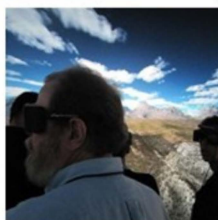


RAGGIO RESEARCH CENTER 2016 SUMMARY & ANNUAL REPORT



Mission Statement and Goals

The Raggio Research Center (RRC) for Science, Technology, Engineering and Mathematics (STEM) Education was created in the College of Education at the University of Nevada, Reno in 2002 as an educational outreach and training facility for primarily STEM education and STEM fields.

Mission Statement

The Raggio Research Center for STEM Education in the College of Education at the University of Nevada, Reno advances the theory and practice of science, technology, engineering and mathematics (STEM) education through collaborative research, development, instruction, dissemination, leadership and outreach.

Our Goals

1. Conduct cutting-edge research on STEM education at the highest level on questions of state and national importance as applied to Nevada's needs.
2. Recruit and promote STEM education opportunities for all students at all levels in formal and informal educational settings.
3. Actively promote STEM education opportunities for traditionally underrepresented populations as specified by the Next Generation Science Standards as: Economically Disadvantaged, Race and Ethnicity, Students with Disabilities, English Language Learners, Girls/Women, Alternative Education, and Gifted and Talented students.
4. Conduct professional development for better integrated STEM teaching PK-20.
5. Form interdisciplinary research teams of STEM content including university faculty, staff, graduate students, and undergraduate students together with teachers to develop, deliver, and assess/evaluate programs and activities.
6. Serve as an interdisciplinary education center to develop research-rich experiences for pre-service and in-service teachers to deepen and enhance STEM concepts and pedagogy.
7. Develop outreach activities and programs for students of all ages to support knowledge acquisition in the STEM disciplines.
8. Disseminate standards-based and scientifically supported research and information on STEM education.

Message from the Executive Director



David T. Crowther, Ph.D., Executive Director

Raggio Research Center for STEM Education

Welcome to the annual report for the Raggio Research Center (RRC) for Science, Technology, Engineering, and Mathematics (STEM) Education, housed in the College of Education at the University of Nevada, Reno. This report is an update on our current grants, projects, and collaborations, our dedicated staff, and offered services.

The RRC has had an incredible year and continues to grow in grants, projects and new collaborations. The RRC is associated with over \$32 million dollars of grant related projects and is managing over \$4 million dollars of funding spread across 10 funded grant projects, all culminating from over 25 projects actively pursued by the RRC this year, several still in review. These grant related projects are collaborations at UNR with the College of Education, College of Science, College of Engineering, the University of Nevada, Las Vegas, and have related work in all 17 school districts across Nevada.

Although there are many wonderful STEM related projects associated with the center, it is of note that we highlight a couple of successful and ongoing projects. The Northern Nevada English Learning Initiative (NNELI) will be finishing its 5th year in a collaboration to train pre-service and in-service teachers and paraprofessionals to work with EL students by seamlessly integrating content and language through STEM content instruction. To date, we have worked with 58 pre-service teachers, 31 in-service teachers, and 59 paraprofessionals, and we look forward to further collaboration with WCSD when this grant ends.

We are also in the 3rd and final year of Project ReCharge, an NSF I-TEST grant where we have worked with 11 schools to train faculty and students in energy education that has resulted in student led energy efficiency projects in three schools saving the district over \$40,000 annually in energy costs. This year the grant extended to Douglas County High School in an effort to become more regional in our efforts for this energy program. There are several extension grants submitted to continue this great work in Northern Nevada.

The RRC is a crucial partner in the Moving Teachers through Awareness of the Nevada Academic Content Standards in Science (MANTA). This grant, funded by the NDOE MSP worked with UNLV and the three Regional Professional Development Programs (RPDP) to train 90 Next Generation Science Standards (NGSS) / Nevada Academic Content Standards in Science (NVACSS) regional trainers to help the State of Nevada transition from the old science standards to the new NGSS based NVACSS. This grant will impact all 17 school districts by the time it closes.

