Evaluation of the Idaho, Nevada, and New Mexico NSF EPSCoR Track 2 Project

Q3 Formative Report

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Section 1. Executive Summary

1.1 Overview

From May June 2011, SmartStart Educational Consulting Services conducted a formative evaluation of the NSF Tri-state EPSCoR project. The focus of this quarter's evaluation is to identify activities that are being conducted and to assess the quality of those activities and the evaluation forms that are being used to evaluate them. The evaluation will also progress towards assessment of impact on project participants based on project goals. The primary goal and three objectives of the Track 2 EPSCoR project are:
Project Goal - Knowledge transfer

- Objective 1 - Connectivity
- Objective 2 - Interoperability
- Objective 3 - Cyberlearning

The following EPSCoR activities were conducted between May 21 and June 30, 2011. Evaluation results and/or evaluation forms of these project components are included in this Quarter 3 report:

- Nevada climate change and cyberlearning education materials development
- Tri-state CI Training opportunities
- New Mexico education materials development
- New Mexico Supercomputing Challenge
- New Mexico GUTS program
- Data portal survey results

1.2 Findings

The EPSCoR Track 2 project continues to make excellent progress. Eight people have joined the Nevada Education Materials Development team, including a climate education specialist from CAMeL. The CI trainings conducted at the Tri-state meeting received good or excellent ratings. The New Mexico education materials development continues to progress strongly with seven people currently working on the curriculum development team. The New Mexico Supercomputing Challenge added three new schools this year and now has a total of 5 schools involved in the SCC. The GUTS program also added three new middle schools this year and now has a total of 5 schools involved in the GUTS program. The majority of SCC and GUTS students are from underrepresented minority groups. Fourteen people have made 17 requests to place information in the Nevada and Idaho data portals.

The evaluator recommends that as educational materials are developed that they be aligned with state and national science and climate change standards and standardized tests. Continue to develop formative and summative evaluation plans and tools to track progress and success of the materials development programs. Advertise workshops and trainings as *introductory, intermediate,* and *advanced.* Conduct evaluations at the end of all trainings while all participants are present. Use a standardized evaluation form across all trainings that asks the same demographic questions and similar satisfaction and impact-related questions so comparisons can

be made across trainings. When programs involving students and teachers are conducted, annual participation and demographics should be collected and tracked. Formative (satisfaction) evaluations of trainings should be conducted. Summative evaluations to track the progress and success of the program should be developed and implemented. Fourteen out of 273 EPSCoR participants have completed data portal requests. It is unclear if this is a considered a small number of people or if it is a good number to start the data portal development. The evaluator will send the data portal requests to the interoperability lead and the state data portal coordinators. We will discuss the significance of this number and identify ways to increase awareness, understanding, and interest in development of data portals.

Section 2. Introduction

2.1 Background

Idaho, Nevada, and New Mexico NSF EPSCoR joined programs forming a consortium of EPSCoR states with similar research agendas related to climate change and water resources. The consortium model significantly increases opportunities for scientific collaboration and enhances each state's ability to secure competitive funding and tackle complex climate change research agendas. Program Leads, scientists and educators from the three states met in New Mexico, November, 2008 and Idaho, December, 2009, to create a coordinated Cyberinfrastructure (CI) research and development plan to serve both as a platform for future climate change research collaborations and the foundation for the EPSCoR NSF Track 2 RII.

The primary goal and three objectives of the Track 2 EPSCoR project are:

Project Goal - Knowledge transfer

The Track 2 project will promote knowledge transfer to scientists, educators, students, and citizens within and beyond the Consortium by enhancing state CI, and to enable the community science that is required to address regional to global scientific and societal challenges.

Objective 1 - Connectivity

Significant effort will focus on promoting communication and collaboration by improving connectivity infrastructure within the Consortium. Proposed and future Consortium efforts related to improving research competitiveness, STEM education, and economic development rely on this basic infrastructure.

Objective 2 - Interoperability

The Consortium will promote discovery by supporting community-based climate change science through enhanced interoperability between models and other software components, improved access to and usability of Consortium data products through the adoption of standards-based data management and access models, and new data assimilation, analysis, and visualization capabilities.

Objective 3 - Cyberlearning

The Consortium will enhance learning by focusing particularly on graduate student and postdoctoral researcher development; extending cyberenabled science education into middle and high schools and extracurricular programs; and improving outreach to business and industry

2.2 Quarter 3 Evaluation Components

The following Track 2 EPSCoR activities were conducted during Quarter 3. Evaluation results and/or evaluation forms of these project components are included in this Quarter 3 report:

- Nevada climate change and cyberlearning education materials development
- Tri-state CI Training opportunities
- New Mexico education materials development
- New Mexico Supercomputing Challenge
- New Mexico GUTS program
- Data portal survey results

Section 3. Evaluation Findings

3.1 Nevada climate change and cyberlearning education materials development

The purpose of the year two activities for Nevada Climate Change and Cyberlearning Education Materials Development (http://climatechange.education.unlv.edu/?q=node/153) entitled C4D is to build four cyberlearning curriculum modules to support a teacher professional development summer science institute. Nevada has hired a faculty collaborator (Schrader) and a graduate student for FY2 (Skaza). A project development leadership team has been created that includes faculty, students, and representation from the Curriculum and Professional Development Division (CPDD) of the Clark County School District. The leadership team has been meeting biweekly since January, 2011 to plan for the year two activities and since April 1, 2011, six teachers from four different high schools and two collaborators have been engaged in development activities. The C4D team is shown in Figure 1.

