

Journey Through the Universe

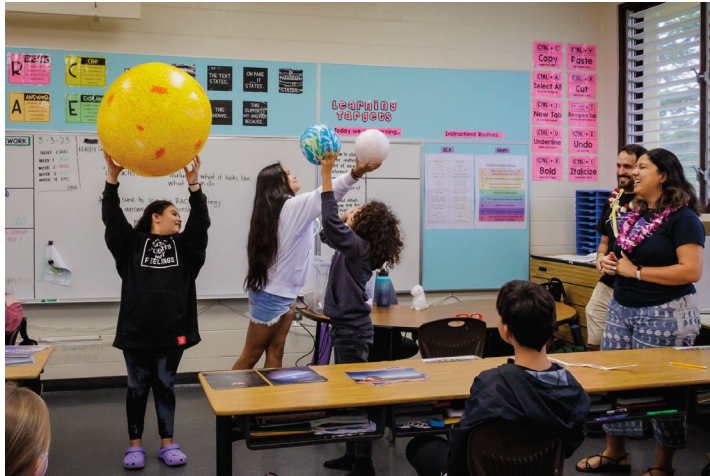
Full Summative Evaluation

27 March 2023



Mahalo to our Journey through the Universe 2023 Community!





Journey Through the Universe is a local education and outreach program led by NSF's NOIRLab, the Hawai'i Department of Education Hilo-Waiākea Complex Area, and the Thirty Meter Telescope International Observatory. The program promotes science education in Hawai'i Island school districts and inspires students to explore Science, Technology, Engineering and Math (STEM) fields by developing literacy in science. *Journey* endeavors to foster curiosity and wonder about our Universe, and the cutting-edge research and technology that is allowing us to understand our place in the cosmos like never before. The success of *Journey Through the Universe* over the past 19 years is evidence of the support from our local community partners across government, business, astronomy and higher education, and our foundational partnerships.

Evaluating the Impact of the Program

Celebrating its 19th year, from 27 February to 2 March 2023, *Journey Week* included in-person classroom presentations and career panels. This Feedback Summary is a collection of the data obtained from *Journey Through the Universe* teacher and astronomy educator surveys. Every year we collect and evaluate these data to find new ways to improve our program; we hope this summary will help to make our 20th year even better!

Journey Through the Universe Deliverables



Connections

Journey Week establishes effective relationships between STEM professionals and local teachers and their students.



STEM Careers

Career Panels and STEM professional presentations in classrooms provide opportunities for students to explore a variety of careers in STEM.



Scientific Literacy

Classroom presentations support grade-level standards and provide a space for practicing science skills.



Wonder

Journey Week's hands-on experiences for students foster curiosity and wonder about our Universe and our place in space.

Journey Through the Universe 2023 Reached...

- 11 schools
- 160+ classes
- 3100+ students
- 150+ teachers

Teacher Feedback

Every teacher is asked to complete one survey per presentation done in their class. The teacher feedback form was designed to obtain quantitative and qualitative feedback from participating teachers. About 155 teachers took part in *Journey 2023*, of whom 49 completed the feedback form.

Summary of Statistics

School Representation

The teachers participating in the survey represented eight different schools, with 30% of feedback coming from Waiakeawaena Elementary (Figure 1).

School name:

49 responses

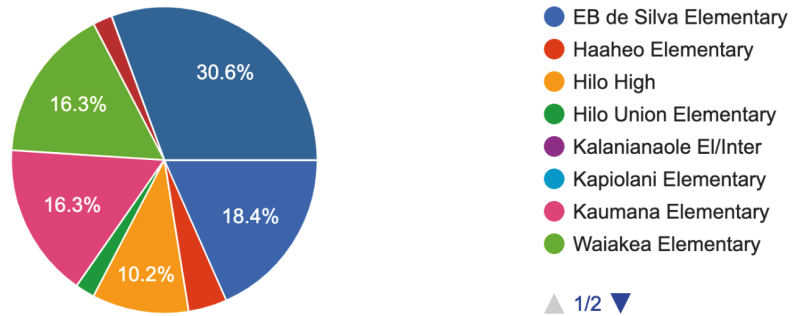


Figure 1. The variety of schools that attended *Journey Week*.

Developing Lasting Relationships

Of the 49 teachers who provided feedback for *Journey Week*, 12% were first-time participants while 71% had participated for more than 5 years (Figure 2). This reflects the positive reputation of *Journey* and the lasting relationship all contributors to *Journey* have developed and fostered over the years with the local participating schools and educators.

