Grants Collection
Kennesaw State University

UNIVERSITY SYSTEM
OF GEORGIA

Lei Li, Rebecca Rutherfoord, Svetlana Peltsverger,
Jack Zheng, Zhigang Li, Nancy Colyar

Database Design and Applications

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.

Syllabus

2. IT 5433 – Database Design and Applications Supporting Material

Instructor: Dr. Lei Li

Email: lli13@kennesaw.edu

Catalog Description:
This course will provide a practical foundation of database systems with emphasis on relational database design, implementation, and management. Topics include normalization, ERD, logical and physical design, SQL query, database applications, usage of XML in database, and data warehouse.

Learning Objectives:
Students who complete this course successfully will be able to:

1. Compare and contrast the basic database models;
2. Analyze, design, develop and implement a relational database system based on business requirements;
3. Create, modify and query databases using the SQL language;
4. Analyze the major aspects of database administration and compare and contrast issues of database security;
5. Describe XML and its use in database systems;
6. Conduct independent research on a subject related to the course material.

Learning Modules

LM1. Database Environment
Learning objectives:

1. Understand key terms in database
2. Explain file processing systems
3. List parts of a database environment
4. Explain types of database develop approaches

Links:
1. http://ecomputernotes.com/fundamental/what-is-a-database/traditional-file-processing-system
2. http://ecomputernotes.com/fundamental/what-is-a-database/advantages-and-disadvantages-of-dbms
3. http://ecomputernotes.com/fundamental/what-is-a-database/type-of-database-system

Module 2 – ER & EER Model

After this module, student will be able to:

1. Explain importance of data modeling
2. Define and use the entity-relationship model
3. Define E/R terms
4. Describe the enhanced E/R model
5. Describe how super types and sub-types are modeled
6. Explain when you would use an enhanced E/R model

Links to potential free course material:
Link 1: http://www.agiledata.org/essays/dataModeling101.html
This link provides information on data modeling.
Link 2: http://jcsites.juniata.edu/faculty/rhodes/dbms/ermodel
This link provides the design, entities and attributes, entity types, keys, graphical representation, relationships, and attributes and roles of an entity relationship.
Link 3: http://jcsites.juniata.edu/faculty/rhodes/dbms/eermodel
This link is about the enhanced entity-relationship model
Link 4: http://adbc.kennesaw.edu/index.php?mainmenu=db&submenu=er_notations
Database Design – ER Notation.

Module 3 – Relational Data Model

After this module, student will be able to:

1. List the 5 properties of relations
2. List the properties of a candidate key, primary key and foreign key.
3. Be proficient in converting ERD into relational data model
4. Explain and use normalization up to 3rd normal form

Links to potential free course material:
Link 1:
http://www.cs.armstrong.edu/liang/intro9e/supplement/Supplement4fRelationalDataModel.pdf
Introduction to relational data model
Link 2: https://support.microsoft.com/en-us/kb/283878
Normalization
Link 3: http://jcsites.juniata.edu/faculty/rhodes/dbms/ermapping
This link is about ERD to relational model mapping.
Link 4: http://adbc.kennesaw.edu/index.php?mainmenu=db&submenu=er_notations
Database Design – ER to tables and Normalization.

Module 4 – Physical Design

After this module, student will be able to:

1. Describe the physical database design process
2. Explain how attributes transpose from the logical to physical model
3. Describe the different types of file organizations
4. Describe the different types of indexing
5. Describe the pros and cons denormalization

Links to potential free course material:

Link 1: https://docs.oracle.com/cd/A81042_01/DOC/server.816/a76994/physical.htm
Overview of Physical Design
Link 2: http://ewebarchitecture.com/web-databases/physical-database-design
Physical Database Design
Link 3: http://www.ovaistariq.net/199/databases-normalization-or-denormalization-which-is-the-better-technique/
Pros and Cons of Denormalization
Link 4: https://docs.oracle.com/cd/B28359_01/server.111/b28313/physical.htm#i1006325
Physical Design in Data Warehouses
Link 5:
https://www.dlsweb.rmit.edu.au/toolbox/knowmang/content/physical/file_organisation.htm#Organising
File Organization

