a year in spring, summer & fall semester with multiple sections each semester.

IT 4833 - Wireless Security - Offered once a year in spring semesters.

IT 6203 - IT Design Studio - Offered twice a year in spring & fall semesters.

IT-6823 Information Security Concepts and Administration - Offered three times a year in spring, summer & fall semester with multiple sections each semester.

List the original course materials for students (including title, whether optional or required, & cost for each item):	Table "Summary of Savings with No-Cost Learning Material"
Average Number of Students per Course Section:	32
Number of Course Sections Affected by Implementation in Academic Year:	19

Average Number of Course Sections Per Semester:

Table "Student Enrollment Summary & Projection"

Course	Spring 2017	Summer 2017	Fall 2017	Total	Projected 2018 Enrollment

					Number of Sections	Total Number of students
CSE 3203	16		24	40	2	50
IT 4323	75	25	84	184	6	230
IT 4833	40			40	2	50
IT 6203	34		57	91	4	120
IT 6823	47	15	45	107	5	150
Total	**212**	**40**	**210**	**462**	**19**	**600**

Total Number of Students Affected by Implementation in Academic Year: 600

Requested Amount of Funding: $30,000

Original per Student Cost: $609.50

Post-Proposal Projected Student Cost: $0.00

Projected Per Student Savings: $609.50

Projected Total Annual Student Savings: $74,410.50

Project Goals:

In this project, we propose to take a department-wide effort to transform the five mobile and network related courses using no-cost-to-students learning materials. This project not only aims to reduce the financial burden imposed by the 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.

Statement of Transformation:

As shown in the Table “Summary of Savings with No-Cost Learning Material”, the textbooks used in the five proposed mobile and network related IT courses are expensive. In fact, most textbooks used in IT mobile and network courses are costly in general. In addition, due to the fast-evolving nature of the technology field, the textbooks used in the proposed courses are updated frequently, which negatively impacts their resale value. Some textbooks do not have the latest edition available in the market (e.g., IT 4833’s textbook is from 2005, IT 6823 is from 2004, see Table “Summary of Savings with No-Cost Learning Material”). 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.

The proposed transformation is an economic and viable solution for the following reasons:

Firstly, the mobile and network related learning materials 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. These materials include open and free tutorials, books, videos, labs, test banks, software, and services. For example, the majority of the network protocols 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. The mobile related topics are also strongly supported by the open source communities especially from the community of Android, and many learning materials are available and open to the public. Wireless 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.

Secondly, Web content can better reflect the latest trends and industrial development than the traditional textbooks as technology is changing rapidly, so is the content of Web resources. Many textbooks may become outdated at the moment they are published. As a matter of fact, many faculties have to use contents from the Web as supplemental materials to the textbook. For example, IT mobile and network courses include hands-on labs where software and tools get updated frequently and the current set of textbooks are not on par with the rapid updates. Current textbooks used in the proposed courses contain links to tools or websites which may no longer be available or supported. 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 and available open source tools to prepare hands-on labs.

Thirdly, the materials from the Web are generally more interactive. The interactive content will not only engage the students, but also improve their learning experience. For example, a student can better learn how a network protocol works through an animation or a video than a printed diagram in a textbook.

Fourthly, 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 our Information Technology program.

Lastly, our team members are well prepared for the proposed transformation. The downsides of using Web resources are that they are often disorganized, may contain inaccurate information, may be changed or deleted without notice. However, our team members are not only subject matter experts in the mobile and network 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 material. All courses in the department are reviewed every three years as part of the continuous improvement process. In addition,

several of team members successfully completed three rounds of ALG grants (round 1 award #42, round 2 #119, and round 8 #302). As part of a department effort, we had transformed 10 IT courses using no-cost-to-student learning material. Those courses were very well received by our students and saved our students more than $200,000 in textbook cost. 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.

The impact of our transformation efforts will be profound. By our estimates, more than 600 students will benefit from the no-cost learning material each year. The proposed project is expected to save students $74,410.50 in textbook cost each year. 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 mobile and network courses adopting no-cost-to-student material not only offers better and more consistent learning experience for students, but also makes our nationally renowned IT programs more affordable. As a result, we could recruit more students and produce more qualified IT professionals that the State of Georgia needs. Developing no-cost-to-student materials can help us better align course content with its learning outcomes and outcomes of our program, which will create the positive impact in terms of curriculum development. Moreover, the learning materials developed in this proposal will be made available to the public and can be easily adopted by other programs or intuitions who want to lower the cost of education to their students. Lastly, we believe that our experience gained in this transformation project could be beneficial to the academic community. We presented our previous ALG grant experience in two national educational conferences: Southern Association for Information Systems Conference (SAIS 2016) and ACM Special Interests Group in IT Education (SIGITE 2016). We also hosted a panel to discuss the not-cost-to-student learning material in SIGITE 2016 and will host another panel in the 14th Annual Open Education Conference in October 2017. Our presence in the national conferences greatly increased the academic community's awareness on no-cost-to-student learning material and stimulated intriguing discussions among our follow educators. We plan to continue doing so in IT academic society with the proposed transformation efforts. In summary, we believe the proposed project will have a positive impact on students' retention, progression, and graduation at program, department and institution level.

Transformation Action Plan:

With a coordinated effort, our team of investigators plans the following activities to transform all mobile and network related courses to completely use no-cost learning materials:

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.
Adopt open source or no-cost-to-student labware 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.

The responsibilities of each investigator are described in table “Investigator Responsibilities”.

Table "Investigator Responsibilities"

Primary Investigator	Course	Responsibilities
Dr. Meng Han	IT 4323	Project lead; Subject matter expert and developer; instructor of record
Dr. Lei Li	IT 4833	Subject Matter Expert and developer; instructor of record
Dr. Guangzhi Zheng	CSE 3203	Subject Matter Expert and developer; instructor of record
Dr. Svetlana Peltsverger	IT 6203	Subject Matter Expert and developer; instructor of record
Dr. Ming Yang	IT 6823	Subject Matter Expert and developer; instructor of record
Dr. Zhigang Li	All Courses	Provide Instructional Design and Hosting Support.