On a personal note, I was elected the President-Elect of the National Science Teachers Association (NSTA) for a three year term that began on June 1, 2016. This is a great honor for Nevada, UNR College of Education, and the Raggio Research Center to be connected at the national level. With that said, this appointment has taken time away from the center and I would like to recognize our fantastic directors and staff who have had to work many more hours to keep the center in top notch performance. The success of any center is a reflection of the hard work of the many people that make its success. With your help and collaboration, we look forward to another productive year.

The Raggio Research Center at a Glance

Funded Projects	Collaborators	Raggio Amount	Total Amount
EPSCoR grants - (Experimental Program to Stimulate Competitive Research)			
EPSCoR programs include: CLASSP - (Cyber-Learning Activities to Scaffold STEM Practices)	Raggio Research Center (North) (L)* UNLV (South)	219,304.84	749,700.00
NEXUS - The Solar Energy-Water-Environment Nexus in Nevada - program includes:	Raggio Research Center UNR UNLV DRI Workforce Development (L)	554,666.49	23,000,000.00
SCIP - (STEM Career Investigation Program) NERDS - (Nevada Educators Really Doing Science)	Raggio Research Center (L)		
K-6th Grade NGSS	NV Virtual Academy (L) Raggio Research Center	10,000.00	40,818.00
MANTA - (Moving All Nevada Teachers Through Awareness of the NVACSS) a Nevada Department of Education Math Science Partnership 2016-2017	UNLV (L) Raggio Research Center	93,377.00	315,000.00

***(L) denotes project lead organization**

The Raggio Research Center at a Glance

Funded Projects	Collaborators	Raggio Amount	Total Amount
Meaning of Life grant through the Nevada Department of Education	Lyon County School District (L) Raggio Research Center	20,000.00	240,000.00
NNELI - (Northern Nevada English Learning Initiative) a U.S. Department of Education grant.	Raggio Research Center (L) Washoe County School District	1,935,167.00	1,935,167.00
Project ReCharge - ITEST grant (Innovative Technology Experiences for Students and Teachers) through the National Science Foundation.	Raggio Research Center (L) Envirolution LoadIQ	1,178,340.00	1,178,340.00
Python - (College/Career Readiness-STEM Program) through the Nevada Department of Education.	Education2000 (L) Raggio Research Center	23,065.00	402,026.21
SETNA - (State Education Technology Needs Assessment) through the Nevada Department of Education.	Raggio Research Center (L)	20,000.00	20,000.00
Wonders of Mekong through US Agency for International Development	UNR College of Science (L) Raggio Research Center	20,000.00	4,800,000.00

Total Raggio Funding:	4,073,920.33
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***(L) denotes project lead organization**

A Message from the Directors

Jacque Ewing-Taylor, Ph.D.

Director of Grants and Evaluation

The Raggio Center has continued to develop grant-funded programs for the benefit of Nevada's teachers and students, and to provide evaluation services in support of others' grant projects. In 2016 we wrote grant proposals to the National Science Foundation (NSF), the National Institutes of Health (NIH), the U.S. Department of Education (USDoEd), and the Nevada Department of Education (NDE). One was funded, and several remain under review. We also provided evaluation services to numerous grant projects in the College of Engineering, Washoe County School District, and local non-profit agencies. To address the significant fiscal challenges of running a Center without State funds and little university support, we are expanding development efforts and hope to obtain funding to enable us to continue our work on behalf of the teachers and students in Nevada's school systems as well as our undergraduate teachers-to-be. However, given that some projects are coming to an end, and until development initiatives are fruitful, I have reduced my work schedule to three days a week. I am confident our remaining staff will continue to provide the excellent service for which we have become known.



Richard Vineyard, Ph.D.

