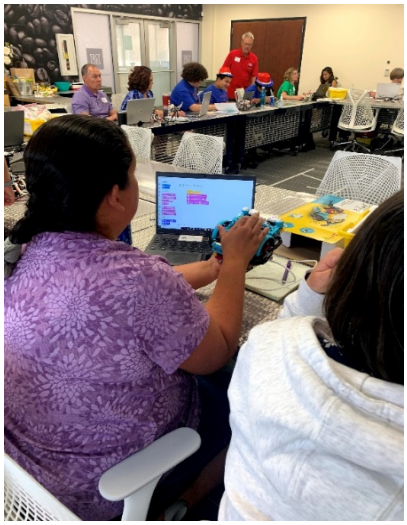
Desert Research Institute

NEVADA ROBOTICS


# Robotics Academy of Nevada Report 2021

NEVADA GOLD MINES

# The Robotics Academy of Nevada (RAN) Teacher Training



Thanks to our founding partners, Tesla, and Nevada Gold Mines, DRI's Nevada Robotics successfully orchestrated the RAN teacher training after its 2020 cancellation due to the global pandemic. Despite several challenges along the way, the 2021 training reached close to **100** teachers with **175** attendees for all robotics trainings.

Virtual & In-Person: The original plan was to host a virtual pandemic-adapted training and send each teacher a robot to train at home. In April, the state announced it would fully open by May 1, so we quickly pivoted and planned for both in-person and virtual sessions, which required us to purchase more robots. The single event morphed into **three statewide events** in Reno, Henderson, and online from June 21-25. **This change in training modality created a logistical hurdle and required us to purchase and distribute enough robots for both in-person and virtual hands-on trainings.**

Location: We were fortunate to find space for the in-person events in Henderson at the Pinecrest Academy, Sloan Canyon, and at the Innevation Center in Reno. As the training date drew near, Nevada Robotics **distributed robots to almost 50** teachers for virtual training and **two sets of robots** for the north and south in-person events. Without robots, would have been no hands-on training. While the pandemic-prone school year halted progress on new teachers and teams, this training served to **reboot robotics in Nevada!**

We provided 175 training units throughout the week - 51% in-person and 49% online. We trained 97 individual teachers from 82 distinct schools & organizations in 4 robotics platforms and saw some new and some familiar faces ready to kick start their robotics programs.

## Our Trainers

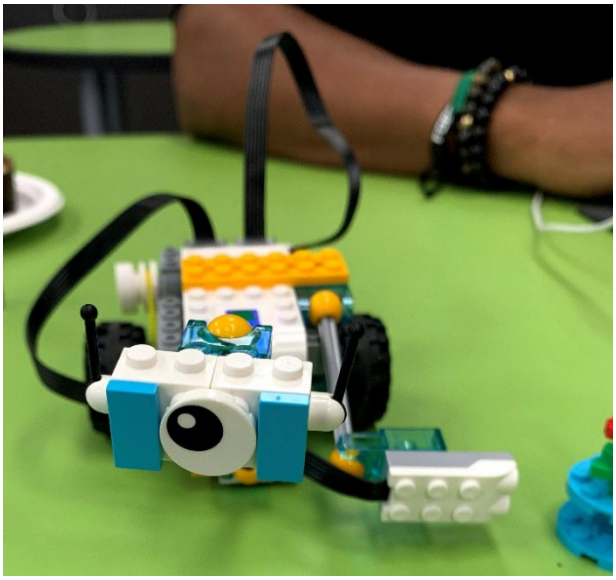
**The REC Foundation** supplied two trainers in each location who trained in-person during the day and offered a virtual event in the early evening. REC offered 3 days for the VEX IQ Challenge competitive robotics for 4th - 8th grade teachers and a 2-day training on the VEX GO robot for elementary teachers. These hands-on events provided instruction for building and coding robots from the ground up as well as a quick overview of the free VEX Robotics Educational Resources such as STEM Labs, Teacher Certification, and the extensive VEX Knowledge base. VEX training saw 98 attendees, with 65% learning the competitive VEX IQ platform.

**FIRST Nevada** supplied a virtual trainer along with in-person support trainers to host the virtual and in-person training at the same time. The FIRST LEGO League (FLL) training lasted three days and provided instruction for 4th - 8th grade teachers in the robot building and programming stages that engage students in research, problem solving, coding, and engineering. The foundation of the program is the FIRST® Core Values, which emphasize teamwork, discovery, and innovation. Students emerge more confident, excited, and equipped with the skills they need in a changing workforce. The FIRST LEGO League Jr. training was held over a 2-day period and is designed for K - 4th teachers. Trainers taught using the LEGO® Education WeDo robot. In total, FIRST trained 74 attendees, 62% on the competitive FLL platform.