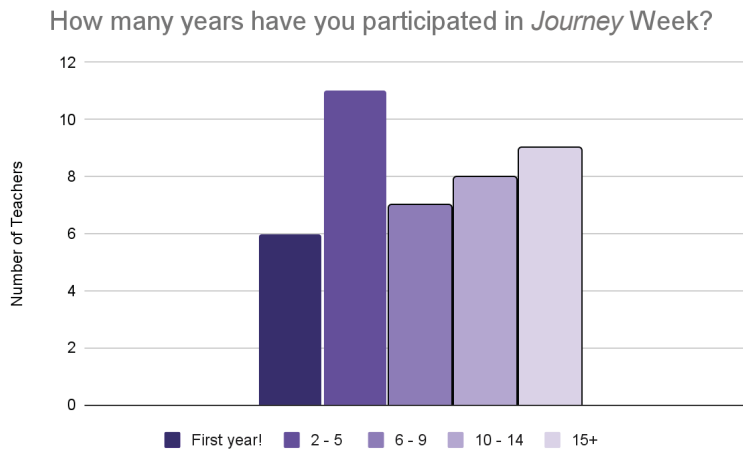


Figure 2. How many years each teacher has participated in *Journey Week*.

Teachers had nine scorable questions administered in the form of Likert ratings on their survey. The cumulative results are as follows:

Question on the Survey	Average Score of Teacher Responses (4 being the highest score possible)
The presentation contributed to student learning in Space Science, Technology and/or Science as Inquiry.	3.83
The presenter successfully engaged students (students were attentive, asked questions, were excited, etc.).	3.71
The presenter used models, visual materials, and/or hands-on activities to help explain concepts and engage students.	3.67
The presentation was appropriate for this grade level-content and vocabulary supported student understanding.	3.69
The presentation contributed to my own understanding of career diversity in Science Technology Engineering and Mathematics (STEM) and ability to discuss this with students.	3.67
The presentation incorporated elements of NGSS	3.48
<i>Journey Week</i> helped my STUDENTS to develop positive attitudes towards STEM careers.	3.71
I would encourage other teachers to participate in <i>Journey Through the Universe</i> .	3.90
My overall satisfaction with the <i>Journey</i> program is...	3.81

What would you like to see more of in future for *Journey Through the Universe*?

Common themes teachers would like to see more of in the program included classroom visits (55%), hands-on activities (18%), teacher workshops (10%), and follow-up visits (8%). Teachers also mentioned they would like to see a parent night, opportunities to explore project-based learning with real data, virtual field trips, virtual sessions, public talks, more grade-level appropriate presentations and an information session for educators leading up to the sign-up for *Journey Week*.

Comments and Suggestions for Presenters

Below are comments and suggestions from teachers organized by the overall rating of their *Journey* experience. Their overall score was determined by finding the sum of the individual teacher's eight or nine Likert Scale questions and calculating the percentage of their overall rating (e.g. a percentage of 100 would mean the teacher rated all 4's for each question, earning an overall sum of 32 [$32/32 = 100\%$]). Comments and suggestions are organized by percentile to indicate what is done well and what can be improved on. Every comment and suggestion is kept anonymous.

100 %

- Thank you for bringing in hands-on materials! The students enjoyed the Solar System model and robots!
- Our presenter was THE BEST. X brought so much enthusiasm and knowledge to the classroom. The students loved the presentation and the opportunity to ask questions.
- X had an excellent presentation! It was engaging and paced well to keep the students engaged. I really enjoyed the songs and hands-on activities, loved it, loved it, loved it!
- Fantastic presentation! Very relevant and geared for the grade level. Pacing was perfect and loaded with information.
- The students were engaged throughout the lesson and learned a lot.
- Thank you for your time.
- She was fantastic!
- Keep doing what you do; the kids had so much fun and are still singing and dancing!
- Thank you so much for the presentation!

90% - 99%

- Thank you all so much for coming and volunteering your time to inspire our students!
- She was a fantastic presenter and had the whole class engaged. She came very well prepared, and even had volunteers to help students with their task.
- THANK YOU!
- Was engaging and the students had a good time.
- The students really enjoyed his presentation and being able to look through his telescope.