Module 5 – SQL

After this module, student will be able to:

1. Explain the basic commands and functions of SQL
2. Use SQL for data administration
3. Use SQL for data manipulation
4. Use SQL to query a database to extract useful information
5. Use SQL to create a trigger and procedure for a database

Links to potential free course material:
Link 1: http://www.sql-tutorial.net/SQL-tutorial.asp
Link 2: http://www.sql-tutorial.net/SQL-Cheat-Sheet.pdf
Link 3: https://docs.oracle.com/cd/B28359_01/appdev.111/b28843/tdddg_procedures.htm
Link 4: http://adbc.kennesaw.edu/

Module 6 – Database Application

After this module, student will be able to:

1. Explain three components of a client-server system
2. Describe differences between a 2-tiered and 3-tiered system
3. Describe key components of a Web application using a database
4. Explain the purpose of XML, XQuery, JSP, PHP and ASP.Net

Links to potential free course material:
Link 1: https://www.youtube.com/watch?v=mm3r8EG4wLQ
Link 2: http://en.wikipedia.org/wiki/Client–server_model
Link 3: http://www.nitrosphere.com/2015/05/14/2-tier-vs-3-tier-application-architecture-could-the-winner-be-2-tier-2/

Module 6 – Data Warehouse

After this module, student will be able to:

1. Describe the needs for data warehouse
2. Describe the three levels of a data warehouse
3. Explain the independent and dependent data mart
4. Explain the basic concept of big data, NoSQL, OLAP, data visualization, and data mining.

Links to potential free course material:
Link 1: Introduction to data warehouse:
https://docs.oracle.com/cd/B10500_01/server.920/a96520/concept.htm
Link 2: Three levels of database warehouse:
http://www.tutorialspoint.com/dwh/dwh_architecture.htm
Link 3: Data mart: http://www.zentut.com/data-warehouse/data-mart/
Link 4: Big data: http://www.sas.com/en_us/insights/analytics/big-data-analytics.html

Link 5: NoSQL: http://nosql-database.org/

Module 8 – Data Administration and Database Administration

After this module, student will be able to:

1. Explain major functions of a data administration and database administration
2. Describe data dictionaries and repositories
3. Describe the basics of database security
4. Understand the role of databases in Sarbanes-Oxley compliance.

Links to potential free course material:

Link 1: Data administration: https://en.wikipedia.org/wiki/Data_administration

Link 2: Data administration and database administration: http://tdan.com/irm-data-administration-vs-database-administration/4197

Link 3: Data dictionaries: https://docs.oracle.com/cd/B10501_01/server.920/a96524/c05dicti.htm

Link 4: Databases in Sarbanes-Oxley compliance: http://www.s-ox.com/dsp_getFeaturesDetails.cfm?CID=448

Link 5: 10 common database security vulnerabilities: http://www.zdnet.com/article/the-top-ten-most-common-database-security-vulnerabilities/

Module 9 – Distributed Database

After this module, student will be able to:

1. Explain distributed database models
2. List reasons why an enterprise would choose a distributed database model over a centralized model
3. Explain data replication and partitioning

Links to potential free course material:

Link 1: Distributed Database Book Chapter: http://wps.prenhall.com/wps/media/objects/3310/3390076/hoffer_ch13.pdf

Initial Proposal

Affordable Learning Georgia Textbook Transformation Grants
Round 2
Summer 2015, Fall 2015, Spring 2016
Proposal Form and Narrative