Figure 1. C4D materials development team

Name	Affiliation	Email
Nya Berry	Green Valley HS	nberry@interact.ccsd.net
Kris Carroll	CCSD-CPDD	kcarroll@interact.ccsd.net
Kent Crippen	UNLV	kcrippen@unlv.nevada.edu
Laura Doughty	West Career and Technical Academy	lldoughty@interact.ccsd.net
Stephanie Galka	Western HS	smgalka@interact.ccsd.net
Cindy Kern	Green Valley HS	clkern@inertact.ccsd.net
Tracy Morris	Palo Verde HS	tsmorris@interact.ccsd.net
Patricia Mynster	Content developer on the Climate Adaptation Mitigation e-Learning (CAMeL) grant awarded to the National Council on Science and the Environment's Council of Environmental Deans and Leads.	tmynster@hotmail.com
PG Schrader	UNLV	pg.schrader@unlv.edu
Heather Skaza	UNLV	hjskaza@hotmail.com
Ryan Zeedyk	Green Valley HS	rdzeedyk@interact.ccsd.net

The primary content developer, Patricia Mynster, is from the Climate, Adaptation, Mitigation, E-Learning (CAMeL) grant, a free online resource to pioneer undergraduate education on climate change causes, consequences, and solutions (http://www.eoearth.org/article/About_CAMEL?topic=49491). CAMeL is developing an extensive, high quality, vetted collection of climate related educational materials that incorporate a broad array of cyber content types. The goal of CAMeL is to provide the opportunity for every college student to become educated about climate change and the personal, professional, and societal options for meeting the major challenges posed by this urgent problem. CAMeL is created by the Council of Environmental Deans and Leads (CEDD) of the National Council for Science and the Environment (NCSE) and supported by a grant from the National Science Foundation, Division of Undergraduate Education (NSF GRANT 0950396).

For year two, the Nevada group will build four cyberlearning curriculum modules to support a teacher professional development summer science institute. The summer science institute is an annual offering by CPDD-CCSD. Climate change is the topic of the institute and CPDD anticipates approximately 50 middle and high school teachers will attend. Teachers are funded through CPDD and the primary activity is a fieldtrip experience to Death Valley, CA to study first-hand the historical impact of climate change on that region. The topics of the four modules are:

1. Earth - Geologic Time - Environment of Formation - Students examine how energy environments govern the type of rock formation and rock features indicate environment.
2. Earth - Continental Drift - Location of Formation - Students examine how the movement of continental plate can affect climate. (Insulation and albedo can affect changes in climate)
3. Regional - Cycles and Regional Environment of Formation- Students examine how small changes in environments can be recorded within the rock record (evaporatic rock systems, i.e. salt flats).
4. Local - Evidence of Environmental Changes with Climate - Students use the Pinnion-Juniper forest as a model for examining how the rate of climate change can be used to predict future environments (Death Valley).

According to the previous project lead (Crippen) and the current project lead (Schrader) a formative evaluation of the usefulness of materials and a summative evaluation of the impact of the materials for the participants of the summer institute has been planned (http://climatechange.education.unlv.edu/?q=node/136). Evaluation instruments and results are not yet available.

Commendations and recommendations

The project is commended for the development of new curriculum materials that inform and better prepare secondary school teachers in the climate change. It is important that curriculum is aligned with state and national science and climate change standards and standardized tests. To demonstrate this alignment, standards that are being addressed should be clearly stated in the description of each lesson. When materials are placed online they should be searchable by standard addressed and by topic.

It is recommended that the program lead continue to develop formative and summative evaluation plans and tools be developed and implemented to track the progress and success of the program. SmartStart will work with project coordinators to refine the evaluation plan. SmartStart will assist program leads in the survey development, conduct of the evaluation, and analysis of evaluation data. Results will be included in the quarterly SmartStart evaluation reports.

3.2 CyberInfrastructure (CI) Training Opportunities

Background

The purpose of the Cyberinfrastructure (CI) training opportunities grants is to offer and support CI training in computation and climate change to EPSCoR participants to broaden knowledge and perspectives on computation and climate change research. Faculty and students in the tri-states may apply for and receive funding to attend national workshops on computation and climate change. Seven different CI trainings were attended by approximately 25 EPSCoR participants during the final week of June and the first week of July. Evaluation forms have been sent to participants. Results from these trainings and the July/August trainings will be included in the Q4 report.

Workshops and trainings are also offered by EPSCoR participants at meetings conducted in Nevada, New Mexico, or Idaho. Two CI training workshops were conducted at the third annual Tri-State Consortium held in Santa Ana Pueblo, New Mexico April 6-8, 2011. The workshops were entitled *Climate Change and Climate Modeling* (Koracin) and *HIS* (Hydrologic Information System) (Ames). In addition to the Tri-state Meeting evaluation that was sent to all participants of the Tri-state Meeting, the online CI Training evaluation form was also sent to all individuals who registered to attend these workshops.