70% - 89%

- Don't change anything, the overarching theme and message from each presenter were clear to students.
- Presenter needed a little help on handling questions by students. The use of hands-on models would help with student engagement.
- X clearly knew a lot about their topic and subject matter, and they were a good presenter for a group of students who are interested in a particular topic. My students weren't engaged, however, since they aren't interested in space in general. X was a much better fit for my

program, as they talked much about their work at the telescopes but tied in a lot of great general information about how they got to where they are now and the different ways people end up in different careers. I'd have them back in a heartbeat, and would recommend them for any/all students who have an interest in space.

- Great powerpoint, appropriate slides for grade levels. I just wish there were more interactive parts of the lesson rather than just presenting.
- Visual model, slide presentation, handouts were great, but I wish students would have had an actual hands-on activity where they would build/create/simulate something

50% - 69%

- Students need hands-on activity to engage in learning, rather than being talked to/lectured. They lose interest and lack understanding if they don't have an active part in their learning.

Comments and Suggestions for the *Journey Through the Universe* Program overall

100 %

- Thank you for continuing to provide the schools with this terrific opportunity and returning to in-person presentations. The students were all under the impression it would be virtual and when they found out a "real" person would be coming they were SO excited!
- Please keep JTTU in our schools!
- Take home manipulatives are fun for the students.
- The students were excited to hear and discuss about the Universe, but it would've been amazing for the students to see something tangible or do an activity.
- Scheduling. Not during testing weeks, if at all possible.
- Very engaging for the students. GLAD you are back to in person vs Zoom presentation
- We had classroom presentations and panel discussions that overlapped. So, next year, I would like the opportunity to attend everything rather than choosing one or the other.
- Thank you for offering this.

90% - 99%

- Thank you for the opportunity.
- JTTU is such a fantastic program!
- Great opportunity for students to learn about careers in astronomy.

70% - 89%

- Thank you for putting a career panel together for our career academy school. It was nice that X mentioned that the majority of the personnel are not scientists or astronomers and that

human resources, technicians, mechanics, photographers, etc. make up the majority of the personnel. Thank you for including X into the career panel, it's nice for our students to make connections with alumni.

- Thank you for the good work you do!
- If we can find a way to incorporate more hands-on learning, more storytelling, and more activities in the presentations, kids would be more engaged. I attended the training on meteorite samples with X, and he was a phenomenal storyteller. I think my students would have loved hearing from him, even though they aren't necessarily interested in a career in astronomy.
- It is always good!

50% - 69%

- Thank you for providing this opportunity

Astronomy Educator Feedback

Astronomy educators volunteer to visit classrooms during *Journey Week* and offer 30–60-minute science/astronomy presentations and/ or participate in 60–75-minute career panels for various grade levels in which they share their work and career stories alongside four or five other panelists. Astronomy educators differ in their professions, as astronomers, engineers, information and technology services, outreach specialists, and more. Astronomy educators submitted one survey each for their entire *Journey Week* experience.

Summary of Statistics

Seventeen presenters submitted surveys out of the 49 who were part of *Journey Week*. Of these, eight were participating for the first time, while eight had more than six years of experience (Figure 3). All astronomy educators would like to participate again next year (Figure 4).



Figure 3. How many years each astronomy educator has participated in *Journey Through the Universe*.

I would like to participate in Journey again next year.

17 responses

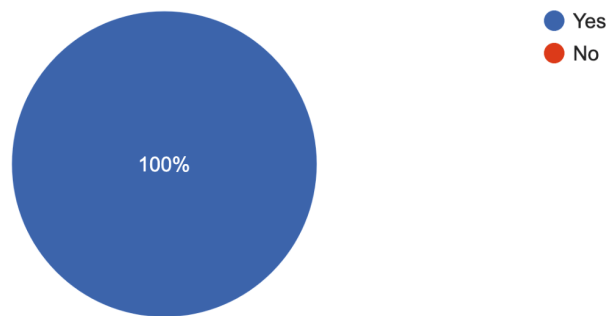


Figure 4. How many astronomy educators would like to participate in *Journey Through the Universe* next year.

Astronomy Educator Workshop Feedback

Of the 17 astronomy educators who completed the survey, 70% attended the astronomy educator workshop in advance to prepare for *Journey Week*. The question, “To what extent were you able to incorporate something you learned from the AE workshop into your presentation?” received an

average rating of **2.58** out of **four**. Astronomy educators rated the usefulness of the workshop with an average of **three** out of **four** (Figure 5).