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

Quantitative & Qualitative Measures: The investigators plan to assess the effectiveness of our proposal in two ways: 1) qualitatively, we will design a survey and gather inputs from the students after they used the no-cost learning material; 2) 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 on the five proposed courses between fall 2016 and summer 2017. This data will be used as a baseline for comparison of student performance in courses with alternative no cost material. The detailed assessment plan is shown in table "Assessment Plan".For each of the measurement, the investigators are going to conduct two levels of analysis:1. Comparing them to the preset goals. Generally, 75% is the aimed passing rate in undergraduate courses and 80% in graduate courses.2. Comparing them to those from past offerings where costly textbooks were used. The investigators will obtain the data from the sections taught in the past 2 years.Table "Assessment Plan"

Timeline:

The major milestones of the proposal are illustrated in table "Major Milestone".

Table "Major Milestone"

Milestone dates	Milestone
10/01/2017	Complete baseline gathering of statistics
11/30/2017	Complete course level materials redesign, which includes quizzes, tests, and syllabus for IT 4833. Complete course modules schedule to use the no-cost materials for CSE 3203, IT 4323, IT 6203, and IT 6823.

12/31/2017	Complete project progress report for IT 4833. Complete course modules redesign materials outline for CSE 3203, IT 4323, IT 6203, and IT 6823.
03/01/2018	Complete the development of no cost materials include all reading, lecture notes, video clips, exercises, labs, and assignments materials for CSE 3203, IT 4323, IT 6203, and IT 6823. The changes are reflected in the learning module study guides.
04/01/2018	Complete course level materials redesign materials for CSE 3203, IT 4323, IT 6203, and IT 6823 including quizzes, tests, and syllabus.
05/05/2018	Complete the course offering for IT 4833. Complete the survey data collection for IT 4833. Complete student evaluation for IT 4833.
05/20/2018	Complete assessment data collection and analysis for IT 4833. Deliver the status report for IT 4833. Compile final report for IT 4833.
06/20/2018	Based on the feedback of IT 4833, further adjust the development of CSE 3203, IT 4323, IT 6203, and IT 6823 including all reading, lecture notes, video clips, exercises, labs, and assignments materials, quizzes, tests, and syllabus.
08/01/2018	Develop a survey on the effectiveness of the no-cost materials for course CSE 3203, IT 4323, IT 6203, and IT 6823.

12/05/2018	Complete the course offering for CSE 3203, IT 4323, IT 6203, and IT 6823. Complete the survey data collection for all offered courses. Complete student evaluation for all offered courses.
12/15/2018	Complete assessment data collection and analysis for the whole project. Deliver the final status report. Compile final report.

Budget:

Funding will compensate team member's work and activity beyond normal teaching load or other job responsibilities. For each proposed course, course architects will spend approximately 80 hours to develop the no-cost learning material. The instructor of records will spend 20 hours in course assessment. Instructional support will include at least about 50 hours to assist course architects. The role for each PI and the corresponding compensation are listed as follows:

Table "Budget for Investigators Compensation"

Team Member	Role	Investigators compensation
Dr. Meng Han	IT 4323 developer & instructor	$5,000
Dr. Lei Li	IT 4833 developer & instructor	$5,000
Dr. Guangzhi Zheng	CSE 3203 developer & instructor	$5,000
Dr. Svetlana Peltsverger	IT 6203 developer & instructor	$5,000
Dr. Ming Yang	IT 6823 developer & instructor	$5,000
Dr. Zhigang Li	All courses support	$3,000

Investigators compensation: $5000*5 + 3,000 = $28,000

Travel & Other Expense: $2,000

$800 is budgeted for two team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.
An additional $1200 is budgeted for one team member to attend the ACM Special Interests Group in IT Education (SIGITE 2018).

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 implements a course architect system for all courses. Each course is assigned to a faculty as the course architect who is responsible for the content of the course and teaches the course regularly. All of our investigators except the instructional designer is a course architecture for the corresponding courses (please see table "Investigator Responsibilities"). Our team members 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 members will also make sure a course is continuously taught using the developed no-cost learning material in the future semesters even the course might have a different instructor.

The IT department also has a well-established continuous course improvement plan. Each course is assessed each semester after being taught, and a course will be formally evaluated and updated every three years. 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 their support letters, our transformation efforts also have strong support from our department chair and the dean of our college which further ensure the sustainability of our transformation efforts.

KENNESAW STATE UNIVERSITY

College of Computing and Software Engineering

September 27, 2017

Dear Affordable Learning Georgia (ALG) Grant Reviewers,

It is my pleasure to write this letter in support of the proposal, "Connecting the World: Developing No-Cost-to-Student Learning Materials for Mobile and Network Related Information Technology Courses", submitted by Dr. Meng Han, Dr. Lei Li, Dr. Svetlana Peltsverger, Dr. Ming Yang, Dr. Guangzhi Zheng, and Dr. Zhigang Li 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 mobile and network-related information technology courses with no-cost-to-students learning materials. Their efforts will significantly lower the cost of education for students 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 mobile and network technology.

Several of the team members successfully completed three rounds of ALG grants (round 1 award #42, round 2 #119, and round 8 #302), 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-student's materials developed will be distributed using the course management system, Desire2Learn Brightspace. Thus, I believe the effort of this project will be sustainable over the long term and benefit students throughout Georgia.

This proposal has the 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

KENNESAW STATE UNIVERSITY
College of Computing and Software Engineering
Information Technology

September 27, 2017

ALG Grant Committee University System of GA
Dear Colleagues:

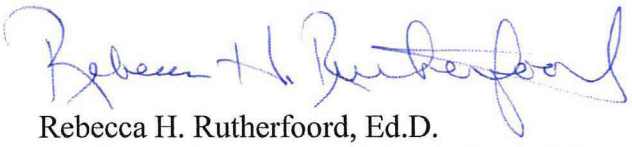
This letter is in support of the Proposal "Connecting the World: Developing No-Cost-to-Student Learning Materials for Mobile and Network Related Information Technology Courses" submitted from Kennesaw State University, Information Technology department faculty. As Department Chair for Information Technology, 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 an ALG grant for web courses (round 1 #42) database courses (round 2 #119), and security courses (round 8 #302) in the curriculum. The current proposal addresses mobile and network 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 the textbook version of our mobile and network courses will allow students for many years to realize savings from not buying textbooks for these courses.