Participation and findings

Climate Change and Climate Modeling workshop

Fourty-one people registered to attend the Climate Modeling workshop (24 registered/17 waitlist). Twenty-two people completed this section of the Tri-state Meeting evaluation form and seven people returned the CI Training evaluation form (one faculty, three postdocs, and three graduate students). It is unclear if the same or different people completed these forms. Demographic information was not collected. Results from both evaluations are reported in Figure 2. Results from the Tri-state meeting evaluation form were also reported in the Q2 evaluation report.

Figure 2. Climate Change and Climate Modeling workshop results

Climate Change and Climate Modeling workshop	
Tri-state meeting evaluation results (n=22)	
Ratings of meeting (rating scale was from 1-5, 1-lowest, 5=highest)	
Overall rating	3.78
Workshop content	2.27
Workshop pace	2.64
Overall Quality	3.45
Likelihood of Recommendation	3.32
Tri-state meeting evaluation comments: • *The climate workshop was good, but geared more towards a relatively nascent audience. I highly recommend it to anyone with little knowledge of climate science, but would not recommend it for people looking for a higher level of discussion.* • *Liked most: Background information on climate modeling.* • *I thought we would get a tutorial in how to use EdGCM to develop new scenarios. It seems like EdGCM is a great program with lots of applications but almost no time was spent on this. We could have split into groups and each group come up with a lesson plan, or a new scenario to run. Next time: less talking, more doing.*	
CI Training evaluation form results (n=7)	
Increased scientific capabilities?	Exceeded my expectations (1) Met my expectations (4) Did not meet my expectations (2)
Increased CI-literacy?	Exceeded my expectations (1) Met my expectations (4) Did not meet my expectations (2)
How has this training increased your CI-literacy (awareness, skills and knowledge) • *I will use some of the tools in my courses.*	
Will this training enhance your ability to conduct research in your scientific field? • *Yes. Learning about the process of climate modeling is important put my studies in context.* • *Perhaps. It certainly gave me more confidence in downloading climate data (at NARR, PRISM, etc.) and knowing how to handle it and use it.* • *This was an interesting course; however, it was quite superficial and left behind or didn't cover in detail important topics. Moreover, the modeling exercise was not properly supervised and became useless.* • *No; I was expecting more hands-on practice with a climate model, for instance, deciding which sets of forcings to use for particular purposes when setting up a run.* • *No, because this training focused on the basics of climate science and modeling, which I already understood very well.*	
How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines? • *The most useful aspect of this training to me was to provide me with materials for classroom/lab instruction (for example, for modules of current classes or for an upcoming class I'm developing called Plant Ecology and Climate Change* • *I now better understand how climate models are created and used.*	

Climate Change and Climate Modeling workshop
CI Training evaluation form results (n=7) (continued)
Additional comments: *This workshop seemed a bit disorganized. The introductory material was interesting and probably necessary, but was presented at a lower level than I was expecting. The hands-on portion, rather than developing my abilities to set up and run a climate model, simply involved mostly individual work plotting the results of a run we had done ahead of time based on a set of presets. I understand based on the time constraints why the run was done ahead of time, but some discussion of how the preset scenarios were constructed, i.e., why specific choices were made in forcing sequences and boundary conditions, would have been more informative.*

HIS workshop

Fourty-three people registered to attend the HIS workshop (24 registered/19 waitlist). Sixteen people completed this section of the Tri-state Meeting evaluation form and six people returned the CI Training evaluation form (one faculty, four graduate students, and one undergraduate student). It is unclear if the same or different people completed these forms. Demographic information was not collected. Results from both evaluations are reported in Figure 3. Results from the Tri-state meeting evaluation form were also reported in the Q2 evaluation report.

Figure 3. HIS workshop results

HIS workshop	
Tri-state meeting evaluation results (n=16)	
Ratings of meeting (rating scale was from 1-5, 1-lowest, 5=highest)	
Overall rating	4.36
Workshop content	3.00
Workshop pace	2.88
Overall Quality	4.38
Likelihood of Recommendation	4.38
Tri-state meeting evaluation comments: • *I especially liked Dan Ames' session on HIS.* • *Dan Ames and his group did a very good job with his HIS session.* • *HIS seems to be standalone efforts that are not integrated into Epscor efforts.* • *I like HIS most (3) really a good effort to make hydrologic dataset easier.* • *HIS HydroDesktop workshop was truly useful, getting hands-on*	

HIS workshop (continued)	
CI Training evaluation form results (n=6)	
Increased scientific capabilities?	Exceeded my expectations (2) Met my expectations (4)
Increased CI-literacy?	Exceeded my expectations (2) Met my expectations (4)

How has this training increased your CI-literacy (awareness, skills and knowledge)

- *I get a better idea of what the other CI components are doing.*
- *Having hands-on experience of the tool was very useful in understanding how researchers would use such tools. This gives me idea of how scientific tool should be designed and developed. This training provided insights on communities about software developers and also scientific researchers sharing data.*
- *Awareness of the system, an introduction to its applications, and contacts made were three most enriching facets of the workshop.*
- *It helped me understand set of problems researchers are facing related to CI and how it can take majority of their research time. My focus will be to help them with the data handling, processing and all other activities to speed up overall research process for faster results.*

Will this training enhance your ability to conduct research in your scientific field?