How useful was the AE Workshop to you?

12 responses

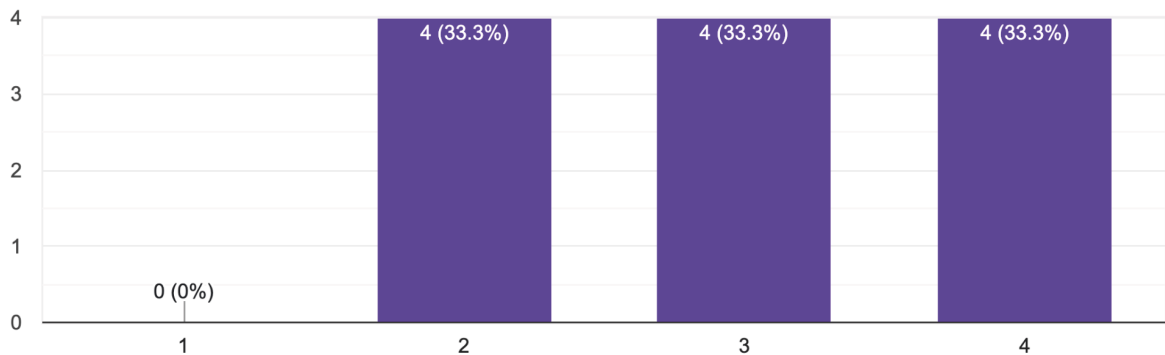


Figure 5. Rating of how useful the AE Workshop was to the astronomy educators.

Comments below about how the astronomy educators were able to use the information and tips from the workshop are organized by their rating of how useful the workshop was to them:

Score of 4

- Example presentation for young kids, making the presentation more interactive
- As a first year presenter, the AE workshop provided useful clarifications on expectations and logistics. While I was not surprised by the content presented, the workshop made me feel much more comfortable going into the classrooms.
- Incorporated more hands-on activities
- Grasp some of the after-lockdown condition of students

Score of 3

- AE Workshop advice to talk about career path even for younger students was helpful.
- It is very useful, but more for newish educators
- Since this was my first year doing *Journey* I wasn't sure what to expect. Seeing examples of presentations during the workshop helped me shape my presentation.
- The workshop gave me a much better idea about the overall philosophy of JTTU and gave me a chance to "meet" the organizers.

Score of 2

- Emphasis on talking about me, making a connection
- The presentations by those that had done a *Journey* event before were useful to get an idea of what was possible. However, since they were so established, it was hard to connect those presentations to my own since I was starting from scratch with no hands-on materials. Giving advice about the presentation structure was helpful as was the suggestion to email teachers beforehand.

Suggestions for Future Astronomy Educator Workshops

Below are comments from the astronomy educators about how the workshop could be improved. These comments are organized by their rating of how useful the workshop was to them.

Score of 4

- While this was not an option for me, I would have liked to attend in person.
- If possible, please provide the so-called standard test trends on math and science over the years.

Score of 3

- Probably useful to have more web links to topics and content organized by grade level, i.e., which topics and content work best for which grade level.
- Keep doing the good examples of activities!
- Include a few teachers who had astronomy educators in their classrooms in previous years who could give tips on what worked and what didn't work, from the teachers' perspective.

Score of 2

- For career panels, which is what I did, not much although having 5–10 minutes dedicated to it would be useful for entirely new people.
- Printed material, URL for resources.
- More communication throughout the entire process would have been very helpful along with a clear list of expectations. I didn't understand until the end of the workshop that I was supposed to be creating a presentation from scratch without much guidance, and that lack of knowledge made the workshop less useful. Also, there was no clear pathway to getting hands-on materials from the workshop, and I struggled to find the materials I needed in time to be able to incorporate them into my presentation. We also weren't given an idea of what an ambassador's role was, which made interactions with them unclear for me.

Student Engagement

With *Journey Week* being delivered in person this year, there were many opportunities for student engagement opportunities within the sessions. Eighty-eight percent of astronomy educators felt their students were engaged and asked relevant questions about their topic (Figure 6).

During my session, students were engaged and asked relevant questions about my topic.