This is a very solid proposal. All faculty participating in the previous ALG grants completed their courses and offered them successfully. I believe that this new ALG proposal will have the same student satisfaction and success that the previous ALG grants did. This new proposal will have an even larger monetary impact on our students than the previous grants. Thank you for your consideration of 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

Affordable Learning Georgia Textbook Transformation Grants
Rounds Ten for Implementations beginning Fall Semester 2017
Running Through Fall Semester 2018

Proposal Form and Narrative

Submitter Name	***Meng Han***
Submitter Title	***Assistant Professor of Information Technology***
Submitter Email	***mhan9@kennesaw.edu***
Submitter Phone Number	(470) 578-3801
Submitter Campus Role	*Primary Investigator*
Applicant Name	***Meng Han*** *Primary Investigator/Team Lead*
Applicant Email	***mhan9@kennesaw.edu***
Applicant Phone Number	(470) 578-3801
Primary Appointment Title	***Assistant Professor of Information Technology***
Institution Name(s)	Kennesaw State University

Team Members	Meng Han, Assistant Professor of Information Technology, mhan9@kennesaw.edu Lei Li, Professor of Information Technology, lli13@kennesaw.edu Zhigang Li, Instructional Designer & Part-Time Assistant Professor of Information Technology, zli8@kennesaw.edu Svetlana Peltsverger, Interim Associate Dean of the College of Computing and Software Engineering and Professor of Information Technology, speltsve@kennesaw.edu Ming Yang, Professor of Information Technology, myang8@kennesaw.edu Guangzhi Zheng, Associate Professor of Information Technology, gzheng@kennesaw.edu
Sponsor, Title, Department, Institution	*Department of Information Technology*
Proposal Title	Connecting the World: Developing No-Cost-to-Student Learning Materials for Mobile and Network Related Information Technology Courses
Course Names, Course Numbers and Semesters Offered	*CSE 3203 - Overview of Mobile Systems - Offered twice a year in spring & fall semesters.* *IT 4323 - Data Communication and Networking - Offered three times a year in spring, summer & fall semester with multiple sections each semester.* *IT 4833 - Wireless Security - Offered once a year in spring semesters.* *IT 6203 - IT Design Studio - Offered twice a year in spring & fall semesters.* *IT 6823 Information Security Concepts and Administration - Offered three times a year in spring, summer & fall semester with multiple sections each semester.*

Final Semester of Instruction	*Fall 2018*				
Average Number of Students Per Course Section	32	**Number of Course Sections Affected by Implementation in Academic Year**	19	**Total Number of Students Affected by Implementation in Academic Year**	600
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)	See Table 2 “Summary of Savings with No-Cost Learning Material”.				
Requested Amount of Funding	$30,000				
Original Per Student Cost	$609.50				

Post-Proposal Projected Per Student Cost	$0.00
Projected Per Student Savings	$609.50
Projected Total Annual Student Savings	$74,410.50
Creation and Hosting Platforms Used	*Kennesaw State University D2L Brightspace*

Table 1. Student Enrollment Summary & Projection

Course	Spring 2017	Summer 2017	Fall 2017	Total	Projected 2018 Enrollment	
					Number of Sections	Total Number of students
CSE 3203	16		24	40	2	50
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IT 6203	34		57	91	4	120
IT 6823	47	15	45	107	5	150
Total	**212**	**40**	**210**	**462**	**19**	**600**

Table 2. Summary of Savings with No-Cost Learning Material

Course	Textbook Used	Cost per Student	Projected Enrollment	Projected Costs

CSE 3203	Introduction to Wireless and Mobile Systems Authors: Dharma P. Agrawal, Qing-An Zeng. Publisher: CL Engineering; 4th edition (January 1, 2015), ISBN-13: 978-1305087132	$184.95	50	$9,247.50
IT 4323	Data Communications and Networking, Author: Behrouz A. Forouzan. Publisher: McGraw-Hill Education; 5th edition (February 17, 2012), ISBN-13: 978-0073376226. Required.	$142.19	230	$32,703.70
IT 4833	Bulletproof Wireless Security: GSM, UMTS, 802.11, and Ad Hoc Security, Author: Praphul Chandra. Publisher: ELSEVIER 2005, ISBN: 0-7506-7746-5	$74.95	50	$3,747.50
IT 6203	• Enterprise Systems Integration: A Process-Oriented Approach, Author: Diogo R. Ferreira. Publisher: Springer; 2013 edition (December 4, 2013), ISBN 978-3-642-40796-3 $79.99 Proposed new book for fall 18	$79.99	120	$9,598.80
IT 6823	• Introduction to Computer Security, Addison Wesley, 2004. Matt Bishop, ISBN: 0-321-24744-2.	$127.42	150	$19,113.00
	Total:	$609.50	600	$74,410.50

NARRATIVE

1.1 PROJECT GOALS

In this project, we propose to take a department-wide effort to transform the five mobile and network 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.

1.2 STATEMENT OF TRANSFORMATION

As shown in the table 2 “Summary of Savings with No-Cost Learning Material”, the textbooks used in the five proposed mobile and network related IT courses are expensive. In fact, most textbooks used in IT mobile and network courses are

costly in general. In addition, due to the fast evolving nature of the technology field, the textbooks used in the proposed courses are updated frequently, which negatively impacts their resale value. Some textbooks do not have the latest edition available in the market (e.g., IT 4833's textbook is from 2005, IT 6823 is from 2004, see Table 2 "Summary of Savings with No-Cost Learning Material"). 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.

The proposed transformation is an economic and viable solution for the following reasons:

Firstly, the mobile and network related learning materials 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. These materials include open and free tutorials, books, videos, labs, test banks, software, and services. For example, the majority of the network protocols 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. The mobile related topics are also strongly supported by the open source communities especially from the community of Android, and many learning materials are available and open to the public. Wireless 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.

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Fourthly, 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 our Information Technology program.

Lastly, our team members are well prepared for the proposed transformation. The downsides of using Web resources are that they are often disorganized, may contain inaccurate information, may be changed or deleted without notices. However, our team members are not only subject matter experts in the mobile and network 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 material. All courses in the department are reviewed every three years as part of the continuous improvement process. In addition, several of team members successfully completed three rounds of ALG grants (round 1 award #42, round 2 #119, and round 8 #302). As part of a department effort, we had transformed 10 IT courses using no-cost-to-student learning material. Those courses were very well received by our students and saved our students more than $200,000 in textbook cost. 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.