Director of Science STEM Fairs and Festivals

This year, we are continuing to grow the Nevada Science Olympiad Program in northern Nevada and the state. The 2017 Olympiad will be held on Saturday, March 4, 2017, at the University of Nevada, Reno. The headquarters for the competition will be the Davidson Math and Science Building. This year the Science Olympiad is supported by the Colleges of Science, Engineering, Agriculture, Biotechnology & Natural Resources, and the Raggio Research Center for STEM Education. There are 20 high school teams and 15 middle school teams registered for the state competition. We are very happy that this year we have two new schools from the Washoe County School District (WCSD) as participants: AACT, and Depoali MS. Science Olympiad is the most exciting and engaging science/STEM focused academic competition offered for all students. Each team of up to 15 students (B Division, grades 6-9; C Division, grades 9-12) competes in a total of 23 events that cover the full range of science and engineering content. This year we are again supporting the Elementary Science Olympiad program in Clark County School District and working with the GATE program in WCSD, to generate interest in starting a similar program in northern Nevada. In addition, we are also working to support the Western Nevada Regional Science Fair, which is celebrating its 50th anniversary in 2017.



Message from the Directors...continued



Daniel W. Ruby

Director of K-12 Outreach and Informal Science

During 2016, as director of K-12 outreach and informal science education, I oversaw two programs: the AACT Rover program and the Pathway to Space program.

The AACT Rover and Human Powered Vehicle (HPV) program, now in its sixth year, is a hands-on STEM training for teachers and secondary students through the WCSD Academy of Arts, Careers, and Technology (AACT) that includes participation in the annual NASA Rover Challenge Competition for human-powered extraterrestrial rover design as well as student participation in the World Human Powered Speed Championships every fall in Battle Mountain, NV. Our student team took third overall in this competition among both high school and college teams, and was the fastest team in the continental United States. In 2016, we expanded this program to include students from other signature academies through advanced manufacturing of human-powered vehicles and in 2017 we expect to send multiple teams with students from multiple high schools, TMCC, and the engineering program at the University of Nevada, Reno.

Pathway to Space is a teacher-training program that developed and trained teachers in grade-banded NGSS-aligned curriculum kits for exploring our atmosphere through high-altitude balloons, powered flight, and instrumented rockets in partnership with the Regional Professional Development Program (RPDP). For 2016, we added an unmanned aircraft systems unit to the program, and participants were inspired to develop programs at their schools around aeronautics, computer programming, and underwater exploration.



Professional Staff



Sandra Prytherch

Program Manager, Education Grants

Sandra came to the Raggio Research Center as Project Coordinator of the NNELI grant in 2012. She continues in this role, while expanding to develop and manage other projects and additional staff. Sandra is the founder of the Community of Bilingual English-Spanish Speakers (CBESS), an intercollegiate and cross-institutional group focused on broadening participation of linguistically diverse students in STEM and the DELTA initiative. In 2017, Sandra led/contributed to the preparation/ submission of ten proposals for federal, state and foundation programs (one was funded and several more are pending.) Sandra and her husband are avid tandem bicyclists and international vegetarian cooks. They are the joyful parents of one daughter and caretakers of a python and many plants.



Shawn Pennell, NNELI Technology and Paraprofessional Coordinator

Since 2005, Shawn has worked on various grants for the Raggio Research Center. Currently, Shawn is working on the NNELI grant and serves as the coordinator for paraprofessionals and technology. She is also involved with the E-Learning for Educators program and the DELTA Initiative. She recently led a team of stakeholders in creating a proposal that was recognized by the White House Initiative for Educational Excellence for Hispanics for a commitment to create a career-ladder program for bilingual paraprofessionals to become certified K-12 teachers called PARALLELS.

Shawn received her dual degree in political science and international affairs in 2005. She earned her Master of Education in curriculum, teaching, and learning in 2009. Her father is hounding her for a doctorate, graduation TBD, and the focus will be experiential education. Shawn and her husband David have two wonderful children and a house full of pets, books, art, and music.

Professional Staff



***Rod E. Case, Ph.D., Principle Investigator
Northern Nevada English Learning Initiative,
NNELI***

Rod is an associate professor of TESOL (Teaching English to Speakers of Other Languages) in the College of Education at the University of Nevada, Reno and he is the principle investigator on the NNELI program. His research interests are in various aspects of inter-language pragmatics and second language acquisition. Rod has been at the University of Nevada, Reno since 2001.



