

Annual Report for Period:09/2011 - 08/2012

Submitted on: 06/29/2012

Principal Investigator: Coleman, John K.

Award ID: 0811826

Organization: Langston University

Submitted By:

Coleman, John - Principal Investigator

Title:

Langston's Integrated Network College Featuring The STEM Digital Village (LINC, Phase II)

Project Participants

Senior Personnel

Name: Coleman, John

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Osei, Richard

Worked for more than 160 Hours: Yes

Contribution to Project:

Richard Osei served as Education and Data Coordinator for the LINC Program

Name: Fondjo, Franklin

Worked for more than 160 Hours: Yes

Contribution to Project:

Franklin Fondjo served as a colloquium facilitator

Name: Fondjo, Vicky

Worked for more than 160 Hours: Yes

Contribution to Project:

Vicky Y Fondjo served as a colloquium facilitator

Name: McKinney, Martell

Worked for more than 160 Hours: Yes

Contribution to Project:

Martell McKinney served as a student lab and office assistant

Name: Anderson, Paurieta

Worked for more than 160 Hours: Yes

Contribution to Project:

Paurieta Anderson served as a high school master instructor for the summer bridge program

Name: Harris, Steven

Worked for more than 160 Hours: Yes

Contribution to Project:

Steven Harris served as a colloquium coordinator

Post-doc

Graduate Student

Undergraduate Student

Name: Mitchem, Sarita

Worked for more than 160 Hours: Yes

Contribution to Project:

S. Mitchem mentors and tutors other undergraduates

Name: Greene, Cedric

Worked for more than 160 Hours: Yes

Contribution to Project:

C. Green is a laboratory assistant

Name: Osborne, Toykeya

Worked for more than 160 Hours: Yes

Contribution to Project:

T. Osborne helps manage the LINC office

Name: Osborne, James

Worked for more than 160 Hours: No

Contribution to Project:

J. Osborne participated in the mentoring & tutoring program

Name: Ekpo, Felicia

Worked for more than 160 Hours: Yes

Contribution to Project:

F. Ekpo participated in the mentoring, & tutoring program as well as help manage the LINC office.

Name: Caldwell, Kenta

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Caldwell participated as a research assistant for Dr. Lewis

Name: Blythe, Karole

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Blythe participated in the mentoring, tutoring program as well as help manage the LINC office.

Name: Vickers, Quanisha

Worked for more than 160 Hours: Yes

Contribution to Project:

Q. Vickers helps manage the LINC office

Name: Bradley, Justina

Worked for more than 160 Hours: Yes

Contribution to Project:

J. Bradley helps manage the LINC office

Name: Vann, Kendra

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Vann helps manage the LINC office, as well and participates in the mentoring and tutoring program

Name: Torres, Tamar

Worked for more than 160 Hours: Yes

Contribution to Project:

T. Torres participates in the mentoring and tutoring program

Name: Momberger, Leslie

Worked for more than 160 Hours: No

Contribution to Project:

L. Momberger worked as a research assistant for Dr. Matand

Name: Stoutermire, Brittany

Worked for more than 160 Hours: Yes

Contribution to Project:

B. Stoutermire helps manage the LINC office, as well and participates in the mentoring and tutoring program

Name: Braggs, Kirk

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Braggs participates in the mentoring and tutoring program

Name: McCarroll, Gjasmine

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Walker, Antjuan

Worked for more than 160 Hours: Yes

Contribution to Project:

Antjuan Walker served as a counselor for summer program

Name: Watson, Detrick

Worked for more than 160 Hours: Yes

Contribution to Project:

Detrick Watson served as a tutor for summer program as well as a lab research assistant

Name: Pugh, Demetrius

Worked for more than 160 Hours: Yes

Contribution to Project:

Demetrius Pugh served as a counselor for summer program

Name: Miro, Njemile

Worked for more than 160 Hours: Yes

Contribution to Project:

Njemile Miro served as a research assistant

Name: Love, Kayla

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Cooper, Rose

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Henderson, Samuel

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Nichols, Shebre

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Johnson, Marcus

Worked for more than 160 Hours: No

Contribution to Project:

Student worked in chemistry laboratory

Name: Vann, Britani

Worked for more than 160 Hours: Yes

Contribution to Project:

Student worked in chemistry laboratory as well as worked in the chemistry office with the LINC coordinator

Name: Ross, Joceci

Worked for more than 160 Hours: Yes

Contribution to Project:

Student work in Computer Science laboratory as well as in the chemistry office.

Name: Pugh, Denzel

Worked for more than 160 Hours: Yes

Contribution to Project:

Student worked in chemistry laboratory

Name: White, Christopher

Worked for more than 160 Hours: Yes

Contribution to Project:

Student worked with the Education Coordinator

Name: Harding, James

Worked for more than 160 Hours: Yes

Contribution to Project:

Student worked in Biology laboratory

Name: McLaurin, Allen

Worked for more than 160 Hours: No

Contribution to Project:

Student worked in chemistry laboratory

Name: Richardson, LaCandace

Worked for more than 160 Hours: Yes

Contribution to Project:

Student worked in mathematics laboratory and office

Technician, Programmer

Other Participant

Name: Williams, Irene

Worked for more than 160 Hours: Yes

Contribution to Project:

The Program coordinator works closely with the PI/Director in coordination all program activities including budgetary concerns.

Name: Watkins, Willie

Worked for more than 160 Hours: Yes

Contribution to Project:

The education, technology & data coordinator assists the program coordinator in the coordination of the colloquiums, CPR-L, STEM Digital Village website & SEIS data.

Name: Chan, Douglass

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Chan helps coordinate the instrumentation laboratory.

Name: Kesete, Tesfai

Worked for more than 160 Hours: Yes

Contribution to Project:

T. Kesete helps in the coordination and upkeep for the instrumentation laboratory

Name: Hill, Anthony

Worked for more than 160 Hours: Yes

Contribution to Project:

Anthony Hill facilitates the Preparation for Success Colloquium

Name: Franks, William

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Franks facilitates chemistry and research colloquiums.

Name: Harvey, Desmond

Worked for more than 160 Hours: Yes

Contribution to Project:

Desmond Harvey is the new Education, Technology and Data coordinator

Name: Parker, Casandar

Worked for more than 160 Hours: Yes

Contribution to Project:

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

Other Collaborators or Contacts

During this reporting period LINC had three (3) major categories of collaborations within the context of NSF defined collaborations: (1) two major program areas within Langston University (2); four other NSF projects derived through a Langston University connection; and (3) collaborations that involved organizations other than the NSF.

There were 25 research sites for LU STEM summer interns.

Category 1: Langston University Collaborations:

Langston University's two major programs that contributed to our LINC objectives are:

Annual LU School of Arts and Sciences Research Day Symposium to showcase STEM scholars' research projects to the LU campus (See details in next section).

High School Day Recruiting Activity, where students from all over the state visit LU's campus. LINC sponsors a display table where students meet LINC scholars. Each of the STEM disciplines also displayed recruitment booths. (See details in next section).

The collaborating entity, purpose of collaboration, a detailed description of the program, program results, and coordinating entity for each of the two areas are listed below.

Activity: 12th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, Friday, April 6, 2012.

LU Department: School of Arts and Sciences

Purpose: Showcase for STEM students' research projects

Detail: The LINC Program co-sponsored the 12th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on April 29, 2011. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. The featured program speaker for the occasion was Dr. Lila Peal, Department of Biology, Cameron University, Lawton, OK. Dr. Peal is a 2004 LU LINC alum. Her primary focus was 'My Journey to a PHD'.

Results: This year's event displayed over forty-four (44) projects which were viewed by 300 participants. Over twenty Faculty judges participated and chose winners in both oral and poster categories. Information about the event, including the program booklet and a slide show, is distributed broadly at our Stem Digital Village (www.stemdigitalvillage.com).

By the end of the morning, awards were given to the top presenters.

Activity: High School Day - Recruiting

LU Department: Admissions - Main Campus

Purpose: Showcase the LINC program, entice students to join LU's STEM program.

Detail: This event was held during November 3, 2011 on the LU main campus. High School participants from over 30 visiting high schools from throughout the state of Oklahoma attended the event. Departmental flyers and brochures were distributed to prospective students by all LU departments including all STEM departments. The marketing materials promoted department programs, scholarships and mentoring activities for incoming students. Science & math quizzes were displayed with a selection of candies as a reward for participation. A guest book was on hand to record contact information for potential entering undergraduates.

STEM faculty participants: Faculty & students representatives were in attendance from all five STEM areas. There were between 25-30 LU personnel from the STEM areas on hand through-out the recruiting program.

Results: Over 150 potential incoming STEM majors signed the guest book on hand. Each likely candidate has been contacted by our STEM staff to solicit participation in our Summer Bridge program.

Category 2: LU-LINC collaborations that involve other NSF programs

Through Langston University, LINC has four (4) programs (in addition to LINC) that involve the National Science Foundation. Each program made a major contribution to the success of our goals. Those programs are:

1. STEM Double Bridge a 4-week summer program that introduces 13-15 incoming STEM majors to courses encountered during the first two years of college. (See details in next section)
2. Oklahoma Louis Stokes Alliance for Minority Participation (OK-LSAMP). This program nurtures and assists 12 students through the undergraduate program, while creating opportunities to pursue graduate degrees in their selected STEM discipline. (See details in next section)
3. Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR) provides collaborative funding for two (2) programs: (See details in next section)

a) Graduate Record Examination Preparation (GRE)

b) Supplemental Instruction (SI)

The collaborating entity, purpose of collaboration, a detailed description of the program, program results, and coordinating entity for each of the three areas are listed below.

