

LIGO SCIENCE EDUCATION CENTER

Annual Evaluation Report

2020-2021

Inverness Research, Inc.



**INVERNESS
RESEARCH**

INTRODUCTION

Inverness Research, Inc., a private firm headquartered in Inverness, California, is the external evaluator for the *LIGO SEC Science Education Center* (LIGO SEC). Inverness Research (IR) has been studying the LIGO SEC since its inception in 2004. Our role as evaluators in this phase of the project is to document and provide feedback on the existing work of the Center and its partnerships, as well as new partnerships and programs.

This report summarizes evaluation findings for the period June 2020-May 2021. Our brief report focuses primarily on findings related to LIGO SEC's adaptation to working in the virtual space, due to COVID, providing virtual docent training, professional development to educators, events to youth, and field trips to classrooms. In this summary we provide the main findings of how that shift went and highlights of evidence; please see the attached summary on the NSBE event and docent interviews for more detailed findings.

Evaluation Tasks

- planning calls among the evaluation team to discuss and plan ongoing work and to debrief observations and interviews
- drafting a scope of work for the year
- planning calls with the LIGO team to plan upcoming work and discuss findings
- conducting interviews with nine new and veteran docents and writing a summary report
- observing new online docent trainings and providing formative feedback to the LIGO team
- observing the annual NSBE event
- observing school virtual field trip events
- observing MISE virtual professional development for teachers
- Preparing this annual report

FINDINGS

Overall, LIGO SEC staff have done an admirable job of shifting all of their work to the virtual space over the past year.

Adapting the Docent Training

- ***The training provided the docents with what they needed to facilitate and assist with the field trips and special events.***

Interviews with docents indicated that the training was providing them with what they needed to be successful and having a positive experience in the program. They reported that the online training prepared them to both present or moderate activities. They gained additional skills in

communication through having to work in the virtual space, particularly in using a variety of web-based video platforms. In addition, they learned the importance of being specific with their language, and how to be direct in asking for input and feedbacks from the groups they were working with because of the lack of in-person, visual cues they usually could rely on.

➤ ***There were some unexpected benefits for docents to the virtual work.***

Interviews with docents also indicated some positives from being virtual, including the following:

- they had personal attention from LIGO staff
- they had opportunity to practice their presentations multiple times
- there was more flexibility in the scheduling of the training

The veteran docents had the experience of being a mentor which was positive, and the docents had the experience of both presenting and moderating.

➤ ***Docents did a good job in both presenting and moderating activities.***

In all the activities we observed, the docents did a good job with their roles. They were all very warm and friendly, their introductions about themselves were brief and drew participants in, and they worked efficiently with the technology. The docents did a good job toggling between their faces, the hands-on activities, and slides. They were supportive and encouraging of participants' observations and work throughout the activities. They all tied the activity in with the LIGO research work well, and they asked good questions throughout. The moderators did a good job monitoring the chat.

Adapting Core Activities for Use With Virtual Field Trips and Events

➤ ***Activities adapted for virtual field trips and events generally worked well.***

We observed four field trips and one event and the activities LIGO SEC staff adapted for the virtual setting (we primarily observed the engineering challenge and the disappearing penny) worked well.

➤ ***For the most part, youth were engaged and actively participating.***

It was sometimes difficult to judge the engagement level of participants in the virtual setting, as oftentimes, participants had cameras turned off and microphones muted. In the best interactions, docents and LIGO staff could see the entire classroom or set of participants and interact with them both "live" and through the chat. At all times, docents and staff were warm and inviting, encouraging of participants' conjectures and observations, promoted trial and error, promoted taking risks and taking on challenges, and always worked the science happening at LIGO into the activities in authentic and meaningful ways.

- ***Docents struggled at times with the lack of interaction with participants during the events.***

During the NSBE sessions and some of the field trips, docents could not see or hear the participants they were working with. They want to build relationships with participants and encourage their exploration with science and technology, and that is hard to do when they cannot see participants faces and microphones are muted.

- ***The virtual platforms were the biggest limiting factor.***

Docents were primarily trained in zoom, but the teachers and districts sometimes used other virtual formats, such as google meet. Depending on the format, the presenter cannot see more than one or two “squares” of activity on the screen. There were also audio difficulties (echoes and feedback) that limited the students’ abilities to interact with the docents and staff in one classroom. All of this makes it hard to develop relationships.

Adapting Professional Development

The MISE workshop we observed involved LIGO SEC staff sharing a solid, thorough set of light and color activities with 14 middle school teachers. At least some of the teachers were engaged and actively participating in the activities. Because the workshop took place on a Saturday, teachers were at home, and many had their cameras off and microphones muted because their families were home. This made it difficult to know the extent to which teachers were engaged in the workshop. A few of the teachers, however, did include their children in the light and color activities. As with the activities for youth participants, these activities encouraged problem solving, making observations, critical thinking, and making hypotheses, and authentically tied in the LIGO science. The final activity on waves was perhaps too complex for the end of the day on a Saturday, and teachers found it difficult to follow and confusing.

SUMMARY

LIGO did a good job responding to a challenging situation. They capitalized on the flexibility and affordances of the virtual setting in the docent training, providing docents with new skills. And they were able to provide docents, teachers and students with authentic, inquiry-based science experiences tied to LIGO science. So many of the challenging aspects of working in the virtual space (platform constraints and technical difficulties) were well beyond the control of LIGO SEC staff. As LIGO heads into this next year of work, they are cautiously optimistic about having in-person tours and field trips again, and have planned a scaled-set of opportunities to bring students and teachers back into LIGO that will start with small numbers and build from there.