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

Q4 Annual Report

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Section 1. Executive Summary

1.1 Overview

From June to August 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 and objectives.
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

Evaluation results of the following EPSCoR activities that were conducted during Quarter 4 are included in this report:

- Idaho Cyberlearning educational materials development
- Idaho McCall Outdoor Science School (MOSS) summer institute
- Nevada summer science institute for teachers
- New Mexico SCC/GUTS student programs
- New Mexico SCC/GUTS summer teacher institute
- Tri-state Educational Materials Development programs
- Tri-state Interoperability component evaluation
- Tri-state Cyberinfrastructure (CI) Training opportunities
- Impacts survey results
- Video interviews and testimonials

1.2 Findings

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

Participants in most project activities are primarily male and Caucasian. Continue to work towards involving more females and underrepresented minorities. The evaluator will research demographics of participant pools (faculty, graduate/undergraduate students, and K-12 teachers) to identify reasonable targets and will include comparison data in future reports.

Program participants assigned high ratings to program components and made useful suggestions for improvement. Review participants' ratings and suggestions as well as the evaluators' recommendations to improve each program. The evaluator will work with program leaders to implement recommendations; however it would be beneficial if program directors could access the quarterly evaluation reports and read the sections of the reports that pertain to their programs. Consider designating a page on the Tri-State EPSCoR website to post evaluation results. Consider

also posting other reports, plans, and project documents so EPSCoR participants can have easy access to all documents pertaining to this EPSCoR project.

Significant progress has been made in developing a plan to identify and record impacts of this Tri-state EPSCoR project. Leadership team members and participants have begun to consider impacts this project is having on participants, institutions, and the community. An impacts matrix and survey has been developed, the survey was piloted with EPSCoR participants, results were analyzed and findings will guide future data collection and analyses of impacts. *Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access* was found to be the most influential activity in achieving the Track 2 EPSCoR short term outcomes. Very few respondents noted achievements in the short-term outcome area of *increased and improved business development*. The evaluator reviewed the Track 2 documents regarding the short-term goal of improving business development. In the Track 2 evaluation plan this is presented as "improve outreach to business and industry."
The evaluator will continue to develop and improve metrics to measure impacts of this project and will work with leadership team members to expand the list of EPSCoR /outputs accomplishments. The evaluator recommends that project leaders continue to have conversations about how outputs lead to short and long-term impacts. It would also be beneficial to clarify the role that improved outreach to business and industry can play in reaching short and long-term outcomes. Conversations may include clarification and examples of why outreach to business and industry is important and how partnerships can be developed. The evaluator will work with project leaders to select specific individuals who can make statements about significant impacts. The evaluator will work with UNLV TV to develop a 6-minute video clip of interviews with six project participants about the impact that participation in this project has had on them.

The Track 2 evaluation plan outlines specific quantitative metrics to be used to track progress made towards achievement of project goals and objectives such as project participation, publications, presentations, connectivity, interoperability, and cyberlearning. Some of these metrics were tracked and reported in the previous evaluator's report; however many were not. The evaluator would like to identify which, if any of these metrics, are possible to track and if tracked, will serve a useful purpose to the project and program leaders. The evaluator will work with the project director to identify useful quantitative metrics and will track them in future reports.

Section 2. Introduction

2.1 Background

The mission of the National Science Foundation (NSF) Experimental Program to Stimulate Competitive Research (EPSCoR) is to assist NSF in its statutory function "to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education."

EPSCoR goals are:

- To provide strategic programs and opportunities for EPSCoR participants that stimulate sustainable improvements in their R&D capacity and competitiveness;
- To advance science and engineering capabilities in EPSCoR jurisdictions for discovery, innovation and overall knowledge-based prosperity.

EPSCoR objectives are:

- To catalyze key research themes and related activities within and among EPSCoR jurisdictions that empower knowledge generation, dissemination and application;
- to activate effective jurisdictional and regional collaborations among academic, government and private sector stakeholders that advance scientific research, promote innovation and provide multiple societal benefits;
- To broaden participation in science and engineering by institutions, organizations and people within and among EPSCoR jurisdictions;
- To use EPSCoR for development, implantation, and evaluation of future programmatic experiments that motivate positive change and progression.

On September 1, 2009 Idaho, Nevada, and New Mexico NSF EPSCoR joined projects 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. Project 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 Tri-state NSF EPSCoR project.

The primary goal and three objectives of the Tri-state 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

Tristate EPSCoR project components include:

- Idaho Cyberlearning educational materials development
- Idaho McCall Outdoor Science School (MOSS) summer institute
- Nevada educational materials development
- Nevada summer science institute for teachers
- New Mexico CI for Industry
- New Mexico educational materials development
- New Mexico SCC/GUTS student programs
- New Mexico SCC/GUTS summer teacher institute
- Tri-state Interoperability component evaluation
- Tri-State Consortium annual meeting and workshops
- Tri-state CI Training opportunities

2.2 Purpose of the Evaluation

Two types of evaluation are being conducted for EPSCoR project: (1) a formative evaluation to monitor implementation of project components and give ongoing feedback to the principal investigators, and (2) a summative evaluation to assess the quality and impact of the project in reaching its stated goals and objectives. Both types of evaluation use a combination of qualitative and quantitative indicators.

Guiding evaluation questions are based on the goals of this EPSCoR project.

Intellectual merit

- How has the addition of research and cyber infrastructure (equipment, facilities, people, and training) provided by the EPSCoR project affected Nevada's, New Mexico's, and Idaho's competitiveness for research funding and sustained partnerships as per the outputs/outcomes/metrics listed for the overarching goal and <u>each</u> of the 3 objectives listed in the evaluation plan?

Impact on project participants, schools, universities, businesses, and communities

- What impact has participation in the EPSCoR programs had on the development and direction of participants' educational and career opportunities and choices?
- In what ways has participation in the EPSCoR programs increased participants' understanding and use of cyberinfrastructure?

Impact on participating organizations and the scientific community

- In what ways did participants' take the knowledge they acquired in EPSCoR programs and transfer it back into the classroom, school district, university, agency and/or community in a meaningful, productive way?
- How has involvement in the EPSCoR project benefited participating agencies, offices, divisions, departments, schools, universities, etc?
- In what ways have the participating agencies, offices, divisions, departments, schools, universities, etc. changed as a result of participation in this project?

Evaluation results of the following EPSCoR activities that were conducted during Quarter 4 are included in this report:

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The evaluator also reviewed the Tri-state Diversity Strategic Plan and items related to evaluation into this report. In addition, the evaluator conducted an impacts survey of all Tri-state EPSCoR participants and began preparation to conduct video interviews and testimonials of impacts. Results are included in this report.

Section 3. Evaluation Findings

3.1 Evaluation of project components

A. Idaho Cyber-enabled Curriculum and Education Materials Development for Middle and High School Students

Background

This program endeavors to use climate change as the underlying theme, to expand Cyberinfrastructure awareness, increase use of Cyberinfrastructure, and integrate quantitative reasoning, data analysis, and climate change modeling with education through support of cyber-enabled curriculum and education materials development for middle and high school students.

Dr. Rita McNeil, a professor at Idaho State University (ISU) in the Human Resource and Training Development department, and Chad Majeske, a middle-school technology education teacher at Idaho Science and Technology Charter School (ISTCS) and graduate student in the Master of Training and Development (MTD) program at ISU, received funding from Idaho EPSCoR Track 2 to integrate cyberlearning into the ISTCS STEM classroom. The project utilizes cyber-technology in the ISTCS STEM class to become linked (in real-time) with professionals throughout America and beyond in the professionals' real-world STEM settings.

Being located in Blackfoot, Idaho poses restrictions on the availability and variety of guest speakers. The purpose of this project is to expand students' accessibility to presenters. Using WebEx, an online video chat, students are connected to professionals (engineers, nurses, scientists, etc.) worldwide and conduct discussions regarding their professions and their impact upon our world. The cyber-technology provides the opportunity for teachers to be able to arrange these cyber-sessions in order to facilitate discussions between students and STEM professionals on climate change and other topics of interest. These cyber-sessions are then recorded, catalogued, and shared with the Idaho Education Network (IEN), allowing teachers from schools who do not have the connectivity equipment to have the live presentations streamed into their classrooms, giving Idaho students from rural areas the opportunity to learn from career professionals and to complete student inquiry- and problem-based projects.

Through the shared resources, teachers statewide can initiate further projects in which students will identify and share strategies for their personal involvement as stewards in the protection of our environment and in the advancement toward environmental science.

Program leaders state, "Research continues to suggest that middle school students are in the process of deciding whether they like math or science, regardless of how well they perform in those classes. It is anticipated that when students have the unique opportunity to engage in discussions with STEM professionals throughout the world, students' perceptions of career possibilities will be greatly expanded as they see the application of math and science beyond what they see in school…supporting the "students in STEM" pipeline initiative. Through the shared resources, teachers statewide can initiate further projects in which students will identify

and share strategies for their personal involvement as stewards in the protection of our environment and in the advancement toward environmental science."

Program leaders would like this program to have the following impacts on teacher and student participants:

1. Improve students' attitudes towards math and science
2. Increase students' knowledge about career opportunities in math and science
3. Increase teachers' incorporation of math and science projects into their curriculum

The following program activities were conducted this year:

January:	Received project approval
	Ordered equipment
	Made preliminary contacts with potential cyber-guest speakers
February – March:	Received, installed, and learned about software/equipment features
	Began development of curriculum and classroom materials according to the CDC specifications outlined in the NCLT
	Conducted class discussions to prepare them for cyber-session
April - June:	Cyber-sessions and student project completion and presentations
June – July:	Develop project evaluation plan
	Facilitate the dissemination of videos created during the project to IEN and STEM classrooms throughout Idaho

Keely Kidner, a doctoral candidate from Victoria University in Wellington, New Zealand was selected as the first speaker in this project because of her experience with global environmental issues. This initial presentation was to introduce the students to environmental stewardship and the individual roles each of them can play in protection and conservation. Subsequent guest speakers will be more specialized in particular fields in efforts to correspond to current environmental global issues (ex. flooding, glacier ice-melts, etc.) and to promote career interests in specific fields of environmental science. The 70-minute video presentation is available at: https://idahoscitech.webex.com/idahoscitech/ldr.php?AT=pb&SP=MC&rID=89437137&rKey=24cd16c79cc30e25. Program leaders also developed a lesson plan and activities to accompany the webex presentation.

Evaluation plan

The evaluator received the request to conduct an evaluation on this project after the project had already been piloted with the middle school students. If this project is conducted again or continues to be conducted in the fall, the evaluator will work with the program leader to evaluate the quality, usefulness, and implementation of the curriculum as well as the impact on teacher and student participants.

B. Idaho McCall Outdoor Science School (MOSS) Summer Institute

Background

The mission of MOSS is to facilitate place-based, collaborative science inquiry within the context of Idaho's land, water and communities. The program provides experiential learning opportunities for students, educators, scientists and citizens to foster the critical thinking skills necessary to address complex problems. MOSS has expertise in the areas of inquiry-based K-12 STEM education, graduate education in STEM inquiry teaching, in-service teacher education in STEM inquiry teaching, and connecting university research with K-12 classrooms. Since its founding in 2001, MOSS has engaged nearly 14,000 K-12 students and over 90 graduate students in authentic, inquiry based STEM education programs.

Dr. Karla Eitel, Assistant Professor of Conservation Social Sciences at the University of Idaho (UI) is the Director of Education for MOSS. Two components of the MOSS program are funded by the NSF EPSCoR. The first component is the CyberLearning website (http://mossi.tfhsbruins.com/index/index/) which aims to get students and teachers connected to concepts that EPSCoR scientists are studying related to water resources in a changing climate. The site includes background information about climate models, water resources, scientists working on the EPSCoR grant, and an interface for uploading hydrologic data to the Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI) Hydraulic Information Systems (HIS) database. A five-person team will collaborate to further develop the CUAHSI HIS database interface and content pieces for the site. The team includes a MOSS graduate student, an Environmental Science teacher from Twin Falls High School, a Technology teacher from Twin Falls High School, and a graduate student in Dan Ames' (Idaho State University) lab. Plans for further development of the site include visualizations of Idaho specific climate and water related data (using an interface like Google Public Data Explorer), an interactive map embedded with water related data and videos of field data collection, and classroom lesson plans that utilize the site as a learning tool. The data upload interface will be enhanced and made fully functional by the end of the project in August 2011. Project leaders plan to obtain feedback on the site at the two summer 2011 teacher institutes and hope to pilot test activities at the July 2011 Geospatial Tools workshop for teachers.

The second component of MOSS that is funded by the Tri-state EPSCoR is week 1 of the MOSS Summer Institute for K-12 teachers (http://www.uidaho.edu/cnr/moss/teachereducation). The 2011 Summer Institute was conducted from June 23 – June 26 at the University of Idaho McCall Field Campus. Teachers attended a series of workshops on various topics related to climate change presented by university scientists. Teachers also had the opportunity to work alongside the scientists to discover the latest information in climate and water research and how it can be integrated into their classroom instruction. The goals of the teacher institute are:

- To give teachers a chance to experience field science research and learn about current projects being conducted in Idaho
- To work with teachers and scientists to create projects that can be conducted in classrooms throughout the state
- To provide an opportunity for our MOSS teachers to gather for a time of reflection and renewal after a long school year

Evaluation metrics

The summer institute evaluation form (Appendix A) was developed by MOSS summer institute program leaders. It was designed to determine the overall quality of the workshops and the main concepts teachers learned. The survey was comprised of ten items. The first four items asked participants to report on demographic characteristics such as name, phone number, email address and school. The only demographic information that will be reported is the school with which teachers are affiliated. The next item on the survey asked participants to rate the quality of each of the five presentations given at the workshop on a 4-point scale (1=*excellent*, 4=*poor*). Because SmartStart reports all data from 1=low to 4=high, the scale was reversed to match the rest of the report. Participants were then asked to state the one concept that they learned during the MOSS program. Next, participants were asked to state whether they would recommend the program to other teachers and why. Two additional items asked questions regarding the accommodations and meal services. These items will not be reported in the evaluation results as they are not relevant to the evaluation questions. The last item asked participants to report any suggestions for improvement of the MOSS program.

Evaluation participants

Ten, K-12 teachers from six different high schools, within the Tri-State consortium and one homeschool teacher, completed the Idaho MOSS Summer Institute evaluation form. No demographic data was collected on gender or ethnicity. Figure 1illustrates the various schools that were represented at the training along with the number of teachers from each school.

Figure 1. Demographic description of MOSS summer institute participants

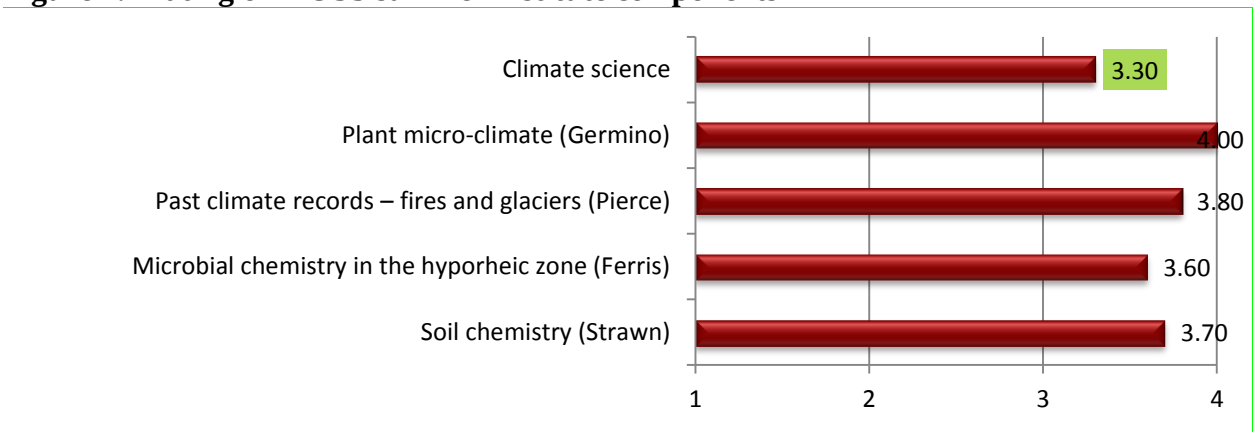
	Number of teachers (n=10)
School	
Sage Valley Middle School	1
Clair E. Gail Junior High School	3
Marsing Elementary School	2
Moscow Charter School	1
Rolling Hills Charter School	1
Payette High School	1
Homeschool	1

Quality and usefulness of program components

Respondents rated presentations given by scientists at the workshops on a four-point Likert scale from *poor* to *excellent*. All respondents rated each of the five workshops as either *good* or *excellent*. There were no ratings of *so-so* or *poor*. Interestingly, only 30% of the respondents rated the workshop on Climate Science as *excellent* while none of the other workshops had less than a 60% rating of *excellent*. Results are displayed in Figure 2. The name of the presenter is shown in parentheses. The name of the Climate Science presenter was not available. Mean ratings can be considered to trend towards positive or negative based on the following scale:

Excellent	3.41 – 4.20
Good	2.61 – 3.40
So-so	1.81 – 2.60
Poor	1.00 – 1.75

Figure 2. Rating of MOSS summer institute components



All teachers reported that they would recommend this program to other teachers. The majority stated they would recommend this program because of the opportunity to interact with scientists, share information with other teachers, and hands on learning.

