

Table of Contents

Rutherford, Rebecca - #2887 - 429	1
Letter of Support	9
Proposal Narrative	11

Application Summary

Competition Details

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

Application Information

Submitted By:	Rebecca Rutherford
Application ID:	2887
Application Title:	429
Date Submitted:	01/15/2019 at 7:37 AM

Personal Details

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

Application Details

Proposal Title

429

Final Semester of Project

Fall 2019

Requested Amount of Funding

\$30,000

Type of Grant

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

Course Title(s)

Programming Principles, Adv Programming & Applications, Adv Mobile Development, Data Communications & Networking, The Internet of Things

Course Number(s)

IT 1113, IT 3883, IT 4213, IT 4323, IT 4893

Team Member 1 Name

Rebecca Rutherford

Team Member 1 Email

brutherf@kennesaw.edu

Team Member 2 Name

Shirley Tian

Team Member 2 Email

xtian2@kennesaw.edu

Team Member 3 Name

Hossain Shahriar

Team Member 3 Email

hshahria@kennesaw.edu

Team Member 4 Name

Susan VandeVen

Team Member 4 Email

svandev@kennesaw.edu

Additional Team Members (Name and email address for each)

Jack Zheng

gzheng@kennesaw.edu

Sponsor Name

Rebecca Rutherford

Sponsor Title

Department Chair Information Technology

Sponsor Department

Information Technology

Original Required Commercial Materials (title, author, price)

IT 1113 – Starting Out with Python (3rd Ed), Gaddis, \$87.00

IT 3883 – Visual C# How to Program (6th Ed) Deitel & Deitel, \$176.00

IT 4213 – Apache Cordova 4 Programming, Wago, \$40.00

IT 4323 – Data Communications and Networking (5th Ed), Forouzan, \$162.00

IT 4893 – Abusing the Internet of Things: Blackouts, Freakouts, and Stakeouts, Dhanjani, \$76.00

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

32

Average Number of Sections Affected by Project in One Academic Year

28

Total Number of Students Affected by Project in One Academic Year

882 (2018)

Average Number of Students Affected per Summer Semester

178

Average Number of Students Affected per Fall Semester

411

Average Number of Students Affected per Spring Semester

293

Original Total Cost per Student

\$541

Post-Project Cost per Student

\$0

Post-Project Savings per Student

Required-\$425, Elective-\$116 Total-541

Projected Total Annual Student Savings per Academic Year

Req-\$374,850 Elec-\$102,312 Total-\$477,162

Using OpenStax Textbook?

No

Project Goals

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

Statement of Transformation

The BSIT/BASIT five courses are part of both required courses and elective courses. In addition, three of the courses are also part of a joint e-major program – Cyber Security. One of the required courses proposed for this grant is also part of the BS in Cybersecurity. Student numbers are not included for the cybersecurity degree in this grant, but the expectation is that there will be an additional 120 students for this course per year within two years. 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 strategic plan of the Department of Information Technology includes a goal to have as many courses without textbooks as pedagogically feasible. 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. One of the major problems with using regular textbooks for IT courses is that information technology material is constantly changing. Textbook publishing cannot keep up with these fast changes in the technology field. In addition, tools and software packages that are part of a textbook also become obsolete. 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. 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 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.

The quality of the BSIT/BASIT curriculum has been a goal of the Information Technology program since inception. Unfortunately, the traditional textbook model doesn't fit for IT courses: they are not only expensive, but also become outdated after being published. The instructors of courses have to constantly add new material to their courses in addition to what's covered in the textbook. The no-cost-learning-material model fits much better for the IT courses.

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

The positive responses from the students, our past successes, and the nature of the IT discipline allow us to aim to continue transforming more IT courses using no-cost learning material. This project aims to replace the textbooks used in the five proposed BSIT/BASIT courses with no-cost-to-students learning materials that offer equal or higher educational effectiveness. One of the proposed courses, IT 4893, is a new addition to BSIT/BASIT curriculum. We believe the proposed transformation of five courses is an economical and viable solution to address the challenges imposed by the traditional textbook model. There are several reasons why we believe that using no-cost learning materials works well with IT courses.