17 responses

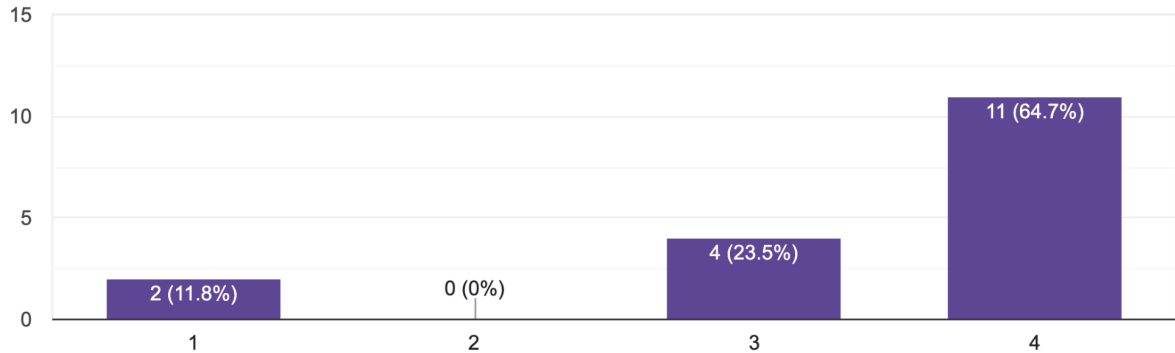


Figure 6. Ranking of student engagement during the presentation by the astronomy educator.

Preparation

Astronomy educators were asked how well they felt the *Journey* team prepared them for their presentation. The *Journey* team offers an astronomy educator workshop to provide suggestions and tips for a successful presentation delivery for the target audiences. The *Journey* team sent out multiple emails to communicate resources and reminders before *Journey* week. Below are the astronomy educators' results when asked how well the *Journey* team prepared them for the delivery of their presentations (1 is a low rating, 4 is a high and the ideal rating) (Figure 7).

The *Journey* Team prepared me (logistically) to deliver my presentation.

17 responses

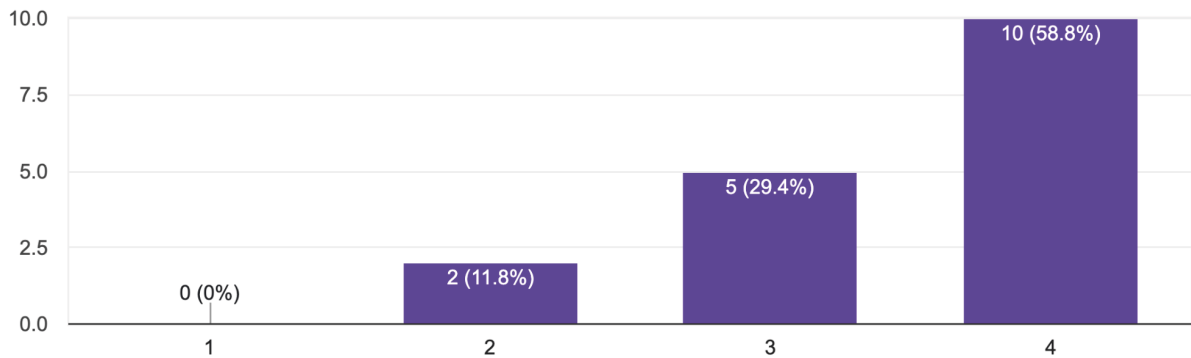


Figure 7. Astronomy educators' ratings for overall preparedness as organized by the *Journey* Team.

Suggestions and ideas that may be beneficial for new AE's:

- Make sure you read about the parking situation at school. Contact teachers ahead of time to learn about projector connection technology. Get to school early because some classrooms are far from the school office.
- Be ready to pivot your presentation to your audience.
- Spreadsheet organization was a little hectic. I think I was rescheduled a few times without being notified. I'm glad that I had someone experienced in my building who I could ask questions.
- A clear set of expectations.
- A guide to resources (*Journey* team contacts, what an ambassador does, where various outreach materials are and where to get them).
- A list of previous activities done in the classroom along with links to pictures/videos.
- A clear pathway for AEs to get hands-on materials.
- Don't pair up first time AEs with first time ambassadors.
- Allow extra time in the early mornings for school traffic.
- Reach out to your teachers beforehand and send them your presentations via google slides to reduce potential technology issues.
- The subject the classroom teacher teaches — math/science/other. Also accurate schedule is very important. Three of my classes were listed as 60 min. but really they were 75 min. (i.e. I was able to continue discussion with the students and that was OK for my case).
- It will be helpful to have a list of activities that were done in previous years. So we can share ideas for the classroom visits.
- A little information about 'Big Island culture' for example, telling folks if a student calls you "Mister" or "Uncle", that is a good thing! :)
- New educator information and resource packets.
- Make sure to contact your assigned classroom teachers a week before *Journey*; I'm really glad I did. Huge amount of preparation is not necessary. Once the students realize you don't bite and answer questions cheerfully, you can almost fill a classroom hour just answering questions they have about any and all astronomy topics.