- *Yes! I highly recommend this program to another teacher. It is great to connect with scientists working in their fields, to talk about how climate change is affecting water in our local areas, and see what they are studying.*
- *Yes...very informative, fun, hands-on... great way to earn credits. I have several ideas to bring back to my class.*
- *Yes! The current research shared and abundance of knowledge not only from the scientists but as well as from fellow educators is fantastic. The setting and people really make it great too!*
- *Yes. We got hands on learning while having a great time!*
- *Absolutely! There was good stuff every day and most importantly, collaboration with educators.*
- *Yes love the ability to talk with scientists about the work they are currently working on. This allows teachers to reconnect with the science world.*
- *I would recommend this program to another teacher because I enjoyed the other participants, the instructors and the location of the camp. I have not had an environmental science course before this and greatly enjoyed the hands on experience. The instructors provided us with interesting information and experiments and demonstrations that we can actually do with our students. The graduate students were knowledgeable nice, and helpful. The camp is in a beautiful location with good facilities and tasty food.*
- *Yes, it was very informative and I enjoyed the interaction with other educators.*
- *Yes, definitely. I like the format (hands on), the scientists were quite knowledgeable and the site is a wonderful place to learn. Also the entire MOSS staff was very professional and helpful.*
- *Yes, and I have been.*

Teachers made the following suggestions to improve the MOSS summer institute:

- *Can you make registration less confusing?*
- *Coordinate the registration process with University of Idaho better. The process was frustrating, especially talking to the UI registrar's office who thought that the class started June 13 and went through the end of July.*
- *Advertise it more to school districts. Send an e-mail/flyer for the professional development coordinator to post.*
- *Keep allowing Elementary teachers to join....and /or consider offering an Elementary focused MOSS workshop!*
- *Follow up activities. Connections with other teachers to continue collaboration through out the year. A system of data collecting from different parts of the state.*
- *On Friday we did a lot of standing while presentations were made. This is extremely hard on my back and I am still paying for it. Being able to sit would have been very helpful.*
- *Didn't care for the mosquitoes...*

Program impact on participants

When asked, *What is the one concept you have learned?* the majority of participants reported gaining knowledge and information dealing with plants/or trees (6) and hyporheic zones (4).

- *Only ONE? I had no idea about the hyporheic zone. Incredible.*
- *Anyone can be a scientist. I was surprised to find out that plants' temperatures are not the same as the air temperature and they vary from plant to plant. Form follows function! (More than one concept.)*
- *I didn't realize that there were so many micro-climates in plants and water...I guess I just don't think about it because they aren't visible.*
- *The different layers of soil, including the O layer, and then A, B and C layers or the soil and that there are all of the micro-organisms absorbing, and essentially filtering (or not) the soil below our feet.*
- *There is so much more than I imagined dealing with climate and the environment around us!*
- *I was amazed to find different plants had such radically different temperatures. The hyporheic zone was a place I never knew existed. (a new world for me:)*
- *Millions of microbial organisms exist in the zone below river beds.*
- *Ponderosa Pine can better survive fire than other trees because it has a thick bark and self-prunes its lower limbs.*
- *What causes dew on plants! (It wasn't what I have always been taught!)*
- *Tree size is not necessarily related to age due to stressors such as water, fire, nutrients etc.*

Participants also want to share the following with the project leaders:

- *I am very impressed with what you do every year. That is why I keep coming back.*
- *I like the direction you are going with the website.*
- *Thanks for everything!*
- *Thanks! It was great!*

Commendations and recommendations

The MOSS program is commended for introducing new scientific concepts to elementary, middle. and high school teachers and creating an opportunity for educators and scientists to share information and resources. It is important that educators remain abreast of new concepts and technologies as they relate to science. This enables them to modify their curriculum and incorporate current, up to date information.

1. The evaluator recommends the institute survey be revised to include the following questions:
   - Demographic description of participants (gender, ethnicity, grade level teaching)
   - More specific ratings of the presenters (knowledge, presentation skills, use of examples, effectiveness in answering questions, facilitation of discussion)
   - Ratings of quality of handouts and/or PowerPoint presentations
   - Ratings of effectiveness of the institute in developing knowledge and understanding of specific concepts that teachers should learn.
   - Ratings of hands-on activities.
   - Teachers' ability to incorporate the new concepts and technologies learned into their classroom instruction and curriculum.
   - Impact participation in this institute will have on them, their schools and/or their students.

2. Program leaders should also consider conducting a pre/post content test and/or self-efficacy in teaching science survey. The evaluator will assist program leaders to revise the evaluation form and develop a more comprehensive evaluation plan. Results will be included in the upcoming evaluation reports.

3. The content of the workshops and the names and affiliations of presenters are unclear. The evaluator is also not sure if any of the cyber learning curriculum that is being developed for the website was used in the summer institute.

The evaluator will work with program leaders to clarify these issues. The evaluator recommends that summer institute program leaders develop a more comprehensive flyer to describe all aspects of the summer science institute that includes:

- *Names and affiliations of program leaders*
- *Name of hosting/sponsoring agencies*
- *Program goals*
- *Program activities*
- *Information about the curriculum that will be taught*

It is also recommended that the cyber learning curriculum development program be integrated with the summer teacher institute, if this has not already been done, to maximize awareness and use of the cyber learning materials.

C. Nevada Summer Science Institute for Teachers

Background

The Nevada Summer Science Institute (SSI) for High School teachers**,** hosted by the Clark County School District, is a three-day work shop created to educate teachers about climate change and the methods used to study and learn about this topic. The SSI also helps teachers develop ways to incorporate information regarding climate change into their curriculum. The UNLV curriculum development team provided the curriculum for the SSI. This year's SSI was held in Death Valley. Participants attended the following institute activities:

- Informational session - Saturday, June 11, 2011, from 10:00 am –12:00 pm
- Field Experience – Monday, June 20, 2011, 6:00 a.m. until Tuesday, June 21, 4:00 pm
- Classroom Component - Wednesday June 22 and Thursday, June 23, 7:30 am –12:00 pm

The field experience included an overnight camping trip to a high elevation area in Death Valley National Park. Participants camped in tents and cooked outside.

Program leaders identified four goals for 2011 Nevada Summer Science Institute:

1. Increase teacher content knowledge about climate change
2. Develop an understanding of climate change, through space and time, at Death Valley National Park.
3. Provide teachers with experience using models for implementing scientific argumentation (MEL).
4. Provide opportunities for collaborative planning and networking.

Evaluation metrics

The SSI evaluation survey (Appendix B) was developed by the summer institute program leaders and was designed to determine if the four goals were met. The survey was comprised of six questions. The first four items asked participants to report whether they feel each of the four goals were met on a 3-point scale (1=*exceeded goal*, 2=*met goal*, 3 = *did not meet goal)*. The next item asked participants to rate the helpfulness of each of the SSI components (collaboration with other teachers, Moodle, field experience, pedagogical strategies, content final project, stipend and graduate credits) on a scale from 1 to 4 (1=*not helpful*, 4=*very helpful).* The last item asked participants to select the main role of Cyberlearning from a list of five options.

Evaluation participants

Thirty-seven teachers completed sign-in sheets and 36 teachers completed the evaluation survey (97% response rate). The sign-in sheet captured demographic information such as gender, affiliated institution, years taught in Clark County School District (CCSD), and Nevada Teaching License endorsement subjects. Seventeen different schools were represented by teachers participating in the science institute. The three schools with the most teachers in attendance were Green Valley High School (5), Western High School (5), and Clark High School (4). Most respondents have been teaching in the CCSD between one and nine years. Only one person reported having been in the CCSD for 20 or more years. The majority of participants have a Nevada Teaching License endorsement in biological sciences (75%). The detailed demographic description of respondents is illustrated in Figure 3.

Figure 3. Demographic description of summer science institute participants

	Number (n=37)	%
Gender		
Male	21	57%
Female	16	43%
School		
Advanced Technologies Academy	1	3%
Centennial High School	1	3%
Cheyenne High School	1	3%
Clark High School	4	11%
Coronado High School	1	3%
Del Sol High School	2	5%
Desert Pines High School	1	3%
East Career and Technical Academy	4	11%
Green Valley High School	5	14%
Las Vegas High School	2	5%
Liberty High School	1	3%
Miley Achievement Center	1	3%
North West Career and Technical Academy	2	5%
Rancho High School	2	5%
South East Career and Technical Academy	1	3%
Spring Valley High School	1	3%
South West Career and Technical Academy	2	5%
Western High School	5	14%
Nevada Teaching License Endorsement[1]		
Biological Science	28	75%
Physical Science	1	3%
Chemistry	1	3%
Physics	1	3%
Geology	1	3%
General Science	9	24%
Earth Science	2	5%
Alternative Science	1	3%
Biochemistry	1	3%
Special Education	1	3%

[1] Percentages do not equal 100 because teachers selected more than one response.

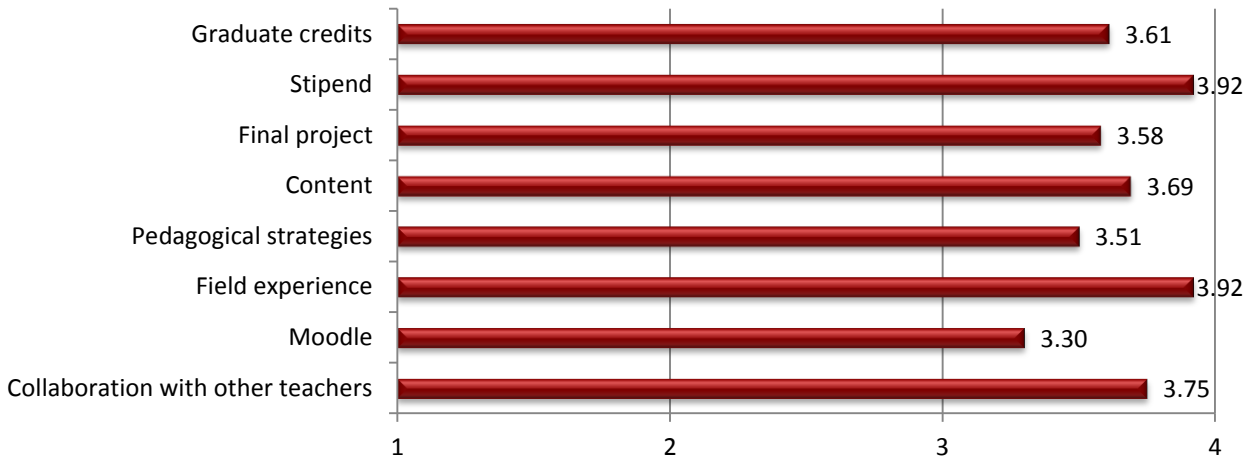
	Number (n=37)	%
Number of years in Clark County School District		
1 to 3	14	38%
4 to 6	9	24%
7 to 9	6	16%
10 to 12	2	5%
13 to 15	3	8%
16 to 19	2	5%
20+	1	3%

Quality and usefulness of program components

Participants were asked to select one descriptor about each component that best represents their experience. The four-point Likert scale descriptors ranged from *not helpful at all* to *very helpful*. The majority of participants rated each of the components as *very helpful*. Results are displayed in Figure 4. Mean ratings can be considered to trend towards positive or negative based on the following scale:

Very helpful	3.26 – 4.00
Somewhat helpful	2.51 – 3.25
Not very helpful	1.76 – 2.50
Not helpful at all	1.00 – 1.75

Figure 4. Rating of Summer Science Institute components



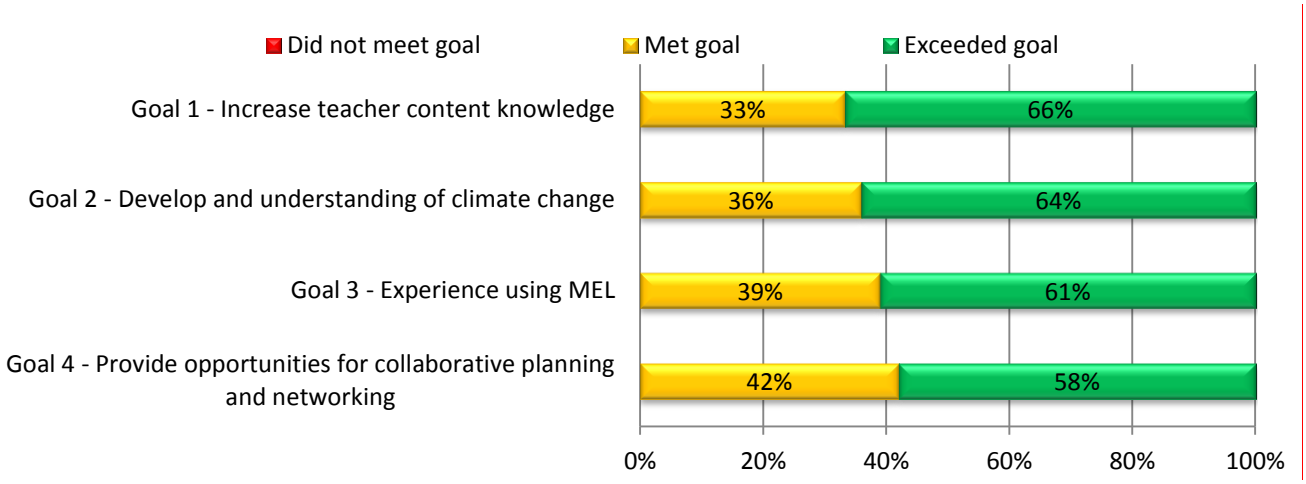
Teachers made the following suggestions to improve the summer institute:

- *Needed one workshop day to use the technology. The procedures might have been better written in Chinese! I need to see someone modeling it.*
- *We should go to Mt. Charleston or somewhere lush and cool and study trees or plants… and camp.*
- *The Moodle was a little repetitive.*

Program impact on participants

Participants rated the level of goal achievement for each of the four summer institute goals on a 3-point Likert scale from 1 to 3 (1=*did not meet goal*, 3=*exceeded goal).* For each of the four goals, the majority of participants reported exceeding the goal. Mean ratings can be considered to trend towards positive or negative based on the following scale:

Figure 5. Rating of goal achievement



Participants explained how participation in this institute has helped them reach each of the four goals. Participants commented that they gained a wealth of new knowledge and strategies for teaching about climate change. Participants also commented on the ability to build team work and collaborate with other teachers. Responses are listed below:

Goal 1 - Increase teacher content knowledge:

- *Field experience increased understanding of topics*
- *Good effort at relating various aspects of climate/environment change.*
- *Learned from many different content areas.*
- *I am weak in geology – this helped, and the Moodle helped most with content!*
- *Was a lot of information for a non-geo teacher, which sometimes made it difficult.*
- *Reinforced and developed content knowledge allowing me to reach deeper understandings!*
- *Very good instruction with lots of different tools and strategies to increase learning.*
- *Learned more about geological processes than i expected!*
- *We were given plenty of information before, during and after the camping trip to be able to better understand what we were looking at.*
- *Great content and fieldwork coherency.*
- *I learned quite a bit. It expanded my knowledge and interest in climate change data.*
- *A bit more understanding in what was expected of us at the beginning would have made it more successful.*
- *Learned a lot about geology and climate change.*
- *Wow! I thought I knew a lot about geology before this, phew!*
- *All of the information was beneficial!*
- *I now know a great deal more about Death Valley, its history and dropstones.*
- *I learned information about earth's strata that i did not know before.*
- *Learning about MELs was great. Wish we could have had time to learn vernier better.*

Goal 2 – Develop an understanding of climate change, through space and time, at Death Valley National Park:

- *I did not previously realize the amount of data presented at Death Valley!*
- *I had prior knowledge; this reinforced!*
- *AND THE WORLD!*
- *I am still unsure how some data we collected in the field is related.*
- *Google Earth and Moodle lessons were great in developing our understanding of climate change.*
- *Excellent site management of content!*
- *Lessons on the Moodle and discussion with peers and leaders opened my eyes even more, especially looking at evidence provided by research articles.*
- *Excellent location to facilitate climate change models!*
- *Loved the blend of location and online material to help understand climate change on a geological timescale.*
- *The info and online lesson that used Google Earth and fossils to map the movement of Earth's plates to infer climate change was interesting.*
- *Explanations in the field were great and the video was awesome.*
- *Learned a lot about! I typically focus on a narrow subject, but there are so many climate change connections and Death Valley was a great place to learn about them.*

Goal 3 – Experience using models for implementing scientific argumentation (MEL):

- *Provides a useful tool that can be used in the classroom.*
- *Always nice to use unfamiliar equipment and software.*
- *Good activity. Easily adaptable for use in the classroom.*
- *Glad I learned C-maps!*
- *I enjoyed that it was a group/partner experience. There was a lot of data in a short period of time, so allowing group work made it easier to understand and complete.*
- *The implementation of the MEL concept was done in such a way that we learned of its inherent value for our students.*
- *Now I feel very comfortable using the MEL – both designing and integrating it into the classroom.*
- *Another tool in the teacher toolbox to use!*
- *We were able to implement our information into MELs to see how the information correlated.*
- *Great method for the argumentation between twp models.*
- *Gave me a good way to teach students to become more informed consumers of information and how to analyze and critically evaluate information.*
- *I think the MEL is an easy tool that I can use with my students.*
- *What a great tool! I am excited to start using as soon as I get back in the classroom. Gives me something to look forward to in August.*
- *MELs provided a fantastic critical thinking platform for science!*
- *Very Helpful! I will use this model with Anatomy/Physiology to help students understand diagnosing patients.*

Goal 4 – Provide opportunities for collaborative planning and networking

- *Met new teachers and had ample time to discuss topics.*
- *Wonderful group of people with whom to work.*
- *Definitely opportunities to work in groups!*
- *We had plenty of time to collaborate and plan.*
- *Group work was efficient and productive.*
- *Collaboration planning and teamwork helped with MEL development, data collection and technology use.*
- *I like working with others.*
- *Met great new people.*
- *Good group of teachers.*
- *Really enjoyed getting to know my colleagues. Without their help I would have been lost.*
- *I liked the group work.*

Participants rated what they believe is the main role of cyberlearning. Most participants (75%) believed that cyberlearning should take place, before, during and after learning activities. Their responses are shown in Figure 6.