The Summer Academic Bridge to College (SABC) & STEM Double Bridge Program (Summer Program)

This is a summer bridge program that is a collaboration between our LINC Summer Academic Bridge to College and The STEM Double Bridge Program, funded by the NSF in a Consortium Grant with the University of Central Oklahoma.

Purpose: The goal of the SUMMER BRIDGE program is to increase the number of students pursuing and receiving baccalaureate degrees in established or emerging fields within STEM. The program introduces incoming STEM majors to courses encountered during the first two years of college during an intensive four week enrichment experience, bridging the gap between high school and college.

This report is for the Summer 2011 session, as the current (2012) programs in progress. The 2012 program accomplishments will be included in the 2013 annual report.

Program Details:

Thirteen (13) students were selected to attend the SABC/STEM Double Bridge Program, held June 20-July 15, 2011. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

For the past 2 seasons, classes have been conducted in our state-of-the-art Smart classroom that features Tablet PCs, LED monitors, screen and projectors with wireless transmission, speakers, student

interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These tools, and the relatively small class size, enabled us to utilize the CPR-L (Competency Performance Recordings for Learning) process and monitor results.

Outcomes. Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. The CPRL process is now embedded for Chemistry courses offered in this program. Students who use this process continue to show a pronounced improvement on Pre & Post assessments. Improvements were marginally higher than the 180 % improvement shown last year. Comparatively, Biology, & Mathematics summer programs both demonstrated around 100% improvement for the Pre & Post Exams.

All students successfully fulfilled the stated requirements. They presented posters of their respective research projects and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium. All students were admitted into a STEM program at LU during the Fall 2011 session; six were accepted as LINC scholars.

OK-LSAMP (Oklahoma Louis Stokes Alliance for Minority Participation) and NSF. Dr. Sharon Lewis is LU campus Director.

Purpose: significantly increasing the recruitment, enrollment and retention of under-represented minority students in the STEM disciplines. The Oklahoma program nurtures and assists students through the undergraduate program, while creating opportunities to pursue graduate degrees in their selected STEM discipline.

Program Detail:

OK-LSAMP Scholars are provided with opportunities to interact with faculty and scientists, developing strong research experiences through academic year and summer internships; receive scientific integrity training; attend and present at local, state and national conferences; and prepare for transition into graduate programs, including GRE preparation. Funds are provided for Scholars to apply to five graduate schools during their senior year of undergraduate studies. Stipends are awarded to Scholars in the amount of \$500-\$2000 per semester

Outcome: 12 STEM scholars received OK-LSAMP stipends. Each participated in annual Research day symposium held at Oklahoma State University.

Graduate Record Exam (GRE) Preparation, an EPSCoR-LU-LINC collaboration. Dr. Alonzo Peterson is the LU campus coordinator for EPSCoR.

Purpose: Provides access to GRE preparation for STEM scholars students.

Program details:

The LINC Program has been a proactive collaborator in providing STEM students with the opportunity to receive free GRE Course preparation since 2003. The Kaplan GRE Preparation course has been very effective in getting more minority students prepared for the GRE, hence, increasing their competitiveness for graduate school and/or professional schools.

Outcomes: Ten (10) students took the Graduate Record preparation course during the Spring 2011 term. Upon completion on the course Mean Verbal Scores and Mean Quantitative Scores improved appreciably. The improvement trend has been continuous during the course of this offering.

Supplemental Instruction (SI), an EPSCoR, LU, LINC collaboration

Purpose: Provides facilitated study sessions to STEM majors that augment classroom participation. SI leaders provide facilitated study sessions for biology, chemistry, physical science, physics, algebra, trigonometry, and calculus I for STEM majors.

Program Details:

Outcomes: The 142 students who regularly attended the 19 SI classes offered over the course of 3 semesters (including a summer term) outperformed students who did not attend.

Category 3: LU-LINC collaborations that involve organizations other than the NSF.

Through Langston University, LINC has three (3) programs funded by other than the NSF that contribute to our success: (1) OK-INBRE IDeA Collaborative Grant (2) OK-INBRE Mini grant and (3) K-INBRE IDeA Collaborative Grant. An additional non-NSF organization is We Care Worldwide, Inc. and Positive Images, Inc. , that provide hosting and bandwidth resources to support our STEM Digital Village.

The collaborating entity, purpose of collaboration, a detailed description of the program, program results, and coordinating entity for each of the three areas are listed below.

OK-INBRE IDeA Collaborative Grant. Dr. Sharon Lewis, Coordinator.

Purpose: This is a collaborative grant with EPSCoR and other Oklahoma state universities that supports students in the STEM areas toward biomedical research. It is funded through the National Institute of Health (NIH). This program and offers 6-10 scholarships to students each year.

K-INBRE IDeA Collaborative Grant. Dr. K.J. Abraham, campus coordinator.

Purpose: This is a collaborative grant with EPSCoR and Kansas universities that supports students in the STEM areas toward biomedical research. It is funded through the National Institute of Health (NIH).

This program offers 6-10 scholarships to students each year.

OK-INBRE Mini grant support for research

Purpose: Provide research experience for STEM faculty

Outcome: STEM faculty member Dr. Sharon Lewis was awarded a mini grant to do utilize research in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder. Dr. Lewis has been

involved in this area of research for several years. The result of her prior work under this grant is in the process of being published in the Journal of Biotech Research

Abstract of research: According to a genome wide association study, mutations in the ANK3 gene may be involved in the bipolar disorder, which is a chemical imbalance of neurotransmitters in the brain, thereby causing dramatic mood swings characterized by episodes of elation and high activity alternating with periods of low mood and low energy. Dr. Sharon Lewis's research focuses on genotyping ANK3 in African American and Caucasian populations in the NIMH (National Institute of Mental Health) Genetics Initiative Bipolar Disorder Consortium. The degree of nucleotide sequence similarity in the ANK3 gene between 100 African-American and Caucasian cases versus 100 African-American and Caucasian controls obtained from the NIMH Genetics Initiative Bipolar Disorder Samples is investigated. In addition, the differences between nucleotides in male and female populations will be monitored.

Results: Dr. Lewis mentors 6-10 students each year in the area of bio informatics and molecular biology for root causes of Bipolar Disorder.

Other collaborations:

Organization: We Care Worldwide, Inc. and Positive Images Community Outreach Foundation

Purpose: Support the LINC project by providing website hosting and content-building assistance.

Organizations supply high bandwidth hosting for www.stemdigitalvillage.com, permitting LINC 24/7 access to site administration, and assist with website content development.

Outcomes: LINC continues to have sufficient bandwidth and server access to support online presence and community building for the STEM Digital Village.

There are 25 universities throughout the U.S. that are hosting LU STEM summer interns.

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)

MAJOR ACTIVITIES

Major research and education activities of the project are represented in the attached 'Activities' pdf file.

An Appendix file (3 pages) is attached at the end of the 'Activities' file

Findings: (See PDF version submitted by PI at the end of the report)**MAJOR FINDINGS**

Major findings are represented in the attached 'Findings' pdf file.

Training and Development:**STUDENT DEVELOPMENTAL RESEARCH PROJECTS**

Activities listed here may have been reported in an earlier section. However, this section seems to require a re-statement of the information presented earlier.

During the course of the LINC project (LINC I and LINC II) fifty two (52) students have won awards for presentations on their research projects in regional and national competition. During this grant reporting period, there were 22 student research presentations at three different competitive venues; two of which were national settings. Six (6) students won national awards for their research presentations. There were four (4) first place winners, one (1) second place, and one (1) third place winner.

In addition, Langston University hosted its Annual Research Day (its twelfth) on April 27, 2012.

Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published in the official programs of each event. The presentation venues, participating scholars, and their research topics are included below.

The story on each event below is featured at www.stemdigitalvillage.com, at the 'News' tab.

FACULTY DEVELOPMENT

Note: Only STEM faculty activities associated with LINC are included.

Dr. Sharon Lewis - Dr. Lewis's research in Bioinformatics and molecular biology for root causes of Bipolar Disorder focuses on genotyping ANK3 in African American and Caucasian populations in the NIMH (National Institute of Mental Health) Genetics Initiative Bipolar Disorder Consortium. The degree of nucleotide sequence similarity in the ANK3 gene between 100 African-American and Caucasian cases versus 100 African-American and Caucasian controls obtained from the NIMH Genetics Initiative Bipolar Disorder Samples is investigated. In addition, the differences between nucleotides in male and female populations will be monitored.

Funding is through a National Science Mini grant, in collaboration with LINC.

Drs. John Coleman; Douglas Chan; and William Franks. Research is on Biomass and Biofuels. The project addresses the need for alternative

energy resources.

Specifically, the project focuses on efforts to increase the yield of biomass for fuel production as well as increase non-productive rangelands for the production of biomass. There is a growing realization that this country has to reduce its dependence on petroleum-based products. The reliance on imported sources of energy threatens our national security, economy and future competitiveness.