1.3. Impact of the Transformation

The impact of our transformation efforts will be profound. By our estimates, more than 600 students will benefit from the no-cost learning material each year. The proposed project is expected to save students $74,410.50 in textbook cost each year. 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 mobile and network courses adopting no-cost-to-student material not only offers better and more consistent learning experience for students, but also makes our nationally renowned IT programs more affordable. As a result, we could recruit more students and produce more qualified IT professionals that the State of Georgia needs. Developing no-cost-to-student materials can help us better align course content with its learning outcomes and outcomes of our program, which will create positive impact in term of curriculum development. Moreover, the learning materials developed in this proposal will be made available to the public and can be easily adopted by other programs or intuitions who want to lower the cost of education to their students. Lastly, we believe that our experience gained in this transformation project could be beneficial to the academic community. We presented our previous ALG grant experience in two national educational conferences: Southern Association for Information Systems Conference (SAIS 2016) and ACM Special Interests Group in IT Education (SIGITE 2016). We also hosted a panel to discuss the not-cost-to-student learning material in SIGITE 2016 and will host another panel in the 14th Annual Open Education Conference in October 2017. Our presence in the national conferences greatly increased the academic community's awareness on no-cost-to-student learning material and stimulated intriguing discussions among our follow educators. We plan to continue doing so in IT academic society with the proposed transformation efforts. In summary, we believe the proposed project will have a positive impact in students' retention, progression, and graduation at program, department and institution level.

1.4 TRANSFORMATION ACTION PLAN

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

- 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.
- Adopt open source or no-cost-to-student labware 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.

The responsibilities of each investigator is described in table 3 "Investigator Responsibilities".

Table 3. Investigator Responsibilities

Primary Investigator	Course	Responsibilities
Dr. Meng Han	IT 4323	Project lead; Subject matter expert and developer; instructor of record
Dr. Lei Li	IT 4833	Subject Matter Expert and developer; instructor of record
Dr. Guangzhi Zheng	CSE 3203	Subject Matter Expert and developer; instructor of record
Dr. Svetlana Peltsverger	IT 6203	Subject Matter Expert and developer; instructor of record
Dr. Ming Yang	IT 6823	Subject Matter Expert and developer; instructor of record
Dr. Zhigang Li	All Courses	Provide Instructional Design and Hosting Support.

All course design with the no-cost materials will be provided through D2L Brightspace for our students and on 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: 1) qualitatively, we will design a survey and gather inputs from the students after they used the no-cost learning material; 2) 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 on the five proposed courses between fall 2016 and summer 2017. This data will be used as a baseline for comparison of student performance in courses with alternative no cost material. The detailed assessment plan is shown in table 4.
For each of the measurement, the investigators are going to conduct two levels of analysis:

1. Comparing them to the preset goals. Generally, 75% is the aimed passing rate in undergraduate courses and 80% in graduate courses.
2. Comparing them to those from past offerings where costly textbooks were used. The investigators will obtain the data from the sections taught in the past 2 years.

Table 4. Assessment Plan

Source	Description
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
Specific survey on no-cost learning materials.	The survey will 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
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.

1.5 TIMELINE

The major milestones of the proposal are illustrated in table 5.

Table 5. Major Milestone

Milestone dates	Milestone
10/01/2017	Complete baseline gathering of statistics
11/30/2017	Complete course level materials redesign, which includes quizzes, tests, and syllabus for IT 4833. Complete course modules schedule to use the no cost materials for CSE 3203, IT 4323, IT 6203, and IT 6823.
12/31/2017	Complete project progress report for IT 4833. Complete course modules redesign materials outline for CSE 3203, IT 4323, IT 6203, and IT 6823.
03/01/2018	Complete the development of no cost materials include all reading, lecture notes, video clips, exercises, labs, and assignments materials for CSE 3203, IT 4323, IT 6203, and IT 6823. The changes are reflected in the learning module study guides.
04/01/2018	Complete course level materials redesign materials for CSE 3203, IT 4323, IT 6203, and IT 6823 including quizzes, tests, and syllabus.
05/05/2018	Complete the course offering for IT 4833. Complete the survey data collection for IT 4833. Complete student evaluation for IT 4833.
05/20/2018	Complete assessment data collection and analysis for IT 4833. Deliver the status report for IT 4833. Compile final report for IT 4833.
06/20/2018	Based on the feedback of IT 4833, further adjust the development of CSE 3203, IT 4323, IT 6203, and IT 6823 including all reading, lecture notes, video clips, exercises, labs, and assignments materials, quizzes, tests, and syllabus.
08/01/2018	Develop a survey on effectiveness of the no cost materials for course CSE 3203, IT 4323, IT 6203, and IT 6823.
12/05/2018	Complete the course offering for CSE 3203, IT 4323, IT 6203, and IT 6823. Complete the survey data collection for all offered courses. Complete student evaluation for all offered courses.
12/15/2018	Complete assessment data collection and analysis for the whole project. Deliver the final status report. Compile final report.

1.6 BUDGET

Funding will compensate team member's work and activity beyond normal teaching load or other job responsibilities. For each proposed course, course architects will spend approximately 80 hours to develop the no-cost learning material. The instructor of records will spend 20 hours in course assessment. Instructional support will include at least about 50 hours to assist course architects. The role for each PI and the corresponding compensation are listed

as follows:

Table 6. Budget for Investigators Compensation

Team Member	Role	Investigators compensation
Dr. Meng Han	IT 4323 developer & instructor	$5,000
Dr. Lei Li	IT 4833 developer & instructor	$5,000
Dr. Guangzhi Zheng	CSE 3203 developer & instructor	$5,000
Dr. Svetlana Peltsverger	IT 6203 developer & instructor	$5,000
Dr. Ming Yang	IT 6823 developer & instructor	$5,000
Dr. Zhigang Li	All courses support	$3,000

Investigators compensation: $5000*5 + 3,000 = $28,000

Travel & Other Expense: $2,000

(1) $800 is budgeted for two team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.
(2) An additional $1200 is budgeted for one team member to attend the ACM Special Interests Group in IT Education (SIGITE 2018).

