

Annual Report for Period:09/2009 - 08/2010**Submitted on:** 07/23/2010**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:****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:

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.

There were three (3) major program areas within Langston University Collaboration; collaborations with three (3) other NSF projects through a LU connection; and collaborations that involved organizations other than the NSF.

There were 25 research sites for for LU STEM summer interns.

1. Collaborations: Langston University collaborations provided three major programs that contributed to our LINC objectives. Those programs are:

- a. Annual LU School of Arts and Sciences Research Day Symposium to showcase STEM scholars' research projects to the LU campus
- b. Three Recruiting Activities: (1) two (2) mentoring sessions for twenty (20) 9-10th graders through a Gear Up; (2) High School Day, where students from all over the state visit LU's campus. LINC sponsors a display table where students meet LINC scholars; (3) community-wide tutorial service in STEM courses for high school students
- c. Financial support - \$125,000 in Title III funding to provide additional computer hardware and facilities for a CPRL-enabled classroom and laboratory.

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.

1) LU Department: School of Arts and Sciences

Activity: 10th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, Friday, April 30, 2010

Purpose: Showcase for STEM students' research projects

Detail: The LINC Program co-sponsored the 10th Annual Langston University Research Day activities that were held in the Agricultural

Research & Extension Education Complex on April 30, 2010. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally revamped the presentation display boards. The featured program speaker for the occasion was Tomica Blocker, a PhD candidate at Oklahoma State University, Department of Zoology, Stillwater, OK. Ms. Blocker is also a LINC alum, as well as a LU 2008, summa cum laude, graduate with a BS in Biology. She engaged symposium participants in a discussion on the intricate ways of applying and succeeding in graduate school. Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

Results: 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. Winners from Oral Competition: First Place; Marshal Bailey, Biology, Gene Expression Analysis of EVL Differentiation in Poky Mutant Embryos. Second Place; Erica Smith, Biology, Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of *Acinetobacter calcoaceticus*, *Acinetobacter Iwoffii* and *Acinetobacter baumannii*. Third Place; Kirk Braggs, Chemistry, Radiolabeling Liposomes with ^{99m}Tc .

Winners from Poster Competition: First Place; Jamila Harris, Biology. Astrocyte Immune Responses to Activation: Relevance to Neuroninflammation and Neurodegeneration Second Place; Marshall Bailey, Biology, Daylily in vitro plant reproduction from flower bud Third Place; Jessica Brown, Psychology, Investigating The Relationship Of Sexual Attitudes And Self Esteem

Each first place winner received a \$300 cash prize. Second place winners received \$200, and third place received \$100.

The student newspaper, The Gazette, did a feature story on the event in its May 5 edition.

(<http://media.www.lugazette.com/media/storage/paper816/news/2010/05/05/News/Research.Day.Showcases.Students.Work-3917212.shtml>)

The Stem Digital Village features presentation photos and winners from the event. (www.stemdigitalvillage.com)

2) LU Department: Admissions Main Campus & LU Tulsa Campus

Activity: Recruiting & Public Service

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

Detail: LU supports three programs that act as recruiting tools for future STEM majors. They are:

a) Mentoring sessions through Gear-Up - This year two sessions were held on November 14, 2009 and February 20, 2010, respectively, on the LU-Tulsa campus. On each occasion three LU STEM faculty and six LINC scholars held mentoring sessions for twenty 9-10th grade students. Motivational comments were given, and mathematical teaser problems and teamwork exercises that require solutions were done. LU undergraduates were assigned as mentors for each participant. Students were provided ACT Study Guides and provided instructions as to how to use them.

Faculty Participants at both sessions: Dr. John K. Coleman; Dr. Alonzo Peterson; Dr.. Emily Patterson.

LU STEM students who participated in both sessions: Rose Cooper, Marshall Bailey, Kirk Braggs, Yasmeen Shumate, Princess Hayes, and Nelson Jones. Student Torano Boykins participated in the November session, and Kelvin Hunter in the February session.

Result: At each of the events students appeared excited about the event and indicated their interest in ultimately obtaining a career that would require a college degree. They displayed great interest in improving their ACT prowess and demonstrated great improvement in their grasp of the concepts presented to them.

b). High School Day ? This event was held on October 29, 2009 on the LU main campus. Over 700 visiting high school participants from various high schools 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.

c). Community-Wide Tutorial Services for Junior & High School students

LU undergraduate students in the LINC organization have spear-headed a tutorial service for junior high school and senior high school students in the Langston & Coyle communities, to be implemented during the Fall, 2010 session. The tutoring services are for all STEM (science, technology, engineering & mathematics) courses. The event was initiated during the spring 2010 semester and the university chapel is the site for all weekly activities. The objective is to increase the efficiency of the math & science skills of the students in the local communities. This in turn should positively impact the decision of the students to consider the STEM disciplines as a major as well as consider Langston as a choice for undergraduate training.

LINC Coordinator Irene Williams is spearheading the program.

Results: There were two tutorial sessions held during the spring term, and the tutorial program format has been constructed. An average of 15 LINC scholars attended the two sessions and there were 12 high school students who attended the first session and 14 students who attended the second session. The tutorial sessions will be fully implemented during the Fall, 2010 term, with sessions held bi-weekly.

3) LU Department: Fiscal Affairs

Activity: Title III Funding - \$125,000 (contributing funds from LINC)

Purpose: Support the LINC program by providing additional computer hardware and facilities for a CPRL-enabled classroom and laboratory.

Detail: 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

Results: The Smart classroom and media laboratory was completed during the Spring 2010 semester. We will have full use of this facility during our 2010 Summer Bridge program. LINC PI, Dr. John Coleman featured the CPR-L in a presentation at a national conference on Learner Centered Teaching in Tulsa, OK on April 12-14, 2010.

The PowerPoint presentation is online in the Stem Digital Village at http://www.stemlearningcommunity.com/events/event/show?id=2258791%3AEvent%3A2307&xg_source=msg_invite_event.

It is also attached as Exhibit I.

The CPRL-enabled classroom was also featured by the LINC PI during a panel discussion on Technology in the Classroom at Langston University's Spring Faculty Institute on January 11, 2010.

The Smart classroom was used to produce a student 'how-to' video that is showcased at the Stem Digital Village (<http://www.stemlearningcommunity.com/video>) and on monitors in the media laboratory.

2. Collaborations: LU-LINC collaborations that involve other NSF programs

Through Langston University, LINC has five (5) 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:

- a) Faculty and Student Teams (FaST) ? research opportunities for a STEM faculty and 2 STEM students
- b) STEM Double Bridge ? a 4-week summer program that introduces 15 incoming STEM majors to courses encountered during the first two years of college
- c) Oklahoma Louis Stokes Alliance for Minority Participation(OK-LSAMP) - nurtures and assists 12 students through the undergraduate program, while creating opportunities to pursue graduate degrees in their selected STEM discipline.
- d) Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR) provides collaborative funding for two programs: Graduate Record Examination Preparation (GRE); and 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.

1) Program: FaST Program (Summer Program)

Purpose: It is a LINC (HBCU-UP) Mini-grant for Faculty and two students to attend University of California ?Berkeley, CA during the summer term through the Department of Energy (DoE) and NSF collaborative program. [Faculty and Student Teams (FaST)]. The venue is the Lawrence Berkeley National Laboratory [LBNL]. Research work is with Dr. Paul Adams' research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project.

Outcomes: LU STEM faculty member Dr. Byron Quinn and 2 HBCU-UP students participate in this summer project. Summer 2010 will be the third year of the LU-FaST collaboration. Due to the previous participation in the FaST program, during the past two years, two additional students applied and were accepted at the Berkeley facility; a total of 4 students attended Berkeley this 2010 summer.

The LU-FaST team will work with the PHENIX project on creating a state of the art set of model parameters for crystallographic refinement, enhancing the automated fitting of ligands in electron density maps, development of advanced methods to model ligands on symmetry axis and the generation of validation test sets. **Methods:** This project will employ the easy to use python programming language, hands on x-ray diffraction synchrotron data collection and data processing at the Advanced Light Source (ALS). The ALS is a division of Berkeley Lab, a national user facility that generates intense light for scientific and technological research and one of the world's brightest sources of ultraviolet and soft x-ray beams. **Broader Impacts:** One of the goals of the PHENIX project is to allow novice users the ability to solve macromolecular structures quickly. This goal is extremely ideal and has proven to be invaluable in bringing undergraduate students from LU into the field of structural biology research. Researchers studying protein function will be able to benefit from the increased speed that proteins will be able to be deposited in the PDB.

2) Program: STEM Double Bridge Program (Summer Program)

This is a summer program collaborative with the LINC Summer Bridge.

Purpose: The goal of the STEM Double Bridge to College 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.

Outcomes: The program began during the summer of 2009, and is being offered during the 2010 summer session. The framework followed during the 2009 session will be replicated during the 2010 session: During the 2009 session twelve (12) students were selected to attend the SABC/STEM Double Bridge Program, held June 22-July 17, 2009. Seven participants were females, five were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

The program provided an excellent opportunity to do a trial run of the department's expanded 'Technology in the Classroom' program (CPRL laboratory) and institute the CPRL teaching process in General Chemistry.

Pre and Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 120 % improvement based on Pre and Post assessments compared to an 85% improvement last year.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium.

ADDENDUM: The STEM Double Bridge Program for the 2010 summer session has just ended. Evaluation of data for the program is still in progress. However, thirteen (13) students attended: 10 females, 3 males. Again, the Pre & Post exams demonstrated outstanding achievement by the participants. The CPR-L process utilized in the chemistry section again led the way which demonstrated a 180% increase in the Pre & Post test comparison.

3) Program: OK-LSAMP (Oklahoma Louis Stokes Alliance for Minority Participation) and NSF

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. 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.

4) Program: Graduate Record Exam (GRE) Preparation, an EPSCoR-LU-LINC collaboration

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

Twelve students took the Graduate Record preparation course during the Spring 2010 term. Upon completion on the course their Mean Verbal Score improved by 83 points, the Mean Quantitative Score improved by 134 points, and the Combined score improved by 217 points. Year over year, the scores were higher pre and post course. Graphs depicting outcomes are included in the Appendix as Exhibit II.

5) Program: 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.

Outcomes: The 211 students who regularly attended the 13 SI classes offered over the course of 2 semesters out performed students who did not attend, except for Calculus during the Fall 2009 semester. Specific outcomes are included in the Appendix as Exhibit III.

3. Collaborations: 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.

An additional non-NSF organization is We Care Worldwide, Inc., that provides Internet bandwidth resources to support our STEM Digital Village.

The following three programs are possible through a number of collaborations:

- a) OK-INBRE IDeA Collaborative Grant
- b) OK-INBRE Mini grant
- c) K-INBRE IDeA Collaborative Grant

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.

a. Program: OK-INBRE IDeA Collaborative Grant

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).

Dr. Lewis coordinates this program and offers 6-10 scholarships to students each year.

b. Program: K-INBRE IDeA Collaborative Grant

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).

Dr. Abraham coordinates this program and offers 6-10 scholarships to students each year.

c. Program: 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 bioinformatics 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.linconline.org, permitting LINC 24/7 access to site administration. They also provide LINC access to domain name pointing and promotion link removal for www.stemdigitalvillage.com, 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 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: Purpose, objectives, and goals

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'. As a STEM course colloquium component, 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. Its 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.

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

Accomplishments:

During the 2nd year of our grant, the following has been accomplished with regard to CPR-L:

- a. During the Spring, 2010 semester, we completed a state-of-the-art Smart classroom, including a computer laboratory featuring Tablet PCs, 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.
- b. During the Spring, 2010 semester, we completed 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.
- c. We used limited hardware to showcase the potential of a fully CPRL-enabled classroom and generate interest and understanding of the process. It was featured in a presentation at a national conference on Learner Centered Teaching in Tulsa, OK on April 12-14, 2010. The PowerPoint presentation is online in the Stem Digital Village at http://www.stemlearningcommunity.com/events/event/show?id=2258791%3AEvent%3A2307&yg_source=msg_invite_event.
- d. The CPRL-enabled classroom was also featured during a panel discussion on Technology in the Classroom at Langston University's Spring Faculty Institute on January 11, 2010.
- e. The Smart classroom was used to produce a student 'how-to' video that is showcased at the Stem Digital Village (<http://www.stemlearningcommunity.com/video>) and on monitors in the media laboratory.

Lessons learned during year one of this activity indicated that we needed a full-fledged CPRL laboratory in which to hold classes because setting up and breaking down components at the beginning and end of each class session detracted too much from available class time. In addition, students needed access to the facility during other than class times to prepare homework. As a result, LU through Title III contributed \$125,000 to construct the laboratory. The facility was completed during the Spring, 2010 term. The time frame to complete the facility is linked to the required bidding process and getting on the facility maintenance department's docket.

During the interim period, however, we have been able to implement CPRL on a limited basis using use laptop computers in a regular classroom environment. Output from these sessions is featured as noted above. The new facility was used during the Summer Bridge program.

Our original plan to implement CPRL in three classes during year 1 of this grant was overly aggressive, and did not consider the time necessary to prepare a suitable facility. We are now on track to accomplish this goal during the Fall, 2010 term and expect to implement additional STEM courses during the Fall, 2011 term.

2. STEM Digital Village: Purpose, objectives, and goals

The STEM Digital Village is an online community managed by the LU STEM group. Its goal is to facilitate increasing the numbers of students who enroll in STEM disciplines and retaining STEM scholars. Its 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. Desmond Harvey ? Education, Technology, and Data coordinator.

Accomplishments:

The STEM Digital Village program is on track. Details are online at www.stemdigitalvillage.com.

We have accomplished the following milestones during years 1 and 2:

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.

Posted STEM-Tube CPR-L Castings that include video shorts of students' problem-solving exercises will be 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.

Networking. STEM students have joined the online STEM community. Alumni have also begun to join, although at a slower pace. During the Fall, 2010 session we will expand participation through a vigorous outreach campaign.

Our next steps will be to foster online discussions among LU STEM scholars, LINC alumni and existing STEM scholars, and finally between LU STEM scholars and STEM students at other universities.