Transformations-At-Scale for Department-Wide Database Related Courses

Institution Name(s)	Southern Polytechnic State University				
Team Members (Name, Title, Department, Institutions if different, and email address for each)	Dr. Lei Li, Associate Professor, Information Technology Department, lli3@spsu.edu Dr. Rebecca H. Rutherfoord, Professor & Interim Dean of Computing and Software Engineering, brutherf@spsu.edu Dr. Svetlana Peltsverger, Associate Professor & Chair, Information Technology Department, speltsve@spsu.edu Dr. Jack Zheng, Assistant Professor, Information Technology Department, jzheng3@spsu.edu Dr. Zhigang Li, Instructional Designer, Adjunct Professor, Information Technology Department, zli24@spsu.edu Ms. Nancy N. Colyar, Director, Lawrence V. Johnson Library, ncolyar@spsu.edu				
Sponsor, Title, Department, Institution	Dr. Svetlana Peltsverger, Chair of Information Technology Department, speltsve@spsu.edu Dr. Richard Cole, Vice President of Academic Affairs				
Course Names, Course Numbers and Semesters Offered (Summer 2015, Fall 2015, or Spring 2016)	CSE 3153 Database Systems (fall 2015) IT 4153 Advanced Database (spring 2016) IT 4713/6713 Business Intelligence Systems (fall 2015) IT 5433 Databases: Design and Applications (spring 2016)				
Average Number of Students Per Course Section	30	**Number of Course Sections Affected by Implementation in Academic Year 2016**	**11**	**Total Number of Students Affected by Implementation in Academic Year 2016**	330
Award Category (pick one)	☐ No-Cost-to-Students Learning Materials ☐ OpenStax Textbooks ☐ Course Pack Pilots				

	☒ Transformations-at-Scale		
List the original course materials for students (including title, whether optional or required, & cost for each item)	Please see Table 1 for details.	CSE 3153 – $240.40 IT 4153 – $322.96 IT 4713/6713 - $153 IT 5433 – $240.40 *$956.76 per person* ***Total Cost: $110,419.20 based on average enrollment of 458 each year***	
Plan for Hosting Materials	☐ OpenStax CNX ☒ D2L ☐ LibGuides ☐ Other _____		
Projected Per Student Cost	**Original: $956.76** **After: $0**	**Projected Per Student Savings (%)**	100%

Table 1. Detailed information of Courses to be transformed

Course	Textbook Used	List price	Number of section	Average number of students per section	Number of students affected
CSE 3153 Database Systems	Modern Database Management, 11th edition, ISBN: 0132662256, required.	$240.40	8 (3 in springs, 3 in falls, & 2 in summer)	36	288
IT 4153 Advanced Databases	1) Database Administration: The Complete Guide to Practices and Procedures, ISBN: 0201741296, required. 2) Database Systems: Design, Implementation, and Management,11th edition, ISBN:1285196147, required	1). $69.99 2). $252.96 Total: $322.96	1 section	25	25
IT 4713/6713 Business Intelligence Systems	1) Delivering Business Intelligence with Microsoft SQL Server 2012, 3rd edition, ISBN: 0071759387, required. 2) Business Intelligence: A Managerial Perspective on Analytics, 3rd edition, ISBN: 0133051056, required.	1). $50 2) $103 Total: $153.00	1 section	20	20
IT 5433 Databases: Design and Applications	Modern Database Management, 11th edition, required.	$240.40	5 (2 in springs, 2 in falls, and 1 in summer)	25	125

1. PROJECT GOALS

In this project, we take a department-wide effort to transform all learning materials used in four database related courses. All selected courses will adopt no-cost-to-students learning material that offers equivalent or better educational effectiveness. These resources will be used for both in-class and online database students.

1.1 STATEMENT OF TRANSFORMATION

The Transformation

The textbooks used in four proposed database related courses are quite expensive (see Table 1 above). In fact, most textbooks on databases are quite expensive 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.