LINC supports this initiative.

Grant Writing and Collaboration initiatives

Dr. Sharon Lewis - OK-INBRE IDeA Collaborative Grant through the NIH (\$55,000)

Dr. Sharon Lewis - Louis Stokes Alliance for Minority Participation Collaborative Grant (\$45,000)

Dr. Sharon Lewis - OK-INBRE Mini-Grant Procurement for Research in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder (\$22,000)

Dr. John K. Coleman - STEM Double Bridge Program Grant Collaboration (\$72,000)

Dr. John K. Coleman Corporate Collaboration (website hosting and assistance)

Outreach Activities:

OUTREACH AND RECRUITING ACTIVITIES

Activities listed here may have been reported in an earlier section. However, this section seems to require a re-statement of the information presented earlier.

High School Day, November 2, 2011. Multipurpose building, LU campus.

Departmental flyers and brochures were distributed to prospective visiting high school participants from various high schools throughout the state of Oklahoma. The marketing materials promoted department programs, scholarships and mentoring activities for incoming chemistry majors. A Chemistry quiz was displayed with a selection of candies as a reward for participation. A guest book was on hand to record contact information for potential entering undergraduates.

Journal Publications

Charles Loftis¹, Dakshinamurthy Rajalingam², Jiashou J. Xu², and Thallapuranam Krishnaswamy S. Kumar², "Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate", Protein Science, p. , vol. , (2009). Pending Cataloguing,

Cheri Ognibene, S.A Lewis, "Analysis of the Molecular Role of COMT in Bipolar Disorder", Journal of Biotech Research, p. , vol. , (2009). Pending Cataloguing,

Books or Other One-time Publications

Web/Internet Site

URL(s):

1. <http://www.stemdigitalvillage.com>;
2. <http://www.linconline.org>

Description:

Stem Digital Village features Video output from CPRL activity
LINC Online connects current and former LINC students to support mentoring

Other Specific Products

Contributions

Contributions within Discipline:

The principal discipline(s) of the project

The CPR-L (Competency Performance Recordings for Learning) Process is poised to make a tremendous contribution to the pedagogical techniques in education. It is aimed at at 'resuscitating' students' learning of the analytical process of problem solving, thus enhancing their problem solving skills as well as their understanding of core course concepts. It utilizes modern technologies to reinforce tried and proven learning processes and is simply a 'learning by teaching' method that embraces numerous learning protocols. According to the Learning Pyramid by National Training Laboratories in Bethel, Maine, 'learning by teaching' produces a 90% retention rate, the highest of all methods.

The primary uniqueness of the CPR-L process is that it includes Concept Rubrics as a basis for understanding the application of a concept, and repetition over multiple learning channels so that learning is retained. Concept Rubrics take the students through a logical process of evaluating problem elements, and foster thorough research. Combined 21st century technologies (smartboard, wireless projector, and tablet pc) allow the well established learning techniques to be more versatile, dynamic and administered to a larger population; they also work to preserve adherence to the integrity of the overall process.

At the end of this program we will have established Concept Rubrics for STEM courses that can be applied at high school and college levels of teaching. The CPRL process will be sufficiently defined so that it can be replicated beyond Langston University.

During this project we institutionalized a process that focuses LINC scholars on obtaining relevant research experiences, augmented by

enhancing their presentation capabilities as well as their capacity for defending their work. Nurturing and confidence-building are included in our process. Our scholars' performance attests to the efficacy of the process. During the course of the STEM program well over 200 STEM scholars presented their research findings and at numerous venues, including national settings. Fifty two (52) students have won national awards defending their projects before a national panel of faculty judges. Performance is on a very positive trajectory.

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

A state-of-the-art Smart classroom, including a computer laboratory featuring Tablet PCs has been created as the primary tool used in the CPR-L process. Other attributes include LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These elements provide the basis of a media laboratory that supports the creation and dissemination of performance videos wherein students learn by teaching' core course concepts as they solve specific problems.

The online portal, STEM Digital Village, showcases output from CPR-L exercises, warehouses a host of study aids and other information relevant to STEM students, and serves as a community forum.

The STEM Instructional Laboratory, managed by Drs. Douglas Chan and Tesfai Kesette, is now embedded at Langston. It became operational during the summer 2004 session. Equipment includes: ICP Optical Emission Spectrometer, FT-IR Infrared Spectrometer, UV/VIS Spectrometer, Gas Chromatograph with Mass Spectrometer, and High Performance Liquid Chromatograph.

This STEM Instructional Laboratory was the base for introducing students to state-of-the-art laboratory equipment, and enhanced tutoring and mentoring efforts. It also enhanced student interaction and laboratory skills development.

Contributions Beyond Science and Engineering:

Conference Proceedings

Special Requirements

Special reporting requirements: None

Change in Objectives or Scope: None

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Organizational Partners

Any Book

Any Product

Contributions: To Any Other Disciplines

Contributions: To Any Human Resource Development

Contributions: To Any Beyond Science and Engineering

Any Conference

Award # 0811826

Award Title: Langston's Integrated Network College Featuring The STEM Digital Village (LINC, Phase II)

PI/Co-PI Name: John Coleman

2012 Annual Report

Findings:

MAJOR FINDINGS

- The CPRL process has a major impact on student learning, comprehension, and retention. It will require a comprehensive list of core course concepts in order to minimize time required for implementation.
- Development of specific rubrics for selected concepts is having a significant impact on students' ability to problem solve.
- It is taking time to develop rubrics for all course concepts which will be required to effectively address the deficiencies of our target participants. However, their development is key to the CPR-L process and improved problems solving skills. It will support consistency in instruction and consistency in core course concept information presented as well as received.
- Posting students' educational projects and accomplishments on monitors continues to provide a great impact on their willingness to participate and learn.

Training and Development:

STUDENT DEVELOPMENTAL RESEARCH PROJECTS

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(1) second place, and one (1) third place winner.

In addition, Langston University hosted its Annual Research Day (its twelfth) on April 27, 2012. Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published in the official programs of each event.

The presentation venues, participating scholars, and their research topics are included below. The story on each event below is featured at www.stemdigitalvillage.com, at the 'News' tab.

Emerging Researchers National Conference. Atlanta, GA February 23-26, 2012

Ten (10) LINC scholars who are also STEM majors presented their research findings at the ERN venue:

Phoebe Lewis, Kayla Love, Justina Bradley, ShaRhonda Pickett, Brittany Stoutermire, Tiffany Glover, Britani Vann, Rajah Singh, Justin Williams, and Terry Phillips.

Two LINC participants received 1st place awards:

Kayla Love, Chemistry major

Oral Presentation: **REFRACTIVE INDEX SENSITIVITY OF DYE-DOPED SILICA-COATED GOLD NANORODS.** ¹Kayla Love, ²Karole L. Blythe, ³Kathryn M. Mayer, and ⁴Katherine A. Willets. ¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry and Biochemistry, University of Texas at Austin, Austin, TX

Phoebe Lewis, Biology major

Phoebe Lewis, Biology major

Poster Presentation: **HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV.** Lewis, Phoebe¹, Joseph L. Mankowski^{2,3,4}, Suzanne E. Queen^{2,3,4}, Jamie L. Dorsey^{2,3,4}. ¹Department of Biology, Langston University, Langston, OK. ²Department of Molecular and Comparative Pathobiology, ³Department of Pathology, ⁴Department of Neurology, Johns Hopkins School of Medicine, Baltimore, MD.

Langston University Advisors accompanying students: Dr. John K. Coleman, LINC Coordinator, Ms. Irene Williams, and Richard Osei, LINC Coordinator of educational activities and data.

BKX/NIS Joint Conference in Nashville, TN. Hosted by Tennessee State University and Fisk University. March 23-25, 2012

LINC student participants (10): Kayla Love, Phoebe Lewis, Justina Bradley, Britani Vann, Tiffany Glover, ShaRhonda Pickett, Brittany Stouter, Justin Williams, Rajah Singh, and Terry Phillips.

Three of the group of participants won awards.

Of the thirty-three schools represented there were two hundred-fifty abstracts presented. Of the ten Langston's Integrated Network Scholars (LINC) presenting, there were three presentation winners.

1st Place:

Phoebe Lewis, Biology major

Poster Presentation: **HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV.**

Lewis, Phoebe¹, Joseph L. Mankowski^{2,3,4}, Suzanne E. Queen^{2,3,4}, Jamie L. Dorsey^{2,3,4}.

¹Department of Biology, Langston University, Langston, OK. ²Department of Molecular and Comparative Pathobiology, ³Department of Pathology, ⁴Department of Neurology, Johns Hopkins School of Medicine, Baltimore, MD.

2nd Place:

Kayla Love, Chemistry major

Oral Presentation: **REFRACTIVE INDEX SENSITIVITY OF DYE-DOPED SILICA-COATED GOLD NANORODS.** ¹Kayla Love, ²Karole L. Blythe, ³Kathryn M. Mayer, and ⁴Katherine A. Willets.

¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry and Biochemistry, University of Texas at Austin, Austin, TX

3rd Place:

Britani Vann, Chemistry major

INFANT MORTALITY & THE LIFE COURSE PERSPECTIVE CREATING A SUSTAINABLE COMMUNITY-BASED PROGRAM TO REDUCE INFANT MORTALITY IN FORT WORTH – PHASE

1. BR Vann¹, K Cardarelli², PhD, M Paul, MA ; Department of Chemistry Langston University, Langston, OK¹; Department of Public Health University of North Texas Health Science Center Fort Worth, Texas².