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. Its goal is to better prepare incoming STEM freshmen for successful experiences in entry level STEM gate keeping courses. The 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 will 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:

1. Bridge Director: Dr. John K. Coleman
2. Bridge Coordinator: Ms. I. B. Williams
3. Bridge Faculty: Mr. Anthony Hill,
4. Dr. G. Naidoo, Dr. K. Matand, and Dr. W. Franks
5. Master High School attending: Ms. P. Anderson, Millwood High School
6. Counselors/Mentors: Karole Blythe, Brittanie Stoutermire, Kirk Braggs, and Tamar Torres

Accomplishments:

The original goal of having 20 participants has not yet been reached, and was perhaps too aggressive financially. The collaboration with the STEM Double Bridge program should provide the needed financial resources to increase the number of participants.

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

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 exceeding our milestones in this area. Thirty (30) students participated in research assignments and presented their findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 3 first place awards, 5 second place & 2 third place winners. Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published at the various national and state events.

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. Its implementation and effectiveness will be a measure of its impact.

Status:

We have not yet implemented this program due to the decision to focus on getting our new activities on track. We plan to implement this activity during the Spring, 2011 session; however, the time line could be impacted by our ability to acquire the program from a third party.

6. Dr. Freddie Fraiser's Mathematical videos tapes

This is a series of videos tapes for lectures from remedial Algebra to Calculus III. These highly acclaimed tapes will be additional resources for our STEM students.

Status:

We have not yet implemented this program due to the decision to focus on getting our new activities on track. We plan to implement this one during the Spring, 2011 session. The current cost of the tapes could impact the number of tapes that we can acquire.

ADVISORY/STEERING COMMITTEE ACTIVITY

Although we held two Project Advisory Committee sessions with the Vice President of Administration, Dean of Arts and Sciences, and STEM staff during year one, we have delayed expanding it to include non-LU personnel pending getting our final program element - a classroom CPRL laboratory - fully operational. It has taken the full force of our LU based team to marshal support and resources required to support bringing this facility online. Its existence has already garnered support among STEM academia and other influential persons in Oklahoma. We have already reached out to many influential persons who can assist us in meeting our objectives, and expect to have our expanded PAC meeting in early October, 2010.

Dates of committee meetings:

1. December 4 2009
2. May 7, 2010?

BUDGET

We have approximately \$100,000 remaining in the budget. We deliberately offset some of our costs through collaborative funding, and delayed some expenses pending completion of the CPRL laboratory, until the Fall 2010 session. Our aim 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)

LU contributed \$125,000 dollars to this project through its Title 3 Program; other contributing funds are from the LINC Program.

1. During the Spring, 2010 semester, we completed a state-of-the-art Smart classroom, including a computer laboratory featuring Tablet PCs, 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.
2. During the Spring, 2010 semester, we completed 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.
3. We used limited hardware to showcase the potential of a fully CPRL-enabled classroom and generate interest and understanding of the process. It was featured in a presentation at a national conference on Learner Centered Teaching in Tulsa, OK on April 12-14, 2010. The PowerPoint presentation is online in the Stem Digital Village at http://www.stemlearningcommunity.com/events/event/show?id=2258791%3AEvent%3A2307&xg_source=msg_invite_event.
4. The CPRL-enabled classroom was also featured during a panel discussion on Technology in the Classroom at Langston University's Spring Faculty Institute on January 11, 2010.
5. The Smart classroom was used to produce a student 'how-to' video that is showcased at the Stem Digital Village (<http://www.stemlearningcommunity.com/video>) and on monitors in the media laboratory.

We will have full use of this new facility during the Summer 2010 Bridge program, and will begin using it full time during the Fall 2010 semester.

STEM DIGITAL VILLAGE

Results:

During the Spring 2010 semester, we began the process of populating our Stem Digital Village with information and tools that benefit our students.

1. Under the 'Study Aids' tab we added study aids for math and science courses, CPR-L rubrics, and time management and interview tips.
2. Under the 'Opportunities' tab we added links to internships, scholarships, and other funding sources.
3. Information, including photographs and videos, about our activities and events can be found under our 'Activities' tab.
4. CPR-L and other studies related videos are under the 'Videos' tab.

Our next steps will be to improve the user interface, and market these resources internally and to LINC graduates. We will incorporate these features during the Fall 2010 session.

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 curriculums. 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:

Twelve students took the Graduate Record preparation course during the Spring 2010 term. Upon completion on the course their Mean Verbal Score improved by 83 points, the Mean Quantitative Score improved by 134 points, and the Combined score improved by 217 points. Year over year, the scores were higher pre and post course. Graphs containing this data is in the Appendix section, as Exhibit II.

Next Steps

We must extend the verbal portion of the GRE Prep Course throughout our school year; providing more assistance through course colloquiums. The students' verbal competences still appears to be the key to significantly impact the GRE scores. This could potentially make the GRE scores even more competitive for graduate schools applications.

SUPPLEMENTARY INSTRUCTION in collaboration with Oklahoma EPSCoR
Data analyzed by Dr. Alonzo Peterson

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

Results:

SI sessions were held for a total of 13 STEM courses during the Fall 2009 and Spring 2010 school terms. Courses were held during both semesters for College Algebra, Trigonometry, Calculus I, Biology I, Chemistry, Physics I, and a Physics II SI course was offered during the Spring 2010 term. SI participants unilaterally perform better than those who do not attend these sessions.

During the Fall 2009 and Spring 2010 semesters, 1100 students had access to the STEM SI sessions; 211 participated. Since participants fare better than non-participants, our challenge is to continue to increase the number of participants in each class. Our goal is to increase participation by 5% per year, and increase the number of SI students who successfully pass related courses.

Results for the Fall 2009 and Spring 2010 sessions, by course, are as follows:

Sciences - Biology

21% of the eligible Biology students (87 out of 414) attended SI sessions. This is an improvement over the 12% who participated during our prior reporting period. However there was significant difference in the percentage of students receiving an 'ABC' or 'DFW'. The SI Group reported an 81% and 83% ABC rate for the Fall 2009 and Spring 2010 semesters respectively, and the non-SI group reported a 70% and 72% ABC rate respectively for the same periods.

Sciences- Chemistry

30% of the 118 Chemistry I students attended Chemistry SI sessions. For the third year in a row we observed positive results. The 'ABC' rate for SI group was 69% and 50%, respectively, while the ABC rate for the Non-SI group was 40% and 34%, respectively.

Sciences-Physics I

33% of the Physics I students attended SI classes. 53% and 33% respectively of those students received an 'ABC' grade, while 35% and 5% respectively of the Non-SI students received an ABC grade.

Sciences-Physics II

36% of eligible students regularly attended SI. 70% of these students received an 'ABC' grade in this class. Of the remaining students who did not attend SI, 50% received an 'ABC' grade.

Mathematics-College Algebra

Almost 400 College Algebra students had access to SI classes during the reporting period. However, only 10% participated. Those who participated fared considerably better than non-participants. 50% and 88% respectively received an 'ABC' grade compared to 35% and 60% respectively of the Non-SI group.

Mathematics-Trigonometry

22% of students enrolled in the course regularly attended SI sessions. Of that number 100% of them completed the course with an 'ABC' grade during each semester. Among the Non-SI students only 47% and 67% respectively earned an 'ABC' grade.

Mathematics-Calculus

22% of the 45 Calculus students attended SI sessions. The per cent of SI and Non-SI attendees who received an 'ABC' grade was the same during the Fall 2009 semester ? 80%. However, during the Spring 2010 session, the SI attendees pulled ahead of Non-SI students; 100% of SI attendees received a grade of 'ABC' compared to 88% of the Non-SI group.

Details on SI performance are reflected in the charts in the Appendix section, Exhibit III.

THE SUMMER ACADEMIC BRIDGE-TO-COLLEGE (SABC) PROGRAM AND 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.

The data for the 2010 program is not included in this report because the report must be submitted prior to the complete analysis of the summer program data..

The 2010 Summer Program followed the format of the Summer 2009 program, which was as follows:

Twelve (12) students were selected to attend the 2009 SABC/STEM Double Bridge Program, held June 22-July 17, 2009. Seven participants were females, five were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

This summer's program provided an excellent opportunity to roll out the department's expanded 'Technology in the Classroom' program (CPRL laboratory) and institute the CPRL teaching process in General Chemistry.

Pre and Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 120 % improvement based on Pre and Post assessments compared to an 85% improvement last year. See more about CPR-L in Technology in the Classroom section.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium.

1. Bridge Director: Dr. John K. Coleman
2. Bridge Coordinator: Ms. I. B. Williams

3. Bridge Faculty: Mr. Anthony Hill,
4. Dr. G. Naidoo, Dr. K. Matand, and Dr. W. Franks
5. Master High School attending: Ms. P. Anderson, Millwood High School
6. Counselors/Mentors: Karole Blythe, Brittanie Stoutermire, Kirk Braggs, and Tamar Torres

Participants attending Program: Shaffran Benton, Ashley Brown, August Brown, Marcell Bryant, Keiauna Clemons, Shaquantae Cotton, Kaiya Fletcher, Tony Griffin, Briana Morrow, Terrence Prince, Samantha Samuels, and Latonya Tolbert

Outstanding performers during the program were: Chemistry: Keiauna Clemons Pre-Calculus: August Brown & Shaffran Benton CPR-L Presenter: August Brown

The major components of the 2009 program, and model for subsequent programs are:

1. Selecting participants. Early spring, notification by mail is sent to prospective students about the Summer Bridge program. Direct contacts are made through high school advisors/counselors and through visits by university faculty and past Summer Bridge participants. The applicants are screened and selected based on their interests and their academic performance in high school, including attention to all qualified underrepresented groups.
2. Morning lectures. Students attend academic lectures each morning. The lectures will cover a variety of topics, including current research projects conducted by faculty, modern research methods and techniques, university resources, campus life, and study methods. Faculty members with an interest in integrating research with curriculum are chosen to teach these morning sessions.
3. Conducting research. During the afternoons, each student joins a group of 5 to 6 students in a research lab or in the field. Faculty and student peer mentors lead the students in research projects covering a wide spectrum of STEM disciplines. Students learn the basic aspects of laboratory/field skills, literature search, data acquisition, and data analysis, while participating in cutting-edge research projects. At the end of the 4-week program, each student will present his or her findings to the entire student body of the Summer Bridge program.
4. Incorporating high school STEM teachers. A new component of the Summer Bridge program is the inclusion of a high school teacher. An experienced STEM teacher is selected from high schools in close proximity to each Summer Bridge campus. The teacher works alongside the Summer Bridge participants to gain research experience. The teacher serves as advisors to the Summer Bridge program. Research experiences gained by the teachers will be valuable for integration into the STEM curricula in their high school classrooms. They will be effective recruiters for the Summer Bridge students from high schools.

ADDENDUM: The STEM Double Bridge Program for the 2010 summer session has just ended. Evaluation of data for the program is still in progress. However, thirteen (13) students attended: 10 females, 3 males. Again, the Pre & Post exams demonstrated outstanding achievement by the participants. The CPR-L process utilized in the chemistry section again led the way which demonstrated a 180% increase in the Pre & Post test comparison.

MENTORING AND RECRUITING

Given the characteristics of our target population, STEM faculty spends a 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 host a number of outreach activities that serve to mentor the next generation of STEM scholars. These activities serve a dual purpose, that of recruiting students into our program.

Results:

Following is a list of these seven (7) additional mentoring and recruiting activities during the reporting period. Seven of the eight events have already occurred, all of which had LU faculty and STEM scholar participants. They are: 2 mentoring sessions for Tulsa, OK high school students; LU High School Day; LU Goat Research Day; volunteer clean-up activities in New Orleans Gentilly District while attending a

National Institute of Science-Beta Kappa Chi conference; and faculty serving as judges at the New Orleans National Institute of Science-Beta Kappa Chi conference. The 7th activity is the development of a Langston community-wide STEM tutorial service that will be implemented during the Fall, 2010 session.

1. Three LU faculty held mentoring session for twenty (20) 9-10th grade Gear-Up students from the Tulsa area schools at the LU-Tulsa Campus with six (6) LINC students attending as student mentors, Nov 14, 2009.

The LU personnel in attendance were as follows: LU Faculty Drs: Alonzo Peterson, John K. Coleman, and Emily Patterson. LU STEM Students: Rose Cooper, Rochelle Howard, Marshall Bailey, Kirk Braggs, Yasmeeen Shumate, Princess Hayes, Torano Boykins and Nelson Jones. Basic motivational comments were made by the LU faculty, encouraging students to make all effort to benefit from their education and to make special effort to strengthen their math and science skills. LU undergraduates were assigned as mentors for each of the junior-high participants in order to facilitate the activities as well as to provide further opportunity for follow-up activities. All of the students appeared excited about the event and indicated their interest in ultimately obtaining a career that would require a college degree. Students were provided ACT Study Guides and provided instructions as to how to use them. The event was hosted by Emily Patterson, Gear-Up Director.

2. Three LU faculty held mentoring session for twenty (20) 9-10th grade Gear-Up students from the Tulsa area schools at the LU-Tulsa Campus with six (6) LINC students attending as student mentors. Feb 20, 2010.

The LU personnel in attendance were as follows: LU Faculty Drs: Alonzo Peterson, John K. Coleman, and Emily Patterson. LU Students: Rose Cooper, Marshall Bailey, Kirk Braggs, Yasmeeen Shumate, Princess Hayes, and Nelson Jones & Kelvin Hunter. LU faculty gave opening remarks then LU undergraduates were assigned as mentors for each of the junior-high participants in order to facilitate the activities as well as to provide further opportunity for follow-up activities. The event was hosted by Emily Patterson, Gear-Up Director.

3. High School Day, Oct 28, 2009. Multipurpose building, LU campus. The LU chemistry department personnel in attendance were as follows: LU Faculty & Staff: John K. Coleman and Irene Williams. LU Chemistry majors: Alex Henderson and Kirk Braggs.

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.

4. Gentilly Clean-Up and Volunteer activities. Friday, March 26, 2010 Lower 9th ward, New Orleans, LA.

At the National Institute of Science and Beta Kappa Chi Scientific Honor Society's Joint Conference in New Orleans, the LINC participants, students and advisors, along with their fellow Beta Kappa Chi members participated in a community service project for the Katrina victims in the lower 9th Ward. Participants cleaned areas, packaged food and clothing, and organized food and clothing for distribution at the Franklin Street Baptist Church.

5. LU Staff & Faculty members served as judges for the high school science fair at the National Institute of Science and Beta Kappa Chi Scientific Honor Society's Joint Conference in New Orleans: Ms. Irene Williams, Dr. Alonzo Peterson & Dr. John K. Coleman.