First, the learning materials for the proposed BSIT/BASIT courses are widely and readily available on the World Wide Web today and many of these resources are publicly accessible, free, or with an open license to use [1] [2]. These materials include open and free tutorials, books, videos, labs, software, and services. Web content can better reflect the latest trends and industrial development than the traditional textbooks as technology is changing rapidly, as is the content of Web resources. We are already using contents from the Web as supplemental materials to the course textbooks. For example, we have utilized open source resources to redevelop information security courses with the latest open source tools and systems (e.g., [3, 4]).

Second, the materials from the Web are generally more interactive. The interactive content will not only engage the students, but also improve their learning experience. As instructors, one of the key roles we play is to select, organize and deliver from the vast amount of information available from the web and open source resources to fit with the classroom learners background. In particular, developing hands-on labs and assignments with tools and methods so that students are well prepared for the job market and pursuing advanced courses. For example, there are books and manuals (e.g., [5, 6]) available on how to become a network administrator (IT4323), but they may not directly apply to classroom students for effective hands-on learning.

Finally, our project team is well prepared for the proposed transformation. The disadvantages 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 IT fields, but also are proficient educators who on average have more than 10 years of teaching experience. We will select, organize and integrate resources from the Web and transform the information into instructional sound learning materials for the proposed courses. We also created a sustainable plan to periodically review the developed no-cost-to-student learning materials. All courses in the department are reviewed every three years as part of the continuous improvement process. In addition, all but one of the team members have successfully completed many ALG grants.

In summary, the faculty at IT department have transformed 12 BSIT/BASIT courses using no-cost-to-student learning material which are very well received by the students. Building on our previous success and lessons learned, we are

well positioned to continue transformation efforts and further increase the cost-saving benefits to the students in our program.

References

- [1]. Li, L., Peltsverger, S. B., Colyar, N. N., Rutherford, R., Zheng, G., Li, Z. (2016). Transformation At Scale: The Experience Of Developing No Cost Learning Material For Database-Related Courses. 19th Annual Conference of the Southern Association for Information Systems. aisel.aisnet.org/sais2016/9/
- [2]. Rutherford, R., Peltsverger, S. B., Li, L., Zheng, G., Rutherford, J. (2016). Transforming IT Education with No-Cost Learning Materials. SIGITE'16. ACM Special Interest Group for IT Education.
- [3] H. Shahriar, Ethical Hacking for Effective Defense (Modules, Labs, and Lectures), 2018, <https://oer.galileo.usg.edu/compsci-ancillary/9/>
- [4] Shahriar, H., Peltsverger, S. (2018). Open Education Resource for Information Security Courses, USG Teaching and Learning Conference. <https://sched.co/DvNV>
- [5] Clark, N. (2018). Linux: Installation, Configuration and Command Line Basics. Amazon.
- [6] Linuxtraining.be. (2018). NetSec BVVA, <http://linux-training.be/>

Transformation Action Plan

With a coordinated effort, our team of investigators plan to carry out following activities to transform the five proposed BSIT/BASIT courses.

- Research on existing resources, including the ALG website, for publicly available learning material that could be re-used or adapted.
- Research and identify no cost readings for each of the learning modules in each course. The reading list includes both required readings and optional readings. All of these readings will be publicly accessible, free to use, or openly licensed.
- Research and identify no cost materials that can be shared across the courses.
- Develop study guides and lecture notes for students' use to review course content and key learning points.
- Adopt or develop all assignments, exercises and lab materials that are no cost to students to replace the ones in the textbooks.
- Develop test banks to replace the ones in the textbooks if necessary.
- Update the syllabus to include major resources and no cost materials.
- Re-develop the proposed courses in our learning management system, D2L Brightspace.
- The developed course material will be organized based on the template provided by ALG and will be made available to the public for adoption The responsibilities of each investigator are listed as follows.
- Dr. Rebecca Rutherford, project Lead, subject matter expert, developer and instructor of record for IT 1113 Programming Principles.
- Prof. Susan VandeVen, subject matter expert, developer and instructor of record for IT 3883 – Advanced Programming & Applications.
- Dr. Jack Zheng, subject matter expert, developer and instructor of record for IT 4213 Mobile Web Development.
- Dr. Hossain Shahriar, subject matter expert, developer and instructor of record for IT 4323 Data Communications & Networks.
- Dr. Shirley Tian, subject matter expert, developer and instructor of record for IT 4893 Internet of Things.