Langston University Advisors accompanying students: Dr. John K. Coleman, LINC Coordinator, Ms. Irene Williams, and Richard Osei, LINC Coordinator of educational activities and data.

Oklahoma EPSCoR Research Day at the Capitol. Oklahoma City, OK. March 15, 2011

Langston University's LINC scholar and STEM major ShaRhonda Pickett participated. She presented a poster on her research project, **IMPROVED MODELING OF LIGANDS ON A SYMMETRY AXIS.**

ShaRhonda Pickett¹, Byron Quinn¹, Nicholas Sauter², Nigel Moriarty², Paul Adams^{2,3}. ¹Department of Biology, Langston University, P.O. Box 1500 Langston, OK. ²Lawrence Berkeley National Laboratory,

Cyclotron Rd Berkeley, CA. ³Department of Bioengineering, University of California at Berkeley, Berkeley, CA.

12th Annual Langston University Research Symposium Agricultural Research & Extension Education Complex. Friday, April 27, 2012

This year's event displayed over thirty (30) projects which were viewed by 300 participants. Over twenty Faculty judges participated and chose 3 winners in both oral and poster categories.

LINC Scholar takes Top Award at K-INBRE Symposium (January 13-15, 2012)

Phoebe Lewis, LU LINC scholar and junior Biology major, was invited to attend the Kansas Idea Network of Biomedical Research Excellence symposium due to her outstanding research in cell biology. Her speech, which addressed the changes in the immune changes in the livers of macaque monkeys, won her 1st place in oral competition.

FACULTY DEVELOPMENT

Note: Only STEM faculty activities associated with LINC are included.

Dr. Sharon Lewis - Dr. Lewis's research in Bioinformatics and molecular biology for root causes of Bipolar Disorder focuses on genotyping ANK3 in African American and Caucasian populations in the NIMH (National Institute of Mental Health) Genetics Initiative Bipolar Disorder Consortium. The degree of nucleotide sequence similarity in the ANK3 gene between 100 African-American and Caucasian cases versus 100 African-American and Caucasian controls obtained from the NIMH Genetics Initiative Bipolar Disorder Samples is investigated. In addition, the differences between nucleotides in male and female populations will be monitored.

Funding is through a National Science Mini grant, in collaboration with LINC.

Drs. John Coleman; Douglas Chan; and William Franks. Research is on Biomass and Biofuels. The project addresses the need for alternative energy resources.

Specifically, the project focuses on efforts to increase the yield of biomass for fuel production as well as increase non-productive rangelands for the production of biomass. There is a growing realization that this country has to reduce its dependence on petroleum-based

products. The reliance on imported sources of energy threatens our national security, economy and future competitiveness.

LINC supports this initiative.

Grant Writing and Collaboration initiatives

Dr. Sharon Lewis - OK-INBRE IDeA Collaborative Grant through the NIH (\$55,000)

Dr. Sharon Lewis - Louis Stokes Alliance for Minority Participation Collaborative Grant (\$45,000)

Dr. Sharon Lewis - OK-INBRE Mini-Grant Procurement for Research in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder (\$22,000)

Dr. John K. Coleman - STEM Double Bridge Program Grant Collaboration (\$72,000)

Dr. John K. Coleman Corporate Collaboration (website hosting and assistance)

Outreach Activities:

OUTREACH AND RECRUITING ACTIVITIES

Activities listed here may have been reported in an earlier section. However, this section seems to require a re-statement of the information presented earlier.

High School Day, November 2, 2011. Multipurpose building, LU campus.

Departmental flyers and brochures were distributed to prospective visiting high school participants from various high schools throughout the state of Oklahoma. The marketing materials promoted department programs, scholarships and mentoring activities for incoming chemistry majors. A Chemistry quiz was displayed with a selection of candies as a reward for participation.

A guest book was on hand to record contact information for potential entering undergraduates.

Award # 0811826

Award Title: Langston's Integrated Network College Featuring The STEM Digital Village (LINC, Phase II)

PI/Co-PI Name: John Coleman

2012 Annual Report**Activities****Research and Education Activities:****Major research and education activities of the project**

Description of activities implemented and of challenges or barriers to program implementation during the reporting period.

Goals:

LINC, Phase II project goals are twofold: 1) to further increase the number of underserved students who enter college, receive undergraduate and advanced degrees in STEM disciplines, and choose STEM careers, and 2) expand the diversity of participants in the LU STEM program.

Objectives:

LINC's objectives are to 1) increase the number of students who enroll in a STEM major by 15% by 2013; 2) increase the number of LU STEM graduates by 15%; 3) increase the number of students who enroll in STEM graduate programs by 25 %; and 4) increase the course completion rate of gatekeeper courses by 15% over the rate average of the past 3 years.

NUMBER OF SCHOLARS CURRENTLY IN LINC PROGRAM: 21

ACTIVITIES DEFINED TO REACH OBJECTIVES:

There are six (6) new activities, two (2) of which are innovative and utilize cyber technology while based on existing, tried and true teaching, learning, and communication methods.

1. CPR-L
2. STEM Digital Village
3. Summer Bridge
4. Developmental Internships and Master Tutors, Lab Assistant and Research Internships

5. Stars Tutorial Program
6. Dr. Freddie Fraiser's Mathematical videos tapes

STATUS OF EACH ACTIVITY:

1. CPRL: Goals and Objectives

Goal: CPR-L's goal is to improve the number of students' successful matriculation through gate keeping STEM courses, and demonstrate a capacity to improve test scores.

Objectives are 1) improve the grades of students who participate in the process (compared to baseline performance); 2) demonstrate improvement in students' capability to apply core course concepts to solve problems, as measured by adherence to course rubrics; 3) improve students' capability in articulating core course concepts (as measured by competency performance recordings), and 4) utilize students' experiences and demonstrated capabilities to impact the broader LU STEM community and beyond (as measured by the posting of CPR-L recordings in The Digital Village and presentations nationwide).

Program details:

Although enabled by 21st century technologies, CPR-L is simply a 'learning by teaching' method that embraces numerous learning protocols. According to the Learning Pyramid by National Training Laboratories in Bethel, Maine, 'learning by teaching' produces a 90% retention rate, the highest of all methods. It also includes Concept Rubrics as a basis for understanding the application of a concept or equation. As a result, students become more adept at understanding nuances embedded in complex problem statements, and overall problem-solving skills are enhanced. CPR-L incorporates 6 categories of Cognitive Learning as defined in Bloom's Taxonomy. It also includes criteria for learning the 'right way' as outlined in M. S. Donovan and J. D. Bransford's book 'How students learn: Mathematics in the classroom'.

The program is managed by Dr. John K. Coleman, LINC Director, with the assistance of Ms. Irene Williams LINC Coordinator, and Mr. Richard Osei, Education, Technology, and Data coordinator.

Accomplishments:

LINC Director John Coleman worked individually with STEM Double Bridge students during the Summer 2011 session and Organic Chemistry students during the Fall

2011 session to coach them on the concept of core course concepts and their relevance in problem solving. Actions included the following:

1. Elimination of multiple choice test questions that required selecting an answer from a list, unless the student was required to provide justification for the answer selected.
2. Including word problems in all in-class problem examples, and on all exams, to break the 'plug and play' mindset because students use a guessing game and a helter-skelter substitutions of variable for pre-set problems. This breaks the cycle of only seeking answers without any idea of how they were achieved.
3. Students had to articulate the process and logic used in solving problems during in-class exercises. This repetitive exercise helped students to understand the intention of the problem as well as given and missing elements. It also simulated a 'teaching' channel, the highest level of retention.
4. Recording class lectures and making them available online so students can listen repetitively until the concept 'sticks.' This also adds the auditory learning channel.

Additional support is needed to develop sets of rubrics based on core course concepts. Also, in order to develop the kind of study needed for peer review, we must do a comparison study between students who use the CPRL process versus some other process. We are attempting to find funding for this next step.

2. STEM Digital Village:

Purpose: The STEM Digital Village is an online community managed by the LU STEM group. It's goal is to facilitate increasing the numbers of students who enroll in STEM disciplines and retaining STEM scholars.

Objectives are: 1) reducing the administrative personnel support necessary to provide and receive all support documents critical to the program, 2) creating and tracking a repository of LU STEM graduates who are enrolled in graduate programs or are STEM professionals, thus increasing access to capable and supportive mentors, 3) supporting retention by creating a vehicle that encourages on-demand dialogue between cohorts, or between cohorts and STEM graduates, 4) impacting retention by showcasing the accomplishments of STEM scholars making them role models in their home communities, 5) showcasing the accomplishments of the STEM program, particularly as it regards new programs featuring scholars, and 6) serving as a flow of positive public

relations to potential LU STEM scholars. This activity contributes to LU's recruiting and retention goals, assists in the overall program dissemination process, and reaches a broader sector of LU STEM scholars.

The program is managed by Dr. John K. Coleman, LINC Director, with the assistance of Ms. Irene Williams LINC Coordinator, and Mr. Richard Osei, Education, Technology, and Data coordinator.

Accomplishments:

The STEM Digital Village program is on track.