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 implements a course architect system for all courses. Each course is assigned to a faculty as the course architect who is responsible for the content of the course and teaches the course regularly. All of our investigators except the instructional designer is a course architecture for the corresponding courses (please see table 3). Our team members 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 members will also make sure a course is continuously taught using the developed no-cost learning material in the future semesters even the course might have a different instructor.

The IT department also have well established continuous course improvement plan. Each course is assessed each semester after being taught, and a course will be formally evaluated and updated every three years. 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 their support letters, our transformation efforts also have strong supports from our

department chair and the dean of our college which further ensure the sustainability of our transformation efforts.

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.

Syllabus

Kennesaw State University - Department of Information Technology

IT4323: Data Communications & Networking

Fall 2018

Instructor:	Dr. Meng Han
Course Lecture:	Tuesday/Thursday 3:30 pm - 4:45 pm Building J, Room 215B (Marietta Campus)
Office Number:	Building J , Room 302 (Marietta Campus)
Office Hours:	Tuesday /Thursday 1:00 pm – 3:00 pm in campus in J building 302; instructor is also available by appointment and D2L online Monday/Wednesday.
Phone:	470-578-3801
Email:	menghan@kennesaw.edu *preferred method of contact *Students must send email from their students.kennesaw.edu email – NOT through D2L Response to emails within 24-48 hrs (with possible delays during weekends & school holidays/breaks) **Students are also encouraged to interact with each other and the instructor via Discussion Board.**

COURSE DESCRIPTION, COURSE OUTCOMES/GOALS

Credit Hours:	3
Co-requisites:	IT 3121 Hardware & Software Concepts (or equivalent)
Textbook:	*ALG Course, No Text Book Needed* ***All materials are available at:*** ***http://ksuweb.kennesaw.edu/~mhan9/ALG/it4323/index.html***
Technical Requirements:	Computer – You will need to have access to a computer running MS Windows 7 (or later) or Linux and a high speed Internet connection. You will need at least 20 GB of storage capacity and 4 GB of RAM to install and run the tools we will be using in the course. You will also be required to install a VM to use Wireshark. The VM can either be Virtual Box or VMWare.
Class Design:	This section (section 01) is delivered through Brightspace D2L. Videos will be created and posted to the Brightspace website when created in class. Labs, homework assignments, lecture slides, and other materials will be posted in D2L.
Course Description:	Fundamental concepts of computer networking. Topics include properties of signals and media, information encoding, error detection and recovery, LANs, backbones, WANs, network topologies, routing, internet protocols, and security issues. The focus is on general concepts together with their application to support the business enterprise. Credits: 3

Learning Outcomes:	Students who complete this course successfully will be able to: 1. Describe the layered architecture of computer networks and Internet; 2. Summarize and compare techniques and protocols in data link layer, such as error detection/correction, data link control, media access control, LAN, LAN connection, etc; 3. Analyze IP addressing and NAT; be able to implement address allocation; 4. Describe network layer protocols such as IP, ARP, and ICMP; 5. Define and assess routing protocols such as RIP, OSPF, BGP; 6. Summarize the algorithms, flow control, and error control in transport layer protocols UDP and TCP; 7. Describe the algorithms and implementations in application layer protocol HTTP;

Special Dates:	
Last Day of Drop/Add	August 21 (M) 12:00pm Noon
Last day to withdraw w/o academic penalty	October 4 (W)
Holidays	November 20 (M)-November 26(Su)
Last day of class	November 30 (Th)

COURSE CONTENT, REQUIREMENTS, METHODS OF EVALUATION

Course topics/Activities and how they contribute to grading evaluation:

Course activities may include, but are not limited to:

1. Reading assignments
2. Student research projects
3. Class exercises
4. Presentations
5. Class and group discussions
6. Quizzes
7. Simulations/Case studies

Grading Scale: [List the specific grading scale for this course.]

Assessment Criteria:	
Attendance /Participation	10%
Quizzes	5%
Labs	25%
Project	20%
Exams 1 & 2	20%
Final Online Exam	20%

Attendance /Participation: For online students, your participation grade will be determined by your reading of the online discussions and other material and by the extent that you contribute to those online discussions. You are expected to read every item that is posted in the discussion areas. You are also expected to actively participate in the online discussions in the Discussion tool by making at LEAST three significant posts (content-based) per week in the Course Content discussion forum under that week's topic(s). Your reading of posts will contribute to 5% of your final grade, and your contribution to the discussion board will contribute to another 5% of your final grade.

Quiz/Exam Policy: Quizzes are completed online through D2L according to the deadlines stated in D2L. It is the student's responsibility to keep up with assignments and deadlines. Only one attempt is allowed for quizzes. The lowest grade for quizzes will be dropped. For online students, please include proctored exam requirements – http://www.kennesaw.edu/dlc/virtualexam/

Exams 1&2: Exam 1 will be delivered online 2 weeks priors to the withdrawal date and Exam 2 will be delivered prior to Spring Break. You will be given instructions for these exams and a study sheet to help focus your areas of study. The exams will be timed. You will be allowed to take it during a specified week in the schedule whenever you choose outside of class.

Final Exam: The final exam is an online final short answer exam. No resources will be allowed for the Final Exam. The final exam will be proctored during the last day of class during the regular class period on Thursday, April 27th. Should you have a conflict during that period, you must notify the instructor and make other arrangements.

Make-up Policy: There are no makeup quizzes. The quizzes are available from the beginning of the semester and have established due dates. Unless you miss an exam due to a medical emergency or some other personal emergency that can be documented, you will not be allowed an extension for the quizzes and exams. In each case, the instructor must be notified of such emergency within 24 hours of the deadline missed and documentation must be presented.

Assignment Policy: Module Assignments are given usually every other week. Please start your assignments early as they generally will take longer than you might expect. Assignments are due by the deadlines indicated in D2L. There are no exceptions. Late assignments are given a grade of 0. An assignment is considered late if it is received 24 hours or more after the deadline. In the case of a medical emergency or personal emergency, an extension may be allowed with proper documentation presented to the instructor within one week of the deadline.