Quantitative & Qualitative Measures

The investigators plan to assess the effectiveness of our proposal in two ways. 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 for spring, summer and fall 2017. 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.

* Student perception and attitude toward no cost materials including:

- ratings of the no cost materials used in this course
- comments and suggestions for course improvements

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, 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, student evaluations of each course through the Kennesaw State University survey will be examined for any additional information.

The College of Computing & Software Engineering requires that courses pass through an internal review process with three evaluators, including a subject matter expert, using a developed rubric. This review will insure the no-cost learning materials used or developed for the 5 required IT courses are instructionally sound. The student course evaluation can also provide some insights on the effectiveness of no-cost learning material used in the proposed MSIT course.

Timeline

The major milestones of this proposal are listed as follows.

1. 03/01/2019. Complete gathering of baseline data.
2. 04/01/2019. Complete the development of the web-based student survey and submit it for IRB approval.
3. 05/05/2019. a). Student survey is approved by IRB. b). Complete course level materials redesign (mainly course syllabus) for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893. c). Complete the project progress report.
4. 07/15/2019. Complete the module level development including reading, lecture notes, video, exams, labs, and assignments for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893.
5. 07/30/2019. a). Update the D2L Brightspace course sites are updated using the developed no cost learning material for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893. b). Complete project progress report.
6. 12/02/2019. a). Complete the course offering for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893. b). Complete the survey data collection for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4892.
7. 12/15/2019. a). Complete data collection and analysis for the whole project. b). Compile and submit project final report.

Budget

The budget information for this project is listed as follows.

1. Individual Expense

- Dr. Rebecca Rutherford, project Lead, developer and instructor of record for IT 1113, \$5000 for professional development.
- Prof. Susan VandeVen, developer and instructor of record for IT 3883, \$5000.
- Dr. Jack Zheng, developer and instructor of record for IT 4213, \$5000.
- Dr. Hossain Shahriar, developer and instructor of record for IT 4323, \$5000.
- Dr. Shirley Tian, developer and instructor of record for IT 4893, \$5000.
- Subtotal: \$25,000.

1. Travel Expense: \$2500. \$800 is reserved for two team members attend the Kickoff Meeting at Middle Georgia State University in Macon, GA. \$1700 is budgeted for attending another conference.

2. Equipment (computers and tablets): \$2500

3. Total Budget requested: \$30,000

Sustainability Plan

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

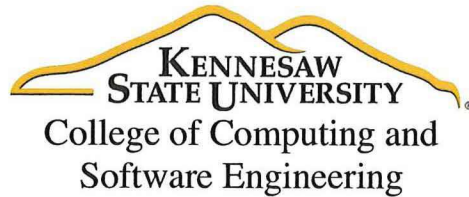
Moreover, the developed course content is not only available at learning management system, but also archived at department server. It is also our department policy that there are at least two faculty who regularly teach a course. This further ensures the developed learning material will be continuously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

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

Acknowledgment

Grant Acceptance

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



January 14, 2019

Dear Affordable Learning Georgia (ALG) Grant Reviewers,

It is my pleasure to write this letter in support of the proposal titled “Developing More Affordable Undergraduate IT Programs (BSIT/BASIT) Using No-Cost-to-Student Learning Material” submitted by Drs. Rutherford, Tian, Shahriar, and Zhang, and Ms. VandeVen 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 undergraduate information technology courses with no-cost-to-students learning materials. Their efforts will significantly lower the cost of education for students, saving over \$477k per year and impacting over 800 students per year at KSU. This will 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 technology.

The proposers have past experience with a successful ALG projects, thus the quality and success of this 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.

In conclusion, I wholeheartedly support this effort to improve access to our IT program. This proposal has the full support of the College of Computing and Software Engineering.

Sincerely,

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



College of Computing and
Software Engineering
Information Technology

January 10, 2019

ALG Grant Committee University System of GA
Dear Colleagues:

This letter is in support of the Proposal “Developing More Affordable Undergraduate IT Programs (BSIT/BASIT) Using No-Cost-to-Student Learning Material 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 rounds #1, #2, #5, #8, #10, #11 and #12. 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 undergraduate students take courses online as well as in-class. Creating the no-cost format for the five BSIT/BASIT 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. Rutherford, Ed.D.