We have accomplished the following milestones:

1. Established warehousing resources and study aids that include scholarship opportunities; research opportunities; graduate application process info and forms; timelines for all applications; GRE Prep; interview tips; time management tools; career goals statement; and STEM course information with study resources.
2. Posted STEM-Tube CPR-L Castings that include video shorts of students 'problem-solving exercises are available online in a format similar to that utilized on You Tube. We are finding that STEM scholars experience a surge in self-confidence as they hear their Competency Performance Recordings for Learning on this section of the Digital Village. STEM staff monitors recordings, so posted works demonstrate excellence.
3. Networking. STEM students are joining the online STEM community. Alumni have also begun to join, although at a slower pace. We are in the process of linking the STEM Digital Village community to Facebook, as our students are already prolific Facebook users. This will expedite the process of getting students involved.

Ex. I: Stem Digital Village – Access to Internships

The screenshot shows the STEM Digital Village website with a navigation bar at the top containing links: Home, News, About, Current Students, Future Students, Study Aids, CPR-L, Activities, Community, LINC, and Contact. The main header features the LINC logo, the text "STEM DIGITAL VILLAGE", and a group photo of students. Below the header, the "Internships" section is highlighted. It includes three main listings:

- Texas A&M University, The Plant – Microbe Interface – May 29 - August 2, 2012**: Financial support will include a stipend of \$5000 in addition to living expenses on campus. Assistance with travel expenses will also be provided. **Deadline for Submission: March 9, 2012 (You can still apply I talked to the program coordinator)**. [Read more and apply](#)
- Purdue Summer Research Opportunities Program**: The Purdue SROP has the goal of enhancing diversity in academic, government, and industry positions that require graduate degrees. It is our aim to encourage talented undergraduate students from social and economic backgrounds that are underrepresented in research careers to pursue graduate education, and to enhance their preparation for graduate study. This program involves intensive research experiences with faculty mentors. All qualified students, including but not limited to African American, ... [Read more and apply](#). **Deadline for Submission: till it's full**
- The Center for Neural Science**: The Center for Neural Science hosts a summer research experience program for undergraduates with an interest in neuroscience. This program is designed to foster entry into a neuroscience research-centered career. Students apply for positions in a 10-week summer program during which they actively participate in research projects in the laboratories of New York University science faculty. [Read more and apply](#). **Deadline for Submission: April 15, 2012**
- NI/NSBRIEPOP Summer Research Program**: The Morehouse School of Medicine Neuroscience Institute (MSNI), in collaboration with the NSBRIEPOP, is offering a 8-week (June 4 - July 27, 2012) Summer Research Program to qualified undergraduate, post-baccalaureate and first-year medical school students. Selected applicants will come to the Morehouse School of Medicine, where they will join a single laboratory, attend lectures on the neurobiology of the nervous system in health and disease, ...

On the left sidebar, there are links for Department Links (Biology Department, Chemistry Department, Computer Science, Mathematics Dept, Technology Department), STEM Organizations (Beta Kappa Chi, Biology Club, Chemistry Club, MANNRS), STEM Scholarships (View All STEM Scholarships), and Number of Visitors (13593, We have 2 guests online). On the right sidebar, there are Quick Links (Internships, Students Research, Graduate School Preparation, Scholarships & Graduate Fellowships, Personal Statements, Career Goal Statements, How to do a presentation, Interview Tips, Time Management, Tribute to Excellence, Achievements, Biology SI - Phoebe Lewis), Summer Programs (SABC-STEM Double Bridge Program, DOT, Math and Science Academy), and SPONSORS (Langston University, National Science Foundation, We Care Worldwide).

Ex. II: Stem Digital Village Study Aids

The screenshot shows the STEM Digital Village website with the same navigation bar as Ex. I. The main header features the LINC logo, the text "STEM DIGITAL VILLAGE", and a group photo of students. Below the header, the "Study Aids Quick Links" section is highlighted. It includes a list of links organized by subject:

- Biology**:
 - [Biology I](#)
 - [Biology II](#)
- Chemistry**:
 - [Chemistry I](#)
 - [Chemistry II](#)
 - [Organic Chemistry](#)
- Computer Science**:
 - [Programming Concepts I](#)
 - [Programming Concepts II](#)
- Mathematics**:
 - [Algebra](#)
 - [Trigonometry](#)
 - [Pre-Calculus](#)
 - [Calculus](#)
 - [Probability](#)
 - [Statistics](#)
 - [Differential Equation](#)
 - [Linear Algebra](#)
- Physics**:
 - [Physics I](#)
 - [Physics II](#)

On the left sidebar, there are links for Department Links (Biology Department, Chemistry Department, Computer Science, Mathematics Dept, Technology Department), STEM Organizations (Beta Kappa Chi, Biology Club, Chemistry Club, MANNRS), STEM Scholarships (View All STEM Scholarships), and Number of Visitors (13587, We have 2 guests online). On the right sidebar, there are Quick Links (Internships, Students Research, Graduate School Preparation, Scholarships & Graduate Fellowships, Personal Statements, Career Goal Statements, How to do a presentation, Interview Tips, Time Management, Tribute to Excellence, Achievements, Biology SI - Phoebe Lewis), Summer Programs (SABC-STEM Double Bridge Program, DOT, Math and Science Academy), and SPONSORS (Langston University, National Science Foundation, We Care Worldwide).

Ex. III: Students accomplishments are featured at Stem Digital Village:

The screenshot displays the STEM Digital Village website. On the left is a navigation sidebar with sections: Department Links (Biology Department, Chemistry Department, Computer Science, Mathematics Dept., Technology Department), STEM Organizations (Beta Kappa Chi, Biology Club, Chemistry Club, MANNRS), STEM Scholarships (View All STEM Scholarships), and Number of Visitors (13596, We have 2 guests online). The main content area features a header with a search bar, 'STEM Digital Village News', and a link 'For older & all news listings Click Here'. Below this is a photo of four students and text about the 'Langston University School of Art and Sciences 12th Annual Research Day Symposium (April 6, 2012)'. Further down is a group photo of students and text about 'Langston University STEM Scholars Present Research Findings at BKX/NIS Conference in Nashville Tennessee'. At the bottom, a student is shown next to a presentation slide titled 'Improved Modeling of Ligands on a Symmetry Axis'. The right sidebar contains 'Quick Links' (Internships, Students Research, Graduate School Preparation, Scholarships & Graduate Fellowships, Personal Statements, Career Goal Statements, How to do a presentation, Interview Tips, Time Management, Tribute to Excellence, Achievements, Biology SI - Phoebe Lewis), 'Summer Programs' (SABC-STEM Double Bridge Program, DOT, Math and Science Academy), 'SPONSORS' (Langston University, National Science Foundation, We Care Worldwide), and 'Share This' with social media icons.

More information in online at www.stemdigitalvillage.com.

3. STEM Summer Bridge-To-College:

Purpose, objectives, and goals

The STEM Summer Bridge is a four (4) week program with intense study and activities in Chemistry, Biology, and Calculus.

Goal: to better prepare incoming STEM freshmen for successful experiences in entry level STEM gate keeping courses.

Objective is to increase the number of potential STEM majors at LU. Components that support the program are intensive classes in: chemistry and Stoichiometry operational methods; methods of research in chemistry and biology; mathematics and calculus graphing; and preparation for success. Field Trips augment the curriculum with real world examples of the integral relationships of mathematics, science and technology, and supplement and enhance the central work of the academy on campus.

The program is managed by Bridge Director: Dr. John K. Coleman, and Bridge Coordinator: Ms. I. B. Williams

Accomplishments:

Data shown is for the Summer 2011 session, as the current (2012) programs in progress. The 2012 program accomplishments will be included in the 2013 annual report.

Thirteen (13) students were selected to attend the SABC/STEM Double Bridge Program, held June 20-July 15, 2011. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

For the past 2 seasons, classes have been conducted in our state-of-the-art Smart classroom that features Tablet PCs LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These tools, and the relatively small class size, enabled us to utilize the CPR-L (Competency Performance Recordings for Learning) process and monitor results.

Outcomes. Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. The CPRL process is now embedded for Chemistry courses offered in this program. Students who use this process continue to show a pronounced improvement on Pre & Post assessments. Improvements were marginally higher than the 180 % improvement shown last year. Comparatively, Biology, & Mathematics summer programs both demonstrated around 100% improvement for the Pre & Post Exams.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium. All students were admitted into a STEM program at LU during the Fall 2011 session; 6 were accepted as LINC scholars.

4. Developmental Internships and Master Tutors, Lab Assistant and Research Internships:

Purpose, objectives, and goals

Purpose: attract and maintain new STEM scholars through providing financial assistance, and enriching research experiences.

Objectives: grant 15 LINC awards per year and not over 40 awards at any one time over a four-year period. Engage Scholars as Master Tutors and Lab Assistants as a means of

additional financial assistance.

Description: This activity is a critical factor in competing with other institutions for high-performing students. Most LINC candidates will have credentials that will qualify them for financial assistance through other programs available at the university. The LINC Developmental Internships will be offered to scholarly students who do not have the full amount of their college cost; these internships will help the student avoid the accumulation of loans or assuming excessive workloads. The goal is to grant 15 awards per year and not over 40 awards at any one time over a four-year period. Master Tutors, Lab Assistant and Research Internships are competitive opportunities for approximately 10-15 advanced students and are coordinated with the Developmental Internship.