# Our Robots

For the first time since its inception and due to challenges related to the global pandemic, Nevada Robotics purchased robots for this year's event so that all participants could experience hands-on training. These robots will serve the **661** attendees who have trained at RAN events since 2018.

RAN robots will reach approximately **1,600** students over the next year. The Nevada Robotics' Robot Lending Library includes the following:



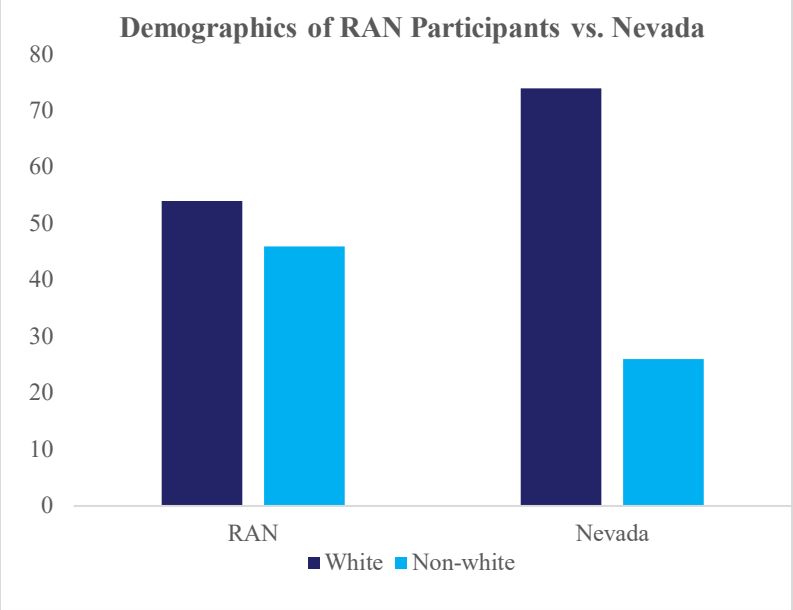
- ✓ 75 VEX GO Kits
- ✓ 35 VEX IQ Kits
- ✓ 33 FIRST LEGO League Kits
- ✓ 60 FIRST WeDo Kits

This **sustainable** Robot Lending Library will provide robots for Nevada Robotics' Community Outreach Robotics Program (CORP) events and activities at the new K-12 Robotics Center (and across Nevada) and support **on-going Teacher Training** for years to come.