Shanelle Davis, Project Coordinator STEM

Nevada alumna Shanelle Davis joined the RRC in April 2016, following 3 1/2 years at the College of Engineering where she coordinated programs and projects related to outreach and recruitment. At the RRC, Shanelle coordinates the SCIP (Stem Career Investigation Program) and NERDS (Nevada Educators Really Doing Science) programs and provides support to NNELI (Northern Nevada English Learning Initiative).

In her free time, Shanelle enjoys taking in the beautiful views of Northern Nevada via hikes and nature walks, playing on an adult indoor soccer league, crocheting, and learning about craft beer! Shanelle's favorite hobby is spending time with her husband Jason and their cat, Magnolia.

Support Staff



Brendi Gertsma, Accounting Assistant III

Brendi joined the Raggio Research Center March 2016, transferring from the UNR Foundation Accounting office where she did accounting and administrative work. Her work at the RRC has enabled her to gain experience in grant fiscal management, which she calls a “new realm” of accounting. Prior to university service, she worked in the healthcare industry for 13 years. Brendi successfully juggles work, family, youth coaching and school. She attends college in pursuit of a career in nursing and accounting. She is the proud mother of three very beautiful and gifted children.

Graduate Research Assistants



Timothy Robinson

Passionate for quality science education in all grade levels and schools, Tim has temporarily left the classroom and public school environment after a decade of teaching and participating in science-related NSF field work in many countries, to pursue his doctoral degree. After earning his Bachelor of Science in elementary education from Montana State University, he continued his higher education earning a Master of Education from the University of Tasmania while living in Australia. Tim is married to a brilliant ecologist and together they are raising two children to observe the natural world, ask questions, and more importantly have fun while doing so. Tim does research and data gathering for Project ReCharge.

Fond Farewells!



We bid “Farewell!” to Raggio staff--student workers, graduate research assistants, and administrative staff--as they moved onward to other opportunities.



Jeffrey Bouchard worked in the RRC since 2012 and leaves with his degree in computer science and engineering. Nathan Youmans was with the RRC since 2014, working on the NNELI grant and earning his Masters in Education, and leaves us to begin a student-teaching internship in social studies at Sparks Middle School. Dan Monk has worked on several grants, including SETNA 2016, and upon graduating with his Masters in Business Administration leaves the RRC to travel the world and explore the commercial greenhouse manufacturing process. Nick Vienneau served as a Library Assistant in the RRC since 2014, expanding science kit access in local classrooms. Finally, the RRC said good bye to Administrative Assistant Pamela Smith, who accepted a promotional opportunity elsewhere on campus.



We want to thank these individuals for their contributions to the RRC and we wish them the best as they embark on their new life adventures!

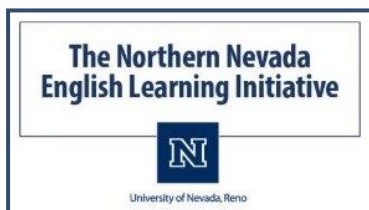


NNELI-Northern Nevada English Learning Initiative

The Northern Nevada English Learning Initiative (NNELI) is a National Professional Development Grant program fully funded by the Office of English Language Acquisition of the United States Department of Education. The grant was sought by the University of Nevada, Reno College of Education, Associate Professor of TESOL Rod Case, Ph.D., principal investigator, along with Jacque Ewing-Taylor, Ph.D., and David Crowther, Ph.D., co-Investigators, in consortium with the Washoe County School District (WCSD). NNELI was funded in May 2012 and is in its final year, with a total grant award of \$1,935,167.

NNELI's purpose is to improve instruction to English learners (ELs) by providing professional development opportunities for pre-service and classroom teachers as well as paraprofessionals in northern Nevada. In 2016, the final cohort of undergraduates completed their program of study, preparing them to apply for a Nevada Teach English as a Second Language (TESL) endorsement. Along with graduate level master teachers, they also completed coursework in Academic Language and strategies for working with ELs within science, technology, engineering and mathematics (STEM) content-based disciplines. NNELI offers paraprofessionals specialized training using multi-modal digital ESL/STEM tools which align with the rest of the NNELI program. Through 2016, 55 pre-service teachers, 31 classroom teachers and 32 paraprofessionals completed the NNELI program of study. The final year will include an intensive two-day workshop for classroom teachers who are responsible for teaching STEM subjects.