6. Goat Research Day. Agricultural Research & Extension Education Complex, Saturday, May 30, 2010

Chemistry majors Samuel Henderson & Kirk Braggs provided a demonstration booth for junior high students of the 4-H Club, illustrating how science could be enjoyable. They demonstrated a variety of chemistry experiments that glowed in the dark, showed rainbow colors in various layers of liquids to those that erupted and formed volcanic ash. All of the students appeared to be very excited about the 'cool science' display.

7. Community-Wide Tutorial Services for Junior & High School students (Under development)

LU undergraduate students in the LINC organization have spear-headed a tutorial service for junior high school and senior high school students in the Langston & Coyle communities. The tutoring services are for all STEM (science, technology, engineering & mathematics) courses. The event was initiated during the spring 2010 semester and the university chapel is the site for all weekly activities. The objective is to increase the efficiency of the math & science skills of the students in the local communities. This in turn should positively impact the decision of the students to consider the STEM disciplines as a major as well as consider Langston as a choice for undergraduate training.

Key personnel to lead project: Irene B. Williams

Budget: Supported by LINC.

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.

Dr. Byron Quinn, along with two STEM scholars, is working with Dr. Paul Adams research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project. This project is through the Department of Energy (DoE) Faculty and Student Teams (FaST) program at the Lawrence Berkeley National Laboratory (LBNL). This will be the third year that the LU-FaST will be working with Dr. Paul Adams research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project. PHENIX is a software suite designed for automated macromolecular structure determination with minimal human intervention. Intellectual Merits: Due to the rapid pace that genomes are being solved, there has recently been a great deal of effort to increase the speed of macromolecular protein structure solution. PHENIX is designed to allow researchers to rapidly get to the final protein structure after data collection, thus having a dramatic effect on decreasing the amount of time it takes to get structures deposited in the Protein Data Bank (PDB).

Funding is through a National Science Foundation mini-grant.

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 with Dr. Byron Quinn - Mini-Grant Procurement: FAST Program (\$22,000)

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

Presentations

Dr. John K. Coleman ? Technology in the Classroom ? Presenter on 5-person panel discussion. Spring Faculty Institute, Langston University. January 11.2010.

Dr. John K. Coleman - Competency Performance Recordings for Learning (CPR-L). Presentation at the 2010 National Conference on Learner Centered Teaching, April 12-14, 2010, Crown Plaza Hotel, Tulsa, OK

Dr. John K. Coleman - Facilitator for Grant Procurement for Oklahoma Board of Regents, July 20-24, 2009, Oklahoma City, OK

Dr. Sharon Lewis - Review of Grant Proposals for the National Science Foundation, February 21-23 2010. Arlington, VA.

RESEARCH ACTIVITIES

Developmental and Research Internships

This past school term, 30 STEM scholars presented their research findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 3 first place awards, 5 second place and 2 third place winners. Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published at the various national and state events. Six research presentation venues and participating scholars are included below.

HBCU-UP National Research Conference
Washington, DC. 10/29/09 ?11/01/09

Langston University students: Marshall Bailey, Shabree Nichols, Sheree McDaniel, Kirk Braggs, Jamila Harris, Samuel (Alex) Henderson, Erica Smith, Nona Kelley, Rose Cooper, Rochelle Howard, Yasmeen Shumate, and Kenta Caldwell traveled to the HBCU-UP National Research Conference to defend their research projects to faculty judges from across the country with either an oral or poster presentation competition. Each Student did an excellent job defending their work showcasing the type of scholars Langston University has in the STEM disciplines. There were four HBCU-UP National Research presentation winners (one 1ST place and three 2nd places).

Erica Smith, Biology, 2nd place, Oral Presentation - 'Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of Acinetobacter calcoaceticus, Acinteobacter lwoffii and Acinetobacter baumannii'

Kenta Caldwell, Chemistry, 1st place, Poster Presentation - 'Informatics to Improve Clinical Brain Magnetic Resonance Spectroscopy'

Rochelle Howard, Math, 2nd place, Poster Presentation - 'IFP SIAP: Instrument Flight Procedure Standard Instrument Approach Procedures'

Nona Kelley, Biology, 2nd place, Poster Presentation - 'HM-CSF expression, stability and optimization in CHO cells cell line'

Langston University Advisors accompanying students:

Dr. John K. Coleman, Dr. Alonzo. Peterson & Linc Coordinator: Ms. Irene Williams

Trip financed by OK-EPSCoR & Langston's Integrated Network College ? LINC

15th Annual Research Symposium. Louis Stokes Alliance for Minority Participation Research Day. Oklahoma State University, Stillwater, OK (10/3/2009) (J. Coleman; S. Lewis)

Twelve students from the Chemistry and Biology Departments traveled to Stillwater, OK to present poster and oral presentations of their summer research projects.

Faculty attending: Dr. Sharon a Lewis & Dr. John K. Coleman

Oklahoma Research Day, Broken Arrow, OK, 11/13/2009

Thirty students from the Chemistry, Biology and Mathematics Departments traveled to Broken Arrow, OK to present their poster presentations at the 11th annual Oklahoma Research Day. This year, for the first time, the event organizers chose approximately 60 students, to present an oral presentation. Ms. Sheree McDaniels, a Biology Major, was chosen from LU. Her presentation was outstanding and the poster presentations were great.

The 11th Annual Oklahoma Research Day was hosted by Northeastern State University, for the second year, with a record number of research abstracts submitted, approximately 1,200 participants. The event receives significant financial support from the Oklahoma State Regents for Higher Education, The National Science Foundation (NSF)-Oklahoma Experimental Program for Stimulating Competitive Research (EPSCoR), the National Institutes for Health (NIH)-INBRE, the Oklahoma Center for the Advancement of Science and Technology (OCAST), and the participating Oklahoma Regional Universities.

Langston University Advisors accompanying students:

Dr. John K. Coleman, Dr. K. J. Abraham & Irene Williams, LINC Coordinator

The BUS Trip was financed by LU-NASA Program & Langston's Integrated Network College ? LINC

The National Institute of Science and Beta Kappa Chi Scientific Honor Society 67th Joint Annual Meeting, New Orleans, LA, 03/24/10
?03/28/10

At the National Institute of Science and Beta Kappa Chi Scientific Honor Society's Joint Conference in New Orleans, over sixty per cent (60%) of Langston's nine participants brought trophies home.

Two first place, two second place and two third place prizes were among the prizes they brought back to LU. These winnings were among a field of 600 participants from 40 different universities, and were received for a combination of Oral and Poster presentations.

Langston University students: Marshall Bailey, Shabree Nichols, Sheree McDaniel, Kirk Braggs, Samuel (Alex) Henderson, Erica Smith, Nona Kelley, Rose Cooper, Rochelle Howard, and Yasmeen Shumate defended their research projects (oral or poster presentations) to faculty judges from across the country.

The event was hosted by Dillard University and Southern University @ New Orleans, LA. Each Student did an excellent job defending their work.

The six NIS-BKX presentation winners (two 1ST place, two 2nd place and two 3rd places) were as follows:

Erica Smith, Biology, 1st place, Oral Presenttion - 'Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of Acinetobacter calcoaceticus, Acinteobacter lwoffii and Acinetobacter baumannii'

Marshall Bailey, Biology, 1st place, Oral Presentation - 'Gene expression analysis of EVL differentiation in poky mutant embryos'

Kirk Braggs, Chemistry, 2nd place, Oral Presentation - 'Radio labeling Liposomes with Tc-99m'

Samuel (Alex) Henderson, Chemistry, 3rd place, Oral Presentation - 'Lifetime and Intensity Responses to Laser Pump Power in CdSe/ZnS Quantumdots'

Yasmeen Shumate, Biology, 2nd place, Poster Presentation - 'Effects of Chronic Environmental Arsenic on the Response to Acute Inflammation'

Rochelle Howard, Math, 3rd place, Poster Presentation - 'IFP SIAP: Instrument Flight Procedure Standard Instrument Approach Procedures'

Langston University Advisors accompanying students:

Dr. John K. Coleman, Dr. Alonzo. Peterson, Ms. Irene Williams, LINC Coordinator

Trip financed by OK-EPSCoR & Langston's Integrated Network College ? LINC

10th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, Friday, April 30, 2010. The Department of Chemistry's LINC program was the 2010 program coordinator.

The LINC Program co-sponsored the 10th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on April 30, 2010.

LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally revamped the presentation display boards.

The featured program speaker for the occasion was Tomica Blocker, a PhD candidate at Oklahoma State University, Department of Zoology, Stillwater, OK. Ms. Blocker is also a LINC alum, as well as LU 2008, summa cum laude, graduate with a BS in Biology. She engaged symposium participants in a discussion on the intricate ways of applying and succeeding in graduate school.

Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

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.

Winners from Oral Competition:

First Place; Marshal Bailey, Biology, Gene Expression Analysis of EVL Differentiation in Poky Mutant Embryos.

Second Place; Erica Smith, Biology, Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of Acinetobacter calcoaceticus, Acinteobacter Iwoffii and Acinetobacter baumannii.

Third Place; Kirk Braggs, Chemistry, Radiolabeling Liposomes with 99m Tc.

Winners from Poster Competition:

First Place; Jamila Harris, Biology. Astrocyte Immune Responses to Activation: Relevance to Neuroninflammation and Neurodegeneration

Second Place; Marshall Bailey, Biology, Daylily in vitro plant reproduction from flower bud

Third Place; Jessica Brown, Psychology, Investigating The Relationship Of Sexual Attitudes And Self Esteem

Research Day at the Capitol 2010 on Monday, March 29, 2010, sponsored by the Oklahoma State Regents for Higher Education, the Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR) and the National Science Foundation.

Each Oklahoma institution is invited to nominate research projects conducted by Oklahoma undergraduate students. Only one student from each of the regional universities was allowed to participate.

Shabree Nichols, Biology major, was selected as the LU representative who presented her poster entitled: Cytokine Induced Microtubule Disassembly In Corneal Endothelium During Allograft Rejection.

LU Faculty & Staff attending. Dr. John K. Coleman & Ms. Irene Williams.

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 will be required to effectively address the deficiencies of our target participants.

Posting students' educational projects and accomplishments on monitors appears to provide a great impact on their willingness to participate and learn.

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.

This past school term, 30 STEM scholars presented their research findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 3 first place awards, 5 second place & 2 third place winners. Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published at the various national and state events. Six research presentation venues and participating scholars are included below.

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Langston University students: Marshall Bailey, Shabree Nichols, Sheree McDaniel, Kirk Braggs, Jamila Harris, Samuel (Alex) Henderson, Erica Smith, Nona Kelley, Rose Cooper, Rochelle Howard, Yasmeen Shumate, and Kenta Caldwell traveled to the HBCU-UP National Research Conference to defend their research projects to faculty judges from across the country with either an oral or poster presentation competition.

Each Student did an excellent job defending their work showcasing the type of scholars Langston University has in the STEM disciplines. There were four HBCU-UP National Research presentation winners (one 1ST place and three 2nd places).

Erica Smith, Biology, 2nd place, Oral Presentation - 'Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of Acinetobacter calcoaceticus, Acinteobacter lwoffii and Acinetobacter baumannii'

Kenta Caldwell, Chemistry, 1st place, Poster Presentation - 'Informatics to Improve Clinical Brain Magnetic Resonance Spectroscopy'

Rochelle Howard, Math, 2nd place, Poster Presentation - 'IFP SIAP: Instrument Flight Procedure Standard Instrument Approach Procedures'

Nona Kelley, Biology, 2nd place, Poster Presentation - 'HM-CSF expression, stability and optimization in CHO cells cell line'

Langston University Advisors accompanying students:

Dr. John K. Coleman, Dr. Alonzo. Peterson & Linc Coordinator: Ms. Irene Williams

Trip financed by OK-EPSCoR & Langston's Integrated Network College ? LINC

15th Annual Research Symposium. Louis Stokes Alliance for Minority Participation Research Day. Oklahoma State University, Stillwater, OK (10/3/2009) (J. Coleman; S. Lewis)

Twelve students from the Chemistry and Biology Departments traveled to Stillwater, OK to present poster and oral presentations of their summer research projects.

Faculty attending: Dr. Sharon a Lewis & Dr. John K. Coleman

Oklahoma Research Day, Broken Arrow, OK, 11/13/2009

Thirty students from the Chemistry, Biology and Mathematics Departments traveled to Broken Arrow, OK to present their poster presentations at the 11th annual Oklahoma Research Day.

This year, for the first time, the event organizers chose approximately 60 students, to present an oral presentation. Ms. Sheree McDaniels, a Biology Major, was chosen from LU. Her presentation was outstanding and the poster presentations were great.

The 11th Annual Oklahoma Research Day was hosted by Northeastern State University, for the second year, with a record number of research abstracts submitted, approximately 1,200 participants.

The event receives significant financial support from the Oklahoma State Regents for Higher Education, The National Science Foundation (NSF)-Oklahoma Experimental Program for Stimulating Competitive Research (EPSCoR), the National Institutes for Health (NIH)-INBRE, the Oklahoma Center for the Advancement of Science and Technology (OCAST), and the participating Oklahoma Regional Universities.

Langston University Advisors accompanying students:

Dr. John K. Coleman, Dr. K. J. Abraham & Irene Williams, LINC Coordinator

The BUS Trip was financed by LU-NASA Program & Langston's Integrated Network College ? LINC

The National Institute of Science and Beta Kappa Chi Scientific Honor Society 67th Joint Annual Meeting, New Orleans, LA, 03/24/10
?03/28/10

At the National Institute of Science and Beta Kappa Chi Scientific Honor Society's Joint Conference in New Orleans, over sixty per cent (60%) of Langston's nine participants brought trophies home.

Two first place, two second place and two third place prizes were among the prizes they brought back to LU. These winnings were among a field of 600 participants from 40 different universities, and were received for a combination of Oral and Poster presentations.

Langston University students: Marshall Bailey, Shabree Nichols, Sheree McDaniel, Kirk Braggs, Samuel (Alex) Henderson, Erica Smith, Nona Kelley, Rose Cooper, Rochelle Howard, and Yasmeeen Shumate defended their research projects (oral or poster presentations) to faculty judges from across the country.