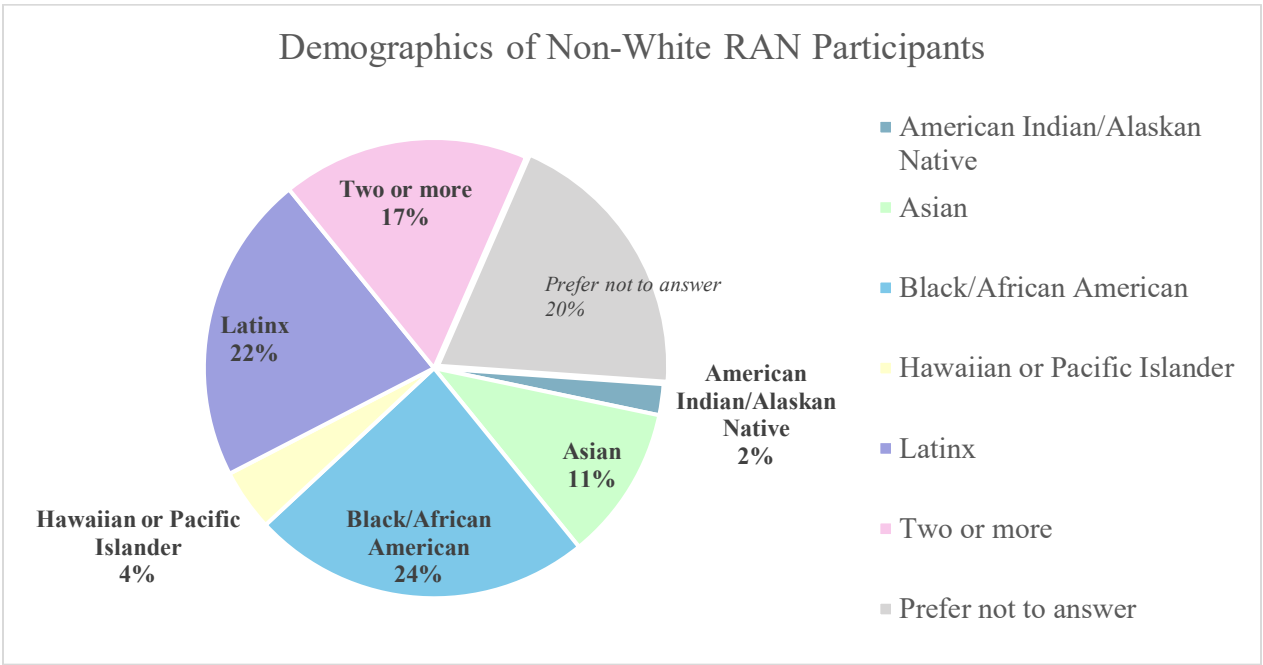


# Educator Diversity

RAN served a diverse group of educators from across the state of Nevada. The trainings reached minority educators who largely work with underrepresented youth in Nevada.




- 46% of all RAN participants identified as non-white compared to Nevada's 26% reported in the 2019 census. 54% of RAN participants identified as white or Caucasian; the 46% who did not are identified in the graph below
- 69% of trainees teach at Title 1 schools
- Over half of the participants currently teach at middle/high schools
- 20% attended from RURAL Nevada locations including: Battle Mountain, Carson City, Dayton, Duck Valley Indian Reservation, Elko, Fernley, Nixon, Owyhee Valley, Pahrump, Silver Springs, Smith Valley, West Wendover, and Yerington
- 12 years is the average years of teaching
- 69% identify as female

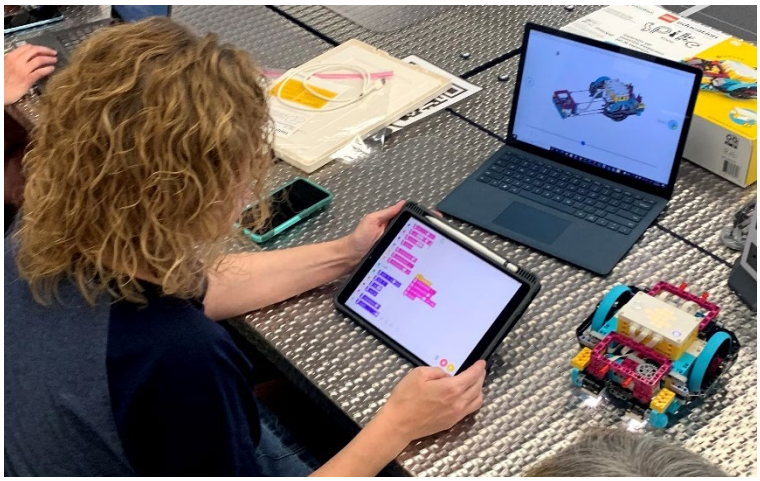


# Educator Perspectives

All trainees agree that robotics provides a great deal of motivation for students to engage in school. The majority of the educators reported that they were 'very engaged' during the training sessions.

*"We built a couple of models. Then, we were able to explore. There's a Morse code key. I can't believe that!...I may do that activity with my students first!" – Las Vegas Trainee*

While they hail from across the Silver State and from a variety of backgrounds and experiences, one thing all of the participants agree on - the importance of robotics and STEM education for all students at all levels for their future success and college and workforce readiness in all fields and disciplines. And our educators think that ALL teachers need STEM and robotics training.



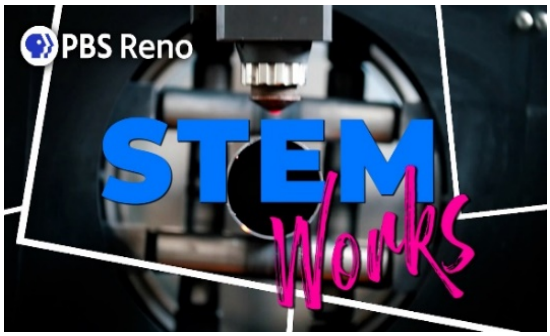
*"I have worked in several fields. Robotics is being used in (many fields). It should be important for (all) students to at least learn basic programming." – Virtual Trainee*

# Beyond the Bots

In addition to hands-on robotics training, we also had guest presenters at each location.