With a focus on community and sustainability, we continually strive to create new relationships and collaborations to advance the grant goals. Through social media, workshops, classes, networking opportunities, and our advisory board (with members from WCSD, College of Education (COE) Integrated Elementary Teaching Program, COE Secondary Teaching Program, Nevada Department of Education, and COE Student Advising Center), our aim is to contribute to our participants' community of practice while targeting sustainability and capacity building across participant types and organizations. To learn more about the NNELI program, please visit our website at: <https://www.unr.edu/nneli>



Project ReCharge

This year, Project ReCharge was recognized by GREENevada (Growing Resources for Environmental Education in Nevada) as an Outstanding Educational Program. Project ReCharge was awarded the Golden Pinecone award for its success in engaging students, faculty and staff in local middle schools and high schools to become energy detectives focused on saving their schools thousands of dollars in energy costs.



The project strategy involved implementing research-based energy efficiency curriculum in 8th grade mathematics and science classes, as well as high school environmental science, and Career and Technical Education (CTE) classes. Teachers attended professional development workshops which integrated energy and technology into their core curriculum, and hands-on inquiry science methods to create authentic STEM experiences for their students. Project ReCharge outreach included 47 teachers and over 4,500 middle and high school students from mostly rural, economically disadvantaged, and racially diverse communities.

Led by a highly-qualified team consisting of the University of Nevada, Reno's Raggio Research Center for STEM Education, Envirolution, a nonprofit energy education provider, and the Washoe County School District, the students discovered how building systems and appliances consume energy in their schools. Student groups used tablet computers to interact with real-time data: identifying and tracking major electrical loads in their school buildings. Using this data, student groups submitted proposals with energy conservation opportunities. Students, teachers, Envirolution staff, building control services engineers, and school district facility collaborated to implement these recommendations. These student driven projects are now saving the school district every year over \$44,000 while reducing the districts carbon footprint by 352,000 lbs. of CO₂.

Project ReCharge is designed to have triple bottom-line benefits. Teachers are provided with STEM/ICT resources that inspire students to pursue STEM careers, reduce school energy costs and introduce environmental benefits because of energy conservation. The work of these students and teachers has the potential to make a positive impact on a local, regional and national level that results in modern efficient, well-lit and comfortable school buildings that will not drain school budgets.

Project ReCharge is funded by a grant from the National Science Foundation, Innovative Technology Experiences for Students and Teachers (I-TEST) Project #DRL-1433597.

Nexus

The Nexus project is funded by the National Science Foundation (NSF) as part of its Experimental Program to Stimulate Competitive Research – EPSCoR program. The five-year grant is being conducted through different components across the University of Nevada, Reno (UNR), the University of Nevada, Las Vegas (UNLV), and the Desert Research Institute (DRI).

Understanding the nexus – or linkages – among solar energy development, limited water resources, and fragile environments is key to achieving benefits from solar energy in Nevada. Over the course of the five years, the Nexus project will create a center of research excellence on solar energy conversion to electricity within the context of minimizing its negative impacts on water usage and the environment.

Through Nexus, Nevada will develop innovative approaches to Cyber Infrastructure (CI) and science, technology, engineering, and mathematics (STEM) education, engage stakeholders, and build its workforce while diversifying its economy. Advanced CI capabilities will enable interdisciplinary research as well as education and outreach. Through a life-cycle approach, workforce and education development activities will build and sustain research capacity and Nevada's economic growth by (1) developing trained manpower at graduate, undergraduate, and community college levels that will supply needs of the solar power industry, environmental agencies, and the water industry; (2) developing and expanding a STEM teacher workforce; (3) enhancing education and public understanding of solar, water and energy that will lead to development of a sustainable STEM workforce; (4) establishing a sustainable social network for learning; (5) exposing and involving rural counties, K-12, and underrepresented communities to STEM topics and cutting-edge research; and (6) increasing participation in STEM education through peer-directed content and mentors.