Course Technology: You will be expected to download the current version of Wireshark and run it in a Virtual Machine (Virtual Box or VMWare). In D2L, the Course Content tab Additional Resources has links to the websites for downloading each of these tools.

CREDIT HOURS, PREREQUISITES, MEETING TIMES, MODALITY, SCHEDULE

Class Meeting Location: Face to Face with Online Supplement

Communication w/ Instructor: Set office hours – Monday /Thursday 1-3pm in campus in J-302; instructor is also available by appointment and D2L online Monday/Wednesday. please email for an appointment. Make certain you are using the appropriate email for the instructor menghan@kennesaw.edu.

Electronic Communications. The University provides all KSU students with an "official" email account with the address "students.kennesaw.edu." As a result of federal laws protecting educational information and other data, **this is the sole email account you should use to communicate with your instructor or other University officials.**

Tentative Weekly Schedule:

Module Assignments/Quiz due on Sunday @ 11:59pm – assignments are not considered late until 24 hours after the deadline. After the 24 hour period ends, later assignments will not be accepted.

Week – Date		Topic
1	August 13-19	Module 1 - Start Here Acceptance of syllabus Introduction Network Models Complete Introduction Discussion Complete Assignment 0 Wireshark Lab
2	August 20-26	Module 2 - Physical Layer Introduction to Physical Layer Digital and Analog Transmission Complete Quiz 1
3	August 27-September 2	Module 3 - Physical Layer Bandwidth Utilization Transmission Media, Switching Complete Assignment 1
4	September 3-9	Module 4 - Data link Layer Introduction to Data Link Layer Data Link: Error Detection and Data Link Control Complete Assignment 2 Complete Quiz 2
5	September 10-16	Module 5 - Data link Layer Media Access Control Wired LANs, Ethernet Complete Quiz 3
6	September 17-23	Module 6 - Data Link Layer Wireless LANs Assignment 3 Exam 1 (M1-M6)
7	September 24-30	Module7 – Network Layer Subnetting
8	October 1-7	Module 8 – Network Layer Subnetting Assignment 4 Introduce Project
9	October 8-14	Module 9 Network Layer Protocols and Unicast Routing Ping and Tracert Complete Wireshark TCP Lab Assignment 5
10	October 15-21	Module 10 Next Gen IP
11	October 22-28	Module 11 - Transport Layer Introduction to Transport Layer Exam 2 (M7 – M11) Project Work
12	October 29-November 4	Module 12 Transport Layer Protocols Project Due
13	November 5-11	Module 13 Application Layer
14	November 12-18	Latest Network Related Issues 2017 Review for Final
15	November 30	Final Exam – Online. Students will be able to take the final exam online November 27-30. All students qualifying for Disability Services can schedule their exam with Disability Services during the time November 14-18. Conflicts must be discussed with the instructor prior to the 4th week.

General Expectations for Coursework in CCSE IT Programs

This course syllabus *is a general "plan" for the course and not a contract* - please know that the course instructor is permitted to make updates to it. If you have questions regarding this, please contact the Chair of the IT Department.

1. *Intellectual Property Issues*. You may not misappropriate the intellectual property of a member of the Faculty, another student, an online resource or other source even if you paid for them to do your work.
   Ideas, and course content are the intellectual property of the author irrespective of whether they are written in a book, course online content, course lectures or a paper. Kennesaw State University prohibits the misappropriation of intellectual property (which is a form of theft), which can result in discipline for a student, up to and including dismissal from the University. If the student is also a member of a profession with an applied code of ethics, it may additionally result in professional discipline, as well as subjecting the student to any civil legal remedies protecting intellectual property.

2. *Copyright Law.* It is the responsibility of KSU faculty and students to respect the rights of copyright holders and comply with copyright law. Students, faculty, and staff must comply with limited exclusive rights of copyright holders as set forth in 17 U.S.C. § 106, the application of the four fair use factors in 17 U.S.C. § 107, and other copyright exceptions.

3. *Electronic Recording*. You may not record or disseminate any electronically recorded class discussion unless given explicit permission by the instructor in writing. If a student needs to electronically record a course as a result of a recognized disability or other exceptionality, the student should contact the University's DisAbled Student Support Services to develop an appropriate reasonable accommodation.
   http://www.kennesaw.edu/stu_dev/dsss/prospect.shtml

TURN-AROUND TIME/FEEDBACK

Assignments will be graded within 8-10 days of submission deadline. Solutions will not be provided to assignments, however, students can discuss individual feedback given with instructor.

COURSE WITHDRAWAL

Please refer to the KSU Catalog http://www.kennesaw.edu/registrar/policies/withdrawl.php

ACADEMIC INTEGRITY

Every KSU student is responsible for upholding all provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. The Code of Conduct includes the following:

- Section II of the Student Code of Conduct addresses the University's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/falsification of University records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the University Judiciary Program, which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement.
- Students involved in off-campus activities shall not act in a disorderly or disruptive fashion, nor shall they conduct any dangerous activity.
- Students involved in off-campus activities shall not take, damage or destroy or attempt to take, damage or destroy property of another.

Reasonable Accommodations

Students with qualifying disabilities under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act who require "reasonable accommodation(s)" to complete the course may request those from Office of Student Disability Services. Students requiring such accommodations are required to work with the University's Office of Student Disability Services not individual faculty members or academic departments. A student anticipating a need for accommodation, must submit documentation requesting an accommodation in a timely fashion to permit time for a determination prior to submitting assignments or taking course quizzes or exams. Students may not request retroactive accommodation. Students should contact the office as soon as possible in the term for which they are seeking accommodations. Student Disability Services is located in the Carmichael Student Center in Suite 267. For more information, please call 470-578-2666 or visit the Student Disabilities Services websites at
www.kennesaw.edu/stu_dev/sds
http://www.kennesaw.edu/stu_dev/dsss/dsss.html

Student Privacy (FERPA)

Students have certain rights to privacy. http://registrar.kennesaw.edu/resources/ferpa.php

The University's online learning system and email system are designed to prevent unauthorized individuals from gaining access to sensitive information or information protected by federal or state law. We will communicate regarding course matters through the University's designated technology learning system or Kennesaw state email system.