Additional Comments:

- I think it would be beneficial to have a broader career panel with more diverse professionals by inviting local technicians, IT specialists... (I will ask around to motivate people for next year). Also, the students were VERY hesitant to ask questions. Asking them to prepare some questions in advance may be useful to get the discussion started.

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- Getting everyone else's emails for the career panel a week or two in advance would enable us to work together on our presentations if everyone wanted to do that.
 - Need to be very cautious as to what kind of presentation goes to high school and especially special needs or at-risk student classes.
 - I had a wonderful time, the kids and the teachers were incredible, my ambassador was amazing, and the experience was very invigorating. I appreciate the *Journey* team facilitating my engagement in this event and I very much appreciated all the hard work it took. Since *Journey* is only once a year, it would be good to have a central repository of emails of teachers that were interested in *Journey*. This would be useful to be able to make them aware of other outreach activities. Conversely, it would be great if the teachers could be provided a centralized email to reach those who participated in *Journey* in case they would like to ask again for some engagement in off-*Journey* times. I would be happy to make such a list through the Gemini listservs if it's welcome.
 - Thank you so very much for this opportunity. I truly enjoyed being involved with JTTU 23.
 - Mahalo!
 - It might encourage newer AEs to know if lunch is provided or not so that they can prepare accordingly.
 - Happy to take part and proud to be invited to come back on-island.

Comparing Feedback From 2021–2023

Journey 2023 went back to in-person activities after two years of virtual experiences. In 2021, 18 out of the 103 participating teachers submitted feedback. In 2022, 43 out of 173 teachers completed the feedback form and in 2023, 49 out of 155 provided feedback. In 2021, 5515 students participated in the virtual *Journey* Week, compared to 8000 in 2022. Fewer students participated in *Journey* Week 2023 (3100+ students) compared with the virtual years, a result of going back to an in-person format.

Comparing Teacher Feedback Experience

Data collected from three questions from the 2021–2023 teacher feedback forms are compared below. The first comparative question asks teachers if they would encourage other teachers to participate in *Journey* (Figure 8). In 2022, 82% agreed or strongly agreed that they would encourage other teachers to participate, compared with 100% of teachers agreeing or strongly agreeing in 2023.

I would encourage other teachers to participate in *Journey Through the Universe*.