The Stakeholders

There are two primary sets of stakeholders for this proposal – the students taking the four database classes (both in-class and online students), and the faculty developing and teaching the database courses. The high costs of textbooks put a big financial burden on students and may become a road block for students' ability to finish their education. Our team of investigators strives to make the higher education more affordable to the students. The database related learning materials are widely available on the World Wide Web today, and some of them have been created by our faculty members. Many of these resources are publicly accessible, free, or with an open license to use. These materials include open and free tutorials, books, videos, labs, test banks, software, and services. For example, major database vendors such as Oracle and Microsoft published abundant tutorials and examples of their products on their websites. Oracle provides VMs with preinstalled Oracle DBMS (current version 12c). Microsoft Azure grants are widely available for faculty who needs free instances of MS SQL server (current version 2014) or Linux/Windows VMs.

Many of the textbooks become outdated at the moment they are published, while digital delivery of the learning materials makes it easier to keep the content up-to-date. Developing and assembling a set of learning materials for all database-related courses at the same time is a unique approach. It will not only allow us to target the outcomes of each course, but also target the outcomes of the Information Technology program.

Compared to traditional textbooks, the Web resources have many benefits: 1) the Web resources are generally free to use; 2) they are constantly being updated and always reflect the latest trends and industrial development; 3) the materials from the Web are also more dynamic and interactive. The pitfalls of Web resources are that they are often disorganized and may contain inaccurate information. However, our team of investigators are not only subject matter experts in the database field, but also are proficient educators who on average have more than 10 years teaching experience. We will select, organize and integrate resources from the Web and transform the

information into instructionally sound learning materials for the proposed courses. We strongly believe that the new learning materials will offer equivalent or better learning effectiveness compared to the original textbooks. Digital delivery also allows us to add interactive elements into the learning materials. The interactive content will not only engage the students, but also improve their learning experience. It will also help to enhance the learning outcomes and learning satisfaction.

The Impact

The impact of our transformation efforts will be profound. By our estimates, 400 to 500 students will benefit from the no-cost learning material 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 database courses adapting no-cost-to-students material not only offers better and more consistent learning experience to students, but also makes our renowned IT program more affordable. As a result, our IT program could recruit more students and produce more qualified IT professionals that Georgia needs. Our experience gained in this transformation project could be useful to other programs or departments who want to lower the cost of the education to their students. In summary, we believe the proposed project will have a positive impact in students' retention, progression, and graduation at program, department and institution level.

1.2 TRANSFORMATION ACTION PLAN

With a coordinated effort, the department investigators plan the following activities to transform all database related courses to completely use no-cost learning materials:

- Research and identify no cost content 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 the no cost material 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-students database software for students to gain hands-on experience.
- Update the syllabus to include major resources and no cost materials.
- Update the D2L accompanying sections for online students to match the resources for the in-class students.

There will be one course architect for each course who will be the main person to develop the course. The responsibilities of each PI is described in table 2.

Table 2. PI responsibilities

Primary Investigator	Course	Responsibilities
Dr. Lei Li	IT 5433	Coordinate project activities; subject matter expert and developer; instructor of record
Dr. Rebecca Rutherfoord	CSE 3153	Subject Matter Expert and developer; instructor of record
Dr. Svetlana Peltsverger	IT 4153	Subject Matter Expert and developer; instructor of record
Dr. Jack Zheng	IT 4713/6713	Subject Matter Expert and developer; instructor of record
Dr. Zhigang Li		Provide Instructional Design and Hosting Support.
Ms. Nancy N. Colyar		Provide support in searching learning material, and handling license and copyright issues of no-cost material.

All course design with the no-cost materials will be provided through USG LMS D2L Brightspace for our students and on CourseSites for the public.

1.3 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 establish baseline data on student pass rates for the five courses over the last two years – 2013 and 2014. 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 3.
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 3. 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.

1.4 TIMELINE

The major milestones of the proposal are illustrated in table 4.