Interim Assistant Dean of the College of Computing & Software Engineering,
Department Chair for Information Technology, Professor of Information Technology
brutherf@kennesaw.edu



Textbook Transformation Grants, Round Thirteen
 (Spring 2019 –Spring 2020)
 Proposal Form and Narrative

Notes

- The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the InfoReady Review online form for proposal submission.
- The only way to submit the official proposal is through the online form in Georgia Tech’s InfoReady Review. The link to the online application is on the [Round 13 RFP Page](#).
- The italic text we provide is meant for clarifications and can be deleted.

Applicant, Team, and Sponsor Information

The **applicant** is the proposed Project Lead for the grant project. The **submitter** is the person submitting the application (which may be a Grants Officer or Administrator). The submitter will often be the applicant – if so, leave the submitter fields blank.

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

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

	Name	Email Address
Team Member 1	Rebecca Rutherford	brutherf@kennesaw.edu

	Name	Email Address
Team Member 2	Shirley Tian	xtian@kennesaw.edu
Team Member 3	Hossain Shahriar	hshahria@kennesaw.edu
Team Member 4	Susan VandeVen	svandeve@kennesaw.edu
Team Member 5	Jack Zheng	gzheng@kennesaw.edu
Team Member 6		
Team Member 7		
Team Member 8		

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

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

Department of Information Technology, Kennesaw State University

Project Information and Impact Data

Title of Grant Project	Developing More Affordable Undergraduate IT Programs (BSIT/BASIT) Using No-Cost-to-Student Learning Material
Type of Grant	<i>"No-or-Low-Cost-to-Students Learning Materials,"</i>
Requested Amount of Funding	\$30,000
Course Names and Course Numbers	IT 1113: Programming Principles IT 3883 – Advanced Programming & Applications IT 4213 – Advanced Mobile Development

	IT 4323 – Data Communications & Networking IT 4893 – The Internet of Things
Final Semester of Project	<i>Fall 2019 or Spring 2020</i>
Average Number of Students Per Course Section Affected by Project	32
Average Number of Sections Affected by Project in One Academic Year	28
Total Number of Students Affected by Project in One Academic Year	882 (2018)
Average Number of Students Affected per Summer Semester	178
Average Number of Students Affected per Fall Semester	411
Average Number of Students Affected per Spring Semester	293
Title/Author of Original Required Materials	IT 1113 – Starting Out with Python (3 rd Ed), Gaddis, \$87.00 IT 3883 – Visual C# How to Program (6 th Ed) Deitel & Deitel, \$176.00 IT 4213 – Apache Cordova 4 Programming, Wago, \$40.00 IT 4323 – Data Communications and Networking (5 th Ed), Forouzan, \$162.00 IT 4893 – Abusing the Internet of Things: Blackouts, Freakouts, and Stakeouts, Dhanjani, \$76.00
Original Total Cost Per Student	Required: \$425 Elective: \$116 Total = \$541
Post-Project Cost Per Student	\$0
Post-Project Savings Per Student	Required: \$425 Elective: \$116 Total = \$541
Projected Total Annual Student Savings Per Academic Year	Required: \$374,850.00 Elective: \$102,312.00 Total = \$477,162.00

Using OpenStax Textbook?	No
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Narrative Section

1. Project Goals

The Bachelor of Science and Bachelor of Applied Science programs in Information Technology are very strong programs with a combined enrollment of over 800 students. In addition, many of our Information Technology courses are being used in the completely online Cyber Security major program that is a collaborative eprogram with Information Security & Assurance program, and the Criminal Justice program. The high-quality of the curriculum, the flexibility of the offerings and affordability are the main enablers for the success of the BSIT/BASIT programs.

Much thanks to the supports of Affordable Learning Georgia in previous grants, we have transformed 8 out of 17 required courses and 5 of our 25 elective courses in the BSIT/BASIT curriculum with no-cost-to-student learning material and the responses from the students are overwhelmingly positive. In this project, we propose to continue our department-wide effort to replace the textbooks used in five more BSIT/BASIT courses with no-cost-to-students learning materials. We believe the impact of the proposed project will be significant given the scale of the BSIT/BASIT programs.

In summary, the objectives of the proposed project are listed as follows.