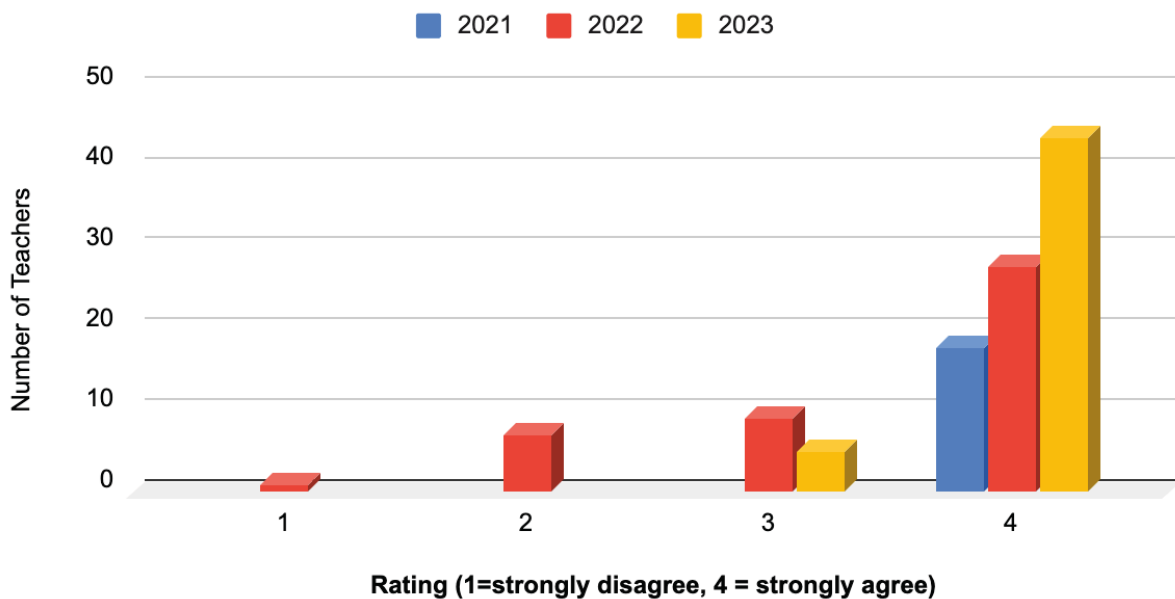


Figure 8. Comparing teacher responses from 2021 to 2023 on encouraging other teachers to participate in *Journey*.

In 2022 many elementary teachers commented that the content being presented was beyond grade level and that a virtual experience is less engaging for younger students. It is evident that in 2022 there were virtual-learning and grade-level challenges that some of the astronomy educators were not prepared for. In 2023, the positive feedback about the presentations confirms that an in-person experience is more appropriate for the younger grades. Additionally, the astronomy educator workshop in 2023 encouraged the presenters to include a hands-on component for the students which increases engagement and understanding (Figure 9, Figure 10).

The presentation was appropriate for this grade level - content and vocabulary supported student understanding.

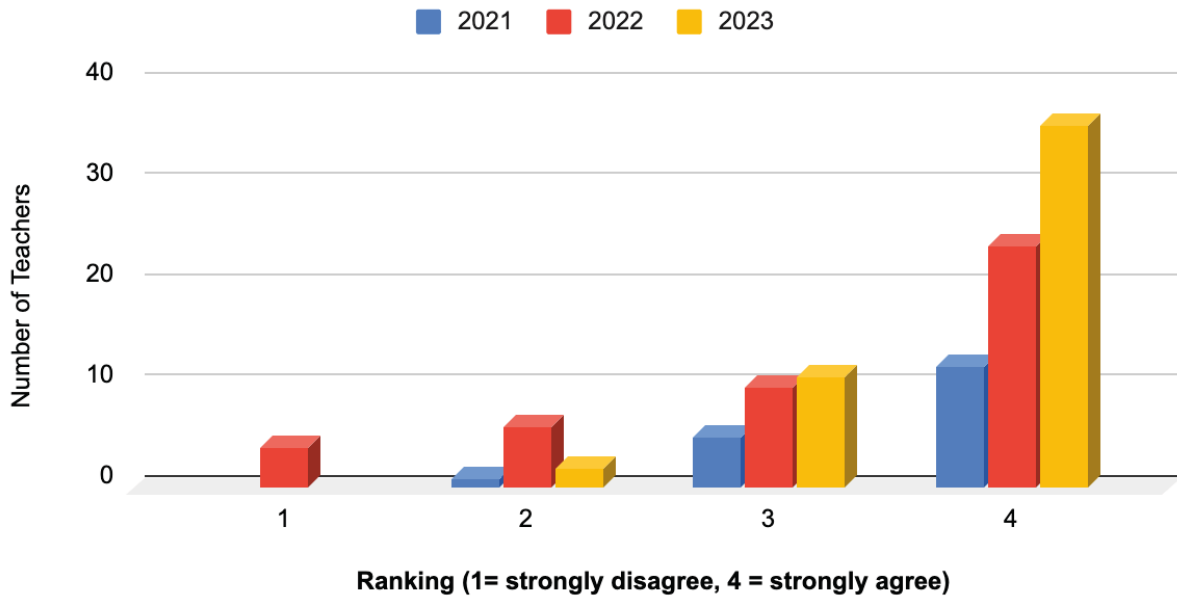


Figure 9. Comparing teacher responses from 2021 to 2023 on grade-level appropriate content.

The presenter(s) successfully engaged students (students were attentive, excited and asked questions, etc.).