Figure 6. Participants' beliefs about the role of cyberlearning

	Number (n=36)	%
Cyberlearning is not needed in learning activities	3	8%
Cyberlearning should take place before learning activities	5	14%
Cyberlearning should take place during learning activities	1	3%
Cyberlearning should take place after learning activities	0	0
Cyberlearning should take place, before, during and after learning activities	27	75%

Teachers' noted the following strengths of this summer institute.

- *Kris, Doug and Bret are awesome! Thanks again!*
- *Thank you (Kris, Doug, and Bret) for an awesome experience and great learning opportunities. I can only begin to imagine the time and effort that you all have dedicated to making this SSI happen the way it did!*
- *Nice focus/concept. Great job.*
- *Excellent experience! Very well organized and hope to do another field experience in '12!*
- *Thanks for an outstanding experience!*
- *I appreciate all of the effort you put into this Institute for us.*
- *Very useful in exposing me to new technologies.*
- *Very helpful! Enjoyed being able to DO science compared to lecture about science ☺*
- *Institute was well planned and thought-out! It also provided potential applications for our classrooms.*
- *Great experience! I can't give enough accolades to those who set it up and implemented this project. I look forward to next year.*
- *Moodle helped build knowledge prior to field experience.*
- *Moodle helped the most – without the Moodle I would have been lost!*
- *Even though this is not my area (Earth Science) I enjoyed meeting the new people.*
- *Great planning, excellent field experience.*
- *Great experience that resulted in a useful product for our classrooms.*
- *Best Professional Development I've ever been a part of. This instilled pride in me for working in CCSD. This is the right direction to take our district, increase their funding!*
- *Awesome combination of things offered for such a short experience!*
- *Data interpretation was a nice fit.*
- *Everything came together very well. This was worth the loss of sleep ☺*

Participants also want to share the following with the project leaders:

Great job ☺ *Great Job – Thank you!* *It was "neato."*
This Institute rocked! *Terrific!!!* *Thank you for everything!*
Great project! *Loved it!* *Absolutely fantastic!*
Great Job! Thanks for ALL of the hard work and time put into the Institute!
Great job everyone! Thanks for all of the help with the team stuff!
Thank you so much for such a great opportunity. It was a super learning experience.
Thanks for everything – it was RAD!
Great job! Thanks for another amazing Summer Science Institute. See you next year!
I very much appreciated the opportunity to participate in the Institute.

Commendations and recommendations

The SSI project is commended for successfully meeting each of the goals it was designed to meet. In addition, the SSI program did a great job recruiting a diverse group of teachers to attend and participate.

1. The SSI evaluation form lacked questions on demographics, ratings of project components, ratings of knowledge gained, and impact of participation in the institute.
The evaluator will assist program leaders to revise the evaluation form to include the following questions. Demographic questions will be included on the survey instead of on a separate sign-in sheet.

- *Demographic questions should include ethnicity and grade level teaching in addition to the other questions that were asked on the sign-in sheet.*
- *More specific ratings of summer science institute components, activities, handouts, and presenters*
- *Ratings of effectiveness of the institute in developing knowledge and understanding of specific concepts that teachers should learn.*
- *Teachers' ability to incorporate the new concepts and technologies learned into their classroom instruction and curriculum.*
- *Impact participation in this institute will have on them, their schools and/or their students.*

2. A pre/post content test and/or self-efficacy in teaching science survey were not conducted.
Program leaders should consider conducting a pre/post content test and/or self-efficacy in teaching science survey. The evaluator will assist program leaders to develop a more comprehensive evaluation plan.

2. It is unclear if the summer science institute is funded by the Clark County School District, the Curriculum and Professional Development Division (CPDD), or Tri-state EPSCoR. In addition, it is unclear how many of the curriculum modules developed by the UNLV-based Nevada Climate Change Education Materials Development program were used in the summer science institute. The evaluator was not able to locate a webpage associated with this summer science institute.
The evaluator will work with program leaders to clarify these issues. The evaluator recommends that summer institute program leaders develop a more comprehensive flyer to describe all aspects of the summer science institute that includes:

- *Names and affiliations of program leaders*
- *Name of hosting/sponsoring agencies*
- *Program goals*
- *Program activities*
- *Information about the curriculum that will be taught*

The flyer should be place on a webpage so others can learn about the summer science institute.

D. New Mexico GUTS/SCC Student Programs

Project GUTS (Growing Up Thinking Scientifically) provides after school clubs for middle school students who are interested in learning computer science and computational thinking. Project GUTS' guided approach using 6-week units offers beginning students an introduction to complex systems, computer modeling and programming. Teachers and students have the opportunity to customize existing GUTS curriculum and models to reflect local conditions they wish to study such as spread of disease, ecosystems, and social networks.

The Supercomputing Challenge (SCC) provides mentoring for teams of students who are interested in working on computer science-related projects of their own specification. Challenge team sponsors mentor student teams as they conduct research, design and implement a computational model then collect and analyze the results of experiments run on the model. Successful Challenge students are self-directed and highly motivated.

Project GUTS and SCC round-ups were conducted during June and July to recruit middle and high school students and teachers to participate in SCC and GUTS programs during the school year. Round-up workshops are conducted locally for student teams and teachers to teach computer modeling and inform participants how the challenge works. Round-ups were conducted in the following locations this summer:

GUTS

- Eagle Ranch Middle School in Rio Rancho
- Gadsden Middle School in Gadsden Independent School District
- Lynn Middle School in Las Cruces

SCC

- Bernalillo High School in Bernalillo
- Picacho Middle School in Las Cruces
- Las Montañas Middle School in Las Cruces.

Summer Round-ups are funded with EPSCoR monies so an evaluation was not conducted by the evaluator. The evaluator will work with GUTS and SCC program leaders (Lorie Liebrock and Nico Marrero) and the new program manager (Ramesh Shakamuri) to identify components of these programs that are funded by EPSCoR and will develop an evaluation plan to assess implementation, impact, and expansion of these programs.

E. New Mexico GUTS/SCC Summer Teacher Institute

Background

The 2011 Summer Teacher Institute was conducted at New Mexico Tech in Socorro, New Mexico from Sunday, July 17 to Friday, July 29. Workshops were conducted on computer programming, modeling, robotics, data analysis, educational technology standards, and teaching computer science. The primary goals of the Supercomputing Challenge and Project GUTS Summer Teacher Institute (STI) are to:

1. Introduce teachers to complex science and computational tools and methods,
2. Advance teachers' knowledge, understanding, and skills in STEM domains,
3. Prepare teachers to support Supercomputing Challenge and/or Project GUTS teams
4. Provide ongoing support to teachers who will recruit and assist students in STEM endeavors.

Secondary goals include forming of networks of support for STEM teachers, raise awareness of the continuity and scaffolding of learning between the two programs, and serving as a model of a coordinated approach to professional development that spans middle and high school informal science programs. The collaborative Summer Teacher Institute provides teachers with a variety of entry points into computational science, offers opportunities for collaboration between middle and high school teachers, and takes advantage of some economies of scale.

Evaluation metrics

The Summer Teacher Institute survey (Appendix C) was developed by the summer institute program leaders and was designed to assess participant demographics, quality of implementation of the STI, and impact participation will have on teachers and students . The survey was comprised of 17 questions. The first section of the survey asked respondents to report on general information such as school affiliation, position, number of years in computer science and current skill/comfort level. The next section asked participants to rate the quality of the workshop and how well the workshop prepared them to perform a series of activities. Lastly, teachers were asked about their plans for the upcoming school year, intentions on implementing SCC/GUTS programs, and any barriers to implementing those programs.

Evaluation participants

According to the roster, the 33 Summer Teacher Institute participants were K-12 teachers from various regions and schools throughout New Mexico. However, 37 participants completed the post-survey. When asked how they found out about this STI, four said they found out by an email, fourteen found out by another teacher, eight learned about it through a consult and two from a flyer. None indicated they learned about the STI through RETA or administration. Demographic data such as gender, ethnicity, and grade level teaching were not collected. Information regarding respondents' employment characteristics is illustrated in Figure 7.

Figure 7. Demographic description of summer institute participants

	Number (n=37)	%
Region		
Northern	8	22%
Central	10	28%
Southern	15	42%
Eastern	1	3%
Western	2	5%
Position		
Elementary school faculty	2	7%
Middle school faculty	20	65%
High school faculty	14	45%
Postsecondary faculty	1	3%
School Type		
District K-12	24	89%
Technical/vocational K-12	3	11%
Private K-12	1	4%

Participants reported the number of years they have been involved in computer science activities such as the Project GUTS club, SCC, MESA, and robotics workshops. Of the 37 respondents, the majority (62-79%) have never participated in any of the listed activities. Results are show in Figure 8.

Figure 8. Number of years of participation in computer science activities

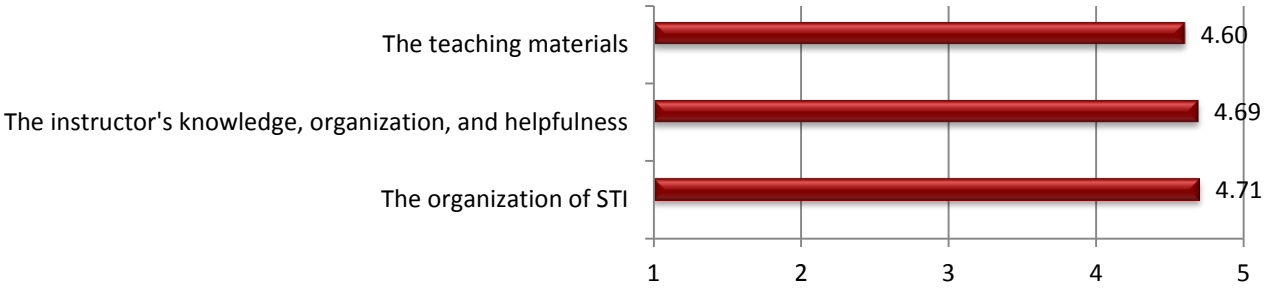
	0	1-3	4-7	8-11	16-19
Activities					
Project GUTS club	71%	24%	6%	0	0
Supercomputing Challenge sponsor	70%	12%	9%	6%	3%
MESA	76%	14%	10%	0	0
Robotics workshop	79%	17%	3%	0	0
Other computer science-related event	62%	24%	10%	3%	0

Quality and usefulness of program components

Participants rated the teaching materials, instructor's knowledge, and organization of the STI on a five-point scale (1 = *not at all useful* to 5 = *very useful*). Results are shown in Figure 9. The majority of participants rated the quality of the workshop as *very useful*. Mean ratings can be considered to trend towards positive or negative based on the following scale:

Very useful	4.21 – 5.00
Useful	3.41 – 4.20
Neutral	2.61 – 3.40
Not very useful	1.81 – 2.60
Not useful	1.00 – 1.80

Figure 9. Rating of usefulness of workshop components



Respondents commented on the most valuable and enjoyable STI activity. Most participants felt that the hands on projects were most helpful followed by the opportunity to collaborate with other teachers.

- *Programming and Team Work. Meeting other teachers in the field and*
- *Learning Starlogo and having the time to program in teams on our own was the most valuable activity for me.*
- *Computer time (project time) - actually having the hands on experience of trying out the different codes to see if our model (illustration) worked.*
- *I really found it valuable to have real time to work on the Starlogo code and gain more understanding of how to manipulate the program. I am more confident in directing my students. I really enjoyed meeting other teachers and working with them to see how they process.*
- *I loved the Networking! The project work was very rewarding. I met and spent time with great people and I will be sad to leave. I had fun and learned a tremendous amount. I hope to continue discussions, networking and communicating with my new found friends.*

Participants also commented on frustrating aspects of this STI. Some sources of frustration were the lack of organization and timing when transitioning between activities. Many participants felt that there was not enough time for specified activities and felt rushed when trying to complete projects. Participants also reported being frustrated with the teaching environment. Many participants reported being frustrated and offended by the aggressive tone of some of the instructors when encouraging participants to complete projects.

- *I hated having to switch activities, when we were just getting on a roll in the programing. I realize how we do this to our students and how it must be frustrating for them- stop writing a creative story-- learn to program - stop- go learn to play your instrument, read and/or write music - stop- go learn how to find LCMs and GCF--- this is frustrating and makes us have to play catch up to be at least half way to the point we were before we left the previous day. Just wow-- the amount of learning we had to do in less strenuous circumstances then what are students are experiencing.*
- *Transitions were a bit difficult at times.... I know we are 'cramming' so much into short time blocks but maybe some things could be rotated, or subjects that some need extra help on could be the night time activities This however was good to remind me to be more patient with my students when we are 'changing gears'*
- *Transitions were sticky sometimes. It was hard to leave some of the activities when I was so involved that I wanted to continue to work on different things that we were working on.*
- *I would appreciate a calm teaching environment to encourage me to learn, such as keeping the voice level lowered when instructing me on what to do.*
- *Overall everything was great and I learned a whole lot, Only negative thing was at times too much yelling at the class, we are all adults and I know some were offended. Also, sometimes too many Indian Chiefs. Sometimes we moved too fast and if we looked down at our computer to do by the time we looked back at the screen the instructor was three steps ahead.... although when we had someone in each row to assist that solved that :-)*

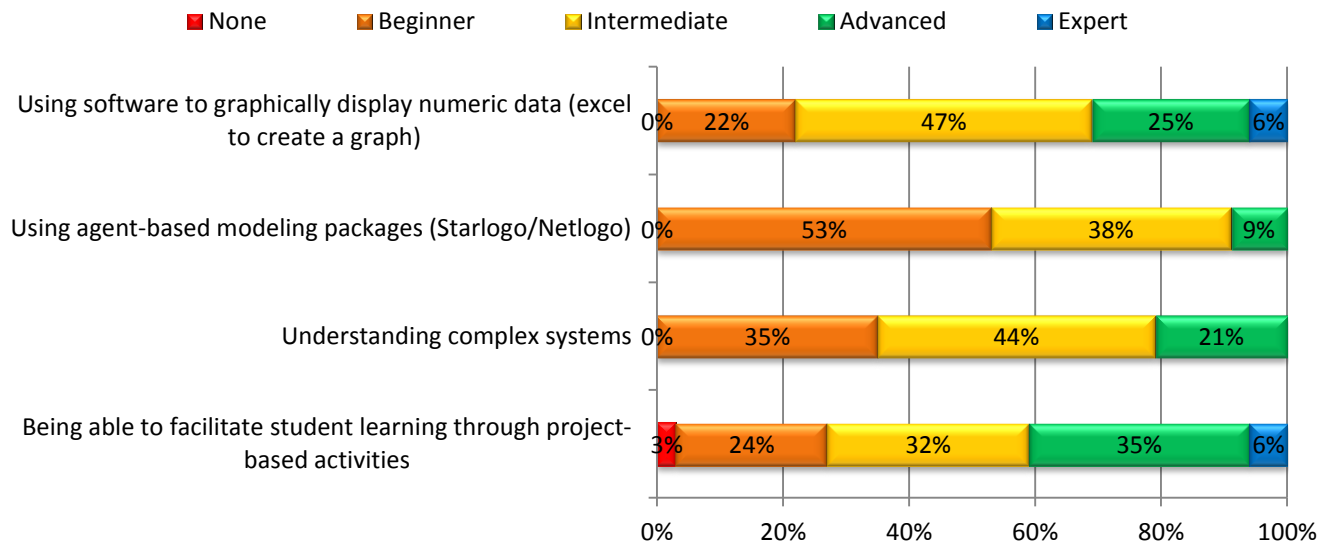
Participants suggested how to make the STI a more valuable academic experience. Participants requested more time spent on programming and having more than one cohort or track; one for beginners and another for more advanced participants.