The SCIP program (STEM Career Investigation Program); and NERDS program (Nevada Educators Really Doing Solar), are funded as part of the Nexus grant. These successful programs are highlighted on the following two pages.

Visit our website at: <https://www.nvsolarnexus.org>



SCIP (STEM Career Investigation Program)



The STEM Career Investigation Program (SCIP) is a successful program funded by the larger EPSCoR Nexus grant. This year, participation was open to high school sophomore, juniors and seniors in Washoe County, and college freshmen from the University of Nevada, Reno. SCIP provides students with opportunities to observe research and career presentations by STEM professionals in a wide array of STEM disciplines and specializations.

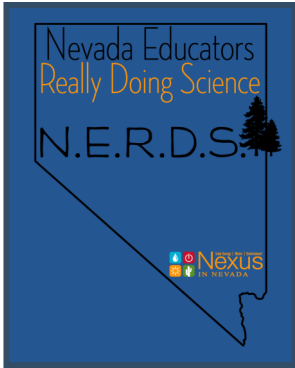
The SCIP seminar series consists of six sessions from February through March. SCIP is entering its final year in 2017.

During 2016, speakers from the College of Science at UNR, Tesla Motors, Renown Health, Washoe County Sheriff's Department, and the Nevada Advanced Autonomous Systems Innovation Center (NAASIC), were invited to present their current research projects to the students and discuss future job possibilities, academic preparation needed for someone with their degree, and area of specialization. Speakers were given an outline of expected talking points for their presentation. Among those expectations were educational background, current research and current job responsibilities. Speakers provided hands-on activities related to their professions and fielded questions from participants. Some highlights from the seminar series included a presentation from Julia Hudson, lead occupational therapist for Renown Health. Using a Functional Electrical Stimulus (FES), she demonstrated the use of electrical stimulus to help the body relearn how to walk or pick up items. Dr. Jennifer Hollander, from the UNR Biology department, brought human organs for the students to explore.

Evaluation results have shown significantly increased interest in STEM fields as a result of students' participation in SCIP.



NERDS (Nevada Educators Really Doing Science)



NERDS (Nevada Educators Really Doing Science), is a year-long program at the Raggio Research Center, funded by the EPSCoR Nexus grant. The program combines a focus on professional development in science teaching with research in science education. Participants in the program are educators from across the state of Nevada. The teachers are asked to participate in the research by completing questionnaires and surveys throughout the process. The NERDS program is dedicated to helping teachers develop their teaching skills in the subjects of science, solar energy, and environmental topics through the process of inquiry.

Every NERDS course is designed to lead teachers, step by step, from "expert"-designed investigations to student-centered investigations through an active process of participation. The field experience portion of the course takes teachers away from familiar ecosystems near their hometown into unfamiliar territory where they must start their learning from scratch, similar to what their students experience every time a new concept is taught. During the summer of 2016, teacher participants explored the Lake Tahoe region. They gathered data relating to native versus invasive species and quality of water at sites including the Tahoe Keys Marina, Emerald Bay State Park, and Taylor Creek Visitor Center on the south shore of Lake Tahoe. The teachers also studied lakes, ponds, streams and rivers which feed to and from Lake Tahoe using probe ware and Hach kits. The 8-day field experience research was funded by the Nevada EPSCoR Nexus grant. Participants then created standards-aligned units for use in their own classrooms.

Evaluation results indicate that participating teachers are more able and willing to use inquiry-based science in their classrooms.



CLASSP (Cyber Learning Activities to Scaffold STEM Practices)

Cyber Learning to Scaffold STEM Practice - CLASSP - is an EPSCoR Track 3 grant funded by the National Science Foundation (NSF). As a pilot project, CLASSP is a crucial next-step to understanding ways to promote meaningful STEM practices online. This state-wide project addresses the overarching question: how can innovative cyber-enabled instructional methods transform science, technology, engineering and mathematics (STEM) education, and increase opportunities for underrepresented populations? Specifically the project: (1) creates and establishes a cyber-learning methodology as a framework to increase STEM interest, participation and success as these students relate to inter-disciplinary content; (2) evaluates the effectiveness of badge and achievement systems from serious gaming literature; (3) identifies best practices to train and effectively support a network of teachers committed to implementing Next Generation Science Standards (NGSS), STEM, and the Common Core state standards using the infrastructure; (4) demonstrates the potential to scale infrastructure for local, state and national dissemination.

