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# Application Summary

## Competition Details

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<b>Competition Title:</b>	Textbook Transformation Grants, Round Twelve (Fall 2018-2019)
<b>Category:</b>	University System of Georgia
<b>Award Cycle:</b>	Round 12
<b>Submission Deadline:</b>	09/13/2018 at 11:59 PM

## Application Information

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<b>Submitted By:</b>	Reza Parizi
<b>Application ID:</b>	2592
<b>Application Title:</b>	392
<b>Date Submitted:</b>	09/11/2018 at 8:32 AM

## Personal Details

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<b>Institution Name(s):</b>	Kennesaw State University
<b>Applicant First Name:</b>	Reza
<b>Applicant Last Name:</b>	Parizi
<b>Applicant Email Address:</b>	rparizi1@kennesaw.edu
<b>Applicant Phone Number:</b>	470-578-2118
<b>Primary Appointment Title:</b>	Assistant Professor of Software Engineering
<b>Submitter First Name:</b>	Reza
<b>Submitter Last Name:</b>	Parizi
<b>Submitter Email Address:</b>	rparizi1@kennesaw.edu
<b>Submitter Phone Number:</b>	470-578-2118
<b>Submitter Title:</b>	Assistant Professor of Software Engineering

## Application Details

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### Proposal Title

392

### Final Semester of Project

Fall 2019

### Requested Amount of Funding

10,800

### Type of Grant

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

**Course Title(s)**

Introduction to software engineering, Software engineering, Emerging software engineering processes

**Course Number(s)**

SWE 3313, SWE 6623, SWE 6733

**Team Member 1 Name**

Reza Parizi

**Team Member 1 Email**

rparizi1@kennesaw.edu

**Team Member 2 Name**

Paola Spoletini

**Team Member 2 Email**

pspoleti@kennesaw.edu

**Team Member 3 Name**

**Team Member 3 Email**

**Team Member 4 Name**

**Team Member 4 Email**

**Additional Team Members (Name and email address for each)**

**Sponsor Name**

Dr. Chi Zhang

**Sponsor Title**

Associate professor and the department's chair of SWEGD

**Sponsor Department**

Software Engineering and Game Development (SWEGD)

**Original Required Commercial Materials (title, author, price)**

Essentials of Software Engineering 4th Edition, Tsui, Karam, Bernal

Software Engineering: Theory and Practice, Shari Lawrence Pfleeger, Joanne M. Atlee

Learning Agile: Understanding Scrum, XP, Lean, and Kanban, Andrew Stellman, Jennifer Greene

Essential Scrum: A Practical Guide to the Most Popular Agile Process, Kenneth S. Rubin

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

100

**Average Number of Sections Affected by Project in One Academic Year**

**Total Number of Students Affected by Project in One Academic Year**

640

**Average Number of Students Affected per Summer Semester**

80

**Average Number of Students Affected per Fall Semester**

280

**Average Number of Students Affected per Spring Semester**

280

**Original Total Cost per Student**

Undergraduate: \$ 130 and Graduate: \$ 275 = 405

**Post-Project Cost per Student**

0

**Post-Project Savings per Student**

Undergraduate: \$ 130 and Graduate: \$ 275 = 405

**Projected Total Annual Student Savings per Academic Year**

Undergraduate: \$ 72,800 + Graduate: \$ 22,000 = 94,800

**Using OpenStax Textbook?**

No

**Project Goals**

The Bachelor of Science in Software Engineering (BSSWE) and the Master of Science in Software Engineering (MSSWE) at Kennesaw State University (KSU) are very successful programs with more than 450 and 75 enrolled students, respectively. Both programs rely on foundation courses that introduce the seminal software engineering concepts and software development processes. In these courses, the concepts of agile and light-weight are highly emphasized since they represent the current trends in the industry. In contrast to the content of the courses, our program does still heavily rely on textbooks, which are expensive and often outdated. Because, the process of realizing new editions for books, especially when big changes need to be included, is much slower than the changes in the software development trends.

In this project, we propose to develop free-cost materials for the courses in our programs that teach software development processes and to evaluate the possibility of expanding this initiative to all the software engineering courses in the program. We will collect and revise material available in the world wide web, identify relevant research papers (for the MS SWE), develop slides, videos, and lecture notes, and organize all the materials together to produce coherent and well navigable courses. We will also discuss a procedure to constantly update and adapt the material in a sustainable way besides the life of this project, which is novel.

The main reason to focus on these specific courses is that they are the entry courses in our programs, and they are also taken by students in other majors (including Computer Science and Information Technology) in the college. These courses are focused on teaching dynamic and iterative processes, thus require constant material updating to stay relevant, a feature that the selected textbooks fall short.