- *Yes. I have a better understanding of which services to implement in the software framework being developed here.*
- *This training provided overview, tutorial, and advanced features of HydroDesktop tool, in which I can utilize to access large amount of data with advanced filtering. It will be very useful and valuable when the research involves analysis of hydrological data.*
- *The resource outlined in this course will be invaluable to me. I am modeling storm surge depth, and rainfall runoff and streamflow data will be important components. Also, I have brought the HIS database to the attention of my mentor, and another researcher that could possibly exploit the resource.*

How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines?

- *Dr. Dan Ames and other presenters demonstrated the potential of advanced analysis, for example, using different types of data within the same region. The tool is also integrated with mapping and reporting capabilities, which makes it a very powerful tool for researchers in hydrology and climate change.*
- *Awareness of the existence of the database and server/client software as it might be applied to my study was paramount. Gaining some familiarity with the client software was useful. I received enough rudimentary training, and access to contacts, to be able to potentially utilize this valuable resource in my work modeling sea-level rise, storm-surge depth, and vulnerability of critical infrastructure to disasters enhanced by climate change.*
- *It did not increase my awareness much. I was already aware of most of the content covered.*

CI Training evaluation form results (n=6) (continued)

Additional comments:

- *This training was truly an invaluable opportunity for me to understand the importance of such a powerful scientific tool, and the complexity of its development. In addition, it was a great opportunity to understand how researchers can share data to grow scientific community, and the potential application of using such data.*
- *Though it does not apply specifically to the workshop, I should convey my sincere thanks to EPSCoR and NSF for the opportunity, through funding and outreach, to assist in pertinent and valuable research under Dr. Tim Frazier, my gracious mentor. This opportunity has altered and enriched the course of my education, and my life. It would be difficult to overstate my gratitude and respect for the professionalism and personal attention of the EPSCoR staff at University of Idaho. Thank you for unlocking the potential my inspiration might achieve! I intend to move into graduate research because of the experience of my REU.*

Commendations and recommendations

The project is commended for the supporting EPSCoR participants' development through CI training opportunities in two very cutting-edge areas of scientific research.

The Climate modeling workshop was rated somewhat lower than the HIS workshop because participants expected to have the opportunity to have more advanced information and hands-on practice with a climate model. It is recommended that designations such *as introductory, intermediate,* and *advanced* be developed and assigned to all CI trainings and listed on flyers, websites, and other advertising material.

Two different evaluations were conducted (one on the tri-state meeting evaluation form and another on the CI training evaluation form). Neither contained specific demographic information of participants. Additionally, not all workshop participants completed evaluation forms. It is recommended that at future tri-state meetings a CI Training evaluation form be distributed and collected at the end of the CI Training workshops while all participants are present. In addition, a more detailed evaluation tool should be developed to track the impact of the CI training opportunities on participants. SmartStart will work with program leads to develop more detailed demographic and survey items to assess the usefulness, quality, and impact of CI training opportunities.

3.3 New Mexico education materials development

Background

The main goals of the New Mexico educational materials development are to develop middle and high school curricula relating to climate change, water resources, and the science, technology, engineering and math (STEM) pipeline that prepares students for studying those areas and to distribute those materials around the state.

Participants

The primary participants are five New Mexico Institute of Mining and Technology also called New Mexico Tech (NMT) Masters of Science Teaching (MST) students. These students are all professional teachers of middle and high school students working towards a Master's degree in teaching. As a culmination of their work at NMT, students create a science-based curriculum. Project coordinators work with the MST students interested in developing EPSCoR-related curricula. Students start their Independent Studies to develop the curriculum at various times throughout the year and usually take about a year to complete them. Figure 4 shows the current NMT materials development team. This figure will be augmented each time progress on the New Mexico educational materials development is reported to show development over time.

Figure 4. NMT materials development team.

Name	Position	Email
Theresa Apodaca	MST student at NMT	tapodaca@socorro.k12.nm.us
George Becker	NMT administrator of MST program	becker@cs.nmt.edu
Jerry Esquivel	MST student at NMT	jlesquivel@cepinm.org
Leigh Hedderman	MST student at NMT	leigh.hedderman@gmail.com
Lorie Liebrock	NMT computer science faculty	liebrock@cs.nmt.edu
Nico Marrero	NMT computer science staff	nicomarrero@gmail.com
Holmen, Martha	MST student at NMT	mvholmen@gmail.com
Ashley Ivins	MST student at NMT	nmcanchaser@gmail.com
Margaret Lewis	MST student at NMT	mlewis34@hotmail.com
Valerie Salas	MST student at NMT	v_salas@yahoo.com

Findings

Currently, the curricula are discussed between the students and EPSCoR staff. Guidance is provided in choosing projects that align with the students' interests and EPSCoR goals and during development of the materials to ensure they will be ready for distribution. The MST students are using the curriculum with their students. There is not currently a formal assessment of the curriculum materials. The project lead stated that some of the MST students have used the curriculum and assessed results with their students, however, most students have not yet completed their curriculum development, but many are slated to finish by the end of summer 2011.