Table 4. Major Milestone

Milestone dates for fall 2015 implementation	Milestone dates for spring 2016 implementation	Milestone
5/01/2015		• Complete baseline gathering of statistics
6/30/2015	10/30/2015	• Complete course modules redesign to use the no cost materials. These include all reading, lecture notes, video clips, exercises, labs, and assignments. The changes are reflected in the learning modeling study guides.
7/31/2015	11/30/2015	• Complete course level materials redesign. This includes quizzes, tests, and syllabus.
10/31/2015	3/31/2016	Develop a survey of using the no cost materials to replace textbook.
12/8/2015	5/8/2016	• Complete the course offering. • Complete the survey data collection. • Complete student evaluation.
12/15/2015	5/15/2016	• Complete assessment data collection and analysis. • Deliver the status report. • Compile final report.

1.5 BUDGET

The funding mainly compensates our team of investigator's work and activity beyond normal teaching load or other job responsibilities in order to successfully complete the project. The role each PI is illustrated in table 2. For each proposed course, course architects approximately will spend at least 80 hours in developing the no-cost learning material and instructor of records, will spend 20 hours in course assessment. Instructional support and librarian would devote at least about 50 hours in assisting course architects. Thus, we request the budget of this project as follows.

Investigators compensation: $5,000 * 6 = $30,000

Travel: $800

Total Budget: $30,800

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

1.6 SUSTAINABILITY PLAN

The IT department 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 co-PI is a course architecture for corresponding courses (please see table 2). 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.

1.7 REFERENCES & ATTACHMENTS

Two letters of support from the VPAA and the chair of Information Technology Department of SPSU are attached.

PROPOSAL SUBMISSION: ALL PROPOSAL DOCUMENTS, REFERENCES, AND ATTACHMENTS MUST BE SUBMITTED IN A SINGLE EMAIL TO ALG@GATECH.EDU.

DEADLINE FOR CATEGORY 4: 5:00 PM, DECEMBER 8, 2014

SOUTHERN POLYTECHNIC STATE UNIVERSITY
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Division of Academic Affairs

1100 South Marietta Parkway
Marietta, Georgia 30060-2896

678-915-7238 OFFICE
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www.spsu.edu/academics

December 5, 2014

Dear Affordable Learning Georgia (ALG) Grant Reviewers,

It is my pleasure to write this letter in support of the proposal, "Transformations-At-Scale for Department-Wide Database Related Courses", submitted by Dr. Li, Dr. Rutherfoord, Dr. Peltsverger, Dr. Zheng, Dr. Li, and Ms. Colyar from our Information Technology (IT) Department at Southern Polytechnic State University (SPSU)/Kennesaw State University.

In this project, the primary investigators will work as a team to replace existing costly textbooks in four database related courses with no-cost-to-students learning materials. Their efforts will significantly lower the cost of education for students and generate immediate and positive impact on the retention, progression, and graduation for the College of Computing & Software Engineering.

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 developed no-cost-to-students material will be distributed using the course management system, GeorgiaView Desire2Learn. Thus, I believe the effort of this project will be sustainable over the long term.

In conclusion, I wholeheartedly support the efforts of Drs. Li, Rutherfoord, Peltsverger, Zheng, and Li, and Ms. Colyar as they seek this funding. This proposal has the full support of the Office of the Vice President for Academic Affairs.

Sincerely,

C. Richard Cole, AIA, NCARB
Vice President for Academic Affairs

SOUTHERN POLYTECHNIC STATE UNIVERSITY

Department of Information Technology

1100 South Marietta Parkway
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http://it.spsu.edu

Dear ALG Grant Review Committee Members:

As the Chair of the Department of Information Technology at Southern Polytechnic State University (SPSU) I strongly support project "Transformations-At-Scale for Department-Wide Database Related Courses", submitted by Dr Li, Dr. Rutherfoord, Dr. Peltsverger, Dr. Zheng, Dr. Li and Ms. Colyar.

The project will have a significant and immediate positive financial effect on 500-600 students, and will make our IT program more affordable. As a result, more students will be able to enroll in the program and Georgia will have more qualified IT professionals. This project aligned with USG's Strategic Imperative 1 to provide high quality and affordable education to Georgians

The primary investigators will disseminate the no-cost materials through USG LMS D2L/Brightspace for SPSU students, and on Course Sites for the public.