**Statement of Transformation**

Even if the traditional textbooks used in the three considered courses are all less than 10 years old and are the newest existing editions of those textbooks (and adopted also in other institutions), they are obsolete in many aspects. Indeed, following the textbooks structure, the courses of foundations of software engineering have a traditional structure in which the software processes are first briefly introduced and then the traditional phases of software development are analyzed as stand-alone activities mainly referring to the waterfall approach. This structure is not only a characteristic of the chosen textbooks, but it is a general structure used in software engineering textbooks. In this way, it becomes very little natural for students to understand the intrinsic nature of agile processes when introduced later in the textbook, the course, and the program. This is a misalignment with the real world, where agile techniques are the most commonly used. These textbooks will be most likely updated and published as new editions that try to solve this misalignment. However, the time required by the process is too much with respect to the students' needs and the pace of the world's changes, and the risk is that when the needed changes will be reflected on textbooks, the world's needs (and consequently the students' needs) will be changed once again.

Additionally, the available textbooks related to agile processes (those above cited books) are typically theoretical and lack hands-on materials for software engineering students. Understanding the agile concepts is not very difficult, but putting them into practice requires a whole set of tailor-made materials which are not presented in these textbooks.

So, the textbooks are not only expensive, but are also (or tend to easily become) obsolete and can harm the students' preparation. The dynamic nature of software engineering requires more easily updatable material and a sustainable procedure to constantly update it. This proposal has the goal to create the needed material and outline the procedure to keep it updated.

Considering the nature of the discipline, there are tons of available high-quality sources in the world wide web, that are always updated and are aligned with research changes and the industry needs. We are not claiming that foundations are not relevant, but we want to stress the need of material that is as flexible as the discipline nature. This would impact twice positively on the students, who could have a more affordable and potentially more effective education.

Moreover, differently from books, online material is offered in different, often interactive ways. This can increase the interests and the self-motivation of students who are usually more engaged when they can refer to the topics of a course using different learning tools. In addition, different perspectives are also available when the material comes from different sources. This can be used to help students to improve their evaluation skills by comparing different views and approaches.

The main drawback of online material is that it is spread and not always easy to find. In this project our goal is to identify the most relevant sources and organize them to obtain an easy to navigate and to use set of material. This set of material will need to be updated periodically, and possibly reorganized, but the identification of a large set of trustable sources will support the process, that has the advantage to allow the faculty member responsible for the course to always be current and align with the industry.

## **Transformation Action Plan**

The PIs will work together to transform the SWE programs through the following milestones:

- Identification of the kind of material needed for the courses of interested – This step includes an analysis of the contents, the selection of different format per different topics, and the construction of a schedule coherent with the choice made.
- Research and selection of the materials used in the course – In this phase, we will analyze different sources and their reliability, and we will select the materials needed for the courses. The selection will comprise different types of material, such as readings, videos, open sources tools, and demos.
- Development of new material – This phase is devoted to complement the identified material with slides, lectures, and lecture notes.
- Development of project and assignments – In this step, we will create ad-hoc assignment and project templates that are in line with the new material developed for the course. In addition, consultation with the industrial partners of the department's IAB will be considered in designing real-world coursework.
- Integration of the materials – In this phase, all the selected and created material will be integrated to obtain a well navigable course.
- Re-development of the courses in D2L Brightspace – The course based on the developed material will be developed in D2L Brightspace so that can be offered to the students both online and on campus.
- Analysis of the SWE programs to identify possible expansion of the zero-cost approach – In this phase, we will analyze the textbooks adopted in the curricula and the possible courses which would benefit not only in terms of affordability but also in terms of content by this flexible approach.

The developed course material will be made available to public for adoption. With roots in the open source, we believe the material would be more sustainable and trustworthy in the community.

### **Quantitative & Qualitative Measures**

We will collect both qualitative data to measure the level of satisfaction of the students on the effectiveness of the no-cost materials created, and quantitative data to measure how the changes in the material affect the success of the course not only in the courses changed by the project but also in the courses that has the affected courses as a prerequisite.

To measure the level of satisfaction of the students we will develop a questionnaire to collect the opinion of the students during, at the end of the course, and after the finals. The reason for this choice is that we can measure not only the students' feedback on the quality of the material, but also how they believe it affected their results in the course.

To analyze the impact of the proposed changes on the students' success we will compare the success rate of the first two semesters in which the new courses are offered with the last four semesters in which the courses were offered. We will compare the obtained data using classic statistical indices. Within the project we will do the analysis only using a single offering of the new course. Moreover, outside the duration of the project, we will measure if and how the changes impacted on the success of the students in the courses that depend on the modified courses. This analysis will be based on success rate, interview with the instructors, and questionnaires for the students.

### **Timeline**

**12/01/2018** Complete the design of the structure of the material in terms of type of support (slides, notes, papers, videos, tools, ...). This task will be developed by differentiating course's content and level (graduate/undergraduate) of it.