- *More programming and understanding the StarLogo. I spent more time in my group doing the PowerPoint presentation and left the programming to the others. So I feel very ill-prepared to do ANY programming.*
- *We- many of us teachers- need more instruction in how to code a mathematical computation. The math is a little intimidating, BUT once we get it, figuring out how and where to place it is challenging and time consuming.*
- *Running sessions in parallel would be nice. Then beginners could get more basic instruction while those people who are more advanced can focus on more advanced skills. (Like our project work, but for all or most sessions).*
- *Have track for people who have STI experience, so they could advance in programming instead of as much repetition on computational thinking background and activities.*

Program impact on participants and participants' institutions

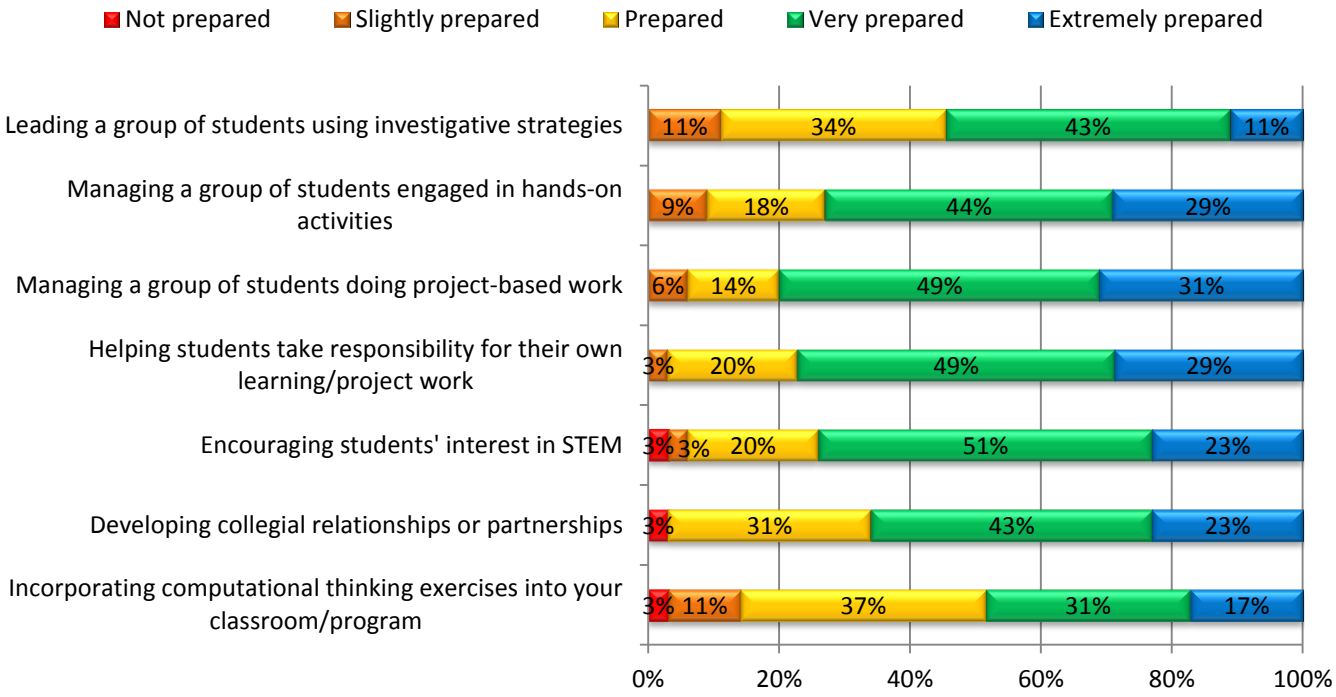
On the post-survey respondents rated their skills and comfort level with various activities on a five-point Likert scale from 1=*none* to 5=*expert.* In general, participants feel more competent in using software to display numeric data and being able to facilitate student learning through project-based activities. It is difficult to interpret results because initial skill levels of participants are not known. Results are displayed in Figure 10.

Figure 10. Rating of participant skill and comfort level with computer science concepts



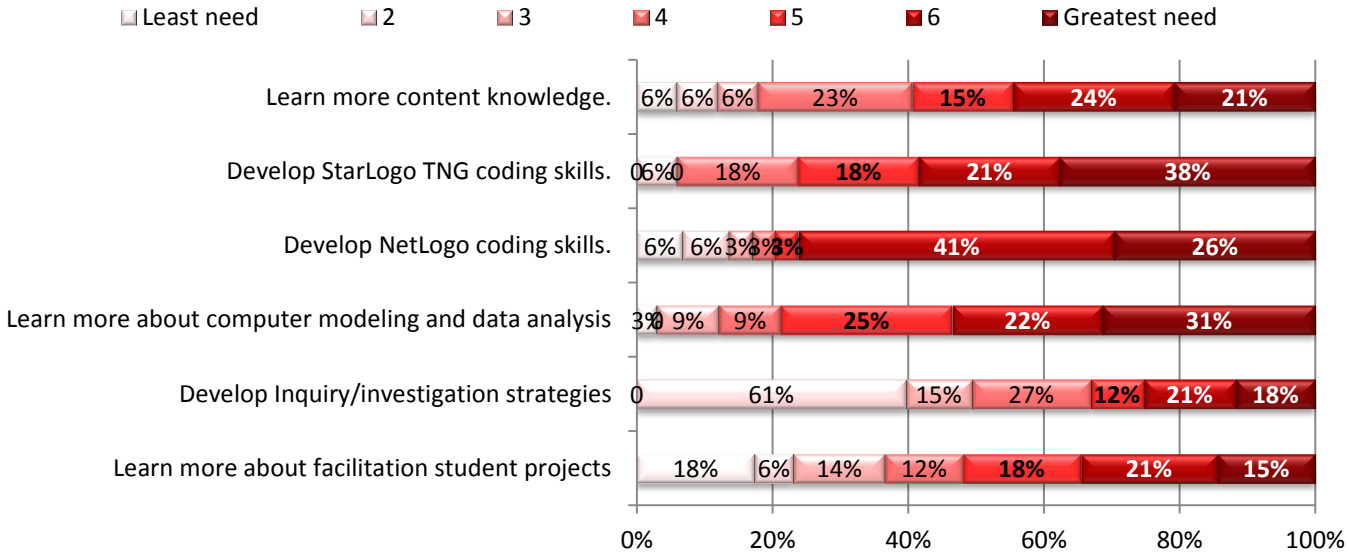
Participants rated how prepared they feel to do any of eight specified activities on a five-point Likert scale from 1=*not prepared* to 5=*extremely prepared.* The majority of participants reported being either very or extremely prepared for each of the eight activities. Participants feel particularly well prepared to manage a group of students doing project-based work. It is difficult to interpret results because initial preparedness levels of participants are not known. Results are displayed in Figure 11.

Figure 11. Rating of participant preparedness to incorporate learning into their lessons



Participants ranked in order of importance areas in which they would like to receive more professional development to support a GUTS Club or Supercomputing Challenge team (1=*least need*, 7=*greatest need).* Respondents reported that the two greatest needs were to learn more about computer modeling and data analysis and develop StarLogo TNG coding skills. The second greatest need was to develop NetLogo coding skills. The area least needed was to learn more about facilitating student projects. Results are displayed in Figure 12.

Figure 12. Areas needed for additional professional development



Participants reported whether or not they will incorporate what they have learned into classes they teach at their school. Most teachers plan to incorporate computational and mathematical modeling approaches; fewer plan to incorporate the CS4HS approaches. Results are shown in Figure 13.

Figure 13. Plans to incorporate learning into STEM classes

	Yes	No
Do you expect to implement any of the following STEM education		
CS4HS approaches.	69%	31%
Computational Modeling approaches.	91%	9%
Mathematical Modeling approaches.	87%	13%

Participants also reported whether or not they will be able to offer Project GUTS/SCC at their schools. About half of the teachers reported they would be able to either offer GUTS/SCC at their school or incorporate GUTS/SCC materials into their classroom curriculum. Responses are shown in Figure 14.

Figure 14. Plans to offer Project GUTS/SCC at participants' schools

	Yes	Maybe	No
Plans for next year			
Are you planning to offer a Project GUTS afterschool club?	56%	23%	21%
Are you planning to sponsor a SCC team?	44%	38%	18%
Do you plan to incorporate Project GUTS/SCC materials into classroom curricula?	56%	29%	18%

Participants explained the barriers they might experience to implementing the information they have learned and/or beginning a Project GUTS/SCC at their school. Common comments included the lack of time, knowledge, and proper computer hardware or software.

- *Because of the push by our district to raise students' test scores, we as teachers don't have enough time to implement some of the things we learned here (e.g. mathematical modeling, Excel.) Because I'll be teaching a multimedia class, I will have greater flexibility in integrating more than I will in Language Arts.*
- *The biggest barriers I foresee being a big issue are the fact that I will be teaching more classes with less planning time. I also anticipate we will have problems with: the internet, the wireless, the computer labs, the computer carts, and occasionally a few students who want to ruin things for everyone.*
- *Access to computers powerful enough to handle the projects. Getting software downloaded (i.e. Tech Team).*
- *We do not have dependable computers during the time we work on GUTS.*
- *I don't know if the students will have access to transportation.*
- *The barriers are definitely my lack of knowledge and starting a new job at a new school. I would like to feel comfortable with my new role before I add more stress to the learning curve.*
- *The only thing is to just work hard in learning the StarLogo code to try to master it and be able to teach it without hesitation.*

Participants reported their interest in attending STI next year. Eighty-two percent said *yes*, they are interest in attending STI next year, 15% said *maybe*, and only 3% (1 participant) said *no*. When asked why, the majority commented that they needed additional training, specifically in programming and the look forward to the opportunity to network and meet new people. No comments discussed reasons for why they would not attend.

Commendations and recommendations

The STI project is commended for its ability to provide hands-on experience to teachers to develop their skills and knowledge in computational thinking, tools, and methods. The project is also commended for providing opportunities for educators to network with one another and collaborate on projects.

1. Some participants stated they felt rushed and pressured to finish projects.
Schedule additional time for difficult activities to enable participants to complete projects as well as a more conducive learning environment where they are able to take their time for specified activities. Consider creating separate activities for beginning and intermediate/advanced learners. By breaking the participants into group based on skill level those who feel they are more advanced may potentially be able to learn even more if they are not hindered by spending excessive time on the basics. This also gives the opportunity to spend more time with those with limited knowledge.

2. Thirty-three teachers signed the roster and 37 people completed the program survey. It is unclear if the additional four people were program participants, presenters, or leaders. The STI survey questions did not flow easily into a report format. The survey should be separated into three sections: demographics of participants, evaluation of project components, and impact on participants and schools.
The evaluator will assist program leaders to revise the evaluation form to include the following questions:

- *Demographic questions should include gender, ethnicity, subject and grade level teaching in addition to the other questions that were asked.*
- *More specific ratings of summer science institute components, activities, handouts, and presenters based on the STI agenda.*
- *Ratings of effectiveness of the institute in developing knowledge and understanding of specific concepts that teachers should learn.*
- *Impact participation in this institute will have on them, their schools and/or their students.*

3. It is unclear if participants' present levels of competency are due to participation in this institute or if they had already achieved those levels prior to attendance. A pre/post content test and/or self-efficacy in teaching science survey were not conducted.
A portion of the survey should be given as a pre- and a post- to measure participants' gains as a result of participating in the STI. Program leaders should consider conducting a pre/post content test and/or self-efficacy in teaching science survey. The evaluator will assist program leaders to develop a more comprehensive evaluation plan.

4. Participants stated three primary barriers to implementing what they have learned at their schools: knowledge, time, and functional computing hardware and software.
Consider the following suggestions to reduce these barriers:
***Lack of knowledge**:*

- *Provide additional training and assistance to teachers throughout the year to augment their knowledge and increase self-confidence in implementing the curriculum.*

***Lack of time in the curriculum**:*

- *Identify specific math and science standards that are addressed by the SCC/GUTS curriculum. Develop activities and curriculum that is directly aligned with these standards.*
- *Develop a computer science elective course that is comprised of the GUTS curriculum so it does not have to be incorporated into other classes or is not an extracurricular activity.*

***Lack of functional computing hardware and software**:*

- *Train teachers how to install software and fix minor hardware problems*
- *Offer small implementation grants to STI teachers who want to set up computer labs and/or purchase software*

F. Tri-state Educational Materials Development programs

The evaluator developed a Survey of Educational Materials Development Teams (Appendix D) to be used by all tri-state educational materials development programs. The purpose of the survey is to obtain feedback from curriculum developers about the demographics of curriculum developers, the process used to develop curriculum, materials they have developed, support they have received from program leaders, and suggestions to improve the process. The survey also requests information about the impact on curriculum developers, and potential impact on teachers, and students who will use the curriculum. A draft of the survey has been sent to New Mexico (Liebrock), Idaho (McNeil), and Nevada (Schrader) materials development program leaders. Final revisions will be made to the survey, it will be posted online, and program leaders will distribute it to curriculum developers in the fall of 2011. The evaluator will review the results of the materials development teams' surveys to assess progress being made on materials development and will give feedback to program leaders. The evaluator will then work with program leaders to develop an evaluation plan to assess implementation, impact, and level of dissemination of program materials.

G. Tri-state Interoperability component evaluation

The evaluator has worked with the tri-state interoperability leads (Benedict, Dascalu, Sheneman) to develop two surveys:

- Data Portal survey of people who publish data
- Data Portal Survey of people who will used the data (Appendix E)

The purpose of the first survey (of data portal publishers) was to collect, in a common format, 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. This information was collected to enable each of the states to have a common knowledge base about the data that is anticipated for delivery through each state's data portal. Seventeen requests (11 from Idaho, 6 from Nevada, 0 from New Mexico) to import data in to the data portals were made. The results of this survey were reported in the Tri-state EPSCoR 2011 Quarter 3 evaluation report.

Next, the evaluator met by videoconference with the interoperability leads to discuss the type of information they would like included in the Data Portal Survey of Data Users. They

requested incorporation of questions pertaining to the following information be incorporated in the survey:

- Demographic description of user
- Usability/user-friendliness of the data portal
- Planned use of data they have obtained
- Willingness to complete a follow-up survey 6-12 months later to assess value of the data they obtained

The evaluator developed a draft survey and posted it on Google Docs. The evaluator met with the tri-state leads by videoconference to discuss each survey item. After the survey was finalized the evaluator posted it on Zoomerang and sent the preview link to the leads. A link to the survey will be posted on each data portal. The evaluator will download responses quarterly and include responses in the quarterly evaluation reports. The evaluator sent a share link to the interoperability leads so they will also have open access to survey results. The evaluator will work with the interoperability leads to develop the follow-up survey and to determine how often it will be sent to data portal users.

H. Tri-state CyberInfrastructure (CI) Training Opportunities

Background

Cyberinfrastructure (CI) training opportunities grants fund opportunities for EPSCoR participants to broaden their knowledge of cyberlearning 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. During Quarter 4, participants attended a Parallel Programming and Cluster Computing workshop at Idaho State University, a CUAHSI Conference on Hydrologic Data and Information Systems, an AWRA Summer conference on Integrated water resources management, Securing the Cloud: Hands-On, a GeoInformatics conference in Shanghai, a DSN conference in Hong Kong, and an ACM SIGCOMM conference in Toronto, Canada.

Evaluation metrics

The CI Training Opportunities survey was developed by program leaders at Idaho State University. The evaluator revised the evaluation form (Appendix F) and posted it online at www.zoomerang.com. The purpose of the survey is to assess the value of the CI training opportunity and the impact of participation on participants. The survey is comprised of fourteen questions. The first seven items ask participants to report on demographic characteristics such as gender, ethnicity, institutional affiliation and current position. The following two items ask participants to report on whether the training they attended met their expectations. Participants responded to these items using a 5-point scale (0=*N/A*, 1=*did not meet my expectations*, 4=*far exceeded my expectations).* The next three items asks respondents to report whether the training they attended enhanced their ability to conduct research as well as increased their knowledge and skills of climate change and cyberinfrastructure literacy. Participants responded either yes or no to each of these items. The last two items were open ended questions. The first open-ended item asked participants to comment on the application and award process. The second open-ended item

requested participants to offer general comments or suggestions regarding the CI training they attended.

Evaluation participants

Six different CI trainings were attended by 22 participants during Quarter 4. Twenty-nine people registered to attend the Parallel Programming and Cluster Computing workshop conducted at Idaho State University from. Seventeen participants (59%) completed a CI training evaluation form. Four other participants attended five other CI trainings or workshops (1 participant attended two separate trainings) and all five completed the CI training evaluation form. It should be noted that the original evaluation from was revised after collection of surveys was already underway. The initial form did not ask for demographic information such as gender, ethnicity and institution. Therefore, there are some missing data with respect to those demographic variables. Demographic data for all workshops is reported in Figure 15. The majority of respondents are male, Caucasian, faculty members.

Figure 15. Demographic description of CI training survey respondents

Date	Name of workshop	Attendees				
		State	Gender	Ethnicity	Position	Institution
June 22-24, 2011	CUAHSI Conference on Hydrologic Data and Information Systems	NM (1)	Male	Caucasian	Graduate student – Masters	UNM
June 22-24, 2011	Cloud Computing Technologies, Learning Tree	NV (1)	Male	Asian	Faculty	UNR
June 23-July 1, 2011	The 19th International Conference on GeoInformatics, Shanghai, China	NV (1)	Male	Asian	Faculty	UNLV
June 23-July 1, 2011	IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), Hong Kong	NV (1)	Male	Asian	Faculty	UNLV
June 26- July 1, 2011	Parallel Programming and Cluster Computing, Idaho State University	ID (1) KS (2) NM (3) NV (3)	Male (15) Female (3)	African Am (2) Asian (2) Caucasian (7)	Faculty (14) System Admin (2) Sci. Academy (1) Postdoc (1) Undergraduate (1)	Bethany College, KS (1) Idaho National Lab (1) Joint Ed Facilities(2) Non-profit Org. (1) Univ. of Kansas (1) UNLV (1) UNM (3) UNR (2)
June 27-29, 2011	AWRA Summer Conf: Integrated water resources management	NM (1)	Male	Caucasian	Graduate student – Masters	UNM
August 15-19, 2011	Acm sigcomm, Toronto, Canada.	NV (1)	Male	Caucasian	Faculty	UNR

Evaluation Findings

Survey results for the CI Training workshops are reported in Figure 16. Most respondents who attended CI trainings said the training either exceeded or far exceeded their expectations to increase scientific capabilities and CI literacy, however only about half of the respondents who attended the parallel computing training said the training either exceeded or far exceeded their expectations to increase scientific capabilities and CI literacy.