KSU Sexual Misconduct Policy & Ethics Statement

KSU will not tolerate sexual misconduct or sexually exploitative or harassing behavior of any kind. https://policy.kennesaw.edu/content/sexual-misconduct-policy.
You are expected to respect religious, cultural, and gender differences.

Netiquette: Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Inappropriate communication will not be tolerated and will be reported to the Chair and Dean. It may result in dismissal from the course.

KSU Student Resources

For issues with technical difficulties, please contact the **Student Helpdesk**:

- Email: studenthelpdesk@kennesaw.edu
- Call: 470-578-3555

***** Additional Technology Resources

- Student Service Desk and Help Center
- Browser Checker
- USG Desire2Learn Help Center
- ITS Documentation Center
- Check Service Outages
- Maintenance Schedule

***** Academic Resources

- Career Services Center
- Academic Tutoring Services
- Disability Resources
- ESL Study and Tutorial Center
- Library
- The Writing Center

***** Student Support and Wellness Resources

- Career Services Center
- Counseling and Psychological Services
- Center for Health, Promotion and Wellness
- Student Health Clinic

Final Report

Affordable Learning Georgia Textbook Transformation Grants

Final Report

To submit your Final Report, go to the Final Report submission page on the ALG website: http://affordablelearninggeorgia.org/site/final_report_submission

Final report submission requires four files:

- *This completed narrative document*
- *Syllabus or syllabi*
    - *(if multiple files, compress into one .zip folder)*
- *Qualitative/Quantitative Measures data files*
    - *(if multiple files, compress into one .zip folder)*
- *Photo of your team or a class of your students w/ at least one team member, minimum resolution 800x600px*
    - *(nearly all smartphones take photos larger than this size by default)*

Follow the instructions on the webpage for uploading your documents. Based on receipt of this report, ALG will process the final payment for your grant. ALG will follow up in the future with post-project grantee surveys and may also request your participation in a publication, presentation, or other event.

General Information

Date: 12/18/2018

Grant Round: 10

Grant Number: 334

Institution Name(s): Kennesaw State University

Project Lead: Dr. Meng Han

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

Meng Han, Assistant Professor of Information Technology, mhan9@kennesaw.edu

Lei Li, Professor of Information Technology, lli13@kennesaw.edu

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

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

Ming Yang, Professor of Information Technology, myang8@kennesaw.edu

Guangzhi Zheng, Associate Professor of Information Technology, gzheng@kennesaw.edu

Course Name(s) and Course Numbers:

- CSE 3203 - Overview of Mobile Systems - Offered t*wice a year in spring & fall semesters.*
- IT 4323 - Data Communication and Networking - Offered three times a year in spring, summer & fall semester with multiple sections each semester.
- IT 4833 - Wireless Security - Offered once a year in spring semesters.
- IT 6203 - IT Design Studio - Offered twice a year in spring & fall semesters.
- IT 6823 Information Security Concepts and Administration - Offered three times a year in spring, summer & fall semester with multiple sections each semester.

Semester Project Began: Spring 2018

Final Semester of Implementation: Fall 2018

Total Number of Students Affected During Project:

Course	Number of sections	Students in each section	Total students affected
CSE 3203	1	47	47
IT 4323	4	15, 29, 29, 44	117
IT 4833	2	20, 27	47
IT 6203	1	19	19
IT 6823	2	34, 26	60
Total	10		290

1. Narrative

A. Describe the key outcomes, whether positive, negative, or interesting, of your project. Include:

Our transformation effort is very successful. In this project, we have transformed five courses using no-cost-to-student learning material. Ten sections and total number of 290 students have been impacted. Students' opinions on Learning material we created are overwhelmingly positive. Our assessment data shows that, in majority of the section where the no-cost learning material were implemented, students' performance is either neutral or better comparing to students' performance in previously taught sections using textbooks.

From the instructors' perspectives, collecting and organizing the learning material ourselves not only enable us to better respond to dynamic nature of the information technology field, but also give us the flexibility to customize the course content to better serve our students. On the other side, the transformation activities require significant efforts and time commitment from the faculty to collect, organize, create, and maintain no-cost learning material that offers equivalent learning experience as the textbooks. Our transformative efforts in replacing textbooks in the proposed courses will not happen without the strong supports from ALG grant.

With our sustainability plan, the no-cost learning material will be continually used and hundreds and thousands of students from Kennesaw State University will enjoy the cost savings and enhanced learning experience in the future.

B. Describe lessons learned, including any things you would do differently next time.

Below are the lessons learned from the members of our project team.

Dr. Meng Han on IT 4323. The software tools keep changing fast, for example, the Wireshark got its latest version recently. Lesson learned is to keep checking on tools for update and revise instructions and screenshots accordingly. Also, the 5G is coming, more materials in the subject related to latest 5G should also be updated more frequently.

Dr. Lei Li on IT 4833. Wireless security is becoming more and more important in the IT domain, and the latest attacks and defends are also developing very fast. The last material will help the students a lot for the understanding, but in another aspect more efforts are very necessary from the instructor.

Dr. Ming Yang on IT 6823. The course was mainly organized and developed by D2L and offered online to student. It may provide other way for the materials if use the open public available environment for the initial development.

2. Quotes

- Provide three quotes from students evaluating their experience with the no-cost learning materials.

1) "It was great, a textbook would have just been an unnecessary expenditure and wouldn't have helped at all over what we were provided. The provided material more than met my needs."
– IT 4833

2) "Not utilizing a book makes it a lot easier to read the material provided from professors and learn the basic concepts of the class. Having the book at hand on the other hand is beneficial as well because you can learn the material in depth but many students don't have the patience or time to read the entire book which consist of too much information that will probably not be retained by the students. So there are pros and cons but in my opinion I believe the no-book requirement makes it easier for us students to learn what is deemed necessary by the professors."
– IT 4323

3) "Since design studio is mixture of multiple software; using no-cost material would be really helpful. It is easy to access and materials are reliable. We might be missing basics but to cover multiple sectors it is effective method."
– IT 6203

3. Quantitative and Qualitative Measures

3a. Uniform Measurements Questions

The following are uniform questions asked to all grant teams. Please answer these to the best of your knowledge.

Student Opinion of Materials

Was the overall student opinion about the materials used in the course positive, neutral, or negative?

