

FIRST IN THE WORLD: A COMPUTER SCIENCE PERSPECTIVE

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Abstract

The Department of Electrical and Computer Engineering and Computer Science is highlighted by introducing innovative ways of approaching a computer science perspective at Jackson State University outside of the classroom. Computer science has not been changed officially since 1972 at Jackson State University once it came to fruition [4]. This article proposes modifying the Department of Computer Science by examining other departments in nearby states. It also underscores the First in the World Grant (FITWG) and reveals a weakness as well. The sophomore students completed a post survey after the first year ended and the data submitted reveals answers 1-5 and 9 had favorable results, but answers 6 – 8 had 51%, 57% and 62%, respectively, that were non-favorable. The engagement team had to give innovative, interesting, and different topics for next semester and added questions to the pre/post assessments for the sophomore students in terms of the engagement team projects.

Keywords: Jackson State University, First in the World, Computer Science. Engagement, Multidisciplinary

Introduction

"First in the World" (FITW) Project was created by President Obama's administration to promote and enhance science, technology, engineering and mathematics (STEM) experiences for Jackson State University (JSU) students [2]. In the fall of 2016, JSU was responsible for working with 16 faculty members (4 faculty per team) and 80 students (10 - per team) on a series of multidisciplinary research, innovation, education and engagement experiences that are designed to give sophomore level students an opportunity to participate in a faculty-student informal learning experience. Students from all academic majors that are in good academic standing on a sophomore level and have an interest in completing a multidisciplinary team research project can join the program [3].

The goals of the Multidisciplinary Research, Innovation, Education and Engagement Team Experiences for All Students are to:

- 1) Impact the teaching, research, innovation, and engagement of faculty team leaders,
- 2) Empower students to become researchers, innovators, educators, and leaders who are engaged in STEM advancement,

- 3) Enhance students' 21st-century competencies, including research skills, understanding of various disciplines, and abilities to work collaboratively with others,
- 4) Increase students' interest and engagement in STEM-related issues, and
- 5) Increase overall STEM literacy.

The faculty from several JSU academic departments will engage students in multidisciplinary research, innovation, education, and engagement projects [3, 10].

Computer Science First Year Introductory Courses

JSU's Computer Science Department is redesigning a new course, CSC 115, which is based on knowledge from past CSC 115 courses, learning experiences, and research. Since 1972, the department of computer science had an traditional way of doing things and it has become established [4]. The purpose of the curriculum is to integrate the old CSC 115 course with new learning experiences from our multidisciplinary team of students and come up with novel awareness and understanding. The computer science skills that are not currently covered in the CSC 115 course and CS grads need to know about Office 2013 and Windows 8. The author wants to consider what other teams of Computer Science Departments are doing in there introductory courses.

Colorado State University offers a course named CS110 Personal Computer which provides the knowledge and skills necessary to use a personal computer in the college environment, focusing on those skills needed to perform and document research. The format of the class includes lectures and labs, with the activities divided approximately evenly between the two. Specific objectives and activities are as follows:

- Understanding of basic computer concepts such as:
 - Computer hardware and software.
 - Security and privacy.
 - Tools that use the Internet and the World-Wide-Web.
 - Searching and collecting information.
- Understanding how to manage and keep information secure.
- Preparation of professional documents.
- Creation of well-designed presentations.
- Manipulating, analyzing and plotting data.
- Projecting information onto the web [1]

Colorado State has an introduction to system lab, excel lab, advanced excel lab, word lab, advanced word lab, and a PowerPoint lab, as well as lectures.

At Purdue University, there is a course labeled CS 11000, which is an introductory course for computers that tell how they can be used for solving problems in everyday life. It talks about the Internet with an emphasis on obtaining information from the World Wide Web, use of a database with an emphasis on data storage and retrieval, spreadsheets, word processing, presentation software, and integration of multiple software packages. It is much like JSU's Computer Science course in that it may not be taken for credit by Computer Science majors [9].

The Department of Computer Science at Virginia Tech has the introduction of the internet, CS1604. Its purpose introduces the concepts, software, data organization and issues involved with using networked information. It also covers file formats (as applied in networked hypermedia and multimedia sound/video documents), local and global (Internet) network access, electronic mail, transferring files, network news, the World Wide Web, digital libraries, on-line public access catalogs and electronic journals, CD-ROMs and on-line databases, and commercial and other networks [11].

JSU First in the World

Since the overall JSU project is focused on improving, teaching, and learning in STEM disciplines, specifically the computer science professor focuses on the following question: How can we improve students' academic performance and engagement in computer science courses? Computer science will explore the issue from multiple perspectives (students' and instructors classroom engagement in CSC 115), departmental culture and its impact on student engagement, students' personal mindsets that impact their computer literacy and learning experiences, and educating students on the benefits of having a strong and documented knowledge of various computing and computer science tools as both students and professionals. It is expected that all students who participate on either of the research, innovation, education, and engagement teams will exhibit increased:

- Problem-solving skills;
- Team work and collaboration skills; and
- Self-confidence in their ability to use technology
 - a) To enhance their learning experiences,
 - b) To facilitate their college completion, and

c) To prepare for their future careers

It is expected that students who participate in the Multidisciplinary Engagement Team will also benefit in the following ways:

- Increased awareness of career paths
- Increased oral presentation skills (at the end of each 8-wks the team leader should select an exemplary team or individual student to present his/her/their work to the entire Engagement Team)