Commendations and recommendations

The project is commended for the development of new curriculum materials that better prepare middle and high school students in the STEM areas. It is important that curriculum is aligned with New Mexico and national science and climate change standards and standardized tests. To demonstrate this alignment, standards that are being addressed should be clearly stated in the description of each lesson. When materials are placed online they should be searchable by standard addressed and by topic.

It is recommended that formative and summative evaluation plans and tools be developed and implemented to track the progress and success of the program. SmartStart will work with project coordinators to develop an evaluation plan. The plan may include post-surveys for the MSTs as well as pre/post surveys for the students being taught the new curriculum. SmartStart will assist program leads in the survey development, conduct of the evaluation, and analysis of evaluation data. Results will be included in the quarterly SmartStart evaluation reports.

3.4 New Mexico Supercomputing Challenge

Background

The main goals of this Supercomputing Challenge program (www.challenge.nm.org/) are to teach teams of middle and high schools students how to use powerful computers to analyze, model and solve real-world problems and to teach computational thinking in science and engineering to high school students. The teams have mentors that provide support and answer questions for them throughout the year.

There are a variety of different activities throughout the year in which the teams or their teachers participate, including:

- Summer Teacher's Institute - teachers are taught computer modeling and how to help their students with their modeling projects
- Summer Roundups - workshops are given locally for teams and teachers on an as-needed basis. These workshops teach computer modeling, how the challenge works, and other materials to both students and teachers.
- Kickoff - teams have introductory classes on modeling, data analysis, and other topics related to the SCC
- Proposals - teams write a proposal for a project that is reviewed and commented on by members of industry and academia
- Interim Reports and Evaluations - teams write up their progress about halfway through the year. The teams travel to a college near them and present their current work. These presentations and reports are also reviewed and commented on by members of industry and academia and suggestions are given to help the teams and/or their projects and point out areas to focus on to help them complete their projects
- Final Reports - teams write up a final report at the end of the year. The final reports are judged to determine finalists but feedback is given to all the teams.

- Expo - the culmination of the year - teams presents their work to panels of judges and receives feedback on their presentations and reports. Awards, scholarships, and prizes are given to many different teams, not just the winners.

SCC is a year-round program, which begins in the summer with the Summer Teachers Institute for teachers and continues through the Expo, which concludes the activities for the year, usually in late April. STI & Kickoff are at conducted at NMT, Interims are done at a college local to the team, and the Expo is at Los Alamos National Lab (LANL).

Participants

Primary participants are high school students, their teachers, and volunteers from academia and industry. In previous project years two schools, Edgewood and Quemado, have participated in SCC. The teachers are leaders in the new Computer Science Teachers Association NM chapter. A third school, Deming, was not able to get a high school team to participate in the SCC this year. The teacher is pursuing a middle school SCC team in Deming as well as working with middle and high school teams in Hatch.

During the 2010-11 project year, NM EPSCoR funded three new teams in the Supercomputing Challenge (SCC). These three teams were from schools in Bernalillo, Albuquerque, and Picacho. EPSCoR funding allowed these schools to start their first SCC teams; send teachers to the Summer Teachers' Institute (STI), which involved professional teacher development in computer modeling and project-based learning so the teachers can support a challenge team for the coming year; host a Summer Roundup, if necessary, which allows teachers who are unable to attend STI to receive the same professional development and send teachers and students to the Kickoff, where the students receive instruction in programming, data analysis, and the chosen SCC topic for the year (in this case, climate change). In the Kickoff this year, Lorie Liebrock presented a session instructing students in visualization and data analysis using tools and data from NMT's EPSCoR website. EPSCoR funding also enables outreach, where consultants visit the students and their teachers to assist students with their projects and provide coaching for teachers; send the team to mid-year evaluations, where they present their work-in-progress to judges and receive feedback and assistance in how to complete their projects by the end of the year; and, at the end of the year, send the team to the SCC Expo, where the students present their finished work to judges and students are given prizes, scholarships, and awards for their work. For the April 2011 Expo and Awards Ceremony, there were 15 volunteers from academia and 122 from industry (95 of those from the LANL, where the Expo is conducted). Middle school and a few elementary school student teams participate as well. The winning team this year modeled the effect of dark matter on galaxy rotation and made good use of parallel processing to simulate and visualizations to illustrate their results, resulting in their winning the *Parallel Processing* and *Best Use of Visualization* awards as well.

Figure 5 shows the newly funded 2010-11 Supercomputing Challenge teams. This figure will be augmented each project year to show development over time.

Figure 5. Newly funded 2010-11 Supercomputing Challenge teams

	Total number of participants	Male		Female		With disability
		URM	Non-URM	URM	Non-URM	
Spring 2011						
Bernalillo	6	1	1	3	1	0
Albuquerque/CEP1	13	4	1	8	0	0
Picacho	26	17	1	8	0	0
Total	**45**	**22**	**3**	**19**	**1**	**0**

Findings

Formative and summative assessments are not currently being conducted. Success is measured by teams completing the challenge, continuing from one year to the next, and by improvement in their projects.
Specific ethnicities, grade levels, grade point averages, etc. of students is not collected.
Demographic information on teachers and volunteers from academia and industry is not collected.