**3/01/2019** Complete course material collection and design for SWE 3313 and SWE 6623. We will work in parallel on these courses because of the similar content.

**5/01/2019** Complete course material collection and design for SWE 6733.

**6/01/2019** Development of a sustainable procedure to update the courses and perform pilot studies.

**7/15/2019** Development of the tools to implement the above described survey procedure to collect both qualitative and quantitative.

**9/15/2019** Analysis of the curriculum to identify the courses to consider for expanding the zero-cost initiative

**11/01/2019** Complete course offering and student evaluation.

**11/15/2019** Complete analysis of the data, compile and submit project final report.

## **Budget**

The requested funds are mainly to compensate the additional work that the investigators will need to do for the project in addition to the normal teaching load, research activities, or other service-related responsibilities. Each course included in this proposal will require at least 120 hours in developing the no-cost learning material and 30 hours in course assessment. Thus, the budget of this project is the following.

- Dr. Reza Parizi – compensation: \$5000
- Dr. Paola Spoletini – compensation: \$5000

Travel & Other Expense: \$ 800 (expense for two team members to attend the Kick-off Meeting)

## **Sustainability Plan**

Our programs follow a 3-year evaluation plan (i.e., each course is evaluated in a collegial way at least once every 3 years). In addition,

- Each course has a coordinator who collects the instructors and the students' feedback;
- The course instructor has to prepare a course evaluation to analyze the student's performance (in all the offered sections he/she teaches), which also include general consideration about the course, its goal, problems related to it, and possible improvement measures;
- Each course is evaluated by students through a course evaluation form that include also evaluation on the provided material.

These mechanisms are already in place and provide the information needed to evaluate the course content and update it in a continuous way. The course coordination is distributed fairly among faculty members, so this should not overload any faculty member that was already invested as responsible for a set of courses before the introduction of zero-cost courses.

On top of this, the PIs are working on an adaptive and automatic way to notify instructors when the content of their courses needs changes or revamping. This approach is based on an analysis of the data collected automatically from the world wide web (we are in the process building the prototype). When this approach gets in place, the load on the coordinator would be even lighter and help achieve more sustainably over time.

Additionally, the developed course material will be made available to public for adoption. With roots in the open source, we believe the material would be more sustainable and trustworthy in the community.

Lastly, we plan to publish all the produce material and to present at meetings and conferences our experience with zero-cost requirements engineering courses.

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## **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.





September 8, 2018

Affordable Learning Georgia (ALG)  
Textbook Transformation Grants, Round Twelve (Fall 2018-2019)

**Re:** Support of Dr. Spoletini and Dr. Parizi's ALG project proposal

Dear ALG Review Committee Members:

I am pleased to write this letter in support of the proposal titled "**Self-motivated and Book-less Learning in Modern BS and MS Software Engineering Programs**" submitted by Dr. Reza Parizi and Dr. Paola Spoletini, faculty at Department of Software Engineering and Game Development (SWEGD) at Kennesaw State University.

I am the SWEGD's Department Chair. At the SWEGD department, we offer both undergraduate and graduate programs in Software Engineering (SE) with a variety of SE-centric courses from Introduction to Software Engineering to more advanced topics in the field.

The majority of the core SE courses in the programs (such as SWE3313 Introduction to Software Engineering, SWE6623 Software Engineering, and SWE6733 Software Engineering Processes) require students to purchase expensive textbooks. As a remedy, the proposed initiative project will provide a massive cut on learning expenses to students at our department. Additionally, the project proposers have pledged collaborative support for content analysis, new material development, and relevant course assessment with the industrial partners on the department's Industrial Advisory Board. This will help in ensuring that the proposed contents will not only be affordable to students but also make them sustainable for hands-on learning grounded in real-world applications.

I look forward to your support for funding this project in eliminating costs and achieving affordable learning for our Software Engineering students. It will be of great help to the proposers and other instructors of Software Engineering where there is a necessity of easily-accessible course modules to teach Software Engineering courses at no cost for students.

Please feel free to contact me if you need further information.

Sincerely,

Chi Zhang, PhD, CPHIMS, CHDA  
Associate Professor of Information Technology  
Interim Department Chair, Software Engineering and Game Development  
College of Computing and Software Engineering  
Kennesaw State University  
470-578-3796  
chizhang@kennsaw.edu

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# Textbook Transformation Grants, Round Twelve (Fall 2018-2019)

## 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 12 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	Reza Parizi
Applicant Email	rparizi1@kennesaw.edu
Applicant Phone #	470-578-2118
Applicant Position/Title	Assistant Professor of Software Engineering
Submitter Name	Reza Parizi
Submitter Email	rparizi1@kennesaw.edu
Submitter Phone #	470-578-2118
Submitter Position	Assistant Professor of Software Engineering