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

2018 Enrollment Data

Course Name	Spring 18	Summer 18	Fall 2018	Sections offered	Total enrollment
IT 1113	135	85	235	13	455
IT 3883	80	23	56	5	159
IT 4213	0	25	0	1	25

IT 4323	78	45	120	8	243
IT 4893	0	0	0	New course	New course

Note: IT 4893 is a newly created courses and the first offering semester is spring 19.

2019 Enrollment Data Prediction

Course Name	Course offering frequency	Sections to be offered	Avg. enrollment per section	Total enrollment	Textbook cost	Total Saving
IT 1113	Each semester	7	40	280	\$87.00	\$24,360
IT 3883	Each semester	5	40	175	\$176.00	\$308,000
IT 4213	2 times every year	4	25	100	\$40.00	\$4,000
IT 4323	Each semester	8	40	280	\$162.00	\$45,360
IT 4893	1 time per year	2	30	101	\$76.00	\$7,676
Total		32	35 (avg.)	1120	\$541.00	\$605,920

- Note: 1) the projected average enrollment per section is based on the enrollment number in 2018 and the assumption of 5% increase in enrollment. 2) IT 1113 course may become an elective course starting fall 2019, thus the decrease in number of sections. 3). The IT 4893 is new course that is offered for the first time in spring 2019. IT 3883 and IT 4323 are required courses, and IT 4213 and IT 4893 are elective courses.

2. Statement of Transformation

The BSIT/BASIT five courses are part of both required courses and elective courses. In addition, three of the courses are also part of a joint e-major program – Cyber Security. One of the required courses proposed for this grant is also part of the BS in Cybersecurity. Student numbers are not included for the cybersecurity degree in this grant, but the expectation is that there will be an additional 120 students for this course per year within two years. 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 strategic plan of the Department of Information Technology includes a goal to have as many courses without textbooks as pedagogically feasible. The high cost of textbooks puts a large financial burden on students and may become a roadblock for students' ability to finish their education. One of the major problems with using regular textbooks for IT courses is that information technology material is constantly changing. Textbook publishing cannot keep up with these fast changes in the technology field. In addition, tools and software packages that are part of a textbook also become obsolete. 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. 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 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.

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The positive responses from the students, our past successes, and the nature of the IT discipline allow us to aim to continue transforming more IT courses using no-cost learning material. This project aims to replace the textbooks used in the five proposed BSIT/BASIT courses with no-cost-to-students learning materials that offer equal or higher educational effectiveness. One of the proposed courses, IT 4893, is a new addition to BSIT/BASIT curriculum. We believe the proposed transformation of five courses is an economical and viable solution to address the challenges imposed by the traditional textbook model. There are several reasons why we believe that using no-cost learning materials works well with IT courses.

First, the learning materials for the proposed BSIT/BASIT courses are widely and readily available on the World Wide Web today and many of these resources are publicly accessible, free, or with an open license to use [1] [2]. These materials include open and free tutorials, books, videos, labs, software, and services. Web content can better reflect the latest trends and industrial development than the traditional textbooks as technology is changing rapidly, as is the content of Web resources. We are already using contents from the Web as supplemental materials to the course textbooks. For example, we have utilized open source resources to redevelop information security courses with the latest open source tools and systems (e.g., [3, 4]).

Second, the materials from the Web are generally more interactive. The interactive content will not only engage the students, but also improve their learning experience. As instructors, one of the key roles we play is to select, organize and deliver from the vast amount of information available from the web and open source resources to fit with the classroom learners background. In particular, developing hands-on labs and assignments with tools and methods so that students are well prepared for the job market and pursuing advanced courses. For example, there are books and manuals (e.g., [5, 6]) available on how to become a network administrator (IT4323), but they may not directly apply to classroom students for effective hands-on learning.

Finally, our project team is well prepared for the proposed transformation. The disadvantages 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 IT fields, but also are proficient educators who on average have more than 10 years of teaching experience. We will select, organize and integrate resources from the Web and transform the information into instructional sound learning materials for the proposed courses. We also created a sustainable plan to periodically review the developed no-cost-to-student learning materials. All courses in the department are reviewed every three years as part of the continuous improvement process. In addition, all but one of the team members have successfully completed many ALG grants.