Accomplishments: We are meeting our goal in this area. We awarded 25 scholars Developmental Internships.

5. Stars Tutorial Program

This is an on-line administrative program provides tracking data for more effectively evaluating and analyzing the effectiveness of our SI and tutorial programs.

We have not utilized the Stars Tutorial Program. However, we are in the process of entering names, expert area, and contact information for tutors in the STEM Digital Village. Students will have access to this information, including how to contact tutors directly.

6. Dr. Freddie Fraiser's Mathematical videos tapes

Status: This is a series of videos taped lectures for remedial Algebra and Calculus. Our Departmental resource library is now equipped with Dr. Freddie Fraiser's Mathematical video tapes. These highly acclaimed tapes so far have been quite popular and is a welcomed additional resource for out STEM students.

Further, we utilized the online resource, Kahn Academy , as a resource for mathematics as well as for many other STEM courses. This library of over 2,600 videos covering everything from arithmetic to physics, finance, and history and 303 practice exercises is excellent and continues to receive rave reviews by those who use it. It fosters on-demand learning, at the student's own pace.

ADVISORY/STEERING COMMITTEE ACTIVITY

We held two Project Advisory Committee sessions with the Vice President of Academic Affairs, Dean of Arts and Sciences, and STEM staff.

Dates of committee meetings:

September 8 2010

May 3, 2011

BUDGET

We have approximately \$100,000 remaining in the budget. Our policy is to utilize any excess after purchasing equipment to expand the number of scholars that we have in our program.

RESEARCH AND EDUCATION ACTIVITIES:

Each of our activities in the Education and Research areas was aimed at meeting our original and continuing objectives of a) increasing the number of STEM graduates, and b) increasing the number of STEM graduates who matriculate to STEM graduate programs.

EDUCATIONAL ACTIVITIES:

Following are Educational Activities conducted during the reporting period.

1. Technology in the Classroom
2. GRE Preparation
3. Supplementary Instruction (SI)
4. The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program
5. Mentoring
6. Faculty Education

Technology in the Classroom

The two major activities included in LINC CPRL and STEM Digital Village utilize technology in the classroom. A description of each of these programs, including their goals, objectives, and planned outcomes, are included in Section II.1. of this report. The current and near-term impact of these activities are listed below.

COMPETENCY PERFORMANCE RECORDING FOR LEARNING (CPRL)

Results:

LINC Director John Coleman worked individually with STEM Double Bridge students during the Summer 2011 session and Organic Chemistry students during the Fall 2011 session to coach them on the concept of core course concepts and their relevance in problem solving. Actions included the following:

1. Elimination of multiple choice test questions that required selecting an answer from a list, unless the student was required to provide justification for the answer selected.
2. Including word problems in all in-class problem examples, and on all exams, to break the 'plug and play' mindset because students use a guessing game and a helter-skelter substitutions of variable for pre-set problems. This breaks the cycle of only seeking answers without any idea of how they were achieved.
3. Students had to articulate the process and logic used in solving problems during in-class exercises. This repetitive exercise helped students to understand the intention of the problem as well as given and missing elements. It also simulated a 'teaching' channel, the highest level of retention.
4. Recording class lectures and making them available online so students can listen repetitively until the concept 'sticks.' This also adds the auditory learning channel.

Additional support is needed to develop sets of rubrics based on core course concepts. Also, in order to develop the kind of study needed for peer review, we must do a comparison study between students who use the CPRL process versus some other process. We are attempting to find funding for this next step.

STEM DIGITAL VILLAGE

Results:

We continuously populate our Stem Digital Village with information and tools that benefit our students.

1. The 'News' tab showcases our STEM scholars accomplishments, including awards won for research at national competitions.
2. Under the 'Study Aids' tab we added study aids for math and science courses, CPR-L

rubrics, and time management and interview tips.

3. Under the 'Opportunities' tab we added links to internships, scholarships, and other funding sources.
4. Information, including photographs and videos, about our activities and events can be found under our 'Activities' tab.
5. CPR-L and other studies related videos are under the 'Videos' tab. Posted STEM-Tube CPR-L Castings that include video shorts of students' problem-solving exercises are available online in a format similar to that utilized on You Tube. We are finding that STEM scholars experience a surge in self-confidence as they hear their Competency Performance Recordings for Learning on this section of the Digital Village. STEM staff monitors recordings, so posted works demonstrate excellence.
6. STEM students have joined the online STEM community. Alumni have also begun to join, although at a slower pace. We are in the process of linking the STEM Digital Village community to Facebook, as our students are already prolific Facebook users. This will expedite the process of getting students involved.

GRE (Graduate Record Examination) PREPARATION

One of the primary predictors of how well undergraduate students will perform in graduate school is the preparation they received in their undergraduate curricula. One of the primary measures of their potential success in graduate school is the GRE.

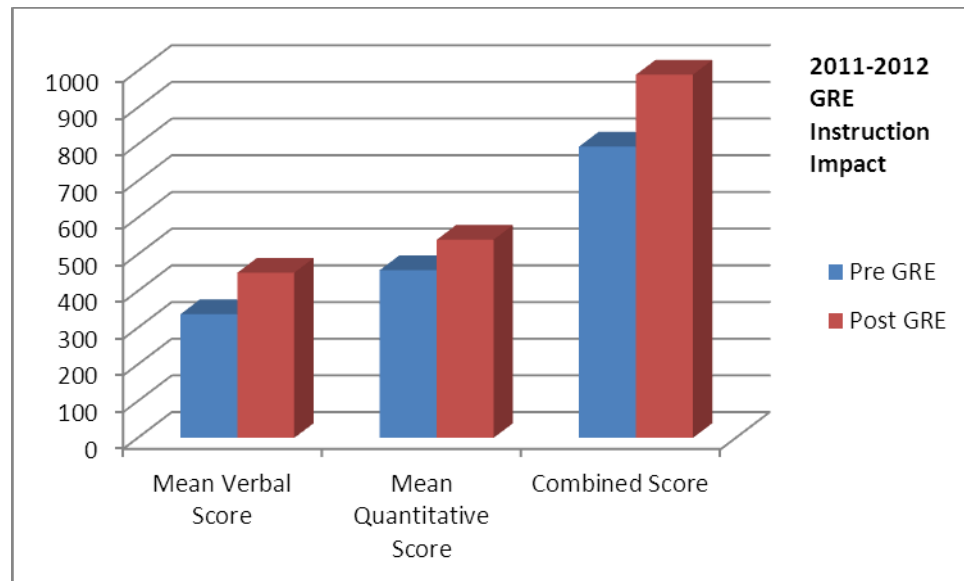
GRE Preparation (Collaboration with EPSCoR: Data analyzed by Dr. A. Peterson, Director LU-EPSCoR Program).

Results:

We changed the 16-week with once a week attendance to a 8-week course with attendance twice a week.

Ten (10) students took the Graduate Record preparation course during the Spring 2011 term. Upon completion on the course Mean Verbal Scores and Mean Quantitative Scores improved appreciably. See Exhibit IV below.

Ex IV: GRE Results



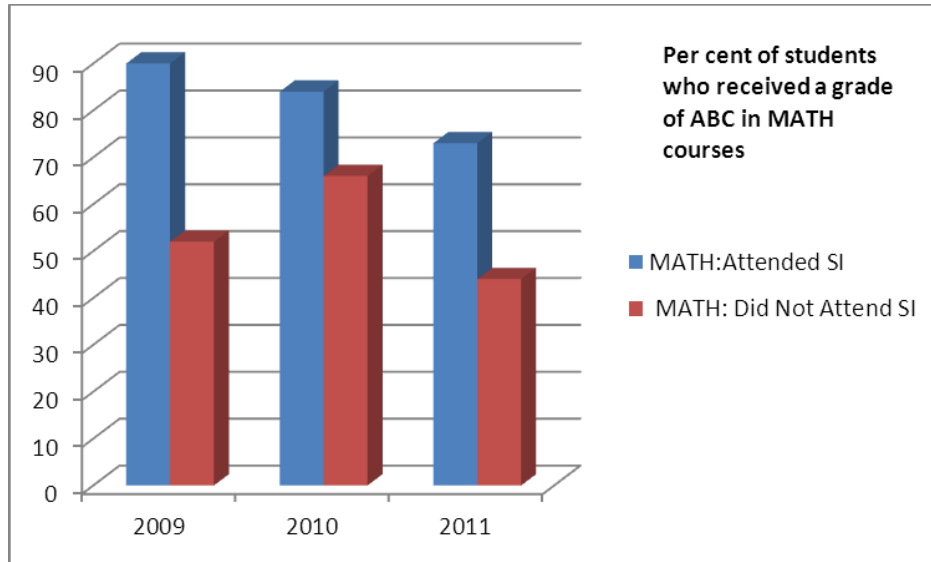
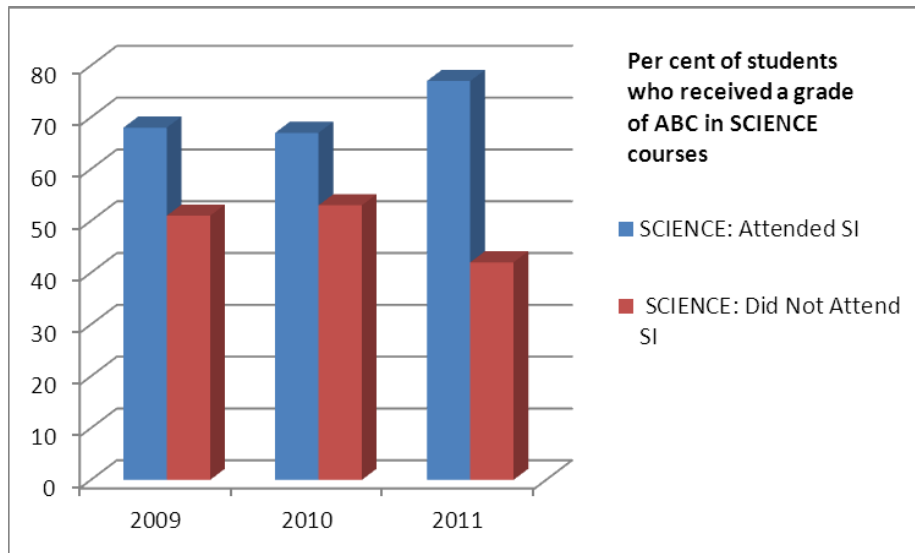
Supplementary Instruction (SI)