Teachers from Reno, Las Vegas and rural areas of Nevada traveled to the Raggio Research Center in August 2015 for a professional development workshop. Over the course of the past year, the educators have explored the 5-Featured Dynamic Inquiry Environment - 5-DIE - design framework approach for developing scientific literacy for use in their classrooms, each creating their own 5-DIE which they taught to their own classes. The 5-DIE method of instruction aligns with Nevada Next Generation Science Standards. CLASSP will be introduced to students in Nevada through an existing partnership within GEAR UP (Nevada Gaining Early Awareness and Readiness Undergraduate Program).



SETNA (State Educational Technology Needs Assessment)

Raggio Research Center was awarded the SETNA contract by the Nevada Department of Education to conduct a statewide technology needs assessment in 2016. The SETNA report is mandated by the Nevada Legislature, which requires a technology assessment every two years that directly influences state and district educational technology initiatives and funding. Other studies occurred during 2008, 2010, 2012, and 2014, in support of the needs assessment requirements set forth in NRS 388.795. However, the most recently implemented state technology plan, the Nevada Ready 21 (NR21) plan, places an even greater, more individualized focus on continuous technology accessibility for students than that found in previous plans, making the SETNA 2016 even more critical in determining the unique technology needs associated with this new plan. SETNA 2016 was guided by research questions pertaining to how technology has improved the field of education, including via usage in assessment strategies, as well as the capability and overall success rate of teachers to implement new technology effectively within their classrooms. Teachers, parents, and district technology coordinators were all surveyed about their experiences with technology usage and associated student learning outcomes pertaining to this usage.

SETNA 2016 findings indicated that while more teacher professional development has been offered to support the higher technology implementation requirements mandated by NR21, an increase of resources is still needed, especially those associated with the maintenance and infrastructural components of new technology equipment, such as internet bandwidth. However, SETNA 2016 also found that students have benefitted from one-to-one continual computer access. SETNA 2016 serves as the public's voice to Nevada Lawmakers regarding educational technology and as a result will initiate real technological advances in our local classrooms.



Neuroscience Career Exploration

The Raggio Research Center was pleased to work with Dr. Dennis Mathew, Assistant Professor, Biology, UNR College of Science, to engage high school students in exploring topics in neuroscience. In spring 2016, students from Dr. Mathew's upper level undergraduate class (BIOL-475) shared exciting presentations about traumatic brain injury, drug addiction, and placebo effects, among others with students at three area High schools (Reed, McQueen, and Damonte Ranch). The presentations focused on various elements of modern neuroscience research. The RRC and Dr. Mathew will continue to offer this outreach and career exploration activity to area high schools in 2017!

MANTA

Moving All Nevada Teachers Through Awareness of the Nevada Academic Content Standards for Science (NVACSS)

MANTA is a Nevada Department of Education Math Science Partnership 2016-2017 grant program. The Raggio Research Center for STEM Education has partnered with eight other leadership teams at the University of Nevada, Las Vegas, Clark County School District, Washoe County School District, the Southern Nevada Regional Professional Development Program, the Northeastern Nevada Regional Professional Development Program, and Nevada's Northwest Regional Professional Development Program for a statewide project in science education with the primary goal of raising awareness of Nevada Academic Content Standards for Science (NVACSS) in our state educators.

This has been done by gathering a group of 96 teacher leaders who are completing a 50-hour institute on the NVACSS and peer leadership. The workshops are being taught by higher education faculty and teacher educators from across the state. Dr. David Crowther, Executive Director of the Raggio Research Center for STEM Education and UNR science education professor, is leading the team from the University of Nevada, Reno. His team has instructed teacher leaders in Reno and Elko, Nevada as well as Las Vegas, Nevada. Upon completion of the workshops, the teacher leaders will develop and present workshops to teachers in their districts and regions, raising awareness of the science standards in Nevada teachers and moving science education forward in the state, fulfilling the project goal.