To ensure the sustainability of the project over the long term, each course has assigned course architect who is responsible for design, development and maintenance of no-cost-to-students learning materials.

Developing and assembling a set of learning materials for all database-related courses at the same time is a unique approach. It will not only allow IT department to target the outcomes of each course, but also target the outcomes of the Information Technology program.

In closing, I encourage the ALG grant representatives to fund this project. The potential impact on students will be significant and sustainable over the long term.

Sincerely,

Svetlana Peltsverger 12/8/2014

Svetlana Peltsverger, PhD, CISSP
Chair, Information Technology Department
School of Computing and Software Engineering
Southern Polytechnic State University
678-915-4285 speltsve@spsu.edu

Final Report

Affordable Learning Georgia Textbook Transformation Grants

Final Report

Date: 5/13/2016

Grant Number: #119

Institution Name(s):

Kennesaw State University (previously Southern Polytechnic State University)

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

Dr. Lei Li, Associate Professor, Information Technology Department, lli13@kennesaw.edu
Dr. Rebecca H. Rutherfoord, Professor & Interim Dean of Honor College, brutherf@kennesaw.edu
Dr. Svetlana Peltsverger, Interim Associate Dean of College of Computing and Software Engineering, speltsve@kennesaw.edu
Dr. Guangzhi Zheng, Assistant Professor, Information Technology Department, gzheng@kennesaw.edu
Dr. Zhigang Li, Instructional Designer, Adjunct Professor, Information Technology Department, zli8@kennesaw.edu
Ms. Nancy N. Colyar, Director, Lawrence V. Johnson Library, ncolyar@kennesaw.edu

Project Lead: Dr. Lei Li

Course Name(s) and Course Numbers:

CSE 3153 Database Systems (fall 2015)

IT 4153 Advanced Database (spring 2016)

IT 4713/6713 Business Intelligence Systems (fall 2015)

IT 5433 Databases: Design and Applications (spring 2016)

Semester Project Began: Spring 2015

Semester(s) of Implementation: Fall 2015 and Spring 2016

Average Number of Students Per Course Section:

Courses	Enrollment
CSE 3153 Database Systems	31
IT 4153 Advanced Database	36
IT 6713 Business Intelligence Systems	26
IT 5433 Databases: Design & Applications	27
Average:	30

Number of Course Sections Affected by Implementation: 4

Total Number of Students Affected by Implementation: 120

No-Cost-Learning Material Links:

Courses	Links
CSE 3153 Database Systems	http://ksuweb.kennesaw.edu/~lli13/CSE3153.html
IT 4153 Advanced Database	http://ksuweb.kennesaw.edu/~speltsve/dba.php
IT 6713 Business Intelligence Systems	http://jackzheng.net/teaching/it6713/
IT 5433 Databases: Design & Applications	http://ksuweb.kennesaw.edu/~lli13/IT5433.html

1. Narrative

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

Overall, our project is very successfully. Overwhelming majority of the students (85%) indicated positive experience with the open-access-free learning material we created. The student success rates in the four participating classes is over 93%. By estimate, our project saved our students $110,419! Our ALG grant along with other KSU ALG recipients are recognized by Kennesaw State University (KSU) in a campus wide announcement.

The transformation process also has positive impact on the instructors. The use of open access materials ensures the flexibility and customized reading materials for our courses which is critical for a project based teaching/learning approach.

Lessons learned:

1. Providing too many choices for reading materials confuses students. Providing too few choices does not provide diverse points of view and enough examples. It may take a couple of semesters to reach a sweet spot.
2. KSU uses Digital Measures to evaluate teaching. There are two questions about textbooks: 1) The textbook was clear and understandable (0-4) and 2) I used the textbook very often (0-4). There is no N/A option, so some students skipped these questions and some chose disagree. We need to modify student survey to correctly collect information about instructional materials.