(Program is in collaboration with Oklahoma EPSCoR. Data analyzed by Dr. Alonzo Peterson)

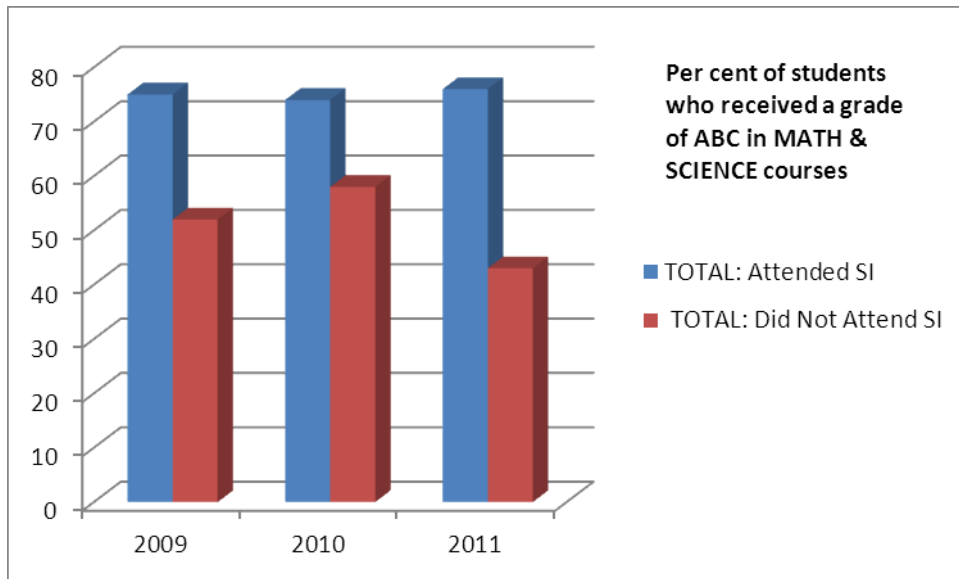
This is Langston University's seventh full academic year of the Supplemental Instruction (SI) Program. We implemented SI in the Spring of 2004.

The 173 students who regularly attended the **19 SI** classes offered over the course of 3 semesters (including a summer term) out-performed students who did not attend.

Exhibits 1-3 below show the percent of students who received a grade of ABC among 2 groups: those who attended SI and those who did not attend SI classes. This snapshot shows that the group that attended SI classes consistently outperformed those who did not attend.

Ex. V.a.: SI Results**Ex. V.b. SI Results**

Ex V.c. SI Results



Additional Exhibits (VI -VII) that show demographics of students who attended and survey results of how students valued SI courses are included in the Appendix.

The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program

The goal of the SABC AND STEM Double Bridge is to increase the number of students pursuing and receiving baccalaureate degrees in established or emerging fields within STEM.

The Summer Bridge program is designed to bridge the gap between high school and college for participants by offering additional tools which will enable success. Tools-for- success are: providing participants with opportunities for interaction with other students, working as a team member, and providing introductions to Pre-Calculus, Biology, Chemistry, and Research techniques.

Students who successfully complete this program enter into the STEM Double Bridge program during the Fall semester.

Results:

Data shown is for the Summer 2011 session, as the current (2012) programs in progress.

The 2012 program accomplishments will be included in the 2013 annual report.

Thirteen (13) students were selected to attend the SABC/STEM Double Bridge Program, held June 18-July 16, 2011. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

For the past 2 seasons, classes have been conducted in our state-of-the-art Smart classroom that features Tablet PCs LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These tools, and the relatively small class size, enabled us to utilize the CPR-L (Competency Performance Recordings for Learning) process and monitor results.

Outcomes. Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. The CPRL process is now embedded for Chemistry courses offered in this program. Students who use this process continue to show a pronounced improvement on Pre & Post assessments. Improvements were marginally higher than the 180 % improvement shown last year. Comparatively, Biology, & Mathematics summer programs both demonstrated around 100% improvement for the Pre & Post Exams.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium. All students were admitted into a STEM program at LU during the Fall 2011 session; half were accepted as LINC scholars.

Mentoring and Recruiting

Given the characteristics of our target population, STEM faculty spends disproportionate amount of time as mentors. As previously stated, faculty often act as nurturers and counselors because our group comes with few positive role models. We serve to motivate, inspire, and nudge.

In addition, we hosted a number of informal outreach activities that serve to mentor the next generation of STEM scholars. The primary formal activity was High School Day on November 3, 2011.

1. High School Day, November, 2011. Multipurpose building, LU campus.

This event was held during November 3, 2011 on the LU main campus. High School participants from over 30 visiting high schools from throughout the state of Oklahoma attended the event. Departmental flyers and brochures were

distributed to prospective students by all LU departments including all STEM departments. The marketing materials promoted department programs, scholarships and mentoring activities for incoming students. Science & math quizzes were displayed with a selection of candies as a reward for participation. A guest book was on hand to record contact information for potential entering undergraduates.

Faculty Development and Education

Activities listed here may have been reported in an earlier section. However, this section seems to require a re-statement of the information presented earlier.

Activities listed only reflect those connected with the LINC program.

Four LU STEM faculty participated in research activities, three in successful grant writing initiatives, and two in multiple presentations, as listed below.

Research

Dr. Sharon Lewis - Dr. Lewis's research in Bioinformatics and molecular biology for root causes of Bipolar Disorder focuses on genotyping ANK3 in African American and Caucasian populations in the NIMH (National Institute of Mental Health) Genetics Initiative Bipolar Disorder Consortium. The degree of nucleotide sequence similarity in the ANK3 gene between 100 African-American and Caucasian cases versus 100 African-American and Caucasian controls obtained from the NIMH Genetics Initiative Bipolar Disorder Samples is investigated. In addition, the differences between nucleotides in male and female populations will be monitored.

Funding is through a National Science Mini grant, in collaboration with LINC.

Drs. John Coleman; Douglas Chan; and William Franks. Research is on Biomass and Biofuels. The project addresses the need for alternative energy resources. Specifically, the project focuses on efforts to increase the yield of biomass for fuel production as well as increase non-productive rangelands for the production of biomass. There is a growing realization that this country has to reduce its dependence on petroleum-based products. The reliance on imported sources of energy threatens our national security, economy and future competitiveness. LINC supports this initiative.

Grant Writing and Collaboration initiatives

Dr. Sharon Lewis - OK-INBRE IDeA Collaborative Grant through the NIH (\$55,000)

Dr. Sharon Lewis - Louis Stokes Alliance for Minority Participation Collaborative Grant (\$45,000)

Dr. Sharon Lewis - OK-INBRE Mini-Grant Procurement for Research in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder (\$22,000)

Dr. John K. Coleman - STEM Double Bridge Program Grant Collaboration (\$72,000)

Dr. John K. Coleman Corporate Collaboration (website hosting and assistance)

RESEARCH ACTIVITIES

Developmental and Research Internships:

During the course of the LINC project (LINC I and LINC II) fifty two (52) students have won awards for presentations on their research projects in regional and national competition.

During this grant reporting period, there were 22 student research presentations at three different competitive venues; two of which were national settings. There were six (6) national awards for research presentations. There were four (4) first place awards, one (1) second place, and one (1) third place award.

In addition, Langston University hosted its Annual Research Day (its twelfth) on April 27, 2012. Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published in the official programs of each event.

The presentation venues, participating scholars, and their research topics are included below. The story on each event below is featured at www.stemdigitalvillage.com, at the 'News' tab.

Emerging Researchers National Conference. Atlanta, GA February 23-26, 2012

Ten (10) LINC scholars who are also STEM majors presented their research findings at the ERN venue:

Phoebe Lewis, Kayla Love, Justina Bradley, ShaRhonda Pickett, Brittany Stoutermire, Tiffany Glover, Britani Vann, Rajah Singh, Justin Williams, and Terry Phillips.