FOSS Science & EIE (Engineering is Elementary) Kits

The Raggio Research Center has a wide variety of science kits available for use by WCSD teachers and NNELI participants. These kits combine hands on activities and grade-appropriate scientific methods, allowing students to conduct exciting scientific investigations in a variety of subjects. In 2016, over 85 WCSD students benefited from FOSS and EIE kits borrowed from the RRC.

Project Python

Python Programming Course for Grades 7-12 College and Career Readiness-STEM Program

The Raggio Research Center for STEM Education has partnered with Education 2000, an educational product developer, in a College and Career Readiness Grant. Funded by the Nevada Department of Education, the grant targets 7-12 grade students' development of computer coding skills. The RRC is assisting Education 2000 in preparing for a Spring 2017 "kick off" event to introduce their Python-language-based programming course to educators and other stakeholders in and beyond the RRC network.

CBESS (Community of Bilingual English Spanish Speakers)

In 2016, the Raggio Research Center for STEM Education initiated the formation of the "Community of Bilingual English-Spanish Speakers (CBESS)", a broad inter-collegiate and community stakeholder group targeting the engagement of linguistically diverse students in STEM. The group collaborated to propose a program to provide opportunities for Spanish-English bilingual (SEB) high school students to explore careers in science and health care. CBESS has also explored opportunities to broaden participation in agriculture, the environment, and mathematics.

DELTA (Community of Bilingual English Spanish Speakers)

DELTA (Developing English Language Teaching Ability) is a STEM-ESL teacher preparation project based in the Raggio Research Center for STEM Education in the College of Education at the University of Nevada, Reno. DELTA's ultimate, long-term aspiration is the research, design and implementation of a multichannel pipeline to bring linguistically diverse students into the STEM workforce. DELTA has continued to engage in the development of a project, recognized by the White House Initiative on Educational Excellence for Hispanics to create a career-ladder to enable bilingual paraprofessionals to become teachers.

As an outworking of DELTA, UNR has partnered with TMCC and WCSD to create PARALLELS- the Paraprofessional to ARL Ladder with English Language Supports. This partnership is recruiting Spanish-English bilinguals, providing language testing and a career-based bridge course to prepare qualified candidates for the ARL program.

Dissemination

The following section outlines the annual publications and conference presentations generated from the research projects previously described in this report.

Connolly, C., Crowther, D., & Ewing-Taylor, J. (2016, January). Project ReCharge: Energy Efficiency with Real Time Data: Results of the Program Pilot Year. A Presentation at the International Conference of the Association of Science Teachers Educators (ASTE). Reno, NV.

Connolly, C. & Crowther, D. (2016, August). Project ReCharge: A STEM curriculum for Energy Efficiency. A Presentation at the Northern Nevada Math and Science Conference. Reno, NV.

Connolly, C. & Crowther, D. (2016, November). Engineering Water Wheels: A Three-Dimensional Approach for Integrating Science and Engineering. A Presentation at the Portland Area Conference of the National Science Teachers Association (NSTA). Portland, OR.

Crowther, D., Ewing-Taylor, J., & Connolly, C. (2016, April). Project ReCharge: Designing Energy Detectives in Your School! A Presentation at the National Conference of the National Science Teachers Association (NSTA). Nashville, TN.

Ewing-Taylor, J., Thornton, B., & Usinger, J. (2016). Promotion of organizational learning: The interaction of teacher education, instructional technology, and program evaluation. In G. Chamblee & L. Langub (Eds.), *Proceedings of the Society for Information Technology & Teacher Education International Conference 2016*, (pp. 2008-2010) Savannah, GA, United States: Association for the Advancement of Computing in Education (AACE).

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- Prytherch, S., & Sella, G., (2016, March). The Vision of Equity in the Workforce: Pipelines of Pipe Dreams? Conference presentation at the 2016 Northern Nevada Diversity Summit, Reno, NV.
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