Figure 16. CI Training workshop results

CUAHSI Conference on Hydrologic Data and Information Systems (n=1)	
Increased scientific capabilities?	Far Exceeded my expectations
Increased CI-literacy?	Far Exceeded my expectations
How has this training increased your CI-literacy (awareness, skills and knowledge) *Several key questions concerning setup/implementation of the NM HIS have been answered and I can now move forward with expanding the functionality of the server.*	
Will this training enhance your ability to conduct research in your scientific field? *The conference allowed me to meet with the developers and programmers developing the software I am using to archive and distribute temporal HIS data. Several key areas of methodology and software improvement were covered in detail.*	
How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines? *Many new technologies were introduced showcasing data management and modeling in hydrology and climate change. A great mix of talented scientists attended and presented.*	
Was the application review and award process timely? *Yes. The entire process was very smooth even though I had special issues with travel.*	
Comments *This was the first annual user conference for the CUAHSI HIS team. I highly recommend attendance for any scientists in climate change, hydrology, or CI.*	

Cloud Computing Technologies, Learning Tree (n=1)	
Increased scientific capabilities?	Exceeded my expectations
Increased CI-literacy?	Far exceeded my expectations
How has this training increased your CI-literacy (awareness, skills and knowledge) *The course covered the background of cloud computing, cost/benefit analysis, the preparation to move cloud environment, cloud providers and their differences, setting up the cloud resources, web-based data processing, and configuring private cloud, etc. It was extremely helpful to me to catch up with recent development in web technologies and the content can be immediately incorporated in to my classes (Computer Networks I & II).*	
Will this training enhance your ability to conduct research in your scientific field? *Cloud computing allows flexible computing resource management on demand. Projects can be uploaded to the cloud data center, and students can conduct their projects or homework any time anywhere. In my research I analyze large amount of cybersecurity data which can be easily done in a cloud environment.*	
How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines? *Storing and accessing climate change data can be best accommodated by cloud computing data center at very low cost. The data can be analyzed very efficiently using the vast cloud computing resources. By migrating to cloud computing, the project funds can be saved and can be used for other important tasks such as installing more sensors.*	

The 19th International Conference on GeoInformatics, Shanghai, China (n=1) IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), Hong Kong	
Increased scientific capabilities?	Exceeded my expectations
Increased CI-literacy?	Met my expectations
How has this training increased your CI-literacy (awareness, skills and knowledge) *I networked with a few researchers in cyberlearning area, and learned quite a bit from them. As a matter of fact, I am inviting one faculty to invite my lab in early August.*	
Will this training enhance your ability to conduct research in your scientific field? *For the first time, I was exposed to a few new modeling tools such as fractal, scaling, universality, agent-based modeling, and network theories. Also I learned some new development in GIS systems, network and infrastructure dependability of cloud computing.*	
How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines? *Examples given in the seminars were directly from climate change scenarios.*	
Was the application review and award process timely? *Yes.*	
Comments: *This CI training award, although only covered partial my expenses, was extremely helpful. This program shall be continued to support more faculty and graduate students if funds are available.*	

Parallel Programming and Cluster Computing, Idaho State University (n=17)	
Increased scientific capabilities?	Met my expectations (9) Exceeded my expectations (8)
Increased CI-literacy?	Met my expectations (9) Exceeded my expectations (7) Far exceeded my expectations (1)

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

- *My high school students will be aware of and knowledgeable of cyberinfrastructure.*
- *Awareness: Power of the supercomputing facility at UNLV. Skills: Write programs to use parallelism (MPI and OpenMP). Build my own cluster (BCCD). Knowledge: Many concepts (parallelism, debugging, storage)*
- *This workshop primarily increased my awareness of how parallel processing in its variety of forms is implemented. My skills and knowledge were enhanced by the lesson that many parallelization techniques are implemented fairly simply through calling MPI, OpenMP, or CUDA functions. This concept makes teaching parallelization to introductory students a lot more manageable.*
- *I am always interested in high performance computing (HPC) to reduce my workloads on model calibration and validation. Ultimately, parallel computing will help me expedite data dissemination processes through CI.*
- *My skills were tested and refined, as well as expanded upon through new application of open MP*
- *I have learned about internet virtual learning capabilities, and higher interactivity. We have used piatzza, and teleconferencing simultaneously. We have learned about various computing architectures and programming.*
- *This training helped me to better understand the hardware and how to tune the code to take advantage of it.*
- *I didn't know anything about parallel programming and now I have some awareness of different types of parallel computation (MPI, multi-threading, GPU). I've written beginning programs to try using it. I could already try to use some of these things in my own research. For other topics, I'm ready to learn more.*
- *I have better understanding of how large-scale parallel models are implemented on supercomputing clusters.*
- *I truly feel like I have a good foundational understanding of parallel processing now. This along, with understanding clusters and GPU's has increased my CI-literacy.*
- *The cooperative learning with other scholars gave me a good opportunity to build social networking excepting the knowledge from this workshop. I planto give a seminar course by cooperating with faculty members from ISU and UNR which will focus on introducing parallel programming and cluster computing* to *geoscience sts..*
- *I was able to meet with people from other states that shared some of my current research goals of visualizing large data sets. We were able to share some of our experiences.*
- *I am not familiar with that field.*
- *It did not increase my CI-literacy.*
- *CI for cyberinfrastructure, I should have read the entire evaluation before searching for what CI means.*

Parallel Programming and Cluster Computing, Idaho State University (n=17) *(continued)*

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

- *The training will enable me to map the concepts onto precollege courses in hpc.*
- *I now have a starting point to understand how to use parallel computing in my field.*
- *Yes. Knowing more about parallel computing will help me work on larger problems without being as limited by the restricting of normal computing. I will be able to develop better visualizations by using parallel computing.*
- *Yes. With the knowledge gained through the workshop, I will be able to convert my computationally expensive programs to benefit from the parallelism on the UNLV supercomputing cluster.*
- *This training will most definitely help my work. I am developing a set of lesson plans to help introduce community college students to parallel programming. This workshop covered many essentials of parallel programming, without which I would have had to spend significantly more time researching just to establish the basics. I feel like I can dive into the material and have a good idea what information I need to be focusing on.*
- *Yes. I learnt the basics for starting writing my parallel code in the future. Before the workshop I thought parallel computing was more complicated, therefore I appreciate the simplicity for presentations.*
- *Yes. I will apply parallel computing to calibrate my hydro models soon.*
- *This training was a fantastic refresher course for parallel programming. I have already used MPI in my research codes and will continue to in the future. I made connections at this workshop I hope will continue and turn into research collaborations.*
- *The training is already impacting my teaching preparation to better prepare students to do modeling and scientific work using parallel computers. It will also enhance my research in computational condensed matter physics – micro/nano-magnetics.*
- *We intend to develop new material simulations for nuclear fuels and energy and a better understanding of parallel programming is welcomed.*
- *I am planning to setup parallel computing to do some materials simulations.*
- *This training gave me a better understanding of how to use mpi and openmpi. With this knowledge I will be able to better support the users of INL resources*
- *Yes, it will enhance my ability to do research in mathematics. I've done one computational-experimental study, and this workshop will help me run the next one much more efficiently. Also I will try to use what I've learned to work with undergraduate and graduate students.*
- *The training familiarized me with the methods used to parallelize scientific models, giving me a starting point for developing future models using these tools, and also greatly enhancing my comfort level with and understanding of existing codes that run on clusters in parallel.*
- *Yes it will, but more so it will enable me to teach HPC and CI effectively and introduce this world to my students. This is even more important in my estimation.*
- *During this workshop, I learned how to use high computing resources for the large amount remote sensing data processing, in my research I used LiDAR data for extracting hydrologic features, the LiDAR data are huge dataset, but through dividing the tasks more efficiently, the long processing time will be reduced. Also we can use openMPI for the single core computer to enhance the efficiency.*

Parallel Programming and Cluster Computing, Idaho State University (n=17) *(continued)*

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

- *I was made aware of the work of the OU Supercomputer Center in support of meteorology*
- *Learning about parallel computing increased my knowledge by adding a tool for future use. Parallel computing will be a "must" for efficient computer programs in climate change. Very useful for complex computer program.*
- *Nowadays, climate models provide a large volume of data set so that many hydrologists have to put a lot of efforts for data assimilation. Parallelism would be a way to reduce time and efforts by enhancing input/output mechanism within parallel computing architecture.*
- *In climate change, I have personally wrote a book; showing a potential bad end for US if the weather and preparedness will not be seriously considered, and in spite the training was very good on parallel processing, in this domain crunching numbers is not the most important – but the global understanding of the effects and the notion of real time – that means: well you did a very good prediction of damages, but all politicians and authorities ignored and took the damage, and after that understood NOTHING…with a dysfunctional system as US has, the computing power starts to be irrelevant – just look around and apply common sense.*
- *It has enhanced my ability to understand the operation of the numerical climate models that are such a crucial component of climate research.*
- *I mostly learned information about computer science.*
- *This training increased my knowledge skills and awareness of parallel computing. I had none before going to this training. I know now that there are many resources available for parallel programming and I don't actually need a supercomputer to start using my new skills.*
- *The NCSI PARI workshop improved my parallel coding skills. This has useful applications in all areas of the sciences with regard to model development, use, and interpretation.*
- *The training has increased my awareness, skill and knowledge in the area of scientific computation and problem solving. I learned ways of distributing tasks and/or data to improve (less solving time, larger problem size, smaller component size…) the problem solving process especially with computers.*
- *This training widened my vision for the difficulty tasks for scientific research. The one week programming practices let me how to program in the LiNUX environments, which will be very important for me to use the high performances computing resources when it is necessary.*
- *Not Applicable… This workshop was about parallel programming and using supercomputers. However, we did discuss how supercomputing is enhancing our understanding of weather phenomena through various parallel modeling implementations.*
- *N/A. I focused on computational/programming information that was presented. It was interesting to hear about some of the applications of high performance computing in weather and climate modeling, and other fields.*

Was the application review and award process timely?

- *It was okay, but I think a little faster processing could have been helpful. I would have saved some money, if I had been able to buy the air ticket earlier.*
- *Yes, the application review and award process was timely. I was told about the workshop by Mary Jo Daniel from NM EPSCoR, and I applied the same day. A few days later I was accepted into the workshop.*
- *I would have appreciated an earlier acceptance to the training, allowing me more time to make arrangements.*
- *Yes, for the most part it was – if I learned of my acceptance earlier I would have made better travel plans. It was an awesome learning experience, and food and lodging was provided.*
- *I would have liked to have been given confirmation and travel information a few weeks earlier, so as to book a flight early and plan for time out of the office. As it was, we received confirmation less than a month advance.*

AWRA Summer Conference: Integrated water resources management (n=1)	
Increased scientific capabilities?	Exceeded my expectations
Increased CI-literacy?	Met my expectations
How has this training increased your CI-literacy (awareness, skills and knowledge) *There was little 'under the hood' discussion. Most dialog was targeted for managers.*	
Will this training enhance your ability to conduct research in your scientific field? *Much of the conference covered dynamic systems models that are not physically based. My knowledge of how various agencies and stakeholders are using model of this type has improved.*	
How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines? *The entire conference was devoted to integrated systems modeling. Many examples were shown illustrating various methods of managing data, modeling future water availability, and managing use.*	
Was the application review and award process timely? *Very well streamlined*	
Comments: *This was a new conference offered by AWRA. I think policy makers would benefit from future attendance.*	

ACM Sigcomm 2011 (n=1)	
Increased scientific capabilities?	Exceeded my expectations
Increased CI-literacy?	Exceeded my expectations
How has this training increased your CI-literacy (awareness, skills and knowledge) *I plan to redefine some of my research within the context of data center networking. The training's exposure to the recent research in data center networking will enable me to make that redefinition much easily.*	
Will this training enhance your ability to conduct research in your scientific field? *The conference helped a lot in getting me exposed to the recent topics being researched in the community. It also helped greatly in getting to know the researchers.*	
How has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines? *It helped in getting to know some of the recent energy-aware networking technologies to be used in data centers.*	
Was the application review and award process timely? *Yes*	
Comments: *Thank you for the opportunity and help in getting us to attend such critical venues in our fields.*	

Commendations and recommendations

The project is commended for supporting EPSCoR participants' professional development through CI training opportunities in two very cutting-edge areas of scientific research. Of all workshops attended, 59% of the participants reported the trainings either exceeded or far exceeded their expectations for increasing their scientific capabilities. Similarly, 50% of attendees reported that the trainings either far exceeded or exceeded their expectations for increasing their CI literacy, while the other 50% reported the trainings met their expectations.

1. Based on demographic data collected, only three women were reported to have attended any of the available trainings. Furthermore, of those who responded, 63% of the attendees were Caucasian. These data show a lack of gender and ethnic diversity for those attending the trainings.
The evaluator continues to recommend that new strategies be developed and implemented to encourage both female and ethnic minorities to apply for available trainings.

2. With regard to the application review and award process many respondents commented that they would have liked for the decisions to be made sooner in order to make timely, less expensive and more efficient travel arrangements.
It is recommended that the review committee respond to applications within a specified time from the date of application receipt. By creating a timeline, potential attendees will have a better estimate of when to send in application materials in order to make the most efficient and cost effective travel plans.

3.2 Review of Project Reports

A. Tri-state Diversity Strategic Plan

The Western Tri-State Diversity Innovation Working Group (WTD-IWG) was convened by EPSCoR representatives from Idaho, Nevada, and New Mexico on September 12- 15, 2010 in Jemez Springs, New Mexico. The goal of the meeting was to develop a comprehensive strategic plan that can be implemented throughout the tri-state area to increase participation and support for underrepresented minorities (URM) and women in EPSCoR scientific research and in science, technology, engineering, and math (STEM) disciplines. Through their meeting report, the WTD-IWG developed ideas and gave suggestions on how to accomplish their objectives. While many ideas and suggestions were mentioned through the report the comments below are those which are related to evaluation.

The WTD-IWG recommends conducting an annual evaluation to recognize faculty mentoring of URM and women in STEM fields. This statement is relatively broad and there were a few areas throughout the report where specific evaluation needs were identified. Those needs are stated below.

1. The WTD-IWG will establish a one-step recruitment hub entitled *Access to your future* center. The purpose of this hub is to recruit women and URM into EPSCoR scientific research and STEM disciplines. To accomplish this task IWG members suggested that a system of statewide recruiters and ambassadors be established.
It is recommended that the WTD-IWG develop a tracking log to track recruiters and ambassadors from each institution along with demographic information and institutional affiliation. The log should also track all partnerships made with other organizations. By creating a tracking log, the WTD-IWG will develop a sense of who the recruiters and ambassadors are and if there needs to be a greater focus in certain geographical regions or on individuals with specific characteristics. This will also help keep track of recruitment efforts to determine if any adjustments need to be made in the future.

2. The WTD-IWG suggested implementing *Advising Centers* that relate to STEM disciplines and to recruit and train the advisors and counselors who work in those centers.
It is recommended that the WTD-IWG leaders coordinate with the evaluator to develop a formative and summative evaluation plan. The evaluator recommends gathering data regarding student and faculty demographics, student satisfaction and the impact on students' lives.
It is important to assess both the process and outcome of the professional training for advisors and counselors to ensure the information is presented effectively and efficiently and that the

*advisors and counselors are equipped with the skills and abilities needed for the position. Also, it is important to assess the impact the Advising Center has on its students by tracking the number and frequency of whi**ch** students utilize the Advising Centers and how they feel they are benefitting.*

3. THE WTD-IWG suggested developing seminars in which peers in STEM disciplines can give presentations or pair with faculty members to give presentations.
It is recommended that the WTD-IWG work with the evaluator to develop both a summative and formative evaluation plan. The evaluator recommends gathering data regarding student and faculty demographics, student satisfaction, and impact on students' opportunities for research and their ability to successfully present their research. It is important to assess both the implementation and outcome of these seminars by assessing the implementation process and the impact on students and faculty.

4. The WTD-IWG recommends offering an *Introduction to Research* course for undergraduate students as a way to cultivate early interest in research.
The evaluator recommends gathering data at the end of each course on student demographics, satisfaction and future plans (i.e. majoring in stem related field, interest in becoming involved in research).

An abundance of ideas were mentioned throughout the report which may need evaluation efforts, however many of the ideas were not concrete enough to recommend a specific evaluation plan. The evaluator will work with WTD-IWG members as they move forward with developing specific projects and events to recommend and develop additional evaluation methods.

B Annual report to NSF

The evaluator read the 2010-11 annual report to NSF with the intent of including information from the report in this Q4 evaluation report. The report to NSF is comprehensive and presents numerous achievements that have been made this project year. However, the evaluator believes that instead of summarizing information from this report as has been done on previous evaluation reports, it would be more beneficial to use information that is included in the report to begin development of a list of specific research, facility, and personnel developments, which is the first column on the impacts survey matrix. This list can be used by project leaders and the evaluator to inform participants of developments that have occurred, which in turn, will enable them to articulate accurate, detailed impacts statements. A preliminary list is presented in Figure 17. By following this approach, the evaluator does have a concern that important metrics, presented in the Track 2 evaluation plan that have been tracked by the previous evaluator may no longer be tracked. This concern is addressed in recommendation #4 of the Commendations and Recommendations section of this report.