Two LINC participants received 1st place awards:

Kayla Love, Chemistry major

Oral Presentation: **REFRACTIVE INDEX SENSITIVITY OF DYE-DOPED SILICA-COATED GOLD NANORODS.** ¹Kayla Love, ²Karole L. Blythe, ³Kathryn M. Mayer, and ⁴Katherine A. Willets.

¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry

and Biochemistry, University of Texas at Austin, Austin, TX

Phoebe Lewis, Biology major

Phoebe Lewis, Biology major

Oral Presentation: **HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV.** Lewis, Phoebe¹, Joseph L. Mankowski^{2,3,4}, Suzanne E. Queen^{2,3,4}, Jamie L. Dorsey^{2,3,4}.

¹Department of Biology, Langston University, Langston, OK. ²Department of Molecular and Comparative Pathobiology, ³Department of Pathology, ⁴Department of Neurology, Johns Hopkins School of Medicine, Baltimore, MD.

Winners are featured at www.stemdigitalvillage.com

Ex. VII



Langston University Advisors accompanying students: Dr. John K. Coleman, LINC Coordinator, Ms. Irene Williams, and Richard Osei, LINC Coordinator of educational activities and data.

BKX/NIS Joint Conference in Nashville, TN. Hosted by Tennessee State University and Fisk University. March 23-25, 2012

LINC student participants (10): Kayla Love, Phoebe Lewis, Justina Bradley, Britani Vann, Tiffany Glover, ShaRhonda Pickett, Brittany Stoutermire, Justin Williams, Rajah Singh, and Terry Phillips.

Three of the group of participants won awards.

Of the thirty-three schools represented there were two hundred-fifty abstracts presented. Of the ten Langston's Integrated Network Scholars (LINC) presenting, there were three presentation winners.

1st Place:

Phoebe Lewis, Biology major

Poster Presentation: HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV.

Lewis, Phoebe¹, Joseph L. Mankowski^{2,3,4}, Suzanne E. Queen^{2,3,4}, Jamie L. Dorsey^{2,3,4}.

¹Department of Biology, Langston University, Langston, OK. ²Department of Molecular and Comparative Pathobiology, ³Department of Pathology, ⁴Department of Neurology, Johns Hopkins School of Medicine, Baltimore, MD.

2nd Place:

Kayla Love, Chemistry major

Oral Presentation: REFRACTIVE INDEX SENSITIVITY OF DYE-DOPED SILICA-COATED GOLD NANORODS. ¹Kayla Love, ²Karole L. Blythe, ³Kathryn M. Mayer, and ⁴Katherine A. Willets.

¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry and Biochemistry, University of Texas at Austin, Austin, TX

3rd Place:

Britani Vann, Chemistry major

Poster Presentation: INFANT MORTALITY & THE LIFE COURSE PERSPECTIVE CREATING A SUSTAINABLE COMMUNITY-BASED PROGRAM TO REDUCE INFANT MORTALITY IN FORT WORTH – PHASE 1. BR Vann¹, K Cardarelli², PhD, M Paul, MA ; Department of Chemistry Langston University, Langston, OK¹; Department of Public Health University of North Texas Health Science Center Fort Worth, Texas².

Langston University Advisors accompanying students: Dr. John K. Coleman, LINC Coordinator, Ms. Irene Williams, and Richard Osei, LINC Coordinator of educational activities and data.

Participants, and a slideshow of activities, are featured at www.stemdigitalvillage.com

Ex IX



Oklahoma EPSCoR Research Day at the Capitol. Oklahoma City, OK. March 15, 2011

Langston University's LINC scholar and STEM major ShaRhonda Pickette participated. She presented a poster on her research project **IMPROVED MODELING OF LIGANDS ON A SYMMETRY AXIS.**

ShaRhonda Pickett¹, Byron Quinn¹, Nicholas Sauter², Nigel Moriarty², Paul Adams^{2,3}. ¹Department of Biology, Langston University, P.O. Box 1500 Langston, OK. ²Lawrence Berkeley National Laboratory, Cyclotron Rd Berkeley, CA. ³Department of Bioengineering, University of California at Berkeley, Berkeley, CA.

Ex. X



12th Annual Langston University Research Symposium Agricultural Research & Extension Education Complex. Friday, April 27, 2012

This year's event displayed over forty four (44) projects which were viewed by 300 participants. Over twenty Faculty judges participated and chose 3 winners in both oral and poster categories.

By the end of the morning, awards were given to the top presenters. They are as follows:

Poster Presentations		
AWARD	NAME	MAJOR
1 st Place	Rajah Singh	Chemistry
2 nd Place	Terry Phillips	Biology
Honorable Mention	Linsay Davis	Chemistry
	Tiffany Glover	Biology
	Kristopher Vine	Biology
Oral Presentation – Section 1		
1 st Place	Rashonda Brown	Biology
2 nd Place	Kayla Love	Chemistry
Honorable Mention	Sashyra Johnson	Biology
Oral Presentation – Section 2		
1 st Place	Justin Williams	Biology
2 nd Place	Brittany Stoutermire	Biology
Honorable Mention	Princess Hays	Mathematics
Over All Winner		
	Phoebe Lewis	Biology

The event is featured at www.stemdigitalvillage.com.

LINC Scholar takes Top Award at K-INBRE Symposium (January 13-15, 2012)

Phoebe Lewis, LU LINC scholar and junior Biology major, was invited to attend the Kansas Idea Network of Biomedical Research Excellence symposium due to her outstanding research in cell biology. Her speech, which addressed the changes in the immune changes in the livers of macaque monkeys, won her 1st place in oral competition.

the Gazette

STUDENT VOICE OF LANGSTON UNIVERSITY



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Upcoming Dates

Mr. Langston Pageant
Thursday, Feb. 16,
 7:30 p.m.
 I.W. Young Auditorium

LU Basketball
Saturday, Feb. 18,
 5:30 p.m.—Women
 7:30 p.m.—Men
 C.F. Gayles Fieldhouse

Women's Softball
Sunday, Feb. 19,
 1 p.m.
 Oklahoma Christian Univeristy

Gospel Concert
Sunday, Feb. 19,

Student wins first place at research competition

By Andrea Perry
 Staff Writer

Ten Langston biology majors took a trip to Kansas City, Mo. for the Kansas-Idea Network of Biomedical Research Excellence symposium Jan. 13-15.

They were sponsored by Dr. KJ Abraham and Dr. Gnanambal Naidoo.

The K-INBRE symposium is an annual conference that hosts keynote speakers, scientists and students from all industries involved in biomedical sciences.



Appendix

2 Exhibits:

Ex. VI: SI Demographics

Ex. VII: SI Survey re Value of SI

Exhibit VI

Supplemental Instruction

Class Demographics 2009 - 2011

Demographic Indicators (NSF)	Spring 2009	Summer 2009	Year 1 Total	Fall 2009	Spring 2010	Summer 2010	Year 2 Total	Fall 2010	Spring 2011	Summer 2011	Year 3 Total
Gender											
Males	53	8	61	44	24	4	48	33	19	23	75
Females	104	13	117	85	85	1	170	63	18	17	98
Ethnicity/Race											
Alaska Native	0	0	0	0	0	--	0	--	--	--	0
Asian	0	0	0	0	0	--	0	2	--		2
Black/African American	153	21	174	125	105	--	230	86	37	30	153
Hispanic/Latino	1	0	1	1	1	--	2	--	--	--	0
Native American	1	0	1	1	1	--	2	6	--	--	6
Native Hawaiian/Other Pacific Islander	0	0	0	0	0	--	0	--	--	--	0
White	2	0	2	2	2	--	2	2	--	--	2
Persons with Disabilities	1	0	1	0	0	--	0	0	0	0	0
Total Number of Participants	157	21	178	129	109	--	248	96	37	50	173

Exhibit VII

Supplemental Instruction – Survey of Students Regarding Value of SI

Survey Item	Math Courses (Mean)	Science Courses (Mean)	Math and Science Courses (Mean)
Are closely related to the material taught in the class.	3.5	3.87	3.7
Help me do better on tests/exams.	3.5	3.87	3.7
Are scheduled when I did not have conflicts.	3.25	3.87	3.56
Help me better understand the course material.	3.5	3.8	3.65
Help me better understand the relationship between concepts in the course.	3.0	3.8	3.4
Improve my ability to solve problems.	3.5	3.87	3.7
Improve my ability to work with others.	3.25	3.8	3.52
Improve my ability to communicate ideas to others.	3.25	3.87	3.56
Increase my confidence to do well in the course.	3.75	3.87	3.81
Provide an opportunity to learn with peers.	3.25	3.8	3.52
Are recommended by my friends.	2.5	3.47	2.98
Are suggested by my instructor.	3.75	3.87	3.81
Positively influence my grade in the course.	3.5	3.8	3.65
Provide an opportunity to ask questions I wouldn't ask in lecture.	3.25	3.8	3.52
The Supplemental Instruction sessions increase my confidence to take more science, technology, engineering or mathematics (STEM) courses.	3.0	3.8	3.4
The Supplemental Instruction sessions contribute to my ability to continue in a science, technology, engineering or mathematics (STEM) major.	3.25	3.67	3.46
I would recommend students who take this course should attend Supplemental Instruction.	3.25	3.8	3.52
The Supplemental Instruction sessions led me to join formal or informal study groups related to other courses.	3.0	3.73	3.37