Total number of students affected in this project: __290_____

- Positive: ___88.17____ % of ___93_____ number of respondents
- Neutral: ____8.61___ % of ___93_____ number of respondents
- Negative: ___3.22____ % of ___93_____ number of respondents

Student Learning Outcomes and Grades

Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?

We have 5 courses in this project. In term of learning outcomes and grades comparing to previous semesters, two courses are positive, and three courses are negative. Overall student performance outcome is slightly positive comparing to previous semester.

Course	Student Performance outcome comparing to previous semester
CSE 3203	Negative
IT 4323	Positive
IT 4833	Negative
IT 6203	Negative
IT 6823	Positive

Student outcomes should be described in detail in Section 3b.

Choose One:

- ___ Positive: Higher performance outcomes measured over previous semester(s)
- _X_ Neutral: Same performance outcomes over previous semester(s)
- ___ Negative: Lower performance outcomes over previous semester(s)

Student Drop/Fail/Withdraw (DFW) Rates

Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Course	Drop/Fail/Withdraw Rate of implementation over previous semesters
CSE 3203	Negative
IT 4323	Positive
IT 4833	Positive
IT 6203	Negative
IT 6823	Positive

Drop/Fail/Withdraw Rate:
Depending on what you and your institution can measure, this may also be known as a drop/failure rate or a withdraw/failure rate.

_12.26__% of students, out of a total __129_____ students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

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

3b. Measures Narrative

In this section, summarize the supporting impact data that you are submitting, including all quantitative and qualitative measures of impact on student success and experience. Include all measures as described in your proposal, along with any measures developed after the proposal submission.

In project, we proposed to use multiple channels of data to measure the success of our transformative efforts. Quantitatively, we compared students' DFW rates, grades, and success in learning objectives. The DFW rates are taken from student registration system. The student grades and success in learning objectives are assessed Faculty Course Assessment Report (FCAR). Faculty in IT department at Kennesaw State University are required to create a FCAR for every course they teach for each semester. The FCAR includes students' grade and success in achieving the learning outcomes. Qualitatively, we developed a survey to collect students' opinion on the learning material used in the courses. Students rated their experience using a 5 points scale. Students also give the opportunities to enter comments they may have. A copy of survey result is attached separately. Based on the assessment data we collected, the learning material we created offer the same level of the learning effectiveness as the textbook (in some case, even better). Students' performance outcomes and DFW in generally stay the same pre-implementation and postimplementation.

4. Sustainability Plan

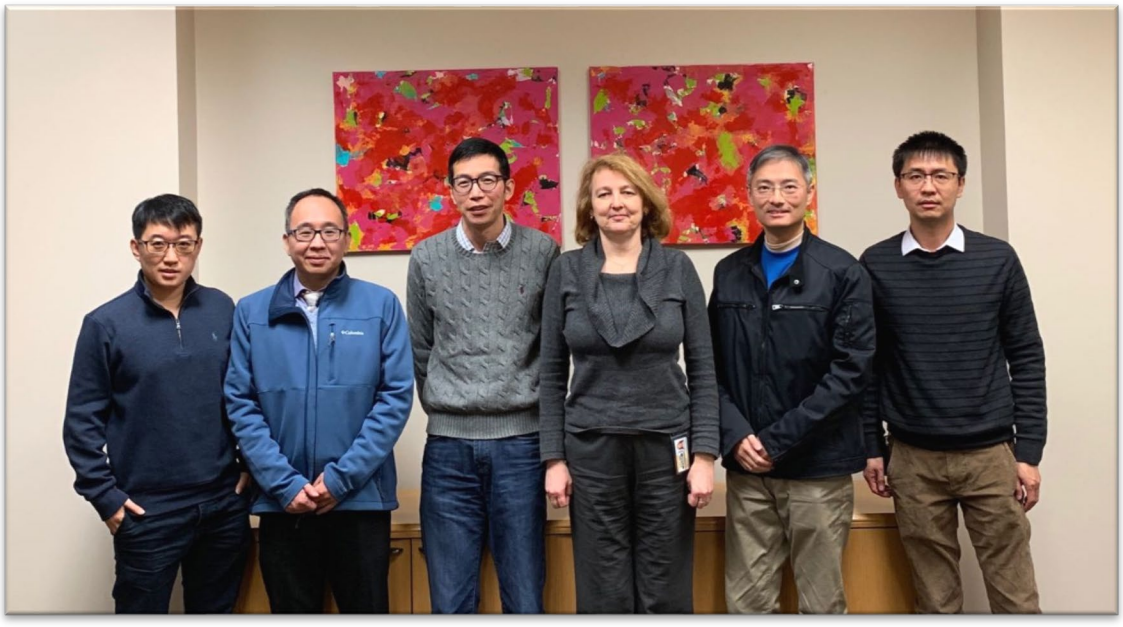
The IT department at KSU implemented a course architect system for all courses. A course architect updates course content based on research, publications and feedback from students and alumni. Each of instructor of record is a course architecture for corresponding courses. A course architect develops 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 make necessary changes. This makes sure all no-cost materials and resources are highly sustainable in the future offerings of this course.

Each of the architecture will update course materials based on this semester course observations and student comments. The courses will be updated every three years based on IT department policy. It would also be update earlier due to the updating of the domain.

5. Future Plans

Standing at the point many emerging Information Technology upcoming, the existing technology frequently get updated and new technology constantly comes out. Due to this reason, the no-cost learning material model naturally fits better for IT curriculum than the traditional textbook models. The faculty in the IT department already completed several individual ALG project and three transform-at-scale grants. The positive feedback from the students and our own development and implementation process inspire more faculty in the IT to get involved with developing no cost learning material for their courses. We shared our experience from this project in the 48th Annual Frontiers in Education (FIE) Conference San Jose, CA, USA by Dr. Han. The responses we received from the panel discussion are very positive.

6. Description of Photograph



Left to right: Dr. Meng Han, team lead and instructor of record, Dr. Ming Yang, instructor of record; Dr. Lei Li, instructor of record; Dr. Svetlana Peltsverger, instructor of record; Dr. Guangzhi Zheng, instructor of record; and Dr. Zhigang Li, for all courses online learning support.