In summary, the faculty at IT department have transformed 12 BSIT/BASIT courses using no-cost-to-student learning material which are very well received by the students. Building on our previous success and lessons learned, we are well positioned to continue transformation efforts and further increase the cost-saving benefits to the students in our program.

References

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- [3] H. Shahriar, Ethical Hacking for Effective Defense (Modules, Labs, and Lectures), 2018, <https://oer.galileo.usg.edu/compsci-ancillary/9/>

[4] Shahriar, H., Peltsverger, S. (2018). Open Education Resource for Information Security Courses, USG Teaching and Learning Conference. <https://sched.co/DvNV>

[5] Clark, N. (2018). Linux: Installation, Configuration and Command Line Basics. Amazon.

[6] Linuxtraining.be. (2018). NetSec BVVA, <http://linux-training.be/>

3. Transformation Action Plan

With a coordinated effort, our team of investigators plan to carry out following activities to transform the five proposed BSIT/BASIT courses.

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

The responsibilities of each investigator are listed as follows.

- Dr. Rebecca Rutherford, project Lead, subject matter expert, developer and instructor of record for IT 1113 Programming Principles.
- Prof. Susan VandeVen, subject matter expert, developer and instructor of record for IT 3883 – Advanced Programming & Applications.
- Dr. Jack Zheng, subject matter expert, developer and instructor of record for IT 4213 Mobile Web Development.
- Dr. Hossain Shahriar, subject matter expert, developer and instructor of record for IT 4323 Data Communications & Networks.
- Dr. Shirley Tian, subject matter expert, developer and instructor of record for IT 4893 Internet of Things.

4. Quantitative and Qualitative Measures

The investigators plan to assess the effectiveness of our proposal in two ways. 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 for spring, summer and fall 2017. 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.

- * Student perception and attitude toward no cost materials including:
 - ratings of the no cost materials used in this course
 - comments and suggestions for course improvements

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, 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, student evaluations of each course through the Kennesaw State University survey will be examined for any additional information.

The College of Computing & Software Engineering requires that courses pass through an internal review process with three evaluators, including a subject matter expert, using a developed rubric. This review will insure the no-cost learning materials used or developed for the 5 required IT courses are instructionally sound. The student course evaluation can also

provide some insights on the effectiveness of no-cost learning material used in the proposed MSIT course.

5. Timeline

The major milestones of this proposal are listed as follows.

1. *03/01/2019*. Complete gathering of baseline data.
2. *04/01/2019*. Complete the development of the web-based student survey and submit it for IRB approval.
3. *05/05/2019*. a). Student survey is approved by IRB. b). Complete course level materials redesign (mainly course syllabus) for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893. c). Complete the project progress report.
4. *07/15/2019*. Complete the module level development including reading, lecture notes, video, exams, labs, and assignments for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893.
5. *07/30/2019*. a). Update the D2L Brightspace course sites are updated using the developed no cost learning material for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893. b). Complete project progress report.
6. *12/02/2019*. a). Complete the course offering for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4893. b). Complete the survey data collection for IT 1113, IT 3883, IT 4213, IT 4323 and IT 4892.
7. *12/15/2019*. a). Complete data collection and analysis for the whole project. b). Compile and submit project final report.

6. Budget

The budget information for this project is listed as follows.

1. Individual Expense
 - Dr. Rebecca Rutherford, project Lead, developer and instructor of record for IT 1113, \$5000 for professional development.
 - Prof. Susan VandeVen, developer and instructor of record for IT 3883, \$5000.
 - Dr. Jack Zheng, developer and instructor of record for IT 4213, \$5000.
 - Dr. Hossain Shahriar, developer and instructor of record for IT 4323, \$5000.
 - Dr. Shirley Tian, developer and instructor of record for IT 4893, \$5000.
 - Subtotal: \$25,000.
2. Travel Expense: \$2500. \$800 is reserved for two team members attend the Kickoff Meeting at Middle Georgia State University in Macon, GA. \$1700 is budgeted for attending another conference.
3. Equipment (computers and tablets): \$2500
4. Total Budget requested: \$30,000

7. Sustainability Plan

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

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

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

Note: Letter of Support

Please see the attached letters from Dr. Rebecca Rutherford, Department Chair Information Technology, and Dr. Jon Preston, Dean of the College of Computing & Software Engineering.