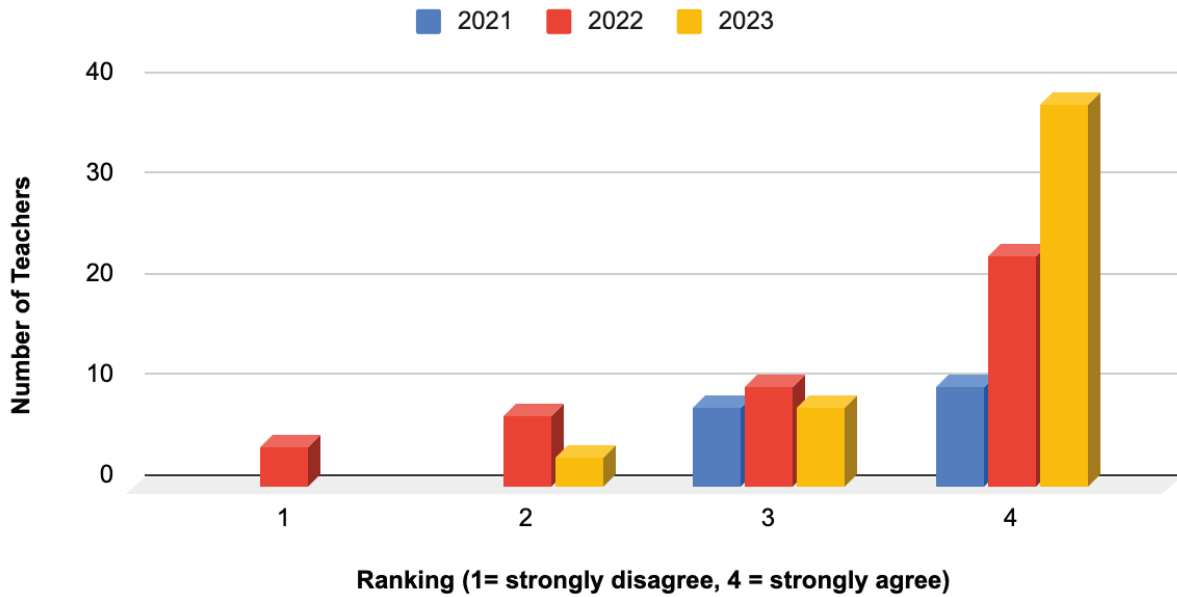


Figure 10. Comparing teacher responses from 2021 to 2023 on whether the presenter successfully engaged students.

Recommendations for *Journey* Week 2024

In response to the 2023 feedback from both the astronomy educators and teachers, the *Journey* team recommends the following actions for the growth and success of *Journey*:

- Consider developing an astronomy educator information packet as a resource that highlights past activities, photos, a list of what to expect, and contact information. This packet would be distributed to the astronomy educators prior to their workshop and can be reviewed during the workshop.
- During the astronomy educator workshop, continue to encourage and model hands-on, grade-appropriate classroom activities for *Journey* Week. Consider developing grade-level lists of topics, recommended activities, and access to the materials for the astronomy educators. This detailed list can also be part of the astronomy educator information packet. Consider consolidating NGSS standards related to Astronomy to include in resource packet for teachers and AEs.
- Consider offering a teacher workshop outside of *Journey* Week that highlights various astronomy activities they could do in their classrooms and support the NGSS.
- Consider broadening the types of careers presented in the career panels to highlight the variety of backgrounds needed to study astronomy.
- Consider creating opportunities for the teachers and the astronomy educators who visited the classrooms to re-engage throughout the school year.
- Consider adding to the current communication strategy for both teachers and astronomy educators. Including an information session for teachers prior to *Journey* Week, would provide first-year teachers and schools with a better understanding of what to expect and what they can sign up for.
- Consider including more demographic information in surveys including the job title of the participating astronomy educators.
- Consider distributing surveys to Community Ambassadors to better understand and support their role in the *Journey* program and gain another insider perspective on the effects of the program.
- Consider ‘Ohana events as a part of the *Journey* Through the Universe program so that entire families can engage in astronomy education versus just students in public school classrooms.

Mahalo to Everyone Involved!

Mahalo for reading our *Journey Through the Universe* Feedback Summary of 2023! For a full highlight of all activities during *Journey Week* visit this [report](#). Additional information can be found on the *Journey* [website](#).

For questions or concerns regarding this document please contact Justine Schaen, Astronomy Education Specialist for NOIRLab at justine.schaen@noirlab.edu. For questions or concerns regarding the *Journey* program please contact Christopher Phillips, *Journey* Lead at NOIRLab at christopher.phillips@noirlab.edu, or Leinani Lozi, Hawai'i Community Outreach Specialist at TMT at llozi@tmt.org. A hui hou!