Figure 17. Examples of outputs due to Tri-state EPSCoR funding

Outputs/Activities	Examples of outputs that have occurred due to Tri-state EPSCoR funding
Research development • Conduct collaborative and/or interdisciplinary research	• Seed grants to link professionals throughout America and beyond in STEM settings • WebEx • Seed grants to develop interdisciplinary and inter-institutional proposals and publications
Facility development • Purchase, develop and/or use equipment and tools • Establish facilities • Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access	• Upgrade networking • Develop model for data synchronization • Develop data portals • Install educational portals
Personnel development • Increase knowledge and skills necessary to use cyberinfrastructure • Conduct and/or attend trainings and meetings • Influence individuals educational and career opportunities/choices • Hire/train/mentor people	• CI-related training for graduate students and faculty • CI-related teacher professional development • Internet training to small business entrepreneurs • CI training workshop attendance • Tri-State Diversity Action Plan • Innovation Working Groups • Cyberinfrastructure working group • Undergraduate assistantships • Recruit and retain post docs, students and technicians • Attendance at summer institutes
Bridges between research, facilities, and personnel • Increased funding • Develop instructional materials, programs, plans, centers • Use new knowledge, facilities, equipment, and cyberinfrastructure • Communicate findings through papers and presentations	• Curriculum modules to support teacher summer science institute • Supercomputing Challenge teams • Project GUTS • Project development leadership team • Cyberlearning websites • Cyberlearning curriculum and materials development • Presentations at conferences • Publication of papers

3.3 Impacts of the Tri-state EPSCoR project

A. Impacts Survey

Background

The purpose of the impacts survey is to identify impacts that the Nevada EPSCoR project is having on participants, institutions, and the scientific and non-scientific community. To guide the impacts evaluation[2], the evaluator developed four evaluation questions:

1. What outputs/activities have occurred as a result of the EPSCoR project?
2. What short-term outcomes have these outputs/activities led to?
3. What long-term outcomes have the short-term outcomes led to?
4. Which outputs/activities have been most influential in the achievement of specific short and long-term outcomes?

Next, long-term outcomes, short-term outcomes, and outputs/activities were identified.

Long-Term Outcomes

To identify long-term outcomes that were aligned with project goals, the evaluator analyzed the project goal and three objectives and grouped them into four general categories of long-term outcomes:

Project Goals and objectives
Project Goal - Knowledge transfer
Objective 1 - Connectivity
Objective 2 - Interoperability
Objective 3 – Cyberlearning

Long-Term Outcomes
- Improved response to scientific and/or societal challenges
- More informed decision-making
- Increased workforce capacity
- Increased state capacity to compete for research funding

Short-Term Outcomes

Next, the evaluator identified achievements that would lead to the identified long-term outcomes.

Short-Term Outcomes
- Scientific discovery
- Communication of impacts of research findings to decision-makers, businesses, educators, and the public
- Growth in knowledge, research skills, and/or cyber skills
- Increased and improved business development

Outputs/Activities

Finally, the evaluator identified outputs/activities that would lead to identified short-term outcomes.

Outputs/Activities
- Research development
- Facility development
- Personnel development
- Bridges between research, facilities, and personnel

Examples of each type of output were identified. Then the outputs, short-term outcomes, and long-term outcomes were placed into a logic model-based format as shown in Figure 18.

[2] Development of the impacts matrix and impacts survey was based on the Track 2 Evaluation Plan and Track 2 Component Team Action plans

Figure 18. Tri-state EPSCoR Impacts Survey Matrix

A. Outputs/Activities	B. Short-term outcomes	C. Long-term outcomes
Increased:	**Resulting in:**	**Leading to scientific and societal changes:**
Research development • Conduct collaborative and/or interdisciplinary research **Facility development** • Purchase, development and/or use of equipment and tools • Establish facilities • Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access **People development** • Increase knowledge and skills necessary to use cyberinfrastructure • Conduct /attend trainings and meetings • Influence individuals educational and career opportunities and choices • Hire/train/mentor people **Bridges between research, facilities, and people** • Increased funding • Develop instructional materials, programs, centers • Use new knowledge, facilities, equipment, and cyber infrastructure • Communicate findings through papers and presentations	• Scientific discovery • Communication of impacts of research findings to decision-makers, businesses, educators, and the public • Growth in knowledge, research skills, and/or cyber skills • Increased and improved business development	• Improved response to scientific and/or societal challenges • More informed decision-making • Increased workforce capacity • Increased state capacity to compete for research funding

Evaluation metrics

The Tri-state EPSCoR impacts survey (Appendix G) was developed based on the outputs, short-term, and long-term outcomes identified in the impacts matrix.

The impacts survey contains 15 questions that request the following information:

Q1-6 Demographic description of participant

Q7-10 Identify EPSCoR activities in which you have participated (Outputs)

Q11-14 Describe short-term outcomes you have experienced as a result of the activities in which you have participated (Short-term outcomes)

Q15 Other resources needed to achieve outcomes

The survey currently focuses on encouraging participants to identify short-term outcomes that they have experienced. In upcoming years of the project participants will be able to also identify long-term outcomes that have occurred or they expect will occur.

Evaluation participants

The impacts survey was posted online at www.zoomerang.com and sent to 80 Tri-state NSF EPSCoR Participants. Of the 80 surveys sent, 26 participants (33%) completed the impacts survey. A demographic description of participants is illustrated in Figure 19. Sixty-four percent are male and 81% are Caucasian. In addition, 26% of respondents were university or college faculty. The top three institutions with which participants were affiliated were University of Idaho (23%), Idaho State University (19%) and University of Nevada, Reno (12%).

Figure 19. Demographic description of survey respondents

	Number (n=26)	%
Gender		
Male	16	62
Female	10	38
Ethnicity		
Caucasian	21	81
East Indian	3	11
Hispanic	2	8
Relationship to this NSF EPSCoR project		
Faculty – community college	2	8
Faculty - university	9	35
Graduate student	6	23
Research faculty	2	8
Project directors/leads	1	4
Teacher - middle or high school	1	4
Undergraduate student	1	4
Other	4	15
Institution		
Boise State University	1	4
College of Southern Idaho	1	4
Dine College	1	4
Idaho State University	5	19
Nevada EPSCoR	1	4
Nevada System of Higher Education	1	4
New Mexico EPSCoR	2	8
New Mexico Highlands University	1	4
University of Idaho	6	23
University of Nevada, Las Vegas	3	12
University of Nevada, Reno	3	12

Evaluation findings

Participation in EPSCoR-related activities

Respondents identified outputs/activities in which they have been involved or by which they have been affected in some manner. They were provided with the list of activities and were asked to select all activities that applied to them. A frequency count of the number of people who reported participating in each activity was conducted. The number and percentage of respondents who selected each activity/output is shown in Figure 20. Highlights match correlations that are made in the next figure.

Figure 20. Participation in Tri-State Track 2 EPSCoR project activities/outputs

Code		Number people who selected the activity (n=26)	Percent of people who selected each activity
Research development			
RD1	Conduct collaborative and/or interdisciplinary research in climate modeling, ecological change, and water resources	14	54%
Facility development			
FD1	Purchase, develop and/or use equipment and tools	11	42%
FD2	Establish facilities	5	19%
FD3	Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access	12	46%
Personnel development			
PD1	Increase understanding of climate change, climate change policy, and/or cyberinfrastructure	18	69%
PD2	Conduct and/or attend trainings and meetings	21	81%
PD3	Influence individuals educational and career opportunities/choices	15	58%
PD4	Hire/train/mentor people	16	62%
Bridges between research, facilities, and personnel			
B1	Increased funding	9	35%
B2	Develop instructional materials, programs, plans, centers	14	54%
B3	Use new knowledge, facilities, equipment, and cyberinfrastructure	17	56%
B4	Communicate findings through papers and presentations	N/A[3]	N/A

[3] This item was added to the matrix after the survey was conducted.

Achievement of short-term outcomes

Next, the evaluator wanted to know which outputs/activities correlated the strongest with the achievement of each short term outcome. Participants were asked four questions; each question relates to one of the short-term outcomes. Responses to the following short-term outcome questions are listed in Appendix H:

- How have the items you selected in the four areas above enabled you to make **scientific discoveries**?
- How have the items you selected in the four areas above enabled you to **communicate impacts** of research findings to decision-makers, businesses, educators, and the public?
- How have the items you selected in the four areas above led to **growth in your knowledge and/or research skills**?
- How have the items you selected in the four areas above led to increased and **improved business development**?

Next, the evaluator compared participants' open-ended responses with the outputs/activities they had selected in the previous questions. Chi-square analyses were conducted to identify relationships between each output/activity and the short-term outcomes. Figure 21 presents the outputs/activities that had the strongest relationship with each short-term outcome. The n=X represents the number of respondents who noted applicable impacts in each short-term outcome area.

- For all of the short-term outcomes, the output/activity *Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access* had the strongest correlation.

It is clear that establishing cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access is strongly tied to achievement of short-term outcomes. It is also notable that very few participants (4) reported achieving short-term *improved business development*.

Figure 21. Instructional strategies that correlate the strongest with short-term outcomes

	Short-term Outcomes			
	Scientific discovery (n=13)	Communication of impacts of research findings to decision-makers, businesses, educators, and the public (n=15)	Growth in knowledge and/or research skills (n=14)	Increased and improved business development (n=4)
Outputs/activities	FD3 - Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access	FD3 - Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access	FD3 - Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access	FD3 - Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access
	B1 - Increased funding			PD3 - Influence individuals educational and career opportunities/choices

Requests for additional resources

Participants commented on what additional resources they need to enable them to increase scientific discovery, communicate findings, increase their knowledge/skills and/or increase business development. Their comments are listed below.

- *I should work more in field of cyberinfrastructure as this is only the start. I want to do PhD taking few research subjects from this field. However, funding is the constraint. If I can be funded for my PhD it can turn out to be a learning and rewarding experience for me as well as project. However, the funding for my organization (ISU) seems to have dried up. Also, Western consortium should pick up the graduate students from its constituents and move them to appropriate/required places (where funding is available) to continue the work. For example, I can be moved to New Mexico or Nevada for cyberinfrastructure projects if the opportunity/and or funding exists for this position. The idea is to be mobile, flexible, creative and cooperative for achieving our goals in cyberinfrastructure.*
- *Human Resources Support to implement ideas that I have to establish a powerhouse in the region so that we are better positioned for climate impacts modeling research*
- *The year 4-5 funding to keep our valuable EPSCoR personnel on really was key.*
- *Equipment and support personnel (IT, programmers, post-docs)..*
- *Working for me! as a postdoc I still do everything myself and there's a bunch a work-study student or 3 could do! Plus learn in the process!*
- *We will need to identify concrete avenues for sustainability and secure funds past the end of the project (August 2013) to keep the Nevada Climate Change Portal and other key project outputs going.*
- *Time, people, and money*
- *Time, always time. There are so many rich ideas associated with the project and too little time (or human resources) to address them all.*
- *May need mentoring from EPSCoR faculty in the future.*
- *With many projects going at various stages and me being "new" and not exactly a "researcher" I need to get out and on-site more frequently. This is a "me and CSI" thing. Maybe some well-directed letters from EPSCoR to President Beck?*
- *Consideration and cooperation from project leadership and participants in regards to EOD activities; have specific EOD activities written into the project during application stage (not as an afterthought), funding to support EOD activities.*
- *Still in the initial stages of developing CI; more investment needs to be made in this area.*
- *More international collaboration and data integration of EPSCoR tri-state region and other regions in the world where similar climate change research is being conducted.*

B. Impacts video interviews

As part of the impacts assessment, the evaluator would like to conduct videotaped interviews with project participants who have experienced significant impacts as a result of their participation in the Tri-state EPSCoR project. The PI and evaluator will select six Track 2 project participants who are willing to discuss impacts they have experienced. The goal is to produce six, one-minute video clips. The evaluator will **wo**rk with Laurie Fruth, General Manager of UNLV TV to coordinate setting up the interview between UNLV TV and the interviewees. The evaluator will develop interview questions and conduct the interviews. UNLV TV will videotape the interviewees, edit the videoclips and produce the final video. Interviews may be conducted at the Annual EPSCoR conference, the Tri-state Consortium, at other group meeting sites, or at participants' research sites. Interviews will be conducted and the video will be produced during the 2011-12 project year.

Section 4. Commendations and Recommendations

Based on the results of this evaluation the following commendations and recommendations for the Nevada EPSCoR project have been identified. Commendations and recommendations are listed for demographics, project components, project impacts, and tracking of evaluation metrics.

1. **Demographics**: Participants in most project activities are primarily male and Caucasian. *Continue to work towards involving more females and underrepresented minorities in this EPSCoR project and activities. Advertise and publicize activities and events more widely and make a greater effort to personally invite individuals from underrepresented groups to apply for CI training opportunities and attend project activities such as summer institutes. The evaluator will research demographics of participant pools (faculty, graduate/undergraduate students, and K-12 teachers) to identify reasonable targets and will include comparison data in future reports.*

2. **Project components**: Program participants of each program that was evaluated this quarter assigned high ratings to program components and made useful suggestions for improvement. The evaluator stated recommendations at the end of each program component section of this report. *Review participants' ratings and suggestions as well as the evaluators' recommendations to improve each program. The evaluator will work with program leaders to implement recommendations; however it would be beneficial if program directors could access the quarterly evaluation reports and read the sections of the reports that pertain to their programs. Consider designating a page on the Tri-State EPSCoR website to post evaluation results. Consider also posting other reports, plans, and project documents so EPSCoR participants can have easy access to all documents pertaining to this EPSCoR project.*

3. Project impacts: Significant progress has been made in developing a plan to identify and record impacts of this EPSCoR project. Leadership team members and participants have begun to think about impacts this project is having on participants, institutions, and the community. An impacts matrix and survey has been developed, the survey was piloted with EPSCoR participants, results were analyzed and findings will guide future data collection and analyses of impacts. *Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access* was found to be the most influential activity in achieving the Track 2 EPSCoR short term outcomes. Very few respondents noted achievements in the short-term outcome area of *increased and improved business development.* The evaluator reviewed the Track 2 documents regarding the short-term goal of improving business development. In the Track 2 evaluation plan this is presented as "improve outreach to business and industry." *The evaluator will continue to develop and improve metrics to measure impacts of this project and will work with leadership team members to expand the list of EPSCoR /outputs accomplishments. The evaluator recommends that project leaders continue to have conversations about how outputs lead to short and long-term impacts. It would also be beneficial to clarify the role that improved outreach to business and industry can play in reaching short and long-term outcomes. Conversations may include clarification and examples of why outreach to business and industry is important and how partnerships can be developed. The evaluator will work with project leaders to select specific individuals who can make statements about significant impacts. The evaluator will work with UNLV TV to develop a 6-minute video clip of interviews with six project participants about the impact that participation in this project has had on them.*

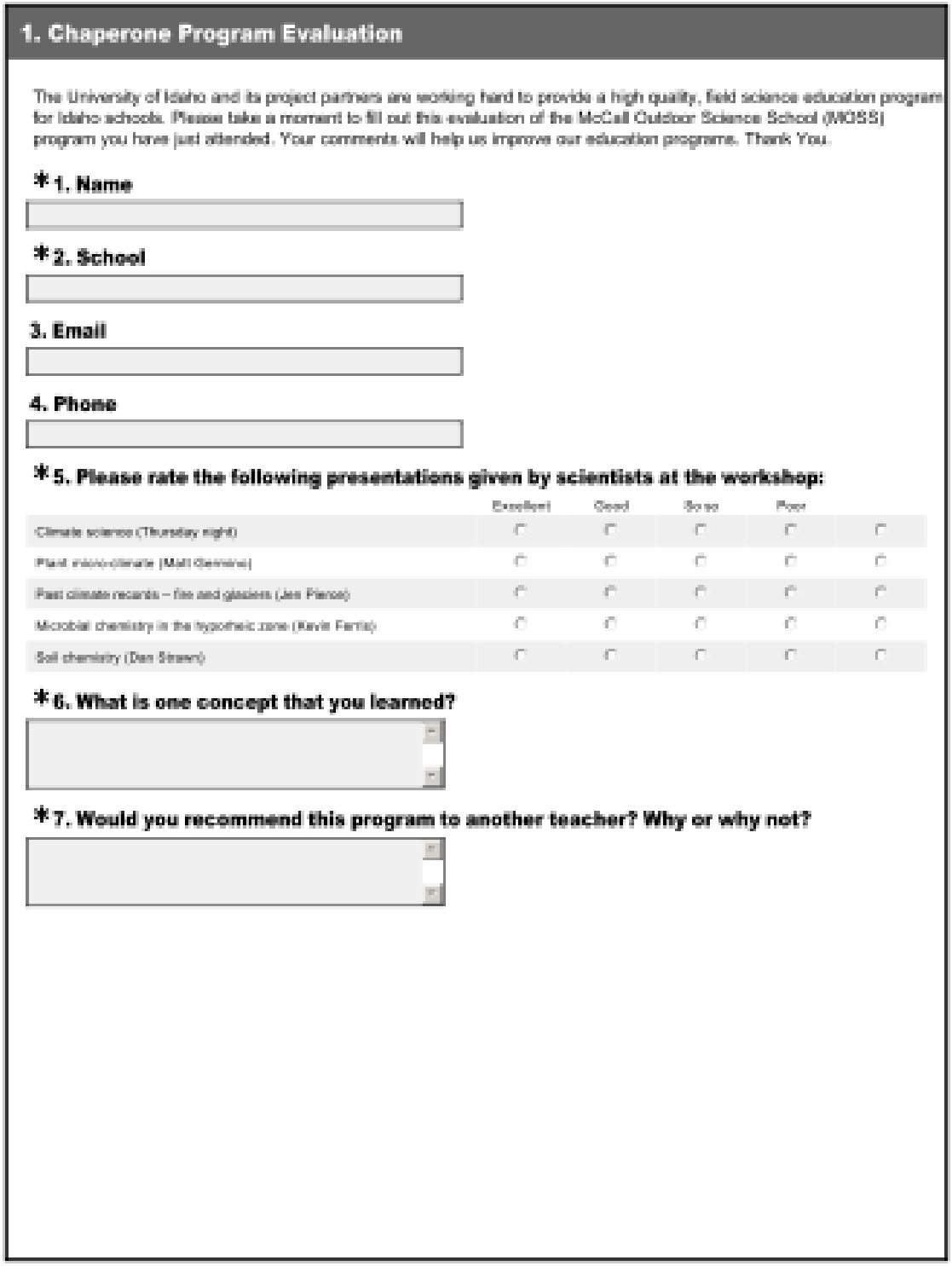
4. Tracking of evaluation metrics: The Track 2 evaluation plan outlines the following quantitative metrics to be used to track progress made towards achievement of project goals and objectives.