Commendations and recommendations

The New Mexico SCC is commended for developing a project for middle and high school students that allows them to use computational thinking and computers analyze, model and solve real-world problems.

It is recommended that annual participation and demographics of students, and volunteers from academia and industry be collected and tracked. In addition, formative evaluations of the Summer Teacher's Institute, Summer Roundups, Kickoff, and the Expo should be developed and conducted. Summative evaluations to track the progress and success of the program should be developed and implemented.

SmartStart will work with project coordinators to create an evaluation plan. The plan will include development of evaluation instruments such as pre- and post-surveys to be given to both student and teacher participants of the Supercomputing Challenge to assess the usefulness and success of the SCC project components. It would also be beneficial to run a basic qualitative analysis on proposals, interim, and final reports written by students to identify indicators of impact. SmartStart will assist in the conduct of the evaluation and assist in the analysis of evaluation data. Results will be included in the quarterly SmartStart evaluation reports.

3.5 New Mexico GUTS program

Background

Growing up thinking scientifically (GUTS) means learning to look at the world and ask questions, develop answers to the questions through scientific inquiry, and design solutions to their problems (www.projectguts.org). It is a summer and after-school science, technology, engineering and math (STEM) program for middle school students. It was designed to be a feeder program for the Supercomputing Challenge.

Participants

Primary participants are middle school students, their teachers, and volunteers from academia and industry. Teachers form the clubs at their schools and interested students join. The EPSCoR-supported teams have 25, 30, and 11 students. Project GUTS is a year-round program. Teachers attend the Summer Teacher's Institute and Roundtables that are conducted at the end of each semester in which teams present and discuss their work. The program culminates with the teams attending the Supercomputing Challenge Expo.

Project GUTS clubs of two schools in Artesia and Las Vegas received NM EPSCoR startup funding during the 2009-10 project year, and have continued to participate in Project GUTS this year.

During the 2010-11 project year, NM EPSCoR funded three new Project GUTS teams. These three teams were from schools in Rio Rancho, Gadsden, and Las Cruces. EPSCoR funding allowed these schools to start their Project GUTS clubs; send teachers to the SCC Summer Teachers' Institute and other professional development workshops throughout the year; have Project GUTS facilitators visit the schools throughout the year to help teachers with further professional development and students with project development, computer modeling, and programming; and fund the two 10-week units for Project GUTS as well as two fieldtrips, two roundtables, and the necessary supplies and club materials.

Figure 6 shows the newly funded 2010-11 GUTS teams. This figure will be augmented each project year to show development over time.

Figure 6. Newly funded 2010-11 GUTS teams

	Total number of participants	Male		Female		With disability
		URM	Non-URM	URM	Non-URM	
Spring 2011						
Rio Rancho/Eagle Ridge MS	25	9	8	4	4	0
Gadsden/Gadsden MS	30	16	2	11	1	0
Las Cruces/Lynn MS	11	10	1	0	0	0
Total	**66**	**35**	**11**	**15**	**5**	**0**

Findings

Formative and summative assessments are not currently being conducted. Specific ethnicities, grade levels, grade point averages, etc. of students is not collected. Demographic information on teachers and volunteers from academia and industry is not collected.

Commendations and recommendations

The New Mexico GUTS is commended for developing a project for middle school students that allows them to use computational thinking and computers analyze, model and solve real-world problems.

It is recommended that annual participation and demographics of students, and volunteers from academia and industry be collected and tracked. In addition, formative evaluations of the Summer Teacher's Institute, Expo, and other events that teachers and/or students attend should be developed and conducted. Summative evaluations to track the progress and success of the program should be developed and implemented.

SmartStart will work with project coordinators to create an evaluation plan. The plan will include development of evaluation instruments such as pre- and post-surveys to be given to both student and teacher participants of Project GUTS to assess the usefulness and success of project components. SmartStart will assist in the conduct of the evaluation and assist in the analysis of evaluation data. Results will be included in the quarterly SmartStart evaluation reports.

3.6 Data Portal Survey Results

The data portal survey was developed by the Interoperability Component Lead (Karl Benedict) and the evaluator. It is a digital version of the paper spreadsheet that was distributed on the last morning of the 2011 Tri-State meeting in Santa Ana Pueblo, New Mexico. The purpose of the survey is to collect, in a common format, the information that is needed by all three states to plan for, and initiate movement of data into the Cyberinfrastructure that is being developed in each state. The inventory is being built to allow each of the states to have a common knowledge base about the data that is anticipated for delivery through each state's data portal. The data portal survey will collect the same information across all three states in lieu of each state developing their own inventory through separate surveys. Each state will make their own use of the results of the survey information as it fits with their specific state's data ingest and processing plan.

In May 2011 the data portal survey (Appendix B) was emailed to 273 EPSCoR Tri-state participants. Three reminders were sent to ask participants to provide data portal requests. They were asked to complete the survey a separate time for each data set. Results of the data portal survey are shown in Figure 7. Fourteen people completed 17 requests. Eleven requests (65%) came from Idaho participants, six (35%) from Nevada participants, and none from New Mexico participants. Names of respondents are included in this data so the Interoperability Component Lead can follow-up with additional questions if necessary. These results will be shared with the individuals in charge developing the data portal in Nevada, Idaho, and New Mexico.