The event was hosted by Dillard University and Southern University at New Orleans, LA. Each Student did an excellent job defending their work. The six NIS-BKX presentation winners (two 1ST place, two 2nd place and two 3rd places) were as follows:

Erica Smith, Biology, 1st place, Oral Presenttion - 'Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of Acinetobacter calcoaceticus, Acinteobacter lwoffii and Acinetobacter baumannii'

Marshall Bailey, Biology, 1st place, Oral Presentation - 'Gene expression analysis of EVL differentiation in poky mutant embryos'

Kirk Braggs, Chemistry, 2nd place, Oral Presentation - 'Radio labeling Liposomes with Tc-99m'

Samuel (Alex) Henderson, Chemistry, 3rd place, Oral Presentation - 'Lifetime and Intensity Responses to Laser Pump Power in CdSe/ZnS Quantumdots'

Yasmeen Shumate, Biology, 2nd place, Poster Presentation - 'Effects of Chronic Environmental Arsenic on the Response to Acute Inflammation'

Rochelle Howard, Math, 3rd place, Poster Presentation - 'IFP SIAP: Instrument Flight Procedure Standard Instrument Approach Procedures'

Langston University Advisors accompanying students:

Dr. John K. Coleman, Dr. Alonzo. Peterson, Ms. Irene Williams, LINC Coordinator

Trip financed by OK-EPSCoR & Langston's Integrated Network College ? LINC

10th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, Friday, April 30, 2010.

The Department of Chemistry's LINC program was the 2010 program coordinator.

The LINC Program co-sponsored the 10th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on April 30, 2010.

LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally revamped the presentation display boards. The featured program speaker for the occasion was Tomica Blocker, a PhD candidate at Oklahoma State University, Department of Zoology, Stillwater, OK. Ms. Blocker is also a LINC alum, as well as LU 2008, summa cum laude, graduate with a BS in Biology. She engaged symposium participants in a discussion on the intricate ways of applying and succeeding in graduate school.

Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

Results. 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.

Winners from Oral Competition:

First Place; Marshal Bailey, Biology, Gene Expression Analysis of EVL Differentiation in Poky Mutant Embryos.

Second Place; Erica Smith, Biology, Effects of Ciprofloxacin levels in Wastewater Treatment Plants: A comparison of Acinetobacter calcoaceticus, Acinteobacter Iwoffii and Acinetobacter baumannii.

Third Place; Kirk Braggs, Chemistry, Radiolabeling Liposomes with 99m Tc.

Winners from Poster Competition:

First Place; Jamila Harris, Biology. Astrocyte Immune Responses to Activation: Relevance to Neuroninflammation and Neurodegeneration

Second Place; Marshall Bailey, Biology, Daylily in vitro plant reproduction from flower bud

Third Place; Jessica Brown, Psychology, Investigating The Relationship Of Sexual Attitudes And Self Esteem

Research Day at the Capitol 2010 on Monday, March 29, 2010, sponsored by the Oklahoma State Regents for Higher Education, the Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR) and the National Science Foundation.

Each Oklahoma institution is invited to nominate research projects conducted by Oklahoma undergraduate students.

Only one student from each of the regional universities was allowed to participate. Shabree Nichols, Biology major, was selected as the LU representative who presented her poster entitled: Cytokine Induced Microtubule Disassembly In Corneal Endothelium During Allograft Rejection.

LU Faculty & Staff attending. Dr. John K. Coleman & Ms. Irene Williams.

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.

Dr. Byron Quinn, along with two STEM scholars, is working with Dr. Paul Adams research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project. This project is through the Department of Energy (DoE) Faculty and Student Teams (FaST) program at the Lawrence Berkeley National Laboratory (LBNL). This will be the third year that the LU-FaST will be working with Dr. Paul Adams research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project. PHENIX is a software suite designed for automated macromolecular structure determination with minimal human intervention.

Intellectual Merits: Due to the rapid pace that genomes are being solved, there has recently been a great deal of effort to increase the speed of macromolecular protein structure solution. PHENIX is designed to allow researchers to rapidly get to the final protein structure after data collection, thus having a dramatic effect on decreasing the amount of time it takes to get structures deposited in the Protein Data Bank (PDB).

Funding is through a National Science Foundation mini-grant.

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 with Dr. Byron Quinn - Mini-Grant Procurement: FAST Program (\$22,000)

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

Presentations

Dr. John K. Coleman ? Technology in the Classroom ? Presenter on 5-person panel discussion. Spring Faculty Institute, Langston University. January 11.2010.

Dr. John K. Coleman - Competency Performance Recordings for Learning (CPR-L). Presentation at the 2010 National Conference on Learner Centered Teaching, April 12-14, 2010, Crown Plaza Hotel, Tulsa, OK

Dr. John K. Coleman - Facilitator for Grant Procurement for Oklahoma Board of Regents, July 20-24, 2009, Oklahoma City, OK

Dr. Sharon Lewis - Review of Grant Proposals for the National Science Foundation, February 21-23 2010. Arlington, VA.

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.

1. Three LU faculty hold mentoring session for twenty (20) 9-10th grade Gear-Up students from the Tulsa area schools at the LU-Tulsa Campus with six (6) LINC students attending as student mentors, Nov 14, 2009.

The LU personnel in attendance were as follows: LU Faculty Drs: Alonzo Peterson, John K. Coleman, and Emily Patterson. LU STEM Students: Rose Cooper, Rochelle Howard, Marshall Bailey, Kirk Braggs, Yasmeeen Shumate, Princess Hayes, Torano Boykins and Nelson Jones. Basic motivational comments were made by the LU faculty, encouraging students to make all effort to benefit from their education and to make special effort to strengthen their math and science skills. LU undergraduates were assigned as mentors for each of the junior-high participants in order to facilitate the activities as well as to provide further opportunity for follow-up activities. All of the students appeared excited about the event and indicated their interest in ultimately obtaining a career that would require a college degree. Students were provided ACT Study Guides and provided instructions as to how to use them.

The event was hosted by Emily Patterson, Gear-Up Director.

2. Three LU faculty hold mentoring session for twenty (20) 9-10th grade Gear-Up students from the Tulsa area schools at the LU-Tulsa Campus with six (6) LINC students attending as student mentors. Feb 20, 2010.

The LU personnel in attendance were as follows: LU Faculty Drs: Alonzo Peterson, John K. Coleman, and Emily Patterson. LU Students: Rose Cooper, Marshall Bailey, Kirk Braggs, Yasmeeen Shumate, Princess Hayes, and Nelson Jones & Kelvin Hunter. LU faculty gave opening remarks then LU undergraduates were assigned as mentors for each of the junior-high participants in order to facilitate the activities as well as to provide further opportunity for follow-up activities.

The event was hosted by Emily Patterson, Gear-Up Director.

3. High School Day, Oct 28, 2009. Multipurpose building, LU campus. The LU chemistry department personnel in attendance were as follows: LU Faculty & Staff: John K. Coleman and Irene Williams. LU Chemistry majors: Alex Henderson and Kirk Braggs.

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.

4. Gentilly Clean-Up and Volunteer activities. Friday, March 26, 2010 Lower 9th ward, New Orleans, LA.

At the National Institute of Science and Beta Kappa Chi Scientific Honor Society's Joint Conference in New Orleans, the LINC participants, students and advisors, along with their fellow Beta Kappa Chi members participated in a community service project for the Katrina victims in the lower 9th Ward. Participants cleaned areas, packaged food and clothing, and organized food and clothing for distribution at the Franklin Street Baptist Church.

5. LU Staff & Faculty members served as judges for the high school science fair at the National Institute of Science and Beta Kappa Chi Scientific Honor Society's Joint Conference in New Orleans: Ms. Irene Williams, Dr. Alonzo Peterson & Dr. John K. Coleman

6. Goat Research Day. Agricultural Research & Extension Education Complex, Saturday, May 30, 2010

Chemistry majors Samuel Henderson & Kirk Braggs provided a demonstration booth for junior high students of the 4-H Club, illustrating how science could be enjoyable. They demonstrated a variety of chemistry experiments that glowed in the dark, showed rainbow colors in various layers of liquids to those that erupted and formed volcanic ash. All of the students appeared to be very excited about the 'cool science' display.

7. Community-Wide Tutorial Services for Junior & High School students (Under development)

LU undergraduate students in the LINC organization have spear-headed a tutorial service for junior high school and senior high school students in the Langston & Coyle communities. The tutoring services are for all STEM (science, technology, engineering & mathematics) courses.

Journal Publications

Charles Loftis¹, Dakshinamurthy Rajalingam², Jiashou J. Xu², and Thallapuram 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:

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

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 within Discipline

Contributions: To Any Other Disciplines

Contributions: To Any Human Resource Development

Contributions: To Any Resources for Research and Education

Contributions: To Any Beyond Science and Engineering

Any Conference

2010

LINC ANNUAL REPORT

APPENDIX



Technology in the Classroom

Langston University's STEM Digital Village

featuring

CPR- for Learning, where scholars use digital
media to improve problem-solving skills

Presenter: John K. Coleman, PhD, Langston University, Langston, OK



What it is the Digital Village?

The STEM Digital Village is a networked environment that alternately informs, educates, poses questions without obvious answers, and ultimately – is aimed at leaving its participants in a more informed place.



The Digital Village

Uses Technology to Enhance the Teaching and Learning Process, and Connect with Students Using a Familiar Medium

STEM Digital Village – Technology that supports four following major categories

I. TEACHING & LEARNING

CPR-L

II. NETWORKING WITH STEM GRADS, UNDERGRADS & STEM PROFESSIONALS

Message Board

Blog/Private Chat

Profile Contact Info

III. WAREHOUSING RESOURCES & STUDY AIDS

Scholarship opportunities

Grad application process

Career goals statement

Course w/Study resources

Research opportunities

Interview tips

Application Time-line

GRE Prep

Time management

STEM Quiz Bowl

IV. ON-Line Administration - Student data on-line-Track students' progress

Academic

Research Experience

Student-Mentor Evaluations

Grad School Entry

Scholarships/Awards

Colloquium/SI

Student-Teacher evaluations

Standardized Exams

Internships

GRE

Community Service



Technology – Teaching & Learning

CPR for Learning –(Competency Performance Recording)

What is CPR for Learning? CPR-L

- ❑ It is a new program that focuses on improving analytical thought, problem solving
- ❑ It merges technology, learning principles, and performance measurement
- ❑ Its process is broadcast using Technology (through Digital Village CPR-Casting)



CPR-L – Using Technology to Enhance Understanding of Core Course Concepts and Problem Solving Skills

Difficulties and disconnects in students' ability to solve reading problems and other problems that involve complex solutions have long been documented

The real issue is “What, if anything, are we going to do to construct an intervention that begins to address the issue?”

We must address the issue if we are to meet our objectives of increasing the number of STEM graduates, as well as the number that matriculate to advanced studies

Technology, and adherence to ‘tried and true’ teaching and learning protocols, permit us to begin to address this issue



CPR-L – Using Technology to Enhance Understanding of Core Course Concepts and Problem Solving Skills

In order to solve the problem, we must first acknowledge its existence, then define it in clear terms

Situations that may have contributed to problem solving difficulties, as articulated by students

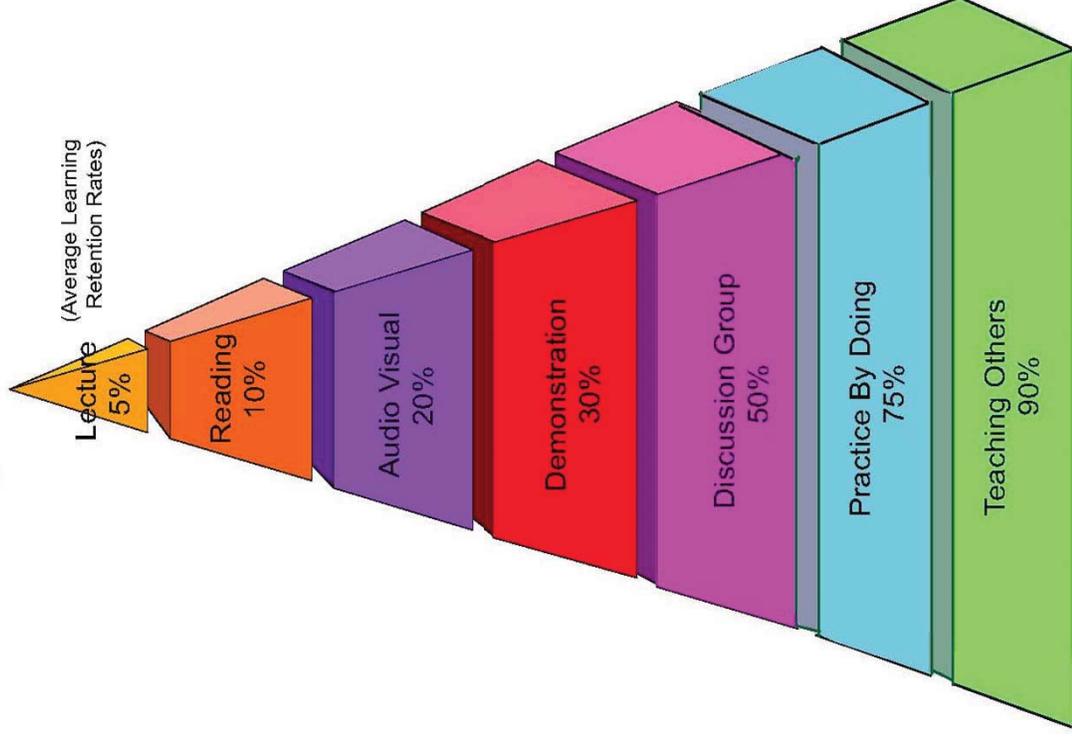
- “Too many multiple choice questions”
- “Too many “Plug & play techniques, Pattern matching, work-arounds, & short cuts taught”
- “Did not know to look at the problem in pieces, looked at the whole pie rather than each slice”
- “Teachers grade word problems with a key that focused only on the answers, not the process”



Situations that enhance learning of problem-solving concepts.
(taken from Literature & surveys)

- Thoroughly understanding the problem before proceeding to solve it
- Writing something down to aid in conceptualizing- sketching the concept of problem
- Speaking aloud when possible – learning channel
- Multiple repetitions of applying concept/ process
- Going-to-the-board and having the opportunity to dissect the problem solving process.
- Following the Problem solving process protocols
- Tutoring or teaching the concept, i.e. SI.