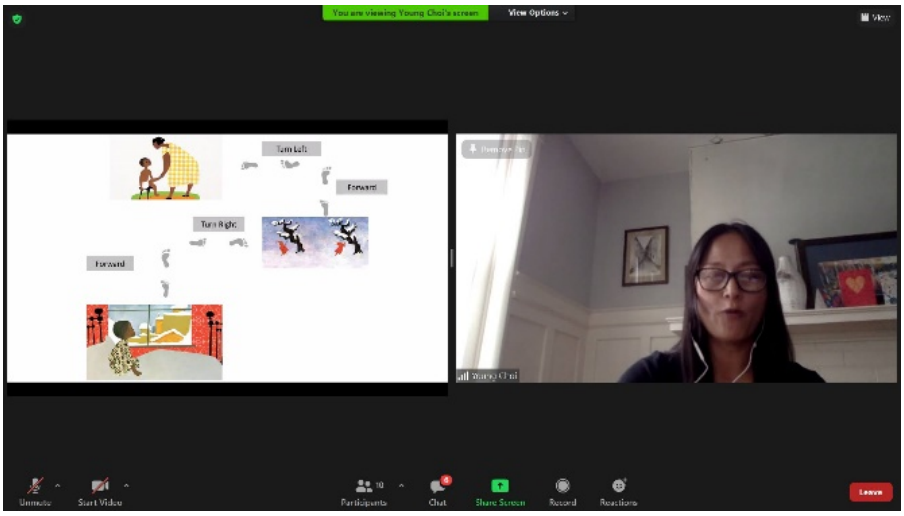
***Dr. Brendan O'Toole**, UNLV College of Engineering:* Dr. O'Toole brought his college students (left) to Pinecrest in Henderson to promote the Tesla-supported SAE: A World in Motion (AWIM) program.


***Dr. Dave Feil-Seifer,*** (right) *UNR College of Engineering:* Dave was one of our guest speakers in Reno who spoke with teachers about Unplugged Robotics and the value of STEM and robotics education for all.



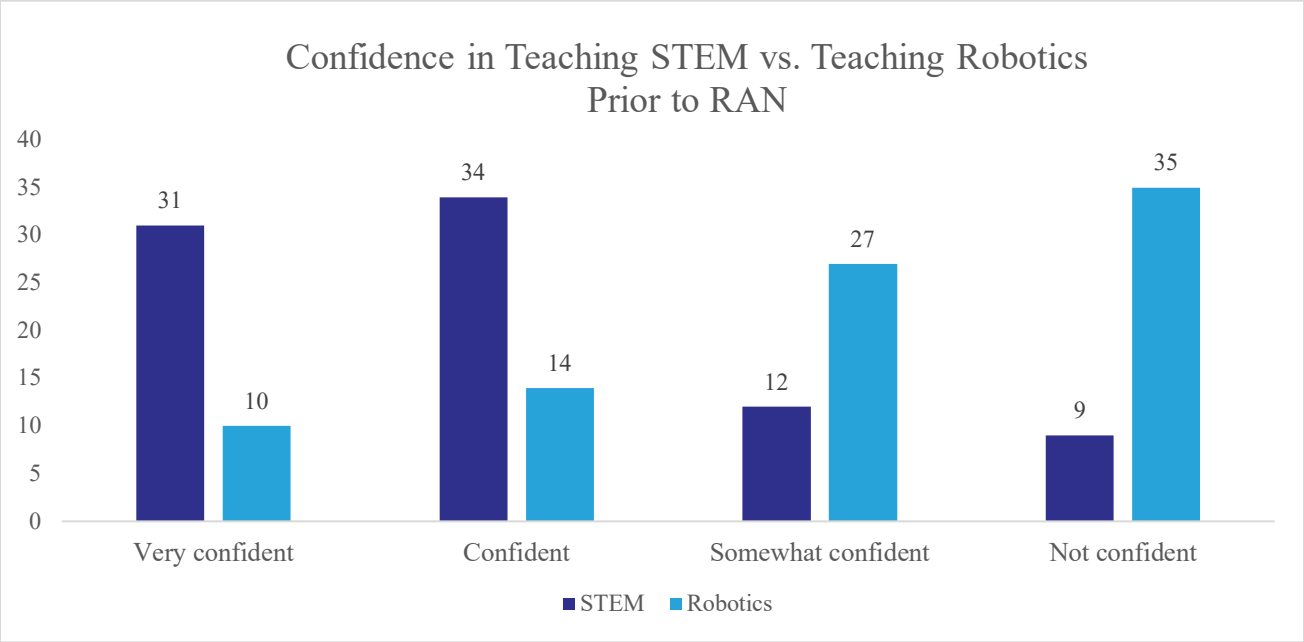

***STEM Works PBS Reno & DRI:*** Teachers viewed the new STEM Works short films that highlight the local and diverse STEM workforce in our area. These videos showcase career opportunities in Nevada and will increase visibility for local companies.