Figure 7. Data portal survey results

Name	E-mail address	Data type	Data Format	Number of files of this type	Projected number of data products of this type you expect to produce	Current storage volume (GB) of the data products of this type?	Project storage volume (GB) of data products of this type?	Do you have metadata for these data? If so, in what format?
Idaho								
Ping Yang	yangping@isu.edu	LiDAR	LAS	500	no	600	600	FGDC - XML
Ben Bright	brig2116@vandals.uidaho.edu	LiDAR	LAS	142 raw LAS files	I will produce 10+ data products	5 GB of data products; 20 GB of raw data	5 GB of data products; 20 GB of raw data	No metadata
Ben Bright	brig2116@vandals.uidaho.edu	Remote sensing (aerial or space-borne)	GeoTIFF	142 raw TIFF files	1 ENVI file	0.5 GB; 20 GB of raw data	0.5 GB; 20 GB of raw data	No metadata
Ping Yang	yangping@isu.edu	Model outputs (gridded time-series or single)	GeoTIFF	15	no	3	3	No metadata
Jae Ryu	jryu@uidaho.edu	Point-Time Series or single Observations/measurements	ASCII/Unicode - Comma-separated values (CSV)	97	More than 1000	1 GB	10 GB	Will be provided in XML format
Benjamin Crosby	crosby@isu.edu	Point-Time Series or single Observations/measurements	HIS WML format	12 sites, 3 years data, 3 parameters	16 sites, 5 years of data, 30 minute freq., 3-4 parameters,	0.1 GB	0.5 GB	HIS WML
Michael Frey	freymich@isu.edu	GIS data	ESRI Shapefile	25	30	3GB	5 GB	FGDC - XML
Danny Marks	ars.danny@gmail.com	All of the above	we have data in ascii, binary image format, and as shapefiles;	between 5,000,000 and 10,000,000 images	5 - 10 times that number	3,000 -4,000 Gbytes (3-4 Tbytes)	15,000 - 35,000 Gbytes (15 - 35 Tbytes)	ascii files, associated with each image
Nancy Glenn	glennanc@isu.edu	both LiDAR, aerial/spaceborne	both LAS, GeoTIFF	100	50	300 GB	500 GB	No metadata

Name	E-mail address	Data type	Data Format	Number of files of this type	Projected number of data products of this type you expect to produce	Current storage volume (GB) of the data products of this type?	Project storage volume (GB) of data products of this type?	Do you have metadata for these data? If so, in what format?
John Abatzoglou	jabatzoglou@uidaho.edu	Model outputs (gridded time-series or single)	NetCDF	approximately 480	1000+	1000	2000	Netcdf metadata
Bill Ebener	bebener@csi.edu	Educational Outreach Learning Objects	MS Access relational database	unknown	unknown	unknown	unknown	No metadata
Nevada								
Subhashree Mishra	smishra@dri.edu	Data from Aircraft probes	ASCII/Unicode - Tab-separated values	Over 200	300	10GB	15GB	No metadata
Sarah Karam	sganschow@cabnr.unr.edu	Area-Time Series or single Observations/measurements	ASCII/Unicode - Comma-separated values (CSV)	56	96	106.4	182.4	No metadata
Sarah Karam	sganschow@cabnr.unr.edu	Remote sensing (aerial or space-borne)	ESRI Shapefile	3	7	0.5	1.1	FGDC - XML
E. Michael Nussbaum	nussbaum@unlv.nevada.edu	Educational Game (Losing the Lake) Weblink	html	1	1	not applicable	not applicable	No metadata
E. Michael Nussbaum	nussbaum@unlv.nevada.edu	Documents	Word Processor	1	1	0.00005	0.00005	No metadata
Lynn Fenstermaker	lynn.fenstermaker@dri.edu	Remote sensing (aerial or space-borne)	ENVI image file (and raw EROS-DC files)	180 raw Landsat TM scenes and 180 processed data	Approx 250 raw and 250 processed image files	254 GB	Approx 500 GB	Limited metadata in excel file

Section 4. Commendations and Recommendations for the Track 2 EPSCoR Project

Based on the results of this evaluation the following commendations and recommendations for the Track 2 EPSCoR project have been identified.

4.1 Commendations

The EPSCoR Track 2 project continues to make excellent progress. Eight people have joined the Nevada Education Materials Development team, including a climate education specialist from CAMeL. The CI trainings conducted at the Tri-state meeting received good or excellent ratings. In reference to the HIS workshop, one participant stated, *The resource outlined in this course will be invaluable to me.* The New Mexico education materials development continues to progress strongly with seven people currently working on the curriculum development team. The New Mexico Supercomputing Challenge added three new schools this year (45 students) and now have a total of 5 schools involved in the SCC. The GUTS program also added three new middle schools this year (66 students) and now has a total of 5 schools involved in the GUTS program. The majority of SCC and GUTS students are from underrepresented minority groups. Fourteen people have made 17 requests to place information in the Nevada and Idaho data portals.