- Project participation (demographics by gender, ethnicity, position)
- Publications (peer-reviewed, climate change focused, co-authored by participants from tri-states, in CI journals)
- Presentations
- Connectivity (number of connections, portals installed utilization in GB and percent increase of use)
- Interoperability (number of data representations, methods, tables, elements, services, quality of downloads, modules, number of users, downloads etc.)
- Cyberlearning (trainings conducted and attendance by demographics, number of materials developed and disseminated, number of schools and industry participants)

Some of these metrics were tracked and reported in the previous evaluator's report; however many were not.

The evaluator would like to identify which, if any of these metrics, are possible to track and if tracked, will serve a useful purpose to the EPSCoR project, component, and site program leaders. The evaluator will work with the project director to identify useful quantitative metrics and will track them in future reports.

Appendix A: MOSS Summer Institute Survey



1. Chaperone Program Evaluation

The University of Idaho and its project partners are working hard to provide a high quality, field science education program for Idaho schools. Please take a moment to fill out this evaluation of the McCall Outdoor Science School (MOSS) program you have just attended. Your comments will help us improve our education programs. Thank You.

*1. Name

*2. School

3. Email

4. Phone

*5. Please rate the following presentations given by scientists at the workshop:

	Excellent	Good	So so	Poor	
Climate science (Thursday night)					
Plant micro-climate (Matt Germino)					
Past climate records – fire and glaciers (Jeff Pierce)					
Microbial chemistry in the hypothetic zone (Kevin Ferris)					
Soil chemistry (Dan Strawn)					

*6. What is one concept that you learned?

*7. Would you recommend this program to another teacher? Why or why not?

2. General Facilities Evaluation

*1. Do you feel the Field Campus accommodations were adequate? If yes, what did you like? If not, what would you like to see improved upon?

*2. Were you satisfied with the meal services? Why or why not? What could we do to improve the meals?

*3. Additional comments or suggestions that would help to improve MOSS programs in the future?

Appendix B: Nevada Summer Science Institute Survey

Curriculum and Professional Development Division
Clark County School District
&
Southern Nevada Regional Professional Development Program

2011 Summer Institute Evaluation

Directions: Please check the appropriate descriptor for each goal and provide a comment explaining your selection.

Goal #1: Increase teacher content knowledge.

_____Exceeded Goal ____Met Goal ____Did not meet goal

Comments:

Goal #2: Develop an understanding of climate change, through space and time, at Death Valley National Park.

_____Exceeded Goal ____Met Goal ____Did not meet goal

Comments:

Goal #3: Experience using models for implementing scientific argumentation (MEL).

_____Exceeded Goal ____Met Goal ____Did not meet goal

Comments:

Goal #4: Provide opportunities for collaborative planning and networking.

_____Exceeded Goal ____Met Goal ____Did not meet goal

Comments:

Please select one descriptor about each component that best represents your experience.

Component	4 Very helpful	3 Somewhat helpful	2 Not very helpful	1 Not helpful
Collaboration with other teachers				
Moodle				
Field Experience				
Pedagogical Strategies				
Content				
Final Project				
Stipend				
Graduate Credits				

Comments:

What do you believe is (or should be) the main role of cyberlearning? Cyberlearning is defined as: the use of networked computing and communications technologies to support learning.

_____ Cyberlearning is not needed in learning activities.

_____ Cyberlearning should take place before learning activities.

_____ Cyberlearning should take place during learning activities.

_____ Cyberlearning should take place after learning activities.

_____ Cyberlearning should take place before, during, and after learning activities.

Please explain your statement:

General Institute Comments:

Appendix C: New Mexico SCC/GUTS Summer Teacher Institute Survey

1. General Information

1. Please fill in the following

Name:

2. What region of the state are you from?

◯ Northern ◯ Central ◯ Southern ◯ Eastern ◯ Western

3. Which of the following best describes you?

☐ Elem. School faculty ☐ Middle school faculty ☐ High school faculty ☐ K-12 administrator ☐ Postsecondary faculty

Other (please specify)

4. At what type of school do you currently teach/work?

☐ District K-12 ☐ Technical/vocational K-12 ☐ Charter K-12 ☐ Private K-12

Other (please specify)

5. How many years in the following CS activities?

	0	1-3	4-7	8-11	12-15	16-19	20+
Project GUTS club	◯	◯	◯	◯	◯	◯	◯
Supercomputing Challenge sponsor	◯	◯	◯	◯	◯	◯	◯
MESA	◯	◯	◯	◯	◯	◯	◯
Robotics workshop	◯	◯	◯	◯	◯	◯	◯
Other CS-related event	◯	◯	◯	◯	◯	◯	◯

6. Your current skill/comfort level:

	Expert	Advanced	Intermediate	Beginner	None
Using software to graphically display numeric data. (ex. using excel to create a chart or graph	◯	◯	◯	◯	◯
Using agent based modeling packages (ex. understanding the use of Starlogo or Netlogo)	◯	◯	◯	◯	◯
Understanding complex systems	◯	◯	◯	◯	◯
Being able to facilitate student learning through project based activities	◯	◯	◯	◯	◯

2. The Workshop

1. How did you find out about this STI?

☐ email ☐ another teacher ☐ administration ☐ RETA ☐ consult ☐ flyer

Other (please specify)

2. Please rate the following:

	very useful	useful	neutral	not very useful	not useful
The organization of the STI.	○	○	○	○	○
The instructors' knowledge, organization and helpfulness.	○	○	○	○	○
The teaching materials (books, presentations, discussions, guests, web resources and offline activities).	○	○	○	○	○

Comments

3. Please indicate how well prepared you feel to do each of the following. Please check ONE box per line.

	Extremely prepared	Very prepared	Prepared	Slightly prepared	Not prepared
Lead a group of students using investigative strategies.	○	○	○	○	○
Manage a group of students engaged in hands-on activities.	○	○	○	○	○
Manage a group of students doing project-based work.	○	○	○	○	○
Help students take responsibility for their own learning/project work.	○	○	○	○	○
Encourage students' interest in STEM.	○	○	○	○	○
Develop collegial relationships or partnerships.	○	○	○	○	○
Incorporating Computational Thinking exercises into your classroom/program	○	○	○	○	○

Comment

4. What was the most valuable and enjoyable STI activity? Why?

5. Were there any aspects of the STI that were frustrating for you? Example?

6. Please list any suggestions you have to make the STI a more valuable academic experience.

3. Next Year

1. Please indicate the areas you would like to receive more professional development to support a GUTS Club or a Supercomputing Challenge team. Rank them in order of importance with 1 being the greatest need:

	greastest need						Least need
Learn more content (subject-matter) knowledge.	○	○	○	○	○	○	○
Develop StarLogo TNG coding skills.	○	○	○	○	○	○	○
Develop NetLogo coding skills.	○	○	○	○	○	○	○
Learn more about computer modeling and data analysis	○	○	○	○	○	○	○
Develop inquiry/investigation strategies	○	○	○	○	○	○	○
Learn more about facilitating student projects	○	○	○	○	○	○	○

Other (please specify)

2. Do you expect to implement any of the following to STEM education at your institution?

	Yes	No
CS4HS approaches (hands-on CS activities)	○	○
Computational Modeling approaches (Project GUTS or Supercomputing Challenge activities)	○	○
Mathematical Modeling approaches (Excel or other)	○	○

3. Plans for next year:

	yes	maybe	no
Are you planning to offer a Project GUTS afterschool club?	○	○	○
Are you planning to sponsor a Supercomputing Challenge team?	○	○	○
Are you planning to incorporate Project GUTS/Supercomputing Challenge materials into classroom curricula?	○	○	○

4. Regards of your intentions, what are some barriers you see to implementing such a program in your own setting?

5. Are you interested in attending STI next year?

◯ Yes ◯ Maybe ◯ No

Why?

6. Other Comments?

Appendix D: Tri-state Educational Materials Development Teams Survey

DRAFT
8-29-11

1. For which state are you developing materials?
   - ☐ Idaho
   - ☐ Nevada
   - ☐ New Mexico

2. What is your gender?
   - ☐ Male
   - ☐ Female

3. With which ethnicity do you most closely identify?
   - ☐ African American (Black)
   - ☐ Asian (Chinese, Filipino, Japanese, Vietnamese, etc.)
   - ☐ Caucasian (White)
   - ☐ East Indian (from India)
   - ☐ Hispanic (Latino/a, Mexican, Chicano/a, Brazilian)
   - ☐ Middle Eastern
   - ☐ Native American (American Indian)
   - ☐ Pacific Islander / Hawaiian
   - ☐ Other, please specify _____

4. Which position(s) do you hold that are related to this educational materials development project? Mark all that apply.
   - ☐ Middle/High School Teacher: Name of middle/high school _____
   - ☐ Master's degree student: Name of university _____
   - ☐ University professor/instructor: Name of university _____
   - ☐ Support staff: Name of university _____
   - ☐ Program administrator/coordinator: Name of university _____
   - ☐ Other, please specify _____

5. For how long have you been working as part of the educational materials development team?
   - ☐ <6 months
   - ☐ 7 months to 12 months
   - ☐ 13 months to 24 months
   - ☐ 24 months to 36 months

6. Tell me about the process that you use to develop, test, and refine the educational materials.

   _____

   _____

   _____

7. Does your lesson planning follow a particular research-based lesson plan process? If so, please tell me the name and general reference information for the process.

8. Tell me about the materials you have developed so far.

9. Have you received sufficient guidance and support from the program leaders? Please explain.

10. Do you have any suggestions to improve this educational materials development program?

11. Tell me how being a part of this educational materials development team has impacted you professionally.

12. Tell me the impact that you believe these materials will have on **teachers** who use them.

13. Tell me the impact that you believe these materials will have on **students** who use them.

14. The primary goal of the cyberlearning portion of this Track 2 EPSCoR project is to use cyberinfrastructure to integrate research with education in order to promote knowledge transfer. On a scale of 1-5 (1=not at all, 5=achieved extremely well) how well do you think this educational materials development program is achieving this goal? _____
Please explain your rating.

Thank you for completing this evaluation form. Please email this form back to the person who sent it to you or to the project evaluator: Lisa Kohne at lkohne@smartstartecs.com

Appendix E: Tri-state Data Portal User Survey

zoomerang

Page 1 - Heading

Page 1 of 3

Page 1 - Question 1 - Choice - One Answer (Bullets)

How did you first find about this data portal?

- ○ Online community
- ○ Informational email or newsletter
- ○ News story (newspaper/television)
- ○ Search engine
- ○ Word of mouth
- ○ Presentation at Conference/Meeting
- ○ Email invitation
- ○ Other, please specify

Page 1 - Heading

DEMOGRAPHIC INFORMATION
Completion of this section provides basic information to capture the demographics of our data portal users. This information, although voluntary, strengthens future applications for funding, ultimately providing research program sustainability and growth.

Page 1 - Question 2 - Choice - One Answer (Bullets)

With which gender do you identify?

- ○ Male
- ○ Female

Page 1 - Question 3 - Choice - One Answer (Bullets)

With which ethnicity do you most closely identify?

- ○ African American (Black)
- ○ Asian (Chinese, Filipino, Japanese, Vietnamese, etc.)
- ○ Caucasian (White)
- ○ East Indian (from India, Sri Lanka, Bangladesh, etc.)
- ○ Hispanic (Latino/a, Mexican, Chicano/a, Brazilian)
- ○ Middle Eastern
- ○ Native American (American Indian)/Alaskan Native
- ○ Pacific Islander/Hawaiian
- ○ Other, please specify

Page 1 - Question 4 - Choice - One Answer (Bullets)

What is your age (in years)?

- ○ <18
- ○ 18-25
- ○ 26-32
- ○ 33-40
- ○ 41-48
- ○ 49-56
- ○ 57-64
- ○ 65-72
- ○ 73-80
- ○ > 80

Page 1 - Question 5 - Choice - One Answer (Bullets)

What is the highest educational degree you have attained?

- ○ High school diploma / GED
- ○ Associates degree
- ○ BA / BS
- ○ MA / MS
- ○ PhD, EdD, or other doctoral degree

Page 1 - Question 6 - Choice - One Answer (Bullets)

What is your primary academic or work location?

- ○ Elementary school
- ○ Middle/High school
- ○ 2-year College
- ○ 4-year College/University
- ○ Government
- ○ National Lab
- ○ Business/Industry
- ○ Other, please specify

Page 1 - Question 7 - Choice - One Answer (Bullets)

What is your primary academic/work role?

- ○ Student
- ○ Post-doc
- ○ Faculty
- ○ Staff
- ○ Decision-maker/Management
- ○ Researcher
- ○ Other, please specify

Page 1 - Question 8 - Choice - One Answer (Bullets)

How many years have you been in your current job or academic status?

- ○ <1
- ○ 1-2
- ○ 3-5
- ○ 6-10
- ○ 11-15
- ○ 16-20
- ○ 21-30
- ○ 31-40
- ○ >40

Page 2 - Heading

Page 2 of 3

DATA PORTAL USABILITY

Page 2 - Question 9 - Rating Scale - Matrix

Please rate the userfriendliness of the following aspects of this data portal.

	Poor	Fair	Average	Good	Excellent	Not sure what this is
Finding data/information	1	2	3	4	5	Not sure what this is
Accessing data/information	1	2	3	4	5	Not sure what this is
Contributing data/information	1	2	3	4	5	Not sure what this is
Data & Information Formats	1	2	3	4	5	Not sure what this is
Services & tools	1	2	3	4	5	Not sure what this is
Documentation (application)	1	2	3	4	5	Not sure what this is
Documentation (data)	1	2	3	4	5	Not sure what this is
Availability of support	1	2	3	4	5	Not sure what this is
Performance	1	2	3	4	5	Not sure what this is
Availability of the portal (absence of crashes)	1	2	3	4	5	Not sure what this is
Ease of Navigation	1	2	3	4	5	Not sure what this is
Quality of design and visual appeal	1	2	3	4	5	Not sure what this is

Page 2 - Question 10 - Open Ended - Comments Box

How can we improve this data portal to make it easier to use and more useful for your needs?

Page 2 - Question 11 - Choice - One Answer (Bullets)

How likely are you to use this data portal again in the future?

- Not likely
- Likely
- Very likely
- I'm not sure

Page 2 - Question 12 - Open Ended - Comments Box

If you are not likely or not sure you will use this data portal again in the future please share with us why.

Page 3 - Heading

Page 3 of 3

PLANNED USE OF DATA

Page 3 - Question 13 - Choice - One Answer (Bullets)

What is your primary purpose for visiting the portal?

- ○ Data (measurements & observations for download and use)
- ○ Information (reports, graphs, charts, tables, maps, photos, videos, references, etc.)
- ○ Tools (search, analysis, mapping, etc.)
- ○ Other

Page 3 - Question 14 - Choice - One Answer (Bullets)

In which of these academic and/or employment domains to you primarily plan to use the information you obtained from this data portal?

- ○ Education
- ○ Research
- ○ Policy Development
- ○ Other

Page 3 - Question 15 - Open Ended - Comments Box

What is the topic focus for the use of the information you obtained from this data portal?

Page 3 - Heading

FOLLOW-UP SURVEY

Page 3 - Question 16 - Open Ended - One Line

The creation of this data portal is sponsored by the National Science Foundation EPSCoR project. In order to continue receiving funding we need your feedback to find out how you used the data from this portal. We would like to send you a very short survey six months to a year from now. Please type your email address into the box below to receive the follow-up survey.

Page 3 - Question 17 - Open Ended - Comments Box

Is there anything else you would like to share with us or with the National Science Foundation about this data portal?

Thank You Page

Thank you very much for your feedback!
If you have any questions about this survey or this data portal please contact:

Project evaluator: Lisa Kohne lkohne@smartstartecs.com
Data portal developer: Sergiu Dascalu - dascalus@cse.unr.edu

Appendix F: Tri-state CI Training Opportunities Evaluation Form

Idaho, Nevada and New Mexico EPSCoR - CI Training Post-Survey

Please answer the following questions about the CI Training workshop you attended. Double click the box to make your selection.