Learning Pyramid



(National Training Laboratories, Bethel, Maine)

The CPR-L process incorporates methodologies that are aligned with highest learning retention rates

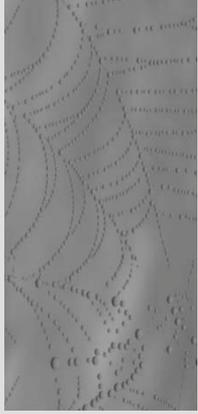


Bloom's Taxonomy

Cognitive Learning Categories

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

CPR-L process
incorporates 6
categories of
Cognitive Learning
as defined in
Bloom's Taxonomy



CPR-L – Using Technology to Enhance Understanding of Core Course Concepts and Problem Solving Skills

The CPR-L Process combines best practices for learning into its process.

- The CPR-L for Problem solving uses a typical three step process – the three A's:
Articulate, Assess, Ascertain
- The CPR- L utilizes a designated rubric combined with technology to maintain process consistency.
- A 12 step rubric guides the student through the steps required for following the problem solving protocol.
- The tablet PC serves to maintain the protocols, present a teaching platform for students, as well as to preserve the integrity of the process.



CPR-L

The Process

Word problems that encompass core course concepts assigned to students as homework

Students work through problem until solution can be presented succinctly in under 3 minutes

Rubrics for problem solving guide students' approach to solving problem

Students use tablet PC with audio/video recording software to record final solution



CPR-L

The Process

In a quiet environment, student begins Step I: articulating the problem. This is the process of sketching it out, talking it out, putting ideas and concepts down on paper.

Step II follows. Student must research applicable concepts, equations, laws, that govern what the problem is asking for. There can be some doodling while clarifying how the solution might be derived, so paper and pencil are recommended for this phase.





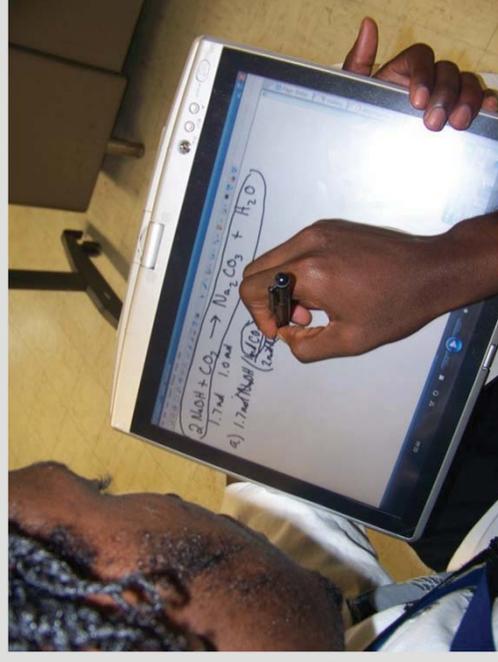
CPR-L

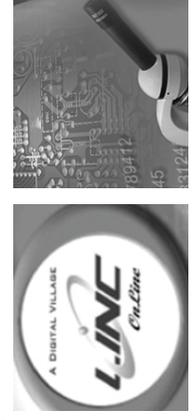
The Process

In Step III, Ascertaining solution, all desired parameters from the problem set data are obtained, compatibility of units and dimensions are ensured, and the solution derived.

This may require solving all mathematical or chemical equations or, assessing and correlating data to derive a conclusion.

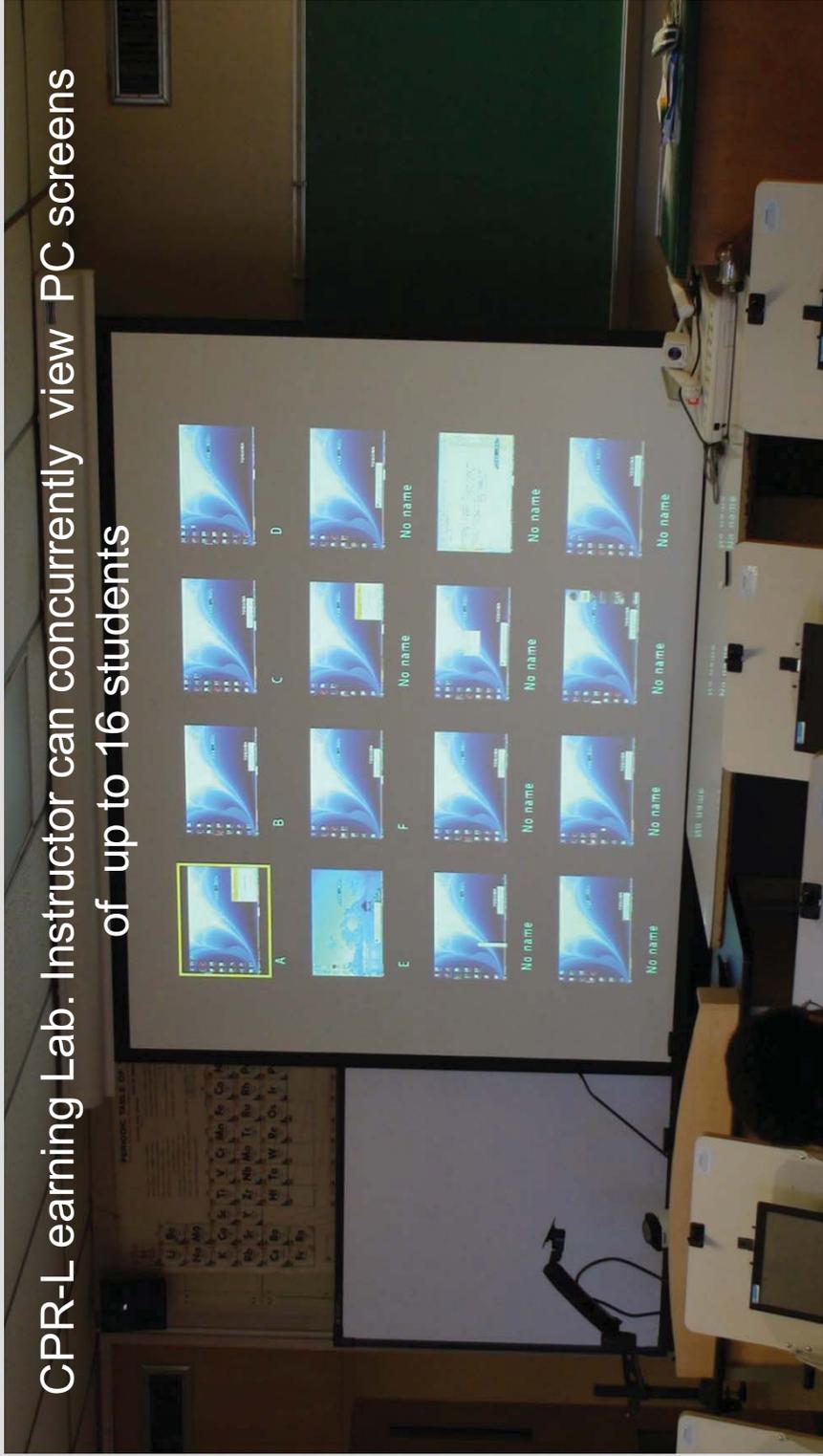
Student is now ready to record conclusions of each of the 3 steps onto a tablet PC





Technology Permits migration of Students' Solutions from the classroom to the Digital Village

CPR-Learning Lab. Instructor can concurrently view PC screens of up to 16 students





Technology Permits migration of Students' Solutions from the classroom to the Digital Village



Technology-enabled CPR-L Learning Lab



Technology Permits migration of Students' Solutions from the classroom to the Digital Village

OneNote 2010 - Getting Started with OneNote

• $\Delta G = 3.8$

9) a) $\text{NaNH}_2 + \text{CH}_3\text{CH}_2\text{OH} \rightarrow \text{CH}_3\text{CH}_2\text{O}^- + \text{NH}_3 + \text{Na}^+$
 $\text{Na}^+ + \text{NH}_2^-$ (Base) $\text{CH}_3\text{CH}_2\text{OH}$ (Acid)

b) $\text{NaOH} + (\text{CH}_3)_3\text{COH} \rightarrow \text{H}_2\text{O} + (\text{CH}_3)_3\text{CO}^- + \text{Na}^+$
 $\text{Na}^+ + \text{OH}^-$ (Base) $(\text{CH}_3)_3\text{COH}$ (Acid)

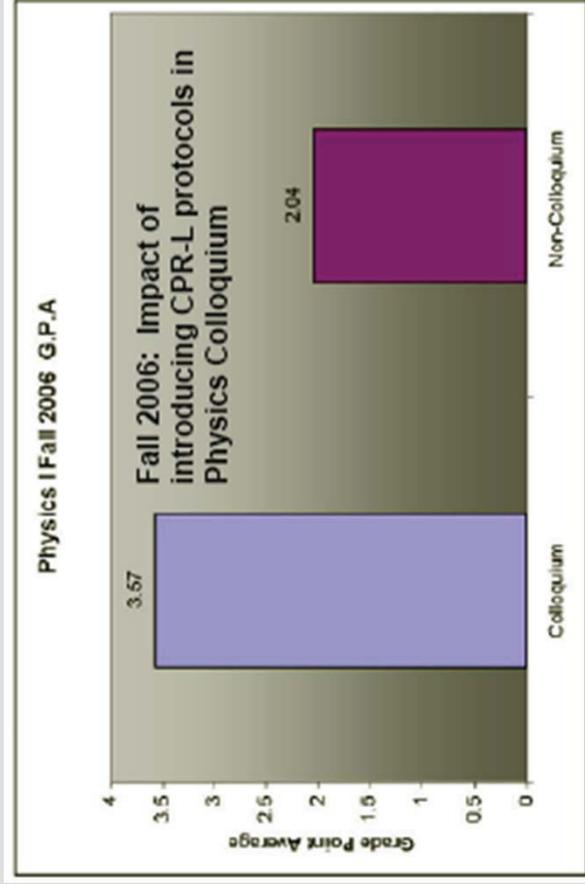
10) With the touch to the screen, the instructor can select which student's work is displayed on the screen. Students may be selected to 'teach' their work to fellow students.

Search All Notebooks

- New Page
- What else can I do with
- Research on the Web
- Text recognition in pict
- Live sharing session
- Side Note
- Multiple computer tap
- OneNote Mobile
- Drag and drop
- Hyperlinks
- Tables
- Drawing tools
- Lasso Select
- Calculator
- Insert files as printouts
- Attach files to your not
- Send to Word
- Excel and PowerPoint I
- OneNote basics on Tab
- Page templates
- Password protection
- Audio and video record
- Audio search
- Full page view
- Organic them fr-class



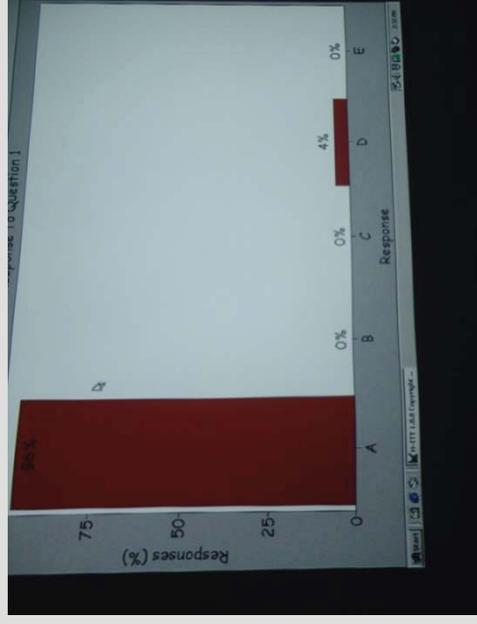
Impact of Introducing Technology-enabled CPR-L Protocols in Physics Colloquium



State of the Art technology enhances assessment & learning



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000188261	TODD SYND	HOLLAND D		
GIPSON SH	Gregory J	BROCK TR	BATTLE CU	
SHAWVER	EBSMIT MONI	ARMSTRO2	JACKSON CT	ERRY DA2



The faculty utilizes HITT Interactive Technology (for instant assessment), SMART board technology and Tablet PC technology for student participation and learning.

96% of the students get the current question correct.



CPR for Learning - Rubrics

5 Rubrics that support Step I

Articulates thorough understanding of the application of the problem

Includes a complete sketch for articulation

Includes all of the pertinent data points on the sketch

Clearly delineates all of the data that is given (known) in the problem on the sketch

Clearly delineates the unknown entity that is requested from the problem on the sketch

When done at target level, it is clear that the student has a thorough understanding of how to read with comprehension and can interpret what is read.



CPR for Learning - Rubrics

4 Rubrics that support Step II

Thorough understanding of the concepts and equations associated with the known & unknown entities

Thoroughly identifies all parameters that are needed to solve for the unknown entity

Thorough understanding of how each parameter for solving the “unknown entity” can be correlated with a datum point found within the problem set

Thoroughly demonstrates how each parameter can be obtained, and can indicate whether it is obtained directly, indirectly, or is implied

When done at target level it is clear that the student has a thorough understanding of all concepts and equations, knowns and unknowns, how each parameter is obtained, and how all elements are correlated.



CPR for Learning - Rubrics

3 Rubrics that support Step III

- Can thoroughly identify each dimension of measurement addressed in the problem
- Can thoroughly demonstrate that identical dimensions have been converted into identical units
- Can thoroughly solve equation (math or chemical) or assess and correlate data to indicate a conclusion

When done at target level, it is clear that the student has a thorough understanding of how to solve equations (math or chemical), assess and correlate data, dimensions, and units; and draw appropriate conclusions.