2. Quotes

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

"Saving money on a textbook was fantastic and a welcomed addition. It's also preferred to have access to any learning materials online and available to download. This class and professor got it right" –IT 5433.

"I enjoy not getting ripped off every semester by having to pay the unreasonably high prices for textbooks that basically cover the same information that is freely available on the Web. So, I am very supportive of Open materials being utilized in the program". –IT 5433.

"Open and free learning materials can be much more useful than textbooks as long as they're picked well (as they were in this course)". – IT 6713

"… conventional "Textbooks" are a horribly overpriced and seldom worth the cost. … I appreciate the money savings in online resources, and use them in my work every day". – IT 6713

3. Quantitative and Qualitative Measures

3a. Overall Measurements

Student Opinion of Materials

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

As the table below indicates, overwhelming majority of students hold positive opinion on the material used in the courses.

Courses	Total number of Respondents	Opinion on the non-cost-material		
		Positive	Neutral	Negative
CSE 3153 Database Systems	31	87%	6.5%	6.5%
IT 4153 Advanced Database	36	81%	11%	8%
IT 6713 Business Intelligence Systems	8	87.5%	0%	12.5%
IT 5433 Databases: Design & Applications	27	85%	11%	4%

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?

Due to the consolidation of SPSU and KSU, we don't have access to comparable students' performance data for three of the four courses. However, the performance data for current courses are very positive.

Courses	Semester 1		Semester 2		Comparison
	Number of Students	Success Rate	Number of Students	Success Rate	
CSE 3153 Database Systems	NA	NA	31	93.5%	Positive
IT 4153 Advanced Database	NA	NA	38	87%	Positive
IT 4713 Business Intelligence Systems	NA	NA	24	96%	Positive
IT 5433 Databases: Design & Applications	24	100%	33	97%	Neutral

Note: 1) Success rate = total number of students with passing grade/total number of students who completed the courses. 2) Semester 1 refers to the semester where traditional textbook was used. Semester refers to the semester where no-cost-learning material was used. Due to the consolidation of SPSU and KSU, the student performance and enrollment of data from previous sections got lost. We use "NA" for those course sections.

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?

Due to the consolidation of SPSU and KSU, we don't have access to comparable students' performance data for three of the four courses. The current DFW rates are in the normal range.

Courses	Semester 1		Semester 2		Comparison
	Enrollment	DFW Rate	Enrollment	DFW Rate	
CSE 3153 Database Systems	NA	NA	31	6.5%	Positive
IT 4153 Advanced Database	NA	NA	48	21%	Positive
IT 4713 Business Intelligence Systems	NA	NA	24	4%	Neutral
IT 5433 Databases: Design & Applications	24	0%	35	9%	Negative*

Note: 1). Semester 1 refers to the semester where traditional textbook was used. Semester refers to the semester where no-cost-learning material was used. Due to the consolidation of SPSU and KSU, the student performance and enrollment of data from previous sections got lost. We use "NA" for those course sections. 2) * The class section in semester 1 is a hybrid section. The class in semester 2 contain both online and hybrid section. Online section traditionally have higher DFW rate.

3b. Narrative

In the project, we used quantitative and qualitative methods to access the effectiveness of the learning material we developed.

Quantitatively, we collected student performance data (success rate, grades, DFW rate). Due to the consolidation of SPSU and KSU, we were not able to collect the student performance data of the controlled courses in previous semester. The student performance data of current courses showed the students were able to achieve their learning goals using the learning material we developed. At the end of the semester, we also conducted survey to all four participating courses to get students' opinion on the learning material. The survey results show that over 85% of the respondents think positively on the learning material used in the classes. The detailed survey results can be found in the supporting document that is submitted along with this final report.

The end of semester survey also contains open-ended questions in which students can freely express their opinion on the learning material. The analysis of the comments also showed students held a positive view on the learning material and many of them appreciated the savings of no-cost-material. Selected list of students' comments can be found in section two. All comments from the survey respondents are included in the supporting document.