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	Reza Parizi	rparizi1@kennesaw.edu
Team Member 2	Paola Spoletini	pspoleti@kennesaw.edu

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

Dr. Chi Zhang, Associate professor and department's chair Department of Software Engineering and Game Development Kennesaw State University
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## Project Information and Impact Data

<b>Title of Grant Project</b>	<i>Self-motivated and Book-less Learning in Modern BS and MS Software Engineering Programs</i>
<b>Type of Grant</b>	<i>No-or-Low-Cost-to-Students Learning Materials</i>
<b>Requested Amount of Funding</b>	\$10,800
<b>Course Names and Course Numbers</b>	SWE 3313 – Introduction to software engineering, SWE 6623 – Software engineering, SWE 6733 – Emerging software engineering processes
<b>Final Semester of Project</b>	<i>Fall 2019</i>
<b>Average Number of Students Per Course Section Affected by Project</b>	20, 40, 20
<b>Average Number of Sections Affected by Project in One Academic Year</b>	3, 14, 1
<b>Total Number of Students Affected by Project in One Academic Year</b>	640
<b>Average Number of Students Affected per Summer Semester</b>	80
<b>Average Number of Students Affected per Fall Semester</b>	280
<b>Average Number of Students Affected per Spring Semester</b>	280
<b>Title/Author of Original Required Materials</b>	<i>Essentials of Software Engineering 4th Edition, Tsui, Karam, Bernal Software Engineering: Theory and Practice, Shari Lawrence Pfleeger, Joanne M. Atlee Learning Agile: Understanding Scrum, XP, Lean, and Kanban, Andrew Stellman, Jennifer Greene Essential Scrum: A Practical Guide to the Most Popular Agile Process, Kenneth S. Rubin</i>
<b>Original Total Cost Per Student</b>	<i>Undergraduate: \$ 130 Graduate: \$ 275</i>
<b>Post-Project Cost Per Student</b>	<i>\$ 0</i>
<b>Post-Project Savings Per Student</b>	<i>Undergraduate: \$ 130 Graduate: \$ 275</i>
<b>Projected Total Annual Student Savings Per Academic Year</b>	<i>Undergraduate: \$ 72,800 Graduate: \$ 22,000</i>
<b>Using OpenStax Textbook?</b>	<i>No</i>

# Narrative Section

## 1. Project Goals

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## 2. Statement of Transformation

Even if the traditional textbooks used in the three considered courses are all less than 10 years old and are the newest existing editions of those textbooks (and adopted also in other institutions), they are obsolete in many aspects. Indeed, following the textbooks structure, the courses of foundations of software engineering have a traditional structure in which the software processes are first briefly introduced and then the traditional phases of software development are analyzed as stand-alone activities mainly referring to the waterfall approach. This structure is not only a characteristic of the chosen textbooks, but it is a general structure used in software engineering textbooks. In this way, it becomes very little natural for students to understand the intrinsic nature of agile processes when introduced later in the textbook, the course, and the program. This is a misalignment with the real world, where agile techniques are the most commonly used. These textbooks will be most likely updated and published as new editions that try to solve this misalignment. However, the time required by the process is too much with respect to the students' needs and the pace of the world's changes, and the risk is that when the needed changes will be reflected on textbooks, the world's needs (and consequently the students' needs) will be changed once again.

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#### 5. Timeline

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- 6/01/2019 Development of a sustainable procedure to update the courses and perform pilot studies.

7/15/2019 Development of the tools to implement the above described survey procedure to collect both qualitative and quantitative.  
9/15/2019 Analysis of the curriculum to identify the courses to consider for expanding the zero-cost initiative  
11/01/2019 Complete course offering and student evaluation.  
11/15/2019 Complete analysis of the data, compile and submit project final report.

## 6. Budget

The requested funds are mainly to compensate the additional work that the investigators will need to do for the project in addition to the normal teaching load, research activities, or other service-related responsibilities. Each course included in this proposal will require at least 120 hours in developing the no-cost learning material and 30 hours in course assessment. Thus, the budget of this project is the following.

- Dr. Reza Parizi – compensation: \$5000
- Dr. Paola Spoletini – compensation: \$5000

Travel & Other Expense: \$ 800 (expense for two team members to attend the Kick-off Meeting)

## 7. Sustainability Plan

Our programs follow a 3-year evaluation plan (i.e., each course is evaluated in a collegial way at least once every 3 years). In addition,

- Each course has a coordinator who collects the instructors and the students' feedback;
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Additionally, the developed course material will be made available to public for adoption. With roots in the open source, we believe the material would be more sustainable and trustworthy in the community.

Lastly, we plan to publish all the produce material and to present at meetings and conferences our experience with zero-cost requirements engineering courses.

### Note: Letter of Support

Attached to the application.