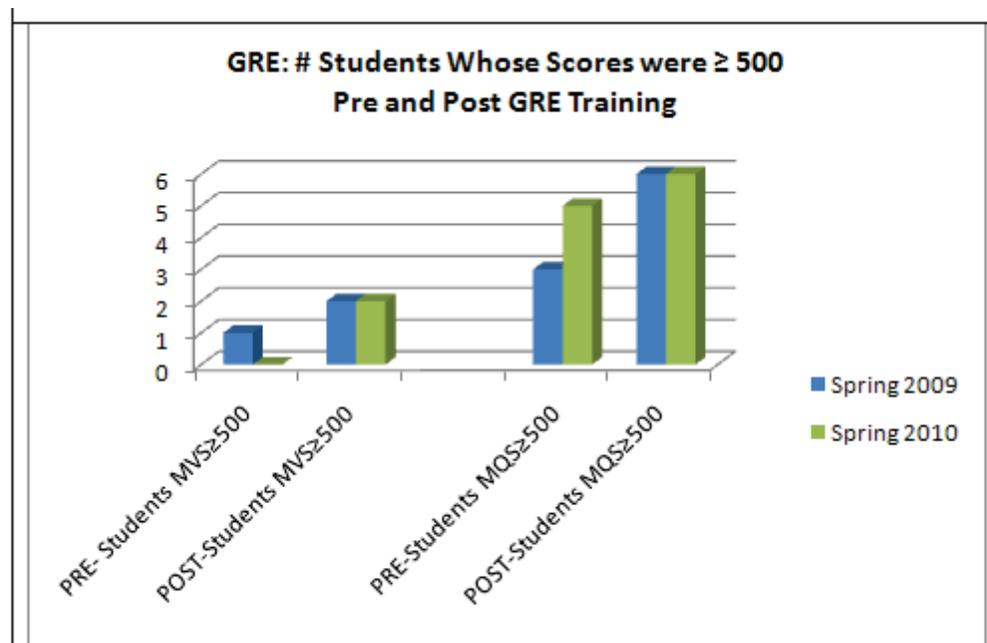
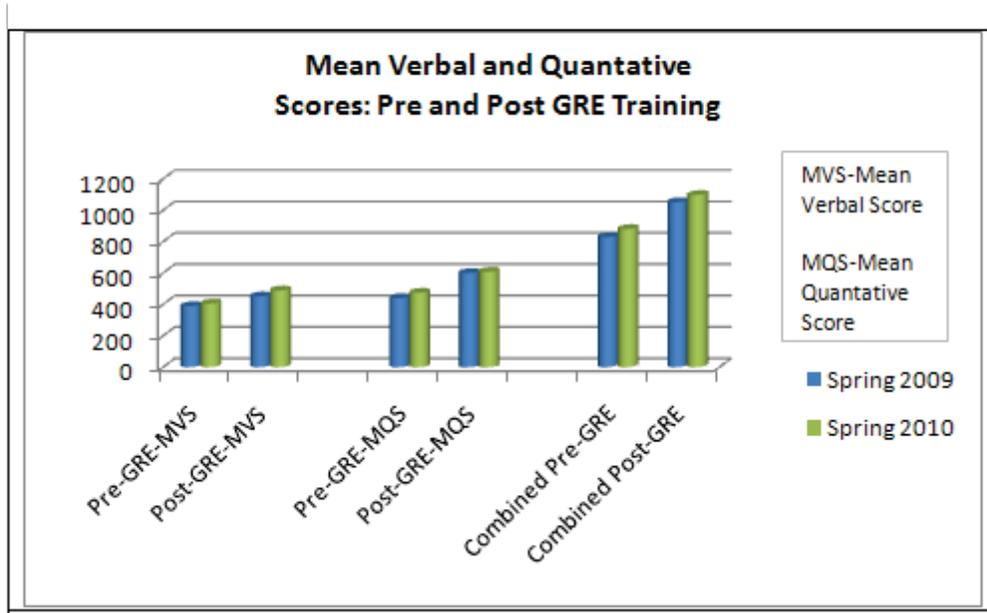


CPR for Learning - Rubrics

A fourth step, **Application**, will be added to the Rubrics assessment process during the course of this project. Application entails having students develop their own problem that encompasses specific knowledge gained from theory, and effectively closes the learning demonstration process.

Ex. II: GR E Mean Scores: 2009-2010

Graduate Record Examination Preparation

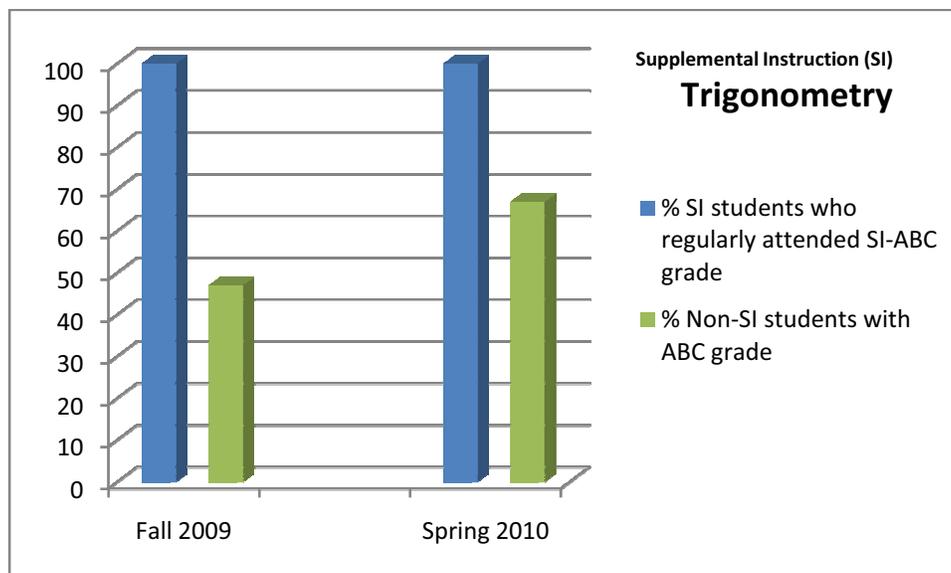
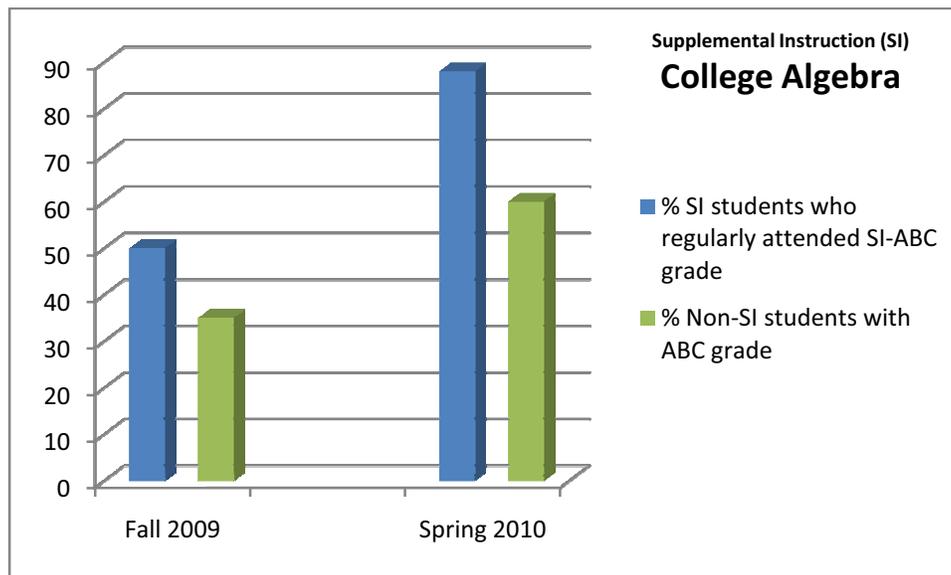


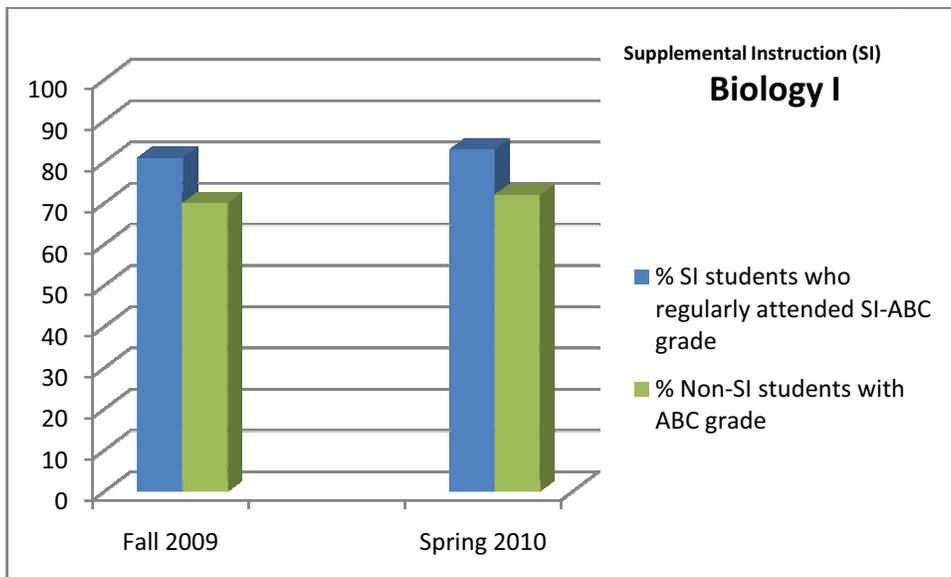
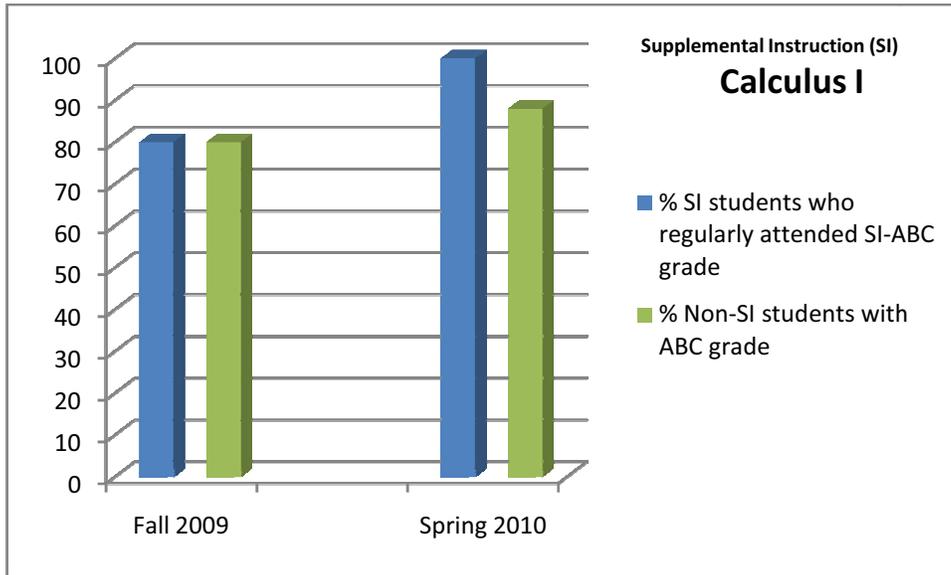
Ex. III

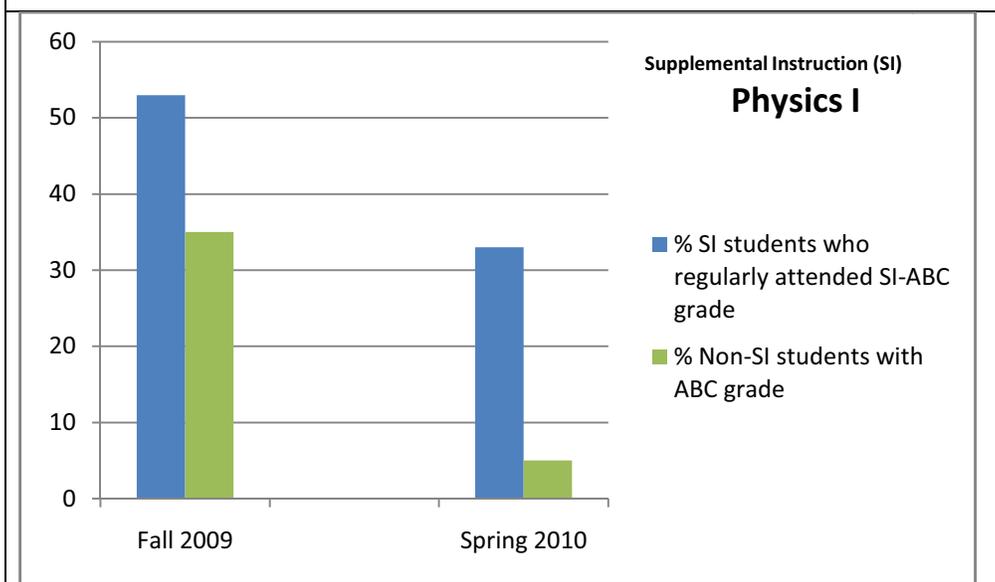
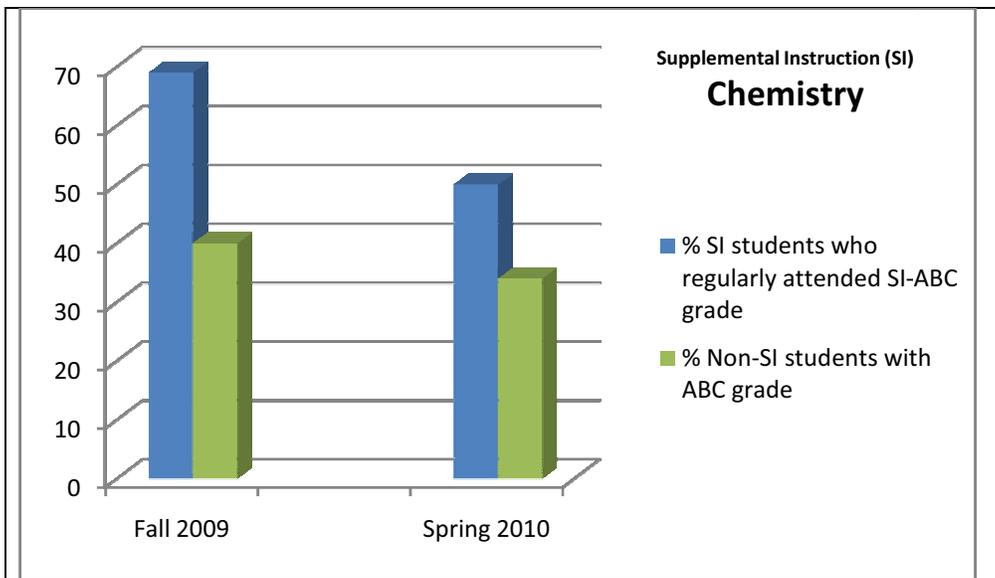
SUPPLEMENTAL INSTRUCTION (SI)

Fall 2009 and Spring 2010 Results

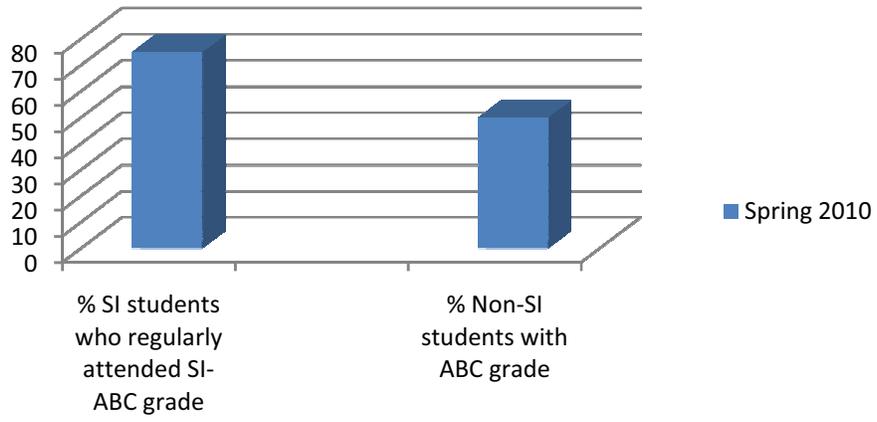
The 211 students who regularly attended the 13SI classes offered over the course of 2 semesters outperformed students who did not attend, except for Calculus during the Fall 2009 semester. Data is shown as per cent of students who achieved a grade of A, B, and C in both categories.