***Dr. Youngae Choi, Nevada State College:*** Dr. Choi offered a 1-hour virtual training for PK - 2nd grade teachers focused on Computational Thinking through integrating plugged and unplugged activities and computational literacy.



# The Gain

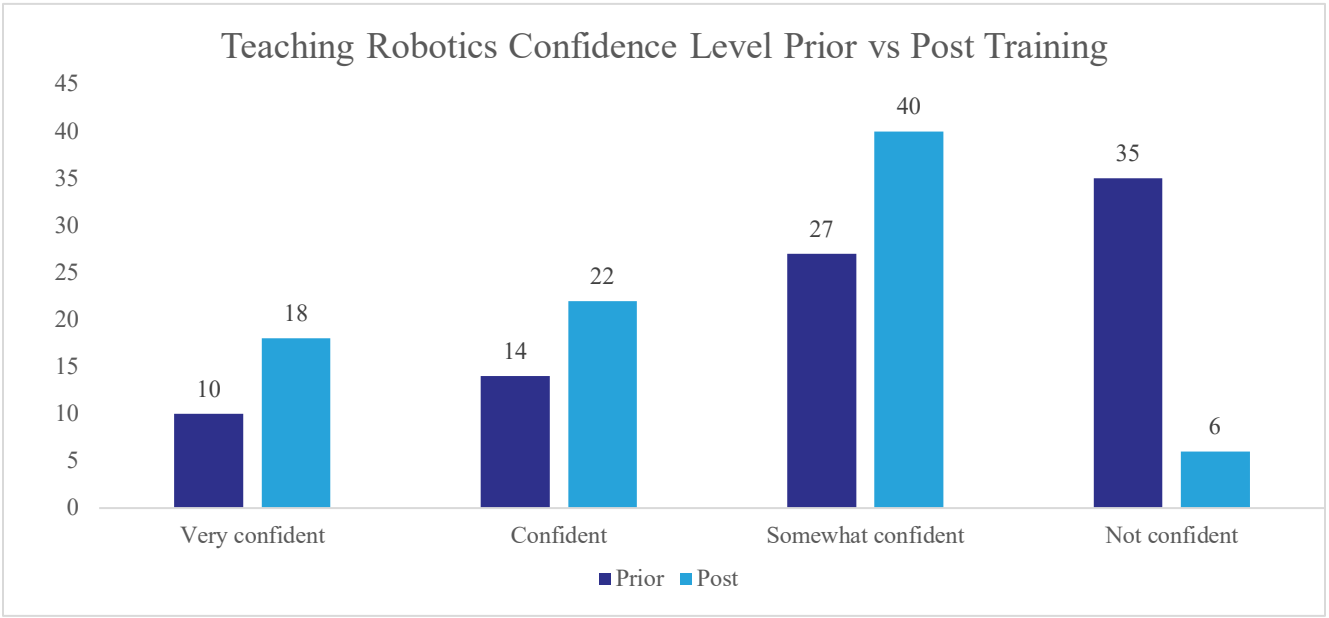
Prior to RAN, teachers reported that they felt confident teaching STEM, but lacked confidence teaching robotics.




**Trainees overwhelmingly expressed an increase in confidence after the training.**

This will lead to

- the creation of **new robotics teams**
- an increase in **STEM workforce and career opportunities**
- an increase of **girls in STEM** education
- a greater **awareness among educators and families** about the importance of STEM



# The Feedback

- ✓ 98% report that RAN trainings are EFFECTIVE or VERY EFFECTIVE in supporting educators to start a robotics program at their school or organization *(data on new team creation will be collected during the 2021-2022 school year).*
- ✓ 96% say they are LIKELY or VERY LIKELY to recommend robotics training to their peers
- ✓ 100 % will LIKELY or VERY LIKELY attend additional robotics and STEM training sessions
- ✓ 86% of the trainees gave RAN 2021 an A grade for excellent (and 14% a B).


"I have learned more in this training than I have in years of educational trainings."
– Virtual Trainee

# The Future – RAN 2022

The Robotics Academy of Nevada's 2021 session was a major success. With its conclusion, Nevada Robotics is looking to next year – RAN 2022. Plans are underway for the following goals and areas of growth:

- ✓ 250+ trainees
- ✓ 4 locations–Reno, Las Vegas, Elko, Virtual
- ✓ Skill level groups – Beginner, Intermediate & Advanced
- ✓ Special session on team fundraising and marketing resources
- ✓ Nevada STEM workforce development presentations