1. What is your name?

2. What is the name of the training you attended?

3. What is the date(s) of the training you attended the training?

4. With which gender do you identify?
   - ☐ Male
   - ☐ Female

5. With which ethnicity do you most closely identify?
   - ☐ African American (Black)
   - ☐ Asian (Chinese, Filipino, Japanese, Vietnamese, etc.)
   - ☐ Caucasian (White)
   - ☐ East Indian (from India)
   - ☐ Hispanic (Latino/a, Mexican, Chicano/a, Brazilian)
   - ☐ Middle Eastern
   - ☐ Native American (American Indian)
   - ☐ Pacific Islander / Hawaiian
   - ☐ Other, please specify:

6. What is your position?
   - ☐ Faculty
   - ☐ Research faculty
   - ☐ Post-doc
   - ☐ Graduate student – Masters
   - ☐ Graduate student – Ph.D.
   - ☐ Undergraduate student
   - ☐ Other, please specify:

7. With which institution with which you are affiliated?
   - ☐ Desert Research Institute
   - ☐ Idaho State University
   - ☐ New Mexico State University
   - ☐ New Mexico Tech
   - ☐ University of Idaho
   - ☐ University of Nevada, Las Vegas
   - ☐ University of Nevada, Reno
   - ☐ University New Mexico
   - ☐ Other, please specify

Please rate the training you attended in the following areas. Put an X in the correct box.

	Did not meet my expectations	Met my expectations	Exceeded my expectations	Far exceeded my expectations	N/A
8. To what degree did this training meet your expectations for increasing your scientific capabilities?					
9. To what degree did this training meet your expectations for increasing your CI-literacy?					

10. Will this training enhance your ability to conduct research in your scientific field?
☐ Yes ☐ No

Please explain.

11. Has this training increased your awareness, skills and knowledge in the area of climate change or other scientific disciplines?
☐ Yes ☐ No

Please explain.

12. Has this training increased your awareness, skills and knowledge in the area of cyberlearning and/or cyberinfrastructure literacy?
☐ Yes ☐ No

Please explain.

13. Was the application review and award process timely?

14. Is there anything else you would like to share with the EPSCoR project leads or directors?

Thank you for completing this evaluation form. Please email this form back to the person who sent it to you or to the project evaluator: Lisa Kohne at lkohne@smartstartecs.com

Appendix G: Impacts Survey

zoomerang

Page 1 - Heading

Page 1 of 2
BACKGROUND INFORMATION

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

In which state do you work?

- ○ Idaho
- ○ Nevada
- ○ New Mexico

Page 1 - Question 2 - Choice - Multiple Answers (Bullets) [Mandatory]

In which project(s) do you participate? Mark all that apply.

- ☐ Nevada Track 1 (Climate Change)
- ☐ Idaho, Nevada, and New Mexico Track 2 (Cyberinfrastructure)

Page 1 - Question 3 - Open Ended - Comments Box [Mandatory]

Please state the following:
1. Your name:
2. The name of the organization that you work for:

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

What is your relationship to this NSF EPSCoR project?

- ○ Faculty – community college
- ○ Faculty - university
- ○ Graduate student
- ○ Policy maker/politician
- ○ Postdoc
- ○ Research faculty
- ○ Project directors/leads
- ○ Teacher - elementary school
- ○ Teacher - middle or high school
- ○ Undergraduate student
- ○ Other, please specify

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

With which gender do you identify?

- ○ Male
- ○ Female

Page 1 - Question 6 - Choice - One Answer (Bullets) [Mandatory]

Select the ethnicity with which you most closely identify.

- ○ African American (Black)
- ○ Asian (Chinese, Filipino, Japanese, Vietnamese, etc.)
- ○ Caucasian (White)
- ○ East Indian (from India)
- ○ Hispanic (Latino/a, Mexican, Chicano/a, Brazilian)
- ○ Middle Eastern
- ○ Native American (American Indian/Alaskan native)
- ○ Pacific Islander/Hawaiian
- ○ Other, please specify

Page 2 - Heading

Page 2 of 2
IMPACTS

Page 2 - Heading

The Nevada Track 1 and/or Track 2 NSF EPSCoR project has facilitated development in the following four areas:

* Research development
* Facility development
* People development
* Bridges between research, facilities, and people.

Which of these developments have you been involved in or have you been affected by?
Mark all that apply.

Page 2 - Question 7 - Choice - Multiple Answers (Bullets)

Research Development

- ☐ Conduct collaborative and/or interdisciplinary research in climate modeling, ecological change, and water resources

Page 2 - Question 8 - Choice - Multiple Answers (Bullets)

Facility Development

- ☐ Purchase, develop and/or use equipment and tools
- ☐ Establish facilities
- ☐ Establish cyberinfrastructure including data portals, software, hardware, connectivity, bandwidth, interoperability, and data access

Page 2 - Question 9 - Choice - Multiple Answers (Bullets)

People Development

- ❑ Increase understanding of climate change, climate change policy, and/or cyberinfrastructure
- ❑ Conduct and/or attend trainings and meetings
- ❑ Influence individuals educational and career opportunities and choices
- ❑ Hire/train/mentor people

Page 2 - Question 10 - Choice - Multiple Answers (Bullets)

Bridges between research, facilities, and people

- ❑ Increased funding
- ❑ Develop instructional materials, programs, centers
- ❑ Use new knowledge, facilities, equipment, and cyber infrastructure

Page 2 - Heading

Please refer to the list of items you have selected in the four development areas above when answering these questions about impacts of the NSF EPSCoR projects:

Page 2 - Heading

Ultimately, the NSF EPSCoR projects endeavor to achieve the following long-term outcomes:

Improved response to scientific and/or societal challenges
More informed decision-making
Increased workforce capacity
Increased state capacity to compete for research funding

Please explain how any of the items listed in the following questions has lead towards these four outcomes. Please provide specific examples where possible such as,
Having increased network speed has enabled me to do XXX type of analysis, which I was not able to do before the network improvements. This has resulted in publishing a paper in XXX and in a successful proposal to the NSF. Please remember that this survey pertains only to Nevada Track 1 and Tri-state Track 2 capabilities and achievements.

Page 2 - Question 11 - Open Ended - Comments Box

How have the items you selected in the four development areas above (Q7-10) enabled you to make **scientific discoveries** that will help achieve the long-term outcomes?

Page 2 - Question 12 - Open Ended - Comments Box

How have the items you selected in the four development areas above (Q7-10) enabled you to **communicate impacts** of research findings to decision-makers, businesses, educators, and the public that will, in turn, help achieve the long-term outcomes?

Page 2 - Question 13 - Open Ended - Comments Box

How have the items you selected in the four development areas above (Q7-10) led to **growth in your knowledge and/or research skills** that will, in turn, help achieve the long-term outcomes?

Page 2 - Question 14 - Open Ended - Comments Box

How have the items you selected in the four development areas above (Q7-10) led to increased and **improved business development** that will, in turn, help achieve the long-term outcomes?

Page 2 - Question 15 - Open Ended - Comments Box

Considering the items listed in the four development areas above (Q7-10) and any other items not listed, **what additional resources do you need** to enable you to increase scientific discovery, communicate findings, increase your knowledge/skills and/or increase business development?

Thank You Page

Thank you for completing this NSF EPSCoR impacts survey.
If you have any questions please contact the project evaluator:
Lisa Kohne, Ed.D.
SmartStart Educational Consulting Services
lkohne@smartstartecs.com

Appendix H: Impacts Statements Made by Participants

Scientific discovery (Q11)

Survey respondents commented on what scientific discoveries have been made possible due to their participation in the project. Ten did not respond and two stated this was not applicable to them. Participants' comments regarding scientific discovery are provided below.

- *Purchase of computer servers for data processing and hydrological modeling*
- *CI has allowed us to analyze remote sensing data in new ways, enabling scientific discoveries.*
- *Facilitated common and limited access to data generated by the project and have enabled persistent access.*
- *Cyberinfrastructure is all about a huge data set and I have learned the first few ropes of creating user interfaces for searching and accessing these datasets. I think, that the knowledge that I have acquired in software development and interface design will help me make better user interfaces in future which in turn will help me to bring this vast data closer to common man.*
- *They provided the funding with flexibility, a stimulating new science community to interact with, and motivation and direction to focus intensely on climate and water resources.*
- *The remote sensing research has given me an opportunity to learn applied techniques and gain greater insight and skills in conducting research related to water resources in a changing climate.*
- *Equipment purchased has increased the research capacity of my institution.*
- *We will be collected data on a watershed which will lead to new information.*
- *Collaborating with innovative climate modelers in another state (who I never would have met otherwise) has helped advance my hydrological modeling. I anticipate the input from these colleagues will lead to very interesting and important results. I am looking forward to publishing with them.*
- *By meeting with other students and researchers & exchanging ideas*
- *I've researched various aspects on how outreach programs can be made more effective in terms of motivating young people from diverse backgrounds in STEM careers.*
- *CSI has expanded its wifi capacity on campus enabling a 200 teacher conference (iSTEM) to participate, interactively, during a week-long STEM activity (July 18-21).*
- *Partner w/MOSS for development and testing of mobile app for HIS - hydrodesktop (June, 2011).*
- *The track 2 connectivity in Nevada has allowed the data transfer for the track 1 data portals to take place. Without the increased bandwidth the data transfers would be severely limited.*
- *As lead of the CI group I have conducted research on data portal and software tools for model and data interoperability that has already resulted in 3 peer-reviewed conference papers (one of them published by Springer) and will certainly result in more publications. The research done has also enabled new grant applications and will set the foundations for deeper explorations of and developments in the area of "software engineering for interdisciplinary research".*
- *The tools available to me allow me to fundamentally understand the functioning of ecosystems under climate change, which allows better parametarization of coupled climate-ecosystem models.*
- *In years one and two, the UNLV portion of cyberlearning developed and implemented a framework for online science inquiry (5die). This is being tested and evaluated in terms of its potential to enhance science learning*
- *No scientific discoveries - I was invited to present at the 2011 Tri-State EPSCoR meeting, but have not otherwise been involved in the project.*

Communication of impacts (Q12)

Survey respondents commented on their activities related to the communication of impacts. Eight respondents did not provide an answer, and one stated this was not applicable to him/her. Respondents' comments are provided below.

- *Processing the climate model outputs and hydrological model outputs to provide on the web(Inside-Idaho)*
- *CI and people support have allowed students to better educate the public through outreach products.*
- *Contributed to the development of a common portal.*
- *Not relevant - I was invited to present at the 2011 Tri-State EPSCoR meeting, but have not otherwise been involved in the project.*
- *Any research in Cyberinfrastructure that doesn't touch common man cannot succeed. The web interface (beta) that I created for hydrologic data search and download can be used by researchers in the university as well as school kids. This is like creating a common platform for both high and low end users. This can also generate interest in the school kids towards STEM field as they will be able touch the technology at school level and may get inspired to become part of it in future.*
- *By having the funding to hire a postdoc and others to help the research, and by engaging me in an interdisciplinary community, the NSF project gave me the time, motivation, and context to communicate in new and effective ways.*
- *The outreach products we have developed have fostered collaboration with educators, federal agencies, and scientists to better communicate and understand our environment and better convey scientific information and its importance to the lay-person. In addition, they help to encourage and promote interest for future scientists.*
- *I am now able to work with faculty from other4 institutions as well as increase the number of students I can work with.*
- *Too early in project yet for dissemination*
- *Collaborations and training have helped me build a much deeper knowledge of the issues associated with my subject area. I feel better able to communicate with people other than other academics because a) I know much more about how to present and communicate and b) I know much more about climate modeling and climate change (through collaborations with climate scientists)*
- *As both a graduate student and a high school teacher I have been involved in the development and implementation of climate change curriculum. The curriculum has been used in high school classrooms and in professional development of approximately 50 teachers. Funding provided 10 Macbooks and a learning lab that has been used on a daily basis with students for climate change educations.*
- *The software tools that I'm developing (HydroDesktop, EPSCOR HIS portal) can be used by the public free of charge. This helps communicating the climate change information to all public.*
- *Participation in an IWG is leading to the development of materials that will help K-12 teachers use EPSCoR generated data in their classrooms.*
- *I've written several papers that have been published and presented at national conferences.*
- *I regularly (daily) tag items on Twitter (#epscor) that relate to educational outreach.*
- *The data portal is helping pull information together to present it to all of these people in a nice fashion.*
- *Having data available as web services has allowed me to begin to develop web applications that can be used to communicate impacts of research findings.*
- *In particular, the Nevada Climate Change Portal (soon to be released for public use), will greatly facilitate communication with the decision-makers, businesses, educators, and the public.*
- *EOD project administration has worked collaboratively with NSF EPSCOR project leadership to provide education and informaiton regarding project research findings. Such outreach as the Climate Change Seminar Series, the Tri-State Diversity Strategic Plan, the NSHE ESPCOR Facebook page and the NSF EPSCOR Website all provide vehicles for dissemination of research findings, events, program opportunities and information sharing for the Nevada NSF EPSCOR projects.*
- *Existing and new partnerships that resulted from this project have enabled us to reach more classrooms and teachers for the specific purpose of implementing the cyberlearning materials. These individuals come from various areas, including education.*

Growth in knowledge and/or research skills (Q13)

Survey respondents commented on growth in knowledge and/or research skills. Fourteen did not provide an answer, and five stated this was not applicable to them.

- *Being able to perform large scale modeling to assess the climate impacts*
- *Funding has allowed for new research opportunities in the field and in the lab, allowing new scientific discoveries and new research skills.*
- *Cyberinfrastructure has also facilitated collaborations between new faculty and existing faculty at multiple institutions.*
- *I have learned about evolving technologies and trends in software development and given me new ideas to continue working in this field as the cyberinfrastructure grows.*
- *I learned new perspectives and technical approaches on the topic of climate and water. I learned to work with a interdisciplinary team.*
- *Opportunities to participate in these research projects has increased my awareness and understanding of the importance of interdisciplinary science and clear communication among scientists, those that fund our work, and the general public. It has provided me with opportunity to further develop my research, technical, critical thinking, and communication skills while still an undergraduate student.*
- *Specifically, the project has allocated resources for cyberlearning initiatives that have synergy with many interests. In particular, using open-sourced materials on the infrastructure funded by the project allows for more fidelity in terms of data collection (usage statistics) and interaction data. This feeds both my personal knowledge and research experience/skills.*
- *It has increased my capacity to conduct research as well as teach.*
- *I have learned about more sophisticated equipment for field research.*
- *My growth in knowledge has primarily been of climate change and downscaling climate models. (thanks to UNR). Before EPSCoR, this was a foreign language to me. Now I understand the modeled data I put into my hydrological models.*
- *As far as research skills go - or skills as a researcher. I am now much more familiar with the grant application process and the admin side of research. Something I avoided if possible in the past has now become less daunting and more more doable.*
- *By attending the climate modeling workshop I acquired valuable skills that I'll use to enhance my thesis and my software.*
- *I better understand cyber-infrastructure issues and constraints/issues involved in connecting data-intensive science to education.*
- *I have partnered with Jae Ryu for research collaboration.*
- *CSI is submitting an IWG to host an exploration of educational outreach activities among the tri-state consortium and how to better communicate, coordinate, and expand without duplication (submission 12/11).*
- *We have had several refereed software engineering papers and on the data portal design and the model coupling. We have also been asked to submit a paper to a special issue of a journal on these topics.*
- *The CI investments have really allowed me to grow in my understanding of computer networks, data interoperability, and data documentation and management. Furthermore, it has helped me establish relationships with faculty to understand better their data management issues and CI-related desires.*
- *I had the extend my knowledge of software engineering and human-cmputer interaction to new application areas for me, all related to climate change research. This, in turn, has enabled me to identify research and development opportunities that if properly pursued could result in substantial benefits for the scientific community (better research tools, increased productivity).*
- *By working with project leadership within Nevada, and the Tri-State Consortium (Track 2),integration of EOD objectives and activities have been broadened. New integrative collaborations and partnership have grown out of the increased knowledge gained from coordinating and participating in facility and people development activities.*
- *Not relevant - I was invited to present at the 2011 Tri-State EPSCoR meeting, but have not otherwise been involved in the project.*

Increased and improved business development (Q14)

Survey respondents commented on activities related to increased or improved business development. Fourteen respondents did not provide a response, and five stated this was not applicable to them.

- *The cyberinfrastruce objectives to get the climatic change, weather and hydrologic data (to name a few) to researchers , academia and private industries will expand this field which in turn will create lot of research and jobs opportunities in future.*
- *I learned and received valuable know-how about the web mapping and web service technology that has good business potential in the water resources field*
- *CSI Board of Directors has officially recognized STEM as a priority for CSI and outreach into the community (June, 2011).*
- *It has led to several groups meeting to put together proposals for future research funding. We have also been able to hire people to work in these areas and train graduate students*
- *Increased the ability to be competitive for future funding.*
- *Business development? Not sure I understand, this is about science and education, and we produce information, concepts, and people who fuel the business economy.*
- *Being able to implement large scale modeling and share the information which helps improve visibility and future proposal opportunities*
- *I hope that the public release of the Nevada Climate Change Portal will open up many opportunities for business development.*
- *Not relevant - I was invited to present at the 2011 Tri-State EPSCoR meeting, but have not otherwise been involved in the project*
- *I am relatively new to the project, so not at this time.*