Supplemental Instruction (SI)
Physics II



Activities and findings:

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

A major focus of the LINC program, and of Langston University, is to expand the use of technology in the classroom. To this end the following activities were accomplished during this past year. LU contributed \$125,000 dollars to this project through its Title 3 Program; other contributing funds are from the LINC Program.

1. Creation of two state-of-the-art Smart classrooms, including a computer laboratory featuring Tablet PCs, 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.
2. Creation 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.

About CPR-L (Competency Performance Recordings for Learning)

CPR-L is simply a "learning by teaching" method that embraces 21st century technologies and numerous learning protocols. It utilizes a smartboard, wireless projector, and tablet PC. 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.

With CPR-L, students are required to take homework problems that contain core course concepts to a lab setting or home, and solve them on a tablet PC while utilizing clearly articulated problem-solving rubrics. The final product must be concise, compressed to essential steps, so students are encouraged to first utilize paper and pen to explore solutions until they believe that they have uncovered all elements in the selected rubrics, and reduced their findings to an effective description of the solutions process. The entire process is iterative, and requires intense re-thinking of the solution in order to reduce it to its essence and meet other required criteria. Students then prepare a Smartboard lecture on tablet PC. The tablet PC records the students' voice, as they are required to talk through the problem as though they were teaching it in class. The laptop visually captures the student's work in-progress straight through to its finished form as the problem solution is written on the tablet PC's surface with a stylus. The effectiveness of the

solution is measured against the selected rubrics. Further, the process of recording requires a quiet environment, devoid of music and other typical distractions, writing the information down, as well as reading aloud to “hear” ones’ thoughts. This effort reinforces the learning process. All students’ completed assignments are maintained in their performance file, and are accessible to them and to the instructor. This gives both a movie-like review of exactly how well the student understands core course concepts and what the progress trail looks like. Upon careful review of these performance “movies”, instructors can isolate student and course content weaknesses, recommend intervention, and better predict examination outcomes.

Technologies enable the student to wirelessly project a "movie-like" presentation of the homework assignment, with sound, on a large whiteboard for classroom viewing and discussion. Since the student must iron out all of the kinks and fine tune the assignment outside the classroom, this process lessens the amount of time associated with traditional "going to the board" activity, and permits broader classroom participation. When CPRL work sessions are completed in the tablet PC lab, the instructor is able to scrutinize each student’s work separately, from the instructor’s laptop, which may include working concurrently on the individual students’ screen.

Selected CPR-L recordings are posted in The Digital Village website.

Other technologies employed in the classroom, and implemented earlier than the subject period, are listed in the *Appendix section, Exhibit II*. A Photo Gallery featuring technology in the classroom is attached as *Exhibit II-A*.

GRE Preparation

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

One of the primary predictors of how well undergraduate students will perform in graduate school is the preparation they received in their undergraduate curriculums. One of the primary measures of their potential success in graduate school is the Graduate Record Examination (GRE).

Background:

In 2002, Langston University issued an internal report on its students’ GRE scores and readiness for graduate school. The report suggested that Langston University mathematics and science students who maintained a 3.2 GPA and scored at least 400/800 on each of the GRE core components were deemed competitive by several in-state graduate schools committees.

The LINC Program has been a proactive collaborator in providing STEM students with the opportunity to receive free GRE Course preparation since 2003. In recent years, EPSCoR has been a significant contributor to the GRE Kaplan Course. Since the implementation of the preparation course by the department more than 120 students have participated. 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. At least 50% of these students have

been confirmed as having been admitted to or are currently attending graduate/professional schools throughout the United States.

Spring 2009 Cohort:

This report focuses on the cohort of fourteen (14) students who participated in the Spring 09 Kaplan GRE course at LU. Seven students were African American female and seven students were African American males. The mean overall scores for the Kaplan Course Diagnostic Pre-Test were 440/800 (quantitative component). The mean overall scores for the verbal component was 389/800. Again, we notice similarity between the two previous year's cohorts. The post-test scores were encouraging, but were not as strong as the previous year's results.

The mean quantitative component score was 600/800. This was a 160 point increase over the Kaplan diagnostic pre-test average. The mean verbal component score for the same group was 451/800. This was a 62 point increase when compared to the Kaplan diagnostics pre-test average. We did not see the huge improvement from last year to this year as we had in previous years. The combined results for last year (2007-2008) are 1059. This year's combined scores were 1051. This represents about a 1% decrease from last year's performance.

Summary: We are again delighted that the Kaplan GRE Preparation Course has had a positive effect in helping students increase their GRE results. Students continue to report that the preparation course not only teaches them how to study for the GRE but also provides them with solid tips on answering seemingly difficult questions. However, the (verbal) portion of the GRE continues to be the "sticking point" for our students.

We must extend the verbal portion of the GRE Prep Course throughout our school year; providing more assistance through course colloquiums. The students' verbal competences still appears to be the key to significantly impact the GRE scores. This could potentially make the GRE scores even more competitive for graduate schools applications.

Finally, Langston University graduated seven (7) African Americans STEM majors (4 female and 3 males) this Spring who were part of a previous GRE Preparation Course sponsored by Oklahoma EPSCoR and Langston University. There were three biology majors, three chemistry majors, and one mathematics major. Six of these students have been confirmed as being accepted to graduate school.

Supplementary Instruction in collaboration with Oklahoma EPSCoR

Data analyzed by Dr. Alonzo Peterson

Summary of Results

This is Langston University's fourth full academic year of the Supplemental Instruction (SI) Program. Langston University implemented the Supplemental Instruction Program in the Spring of 2004. Classes targeted were Mathematics (College Algebra, Trigonometry, Calculus I) and the Sciences (Biology I, Biology II, Chemistry, Physics I, Physics II, and Physical Science). This report includes data

from the Spring 2009 and Summer 2009 semesters. This year's program consisted of eighteen SI leaders one coordinator, one SI Supervisor, and fifteen professors/ instructors. Sessions continue to meet 2-3 times a week at various times. Sessions are held in the Mathematics Building and the Sciences Building. The program was implemented during the spring 2009 semester.

Participants

During the Spring 2009 and Summer 2009 semesters, more than 400 students had access to the Sciences SI sessions. SI was made available to almost 300 mathematics students in the Spring 2009 and Summer 2009 sessions. Approximately 97% of these students are African American. SI was implemented in 19 courses (Sciences-8 and Mathematics-11). This year SI was implemented in two new areas Physics II and Biology II) in addition to the three new areas (Trigonometry, Calculus I, and Physics I) that were added in the previous year. The Physics II course was implemented at the requests of the students. Biology II was implemented at the instructor's request.

Leaders

There are currently 18 undergraduate students serving as SI leaders and number of these students worked in both the spring and summer semesters. There were 11 African American females and seven (7) African American males. Four of the leaders were mathematics majors, four were chemistry majors and the remaining ten were biology majors. Each of these students has strong analytical and problem solving skills. At least 14 of these leaders are McCabe Scholars, Langston Integrated Network College (LINC) Scholars or both. We believe that we have selected some of the strongest mathematics and science students the university has to offer.

SI leaders meet their sessions regularly and attendance is reported weekly. We received positive feedback from those students who are regularly attending SI sessions. However, we continue to observe that only a very small percentage of students are actually taking advantage of the SI program. We have continued our campaign to get students to realize the benefits of SI and to get them to attend the sessions. As mentioned in the preliminary report we have partnered with the Langston University Student Government Association in their "Why Are You Failing" Campaign that provides information to students on study skills and time and place they can receive assistance in their mathematics and science courses. The staff met with the SI mentors to explain their roles and responsibilities in implementing SI. We also placed flyers and notices throughout the mathematics and sciences buildings. SI leaders were given the opportunity to introduce themselves and the SI program to the students in each SI class. Instructors allowed students time to determine the most convenient time to meet for the SI sessions. During our end of the 2007-2008 year questionnaire we found that approximately thirty-eight percent of the students said they did not attend SI because it was not convenient for them. We have attempted to address the concern by allowing and encouraging students to attend any SI session that is convenient for them. The following is a break down of the pass/fail rate of the SI sessions.

Sciences - Biology

Only about 12% of eligible students attended the Biology SI sessions during the Spring 2009 and Summer 2009 semester. However there was significant difference in the percentage of students receiving an “ABC” or “DFW”. The SI Group reported (93% “ABC” rate and 7% “DFW” rate respectively) and the Non-SI Group reported (60%, 40% respectively).

Sciences- Chemistry

Thirty percent of the 45 Chemistry I students attended Chemistry SI sessions during the Spring 2009 semester. For the second year in a row we observed positive results for these SI sessions. Again there was also a positive difference in the number of students receiving “ABC” and “DFW” grades between the two groups. The Non-SI group had a 60% “DFW” rate while the SI group reported a 25% rate. The “ABC” rate for SI group was very encouraging; the Non-SI group had a 40% “ABC” rate while the SI group reported an “ABC” rate that continued to impress at 75%.

Sciences-Physical Science

About 20% of the Physical Science students regularly attended the Physical Science sessions. This group earned about a 67%. Of the non-SI 67 % of the students enrolled in the passed the course. This is an area where the instructors continue to request SI for the students.

Sciences-Physics I

Fifty percent of the students in this class attended SI. About 0% of those students received an “ABC” grade. 100% of these students received a “DFW”. 17 % of non-SI students passed this class. 83 % of non-SI students received either a “DFW” grade. This course will be addressed more aggressively during the upcoming semesters.

Sciences-Physics II

This course was implemented based on a request by the students. The students from this cohort were essentially the same students who requested SI during the previous year while enrolled in Physics I. The course is an extremely rigorous course. Approximately half of the 22 students regularly attended SI. Seventy percent of these students received an “ABC” grade in this class. Of the remaining students who did not attend SI 58% of these students received a “DFW” grade.

Mathematics-College Algebra

More than 200 College Algebra students were offered College Algebra SI during the Spring 2009 semester. In the previous year we reported only about 6% of the students attending the SI sessions. This year about 15% of the students attended the sessions. The SI group earned an 80% “ABC” grade rate compared to a 50% “ABC” grade rate for the Non-SI group.

Mathematics-Trigonometry

About 60% of those students enrolled in the course regularly attended SI sessions. Of that number 80% of them completed the course with an “ABC” grade compared to 50% of the Non-SI students. This made a very strong statement for the inclusion of SI in this course.

Mathematics-Calculus I

About 30% of the 17 students attended the SI sessions on a regular basis. Again this year these students did extremely well in this course. In fact all those who regularly attended SI sessions passed the class. The majority of them made either an A or B. The final SI/Non-SI passage rate in this course was 100% and 62% respectively.

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

The SABC & STEM Double Bridge is a collaborative 4-week residential Summer Bridge Program for 15 incoming freshmen who have expressed an interest in STEM disciplines. It is held on the LU campus during the months of June-July. Classroom lectures on STEM topics are rendered during the morning and research activities are held during the afternoons in laboratories or in the field. 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.

Twelve (12) students were selected to attend the 2009 SABC/STEM Double Bridge Program, held June 22-July 17, 2009. Seven participants were females, five were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

This summer’s program provided an excellent opportunity to roll out the department’s expanded “Technology in the Classroom” program (CPRL laboratory) and institute the CPRL teaching process in General Chemistry.

Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 120 % improvement based on Pre & Post assessments compared to an 85% improvement last year.

See more about CPR-L in Technology section.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium.

Bridge Director: Dr. John K. Coleman

Bridge Coordinator: Ms. I. B. Williams

Bridge Faculty: Mr. Anthony Hill, Dr. G. Naidoo, Dr. K. Matand, and Dr. W. Franks

Master High School attending: Ms. P. Anderson, Millwood High School

Counselors/Mentors: Karole Blythe, Brittanie Stoutermire, Kirk Braggs, and Tamar Torres

Participants attending Program: Shaffran Benton, Ashley Brown, August Brown, Marcell Bryant, Keiauna Clemons, Shaquantae Cotton, Kaiya Fletcher, Tony Griffin, Briana Morrow, Terrence Prince, Samantha Samuels, and Latonya Tolbert

Outstanding performers during the program were: **Chemistry:** Keiauna Clemons **Pre-Calculus:** August Brown & Shaffran Benton **CPR-L Presenter:** August Brown

The major components are:

1. **Selecting participants.** Early spring, notification by mail is sent to prospective students about the Summer Bridge program. Direct contacts are made through high school advisors/counselors and through visits by university faculty and past Summer Bridge participants. The applicants are screened and selected based on their interests and their academic performance in high school, including attention to all qualified underrepresented groups.
2. **Morning lectures.** Students attend academic lectures each morning. The lectures will cover a variety of topics, including current research projects conducted by faculty, modern research methods and techniques, university resources, campus life, and study methods. Faculty members with an interest in integrating research with curriculum are chosen to teach these morning sessions.
3. **Conducting research.** During the afternoons, each student joins a group of 5 to 6 students in a research lab or in the field. Faculty and student peer mentors lead the students in research projects covering a wide spectrum of STEM disciplines. Students learn the basic aspects of laboratory/field skills, literature search, data acquisition, and data analysis, while participating in cutting-edge research projects. At the end of the 4-week program, each student will present his or her findings to the entire student body of the Summer Bridge program.
4. **Incorporating high school STEM teachers.** A new component of the Summer Bridge program is the inclusion of a high school teacher. An experienced STEM teacher is selected from high schools in close proximity to each Summer Bridge campus. The teacher works alongside the Summer Bridge participants to gain research experience. The teacher serves as advisors to the Summer Bridge program. Research experiences gained by the teachers will be valuable for integration into the STEM curricula in their high school classrooms. They will be effective recruiters for the Summer Bridge students from high schools.