4. Sustainability Plan

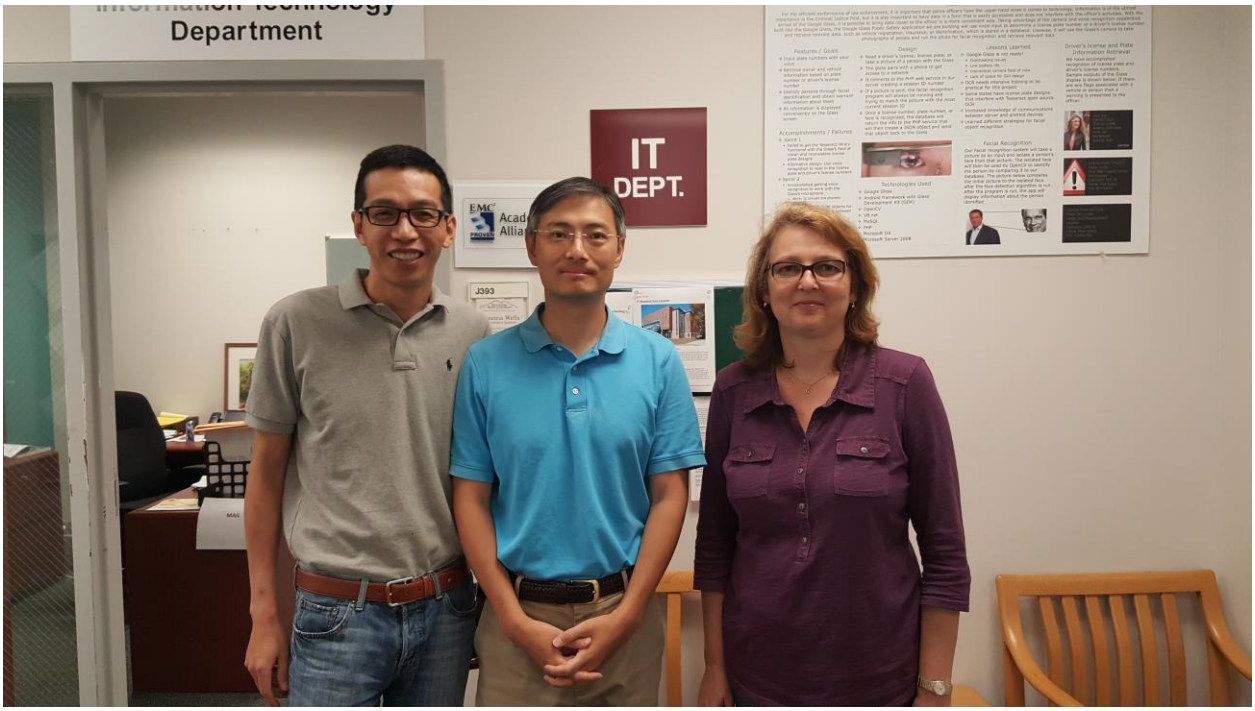
The IT department at KSU implemented a course architect system for all courses. A course architect updates course content based on research, publications and feedback from students and alumni. Each of instructor of record is a course architecture for corresponding courses. A course architect develops 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.

5. Future Plans

In general, this project has enhanced our visions to use free and open access learning materials in all my teaching. This enables me to customize my course content and teaching method to best reflect my experience and expertise.

Secondly, we found out that it may take more than one design-and-implement cycle to get right on the open access learning materials. We will keep revising the corresponding learning material based on our research and feedbacks from students and alumni.

6. Description of Photograph



Left-right: Dr. Lei Li, team lead, instructional designer, and instructor of record; Dr. Jack Zheng, instructional designer, and instructor of record; Dr. Svetlana Peltsverger, instructional designer, and instructor of record. Team members missing from the picture are: Dr. Rebecca Rutherfoord, Ms. Nancy Coylar, and Dr. Zhigang Li.