4.2 Recommendations

1. The evaluator has made recommendations pertaining to each of the programs that were assessed in this Q3 report (pages 5, 10, 12, 14, and 16). A summary of these recommendations is listed below:

Educational Materials Development programs:
Align curriculum with state and national science and climate change standards and standardized tests. To demonstrate this alignment, standards that are being addressed should be clearly stated in the description of each lesson. When materials are placed online they should be searchable by standard addressed and by topic.
Continue to develop formative and summative evaluation plans and tools to track progress and success of the program. SmartStart will work with project coordinators to refine the evaluation plan. SmartStart will assist program leads in the survey development, conduct of the evaluation, and analysis of evaluation data.

Workshops and trainings
Advertise trainings as *introductory, intermediate,* and *advanced.* Conduct evaluations at the end of all trainings while all participants are present. Use a standardized evaluation form across all trainings that asks the same demographic questions and similar satisfaction and impact-related questions so comparisons can be made across trainings. SmartStart will work with program leads to develop standardized evaluation forms.

Programs involving students and teachers

Annual participation and demographics of students, teachers and volunteers should be collected and tracked. Formative (satisfaction) evaluations of trainings should be conducted. Summative evaluations to track the progress and success of the program should be developed and implemented. SmartStart will work with project coordinators to create an evaluation plan that will include development of evaluation instruments, assistance in the conduct of the evaluation and assistance with analysis of evaluation data.

2. Data Portal Requests

Fourteen out of 273 EPSCoR participants have completed data portal requests. It is unclear if this is a considered a small number of people or if it is a good number to start the data portal development. The evaluator will send the data portal requests to the interoperability lead and the state data portal coordinators. We will discuss the significance of this number and identify ways to increase awareness, understanding, and interest in development of data portals.

Appendix A: CI Training Opportunities Evaluation Form

Idaho, Nevada and New Mexico EPSCoR CI Post Training Survey

1. Your name:_____

2. Which Training did you attend?

   _____

3. Please list the dates you attended the training_____

4. Which are you?

   O Faculty

   O Post-doc

   O Graduate student - Masters

   O Graduate student – Ph.D.

   O Undergraduate student

5. To what degree did this training meet your expectations for increasing your scientific capabilities?

   _____Far exceeded my expectations

   _____Exceeded my expectations

   _____Met my expectations

   _____Did not meet my expectations

   _____N/A

6. To what degree did this training meet your expectations for increasing your CI-literacy?

   _____Far exceeded my expectations

   _____Exceeded my expectations

   _____Met my expectations

   _____ Did not meet my expectations

7. Will this training enhance your ability to conduct research in your scientific field? Please explain.

8. Briefly describe how this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines (if applicable).

9. Briefly describe how this training increased your CI-literacy (awareness, skills and knowledge).

10. Was the application review and award process timely?

11. Comments

Appendix B: Data Portal Survey

2011 EPSCoR Track 2 Data Portal Survey

Page 1 - Question 1 - Choice - One Answer (Bullets) [Mandatory]

What state are you in?

- ○ Nevada
- ○ New Mexico
- ○ Idaho

Page 1 - Question 2 - Open Ended - One Line [Mandatory]

What is your name?

Page 1 - Question 3 - Open Ended - One Line [Mandatory]

What is your primary e-mail address?

Page 1 - Question 4 - Choice - One Answer (Bullets) [Mandatory]

What type of data do you have?

- ○ Point-Time Series or single Observations/measurements
- ○ Area-Time Series or single Observations/measurements
- ○ Model outputs (point-time series or single values)
- ○ Model outputs (area-time series or single values)
- ○ Model outputs (gridded time-series or single)
- ○ Remote sensing (aerial or space-borne)
- ○ GIS data
- ○ LiDAR
- ○ Documents
- ○ Other, please specify

Page 1 - Question 5 - Choice - One Answer (Bullets) [Mandatory]

What is the format of the data?

- ○ ESRI Shapefile
- ○ NetCDF
- ○ GeoTIFF
- ○ HDF
- ○ LAS
- ○ ASCII/Unicode - Comma-separated values (CSV)
- ○ ASCiI/Unicode - Tab-separated values
- ○ ASCII/Unicode - XML
- ○ ASCII/Unicode - other
- ○ Excel
- ○ Word Processor
- ○ PDF
- ○ Other, please specify

Page 1 - Question 6 - Open Ended - One Line [Mandatory]

What is the current number of files of this type in your collection?

Page 1 - Question 7 - Open Ended - One Line [Mandatory]

What is the projected number of data products of this type that you expect to produce by the end of the EPSCoR project(s)?

Page 1 - Question 8 - Open Ended - One Line [Mandatory]

What is the current storage volume (GB) of the data products of this type?

Page 1 - Question 9 - Open Ended - One Line [Mandatory]

What is the project storage volume (GB) of the data products of this type?

Page 1 - Question 10 - Choice - One Answer (Bullets) [Mandatory]

Do you already have metadata for these data? If so, in what format?

- ○ No metadata
- ○ FGDC - XML
- ○ FGDC - Other
- ○ ISO 19115 - XML
- ○ EML
- ○ Dublin Core
- ○ Darwin Core
- ○ Other, please specify

Thank you for sending your data set information.
If you have any questions about the Tri-state Data Portal please contact:

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kbene@edac.unm.edu
(505) 277-3622