Mentoring

The Department of Chemistry spends a disproportionate amount of time working with its majors and non-chemistry major LINC students in order to influence them to pursue advanced degrees.

Langston's success at increasing the number of STEM graduates who elect to attend graduate school is due, in part, to the hands-on nurturing necessary to retain and influence program participants. Our faculty had to adjust to the reality of who our students and LINC scholars are, and what influences their behavior and decisions. Many are first generation college students who don't get a lot of encouragement from their family and friends to attend graduate school. Reaction from the home front is generally quite the opposite; they want their children to get a degree and go to work so they can help out financially. LU STEM faculty soon discovered that the role of motivator and source of inspiration and encouragement falls on them if the LU and NSF goals are to be achieved. Students do not easily or quickly comply with application deadlines, queries into graduate school, or research internship opportunities. They are not readily compliant with many other administrative duties that support success. When nurtured, however, their brilliance and capabilities become evident. Although faculty and staff might grumble that assisting these otherwise bright, talented young people should not be necessary, all realize that we are in the process of creating a mind shift – a process that requires patience, perseverance, and dedication.

LINC scholars serve as mentors and tutors in the following programs:

1. The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge
2. Supplemental Instruction (SI)

Faculty Development and Education

Two department faculty members served as presenter, grant readers or grant-writing mentor:

1. Dr. Sharon Lewis –(reader) AP Chemistry Reading , Education Testing Service (ETS), Lincoln, Nebraska
2. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2008.
3. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2009.
4. Dr. Sharon Lewis - OK-INBRE IDeA Program National Symposium, Washington, D.C. Poster Presentation: "Bioinformatics of Bipolar Disorder" August 6-8, 2008
5. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC December 1-2, 2008
6. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC April 1-2, 2009
7. Dr. Sharon Lewis: (Reader) AP Chemistry Reading, Education Testing Service (ETS), Lincoln, Nebraska, Lincoln, Nebraska June 11-19, 2009

Drs. Coleman and Lewis also participated in a number of industry conferences and meetings:

1. Developing Bioinformatics Programs Workshop, Pittsburgh Supercomputing Center, Carnegie Mellon University, Pittsburgh, PA July 13 - 25/2008 (S. Lewis)
2. Louis Stokes Alliance for Minority Participation Oklahoma State University, Stillwater, OK (September 20, 2008) (J. Coleman; S. Lewis)
3. ODOT/OTC Annual Research Symposium OKC, OK October 15, 2008 (S. Lewis)
4. NSF HBCU-UP National Convention – Atlanta, GA – October 23-26, 2008 (J. Coleman)

5. Seminar "Molecular Genetic Analysis of COMT in Bipolar Disorder", Tools and Technology Class, Pilot Project, University of Michigan Medical School, Ann Arbor October 22 – 27, 2008 (S. Lewis)
6. Oklahoma Research Day; University of Central OK Edmond, OK (November 30, 2008)(J. Coleman)
7. 66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA (J. Coleman & I. Williams)
8. National Center for Integrative Biomedical Informatics (NCIBI) Annual Research Meeting at the University of Michigan Medical School, Ann Arbor April 27-28, 2009 (S. Lewis)
9. Langston University Research Day – (May 1, 2009) (J. Coleman) & (S. Lewis)
10. Research Day and the OUHSC, OKC July 2008 & 2009

RESEARCH ACTIVITIES:

LINC Students and Faculty participated in RESEARCH activities during the reporting period.

Student Research was one of LINC's strategies to improve the retention rate of STEM students. Through this experiential learning, students were exposed to challenging and exciting applications of 'book learning'.

During the extension period of LINC, Phase I and beginning of the LINC Continuation period (Summer 2008), thirty seven (37) students participated in Summer Research activities at major U.S. institutions that include University of California at Berkley, Stanford University, Rice University, and three Oklahoma Universities that include Langston.

A. LINC Students:

Through LINC, the Department of Chemistry has impacted research and mentoring experiences, and access to graduate school, of all LU STEM majors for the past 6 years.

Over 180 LINC STEM students have received research internships at over 25 major universities throughout the U.S. Over 50 participated during the last two years.

This year, 30 STEM scholars presented their research findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 5 first place awards, 3 second place, 1 third place, and 1 Top Five oral winner.

First Place

Felicia Ekpo (NSF HBCU-UP National research Conference)
 Jamila Harris (NSF HBCU-UP National research Conference)
 Brittanie Atkinson (K-INBRE Symposium Kansas City, MO)
 Shabree Nichols (BKX/NIS National Research Conference)
 Shree McDaniels (OUHSC- Summer Undergraduate Program)

Second Place

Felicia Ekpo (BKX/NIS National Research Conference) –Beta Kappa Chi/National Institute of Science
Brittanie Atkinson (BKX/NIS National Research Conference)
Shree McDaniels (BKX/NIS National Research Conference)

Third Place

Samuel Henderson (BKX/NIS National Research Conference)

Top 5 Oral

Stacy Bean – top 5 Oral (K-INBRE Symposium Kansas City, MO)

Competitors at national events come from a field of 70 HBCU's. There are between 500 -700 attendees at each national event. Two national venues are highlighted below.

NSF HBCU-UP National Convention – Atlanta, GA – October 23-26, 2008

LU undergraduates have had five (5) national winners in oral and poster presentation competition at the NSF HBCU-UP National Research Conference over the last two years. This includes three (3) first place winners, one (1) second place and one (1) third place winner.

During each of the past two years, the HBCU-UP conference was held during LUs homecoming, which necessitated many students having to set aside activities and organizational obligations to participate at the conference. This year, 17 students, accompanied by two faculty advisors, (John K. Coleman & Cassandra Parker) took a one-stop flight via American Airlines to Atlanta, GA, to present the results of their 10-week summer research projects, conducted at various universities throughout the US. Although this year and last year's trips were bittersweet because homecoming events were sacrificed, LU students gave excellent presentations as they defended their findings in front of faculty judges. Their presentations earned them two (2) first place awards. The list of students attending and the students fortunate to be selected as winners are listed below. The picture of Jamila Harris (which appears on the NSF website) receiving her first place award at the convention is also included in the Appendix section. [Note: Brittanie Atkinson accepted the award for Jamila Harris who was not available at the moment of presentation]. Abstracts for all students are listed in the Appendix section of this report.

The 17 Students attending the NSF HBCU-UP National Convention, Atlanta, GA

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Kirk Braggs, Leethaniel Brumfield III, Kenta Caldwell, Dominick Crane, Felicia Ekpo, Jamila Harris, Alex Henderson, Rochelle Howard, Charles Loftis, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA: Hosted by Norfolk State University and Hampton University.

LU has had ten (10) national winners in oral and poster presentation competition at the Annual Joint Conference of Beta Kappa Chi and the National Institute of Science over the last two years. This includes three (3) first place winners, five (5) second place and two (2) third place winners. This year, 10 students, accompanied by two faculty advisors, (John K. Coleman & Irene Williams) boarded a one-stop American Airlines flight to Norfolk, VA (where they would present the results of their research work), intending to arrive in Norfolk, the day before competition. The first leg of the flight was delayed due to inclement weather, and upon arrival in Dallas-Ft.Worth, the group learned that the last flight to Norfolk, VA had already departed. The news got worse. The earliest flight the next morning would not arrive in time for the oral presenters to make their scheduled defense; however, the poster presenters could meet their schedule. The first inclination of the group was for some of them to return to Oklahoma; however, it was quickly realized that the Conference presented many more opportunities for the undergraduates as a whole. Many nationally renowned speakers would appear, many workshops were anticipated and many Industry and University vendors would be present to recruit for employees and potential scholarship awardees. The missed flight prompted a need to make alternate arrangements, including an unscheduled overnight stay in Dallas and rescheduling a flight from Dallas to Norfolk the following morning.

Meanwhile, Kendra Vann, another LU undergraduate participant had traveled a different route. She arrived in Norfolk on schedule, via Nashville, TN where her interview for graduate school at Vanderbilt University was held. Upon learning that her teammates were delayed in Dallas, she met with Conference officials at Norfolk, on behalf of the LU group, informing them of the adverse circumstances with travel. The intervention resulted in good news. The conference coordinators rescheduled the five oral presenters for a later time; however, the competition refereed by faculty judges would take place almost immediately upon the group's arrival at the convention from the airport.

Back in Dallas, the group was up most of the night cancelling and rescheduling activities and holding practice sessions. An early flight the next day was required in order to make the new presentation schedule. This group of students, although confronted with these unforeseen challenges, pulled together to garner one of their proudest moments as a group. They managed to overcome the woes and performed gallantly upon their arrival at the conference. They produced five (5) national winners; one of the largest amount of winners for any attending university and equaled only by the LU group the year before. Most conference attendees knew of the circumstances surrounding the Langston group's travel and they soon learned of the great sacrifice and commitment to task by the group. The list of students attending the conference and the fortunate winners are listed below. Research abstracts for all students are listed in the Appendix Section at the end of this report.

Students attending Norfolk Convention:

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Felicia Ekpo, Jamila Harris, Alex Henderson, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

Langston University also presents a venue that showcases students' research projects. The Department of Chemistry's LINC program was the 2009 program coordinator.

9th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, May 1, 2009

The LINC Program co-sponsored the 9th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on May 1, 2009. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally constructed the presentation display boards. The featured program speaker for the occasion was Steven A. Harris, a PhD candidate at the University of Oklahoma Department of Chemistry/Biochemistry, Norman, OK. Mr. Harris is also a LINC alum, as well as LU 2005, *summa cum laude*, graduate with a BS in Chemistry. He engaged symposium participants in a discussion on the *pros* and *cons* of continuing a graduate education. Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

This year's event displayed over thirty (30) projects which were viewed by 300 participants, including the university, President Dr. JoAnn W. Haysbert, and many high ranking Industry Officials. Faculty judges chose 3 winners in both oral and poster categories. **Winners from Oral Competition: First Place; Karole Blythe, Chemistry. Second Place; Brittanie Atkinson, Biology. Third Place; Felicia Ekpo, Biology. Winners from Poster Competition: First Place; Marshall Bailey, Biology. Second Place; Sheree McDaniels, Biology. Third Place; Shabree Nichols, Biology.**

Each student who participated in this year's summer research internships was required to write a report about their results. Abstracts on research projects are published at various events. Two (2) of these students received "second author" publication status based upon their summer research projects.

Charles Loftis¹, Dakshinamurthy Rajalingam², Jiashou J. Xu², and Thallapuram Krishnaswamy S. Kumar^{2*} **Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate**, ¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR, **Protein Science**.

Cheri Ognibene, S.A Lewis, Analysis of the Molecular Role of COMT in Bipolar Disorder Department of Chemistry, Langston University, Langston, OK., **Journal of Biotech Research**,

Note: Details on this year's participants, winners, publications, and venues where presentations took place are in the *Appendix section, Exhibit III. Exhibit III also includes LU winners featured on pages from*

the HBCU-Up National Research Conference website, and an official picture of First Place winner, Jamilia Harris. Research Abstracts are included as Exhibit IV.

Six LINC STEM graduates received full scholarships for Ph.D. programs. These were competitive awards wherein scholars had to pursue the positions, travelling to numerous locations for interviews with various institutions who indicated an interest in having them join their ranks.

1. Karole Blythe, chemistry - The University of Texas, Austin
2. Kendra Vann, chemistry - Vanderbilt University, Nashville
3. Felicia Ekpo, Biology – University of Arkansas-Fayetteville
4. Charles Loftis, chemistry –University of Wisconsin –Madison
5. Leethaniel Brumfield – North Carolina University – Chapel Hill
6. Brittanie Atkinson – Indiana University - Bloomington

B. Faculty Research and Publications

1. Dr. Sharon A. Lewis' research conducted at Langston University on the "Analysis of the Molecular Role of COMT in Bipolar Disorder". Results were published in the Journal of Biotech Research. Final Publication cataloging pending.
2. Dr. Sharon Lewis collaborated with Jackson State University and North Carolina Central University through the University of Michigan's National Center for Integrative Biomedical Informatics on a project titled, Genetic Predisposition to Co-Morbidity of Bipolar Disorder and Substance Abuse in African-American Women.
3. Dr. Sharon Lewis: Research project - Warm Mix Asphalt Research Chemical Characterization of Asphalt in collaboration with OU and OSU
4. For two consecutive years, Dr. Byron Quinn has been selected for research internship at University of California, Berkeley, CA. Two (2) LU students were also selected to work on research projects for summer 2009. Although not technically in the Chemistry department, Dr. Quinn's award is through a program that it directs – a NSF LINC Supplementary award.

Results from this activity yielded two papers by the students participants. The title of their papers are listed below. Dr. Bryon was able to solicit collaborative agreement with his mentor Dr. Paul Adams with the University of California, Berkely and submit a grant. The tile of the grant is also listed below.

Titles of student papers:

Amanda D. Steele¹, Nigel W. Moriarty², Enhancing the Assignment of Chemical Parameters for X-Ray Crystallography, ¹Department of Biology, Langston University, Langston, OK, ²Physical Biosciences Division at the Lawrence Berkeley National Laboratory

Brittanie Atkinson¹, Nigel W. Moriarty², Enhancing Automated Ligand Fitting: Reducing required time to identify & fit a ligand from a list of many possible ligands. ¹Department of Biology, Langston University, Langston, OK, ²Physical Biosciences Division at the Lawrence Berkeley National Laboratory.

Title of grant submitted by Dr. Bryron Quinn : MRI-R2:RUI:LIT: Acquisition of Automated Structural Biology Instrumentation