The Engagement Team

The four professors met for the first time in the summer of 2016, which made up the Engagement Team. Each brings his/her own perspective of learning experiences in the classrooms. Through brainstorming and transient ideas being passed off to the other professors, the professors came up with their own plan led by the team leader. Professor A dealt with “Experience in Mathematical Models using Mathematica (EM3) [7]. He explored the practical side of mathematics in everyday life and developed a personal financial plan. Also the students will be shown how to apply mathematics and computer software to chart spending, savings, expenses, and investments. Professor B dealt with revising a professional resume and a professional development plan for sophomore students [6]. Professor C dealt with drafting a research interest statement and a personal undergraduate research plan [8]. The students were able to complete an application to one of the summer research programs. The objective is to help them comprehend the important role that undergraduate research plays in the transition to graduate study. Professor D dealt with developing an online professional profile or an e-Portfolio to house the research, career, and financial plans [5]. The students have to identify the computer skills needed for a STEM literate college student and develop a plan on how to gain those skills if they do not already possess them.

Year One: A Computer Science Perspective

Professor D came up with a plan to engage the students in computer science. The learning outcomes for sophomore students from a computer science perspective are as follows:

- 1) Based on learning experiences from students, the faculty can have a better way of teaching,
- 2) Sharing the work experiences of computer sciences professionals will make students better researchers and communicators,

- 3) A multi-disciplinary team working together to come up with computer specifics based on learning experiences,
- 4) Faculty will get to mentor students of other majors and,
- 5) A new CSC-115 format for students and faculty.

Recruitment efforts were sent by email to sophomore students and professors mentioned the First in the World Program to students in the classroom. The program had 96 sophomore students signed up for FITW Program. By the end of the semester, 85% of the students had dropped out due to financial reasons and not understanding the objectives of the program. First in the World Project paid no financial support to students and given the late start there were only four weeks to work with them instead of eight weeks. The multidisciplinary team considered revamping our plan, at least for this initial (pilot year), to have a more general focus on STEM engagement and literacy. Table 1 shows weeks 1 - 6 by the team leader.

The students dealt with using computer skills to develop a professional online profile and engage in online networks. Professor D brought the students together to work on LinkedIn accounts, which use social media as to tool. Of the engagement group, 15% of students remained for the session. Once the students were done with the session, they were questioned about how this information might be communicated to different groups of students to help them become more STEM literate or more engaged in STEM. One student said learning in a small environment helped them to focus more.

In the spring of 2017, Professor D brought the students together as a whole instead of the 10 per team in order to work on computer literacy and the LinkedIn account. Students got a better grasp of computer science aspects as a college student as a whole instead of 10 to a group (where many did not show up). Questionnaires were given to the sophomore students that inform professors how the multidisciplinary team should improve. Table 2 & 3 is shown below.

The sophomore students agreed with Question 5 and only one disagreed with Questions 1, 2, and 4. Two of the students disagreed with Questions 3 & 9. However, Questions 6 – 8 had different responses. 51%, 57%, and 64% believe the questions were untrue.

Table 1: Fall 2016 Multidisciplinary Engagement Team

Fall 2016	Date	Activity Name and Description
Week 1	8/22	Recruitment for Multidisciplinary Teams
Week 2	8/29	Recruitment for Multidisciplinary Teams
Week 3	9/6	Multidisciplinary Team Orientation Session
Week 4	9/14	Engagement Team Workshop: Introduction and Overview of Engagement and STEM Literacy & Intro to Mathematical Modeling Presentation
Week 5	9/21	Engagement Team Workshop: Undergraduate Research Presentation & Career Exploration Presentation
Week 6	9/28	Teams Meet to Brainstorm and Create a Prezi with their ideas for using what they learned to increase students' STEM literacy or interest in pursuing STEM careers. Final Session Wrap Up and Evaluations

Table 2: Questions for Sophomore Students

Q1	The MDT information and topics were well organized.
Q2	The instructor(s) communicated effectively.
Q3	The topic(s) provided a mixture of enlightenment and practice.
Q4	The instructor(s) seemed knowledgeable about the subject matter
Q5	The instructor(s) conveyed a positive attitude toward the students
Q6	Assignments and projects were engaging.
Q7	This new method of learning enhanced my college experience
Q8	I gave my best effort in this FITW program.
Q9	I, positively, recommend this program to other students.

Conclusion

The multidisciplinary team of JSU has to formulate more innovative and engaging activities in order to assist students in an engaging environment. Year two of the FITW grant is going to be innovative because the scope of the project is small (4-5 weeks plus the presentation day to work with the students). The team leaders' projects should be minute and focused for the students to achieve in approximately one-month. In developing team leaders' projects, five questions could be added to the pre-post assessment to help determine student learning. This will help the team leaders better prepare for sophomore students.

Table 3: Sophomore Students Post Questionnaire

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1	A	A	A	A	A	A	D	A	A
2	A	A	A	A	A	A	A	D	A
3	A	A	A	D	A	A	D	D	D
4	A	A	A	A	A	A	D	D	A
5	A	A	A	A	A	D	A	D	A
6	A	A	A	A	A	A	D	A	A
7	A	A	A	A	A	D	A	A	A
8	A	A	A	A	A	D	D	A	A
9	A	A	D	A	A	D	D	D	D
10	A	A	A	A	A	D	D	D	A
11	A	A	A	A	A	A	D	D	A
12	A	D	D	A	A	D	D	D	A
13	D	A	A	A	A	D	A	A	A
14	A	A	A	A	A	A	A	A	A

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