Engaging museum visitors in conversations about earthquake preparedness

ShakeOut at OMSI, October 2024

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OMSI Engagement Research and Advancement

With support from USGS ShakeAlert and the ShakeAlert EPIcenter Partnership

Overview

This report describes a set of activities facilitated by OMSI on Oct 12, 2024, as part of the ***Great ShakeOut.*** The purpose of this report is to share insights into the process of planning and implementing the activities so that other free-choice learning environments (FCLEs) can build and improve on this experience. It also presents findings from an accompanying pilot evaluation study and outlines reflections and recommendations to guide similar initiatives moving forward.

Rationale

The Great ShakeOut, held annually on the third Thursday of October, is an international effort dedicated to earthquake preparedness. Individuals and organizations around the globe can participate on the day of the Great ShakeOut and/or near the date by practicing earthquake protective actions (e.g. Drop, Cover, and Hold On (DCHO)) and engaging in other activities that promote earthquake resilience.

As a leader in the ShakeAlert EPIcenter Partnership, OMSI participates in the Great ShakeOut each year, building on lessons learned from the past activities while also exploring new approaches to deepen public engagement with earthquake preparedness.

This year's planning drew on prior research with OMSI visitors (Herrán et al., 2023), which revealed that people were interested in exploring social and emotional factors related to earthquake preparedness, as well as in engaging with more hands-on activities (identified as preferred learning approach for children/youth) and simulations or drills (preferred by adults). In addition, adult participants in this prior study saw value in discussing their earthquake plans with their families or other group members prior to engaging in a drill or simulation activity.

To address these findings and provide OMSI visitors with opportunities to engage in meaningful discussions around earthquake safety, for ShakeOut 2024, OMSI EPIcenter team developed the concept of "conversation stations" with a focus on particular aspects of earthquake preparedness.

Setting and Context

Although the Great ShakeOut is traditionally held on the third Thursday of every October, in 2024, OMSI EPIcenter team decided to host the activities on a preceding Saturday to reach a broader audience than would be present on a Thursday. However, the unexpectedly sunny and warm weather on that Saturday seemed to affect attendance on the scheduled day, reducing the number of visitors to the museum. This resulted in a few

adjustments in the programming on the spot, which will be described in more detail in the Overview of Conversation Stations section below.

Planning and Promotion

Planning for OMSI ShakeOut'24 involved collaboration between the OMSI EPIcenter team and other museum departments, including Events, Marketing, Volunteer Engagement, and Facilities. The EPIcenter team led the concept and content development, working closely with the OMSI Safety Manager (this group is further referred to as "*the team*"). The Volunteer Engagement team assisted with staffing needs, helping to recruit volunteers to fill in various roles. The Events team managed logistics, including space reservations and coordination and coordinating with Facilities for setup. The Marketing team supported by promoting the happening on social media as well as OMSI internal and external emails.

Overview of Conversation Stations

In order to reach a broad range of visitors, conversation stations were placed in a few different areas around the museum. Each station had a dedicated facilitator and was equipped up with materials and hands-on activities to engage visitors in discussions of different aspects of earthquake preparedness:

Welcome station. Positioned near the reception desk in an area called the Welcome Wall, this station was intended to provide information about the ShakeOut-related happenings throughout the museum, while also spreading the word about the ShakeAlert and engaging visitors with earthquake science demonstrations (see Appendix A for links to materials and handouts).

Welcome station. Earthquake machine demo in action

Pre- and Post-earthquake Planning station. This station offered a range of activities focused on various aspects of pre- and post-earthquake planning across three tables, all placed in the hallway opposite the entrance to several major exhibits:

> **A go-bag packing** activity invited visitors to participate in a challenge, involving packing emergency items within a 10-second window. Items from a real emergency kit were laid out on the table for visitors to choose from, including bottles of water, water filter, canned food, matches, torch, etc. Once finished packing, the participants were encouraged to talk about their choices. The intention was to further engage participants in conversations about their preparedness plans and steps they can possibly take right now—when they *aren't* in a time-sensitive emergency situation! For those interested in learning more about the topic, there was an emergency kit supply list handout (see Appendix B).
>
> **What to do after the shaking stops** activity was developed by OMSI EPIcenter team based on the pilot material created by USGS ShakeAlert[1], with the goal to

[1] https://www.shakealert.org/

encourage visitors to reflect on their potential protective actions after the shaking stops (the material is still in development and will be posted on their website once finished). The activity used magna tiles with icons illustrating different protective actions placed on a metal board in random order, and visitors were invited to organize them in order that makes most sense to them in their everyday context (see Appendix B).

OMSI team member ready to facilitate the "What to do after the shaking stops" activity

A table hosted by The Portland Bureau of Emergency Management (PBEM), an external organization and OMSI's long-term partner in activities related to earthquake preparedness education. It featured Neighborhood Emergency Team (NET) volunteers - Portland residents trained by PBEM and Portland Fire & Rescue to provide emergency disaster assistance within their own neighborhoods - who came prepared to help OMSI visitors look up their local BEECN sites (Basic Earthquake Emergency Communication Nodes) on their phones and table-top maps.

Protective Responses station. This station was intended to engage visitors in conversations and activities focused on protective responses during an earthquake. The plan for this station included a dedicated space for a public earthquake drill and a table outside of this space featuring activities related to situational awareness (or what to do in different scenarios).

The drill was designed as a simulation activity organized in rolling sessions of approximately 10–15 minutes, with participants going through a simple scenario. During the scenario, participants were encouraged to act the way they would do in a real-life earthquake situation at OMSI. There were a few simple activities (magnatiles, kinetic foam, and tectonic puzzle) set up on tables for visitors to engage with as they simulate a visit to the museum. While visitors were checking out the activities, a simulation video of an earthquake would pop up on the screens around the room along with alert visuals and sounds. Once finished, participants were invited to debrief their experience with a few facilitation prompts, e.g. "How do you think other people you were with today affected how you reacted or how you felt?" (see other suggested prompts in Appendix C). Participants interested in learning about protective responses in other potential scenarios were encouraged to stop by the Situational Awareness table outside the room. Activities there included a dollhouse to engage younger visitors in reflecting on pre-planning steps and protective responses during an earthquake through role play, and several handouts focused on what to do in different scenarios (see Appendix C).

When planning this station, the team went back and forth between two different spaces for hosting the simulation activity - the Physics Lab, located in the central hall of the museum, and a room called the Fishbowl, located in an area somewhat tucked away from the most visitor flow. In the end, for a number of reasons, it was decided to place the simulation activity inside the Fishbowl, and the Situational Awareness table - right outside of it. While choosing this space, the team hoped that with higher traffic during the weekend and with some extra help from recruiters specifically assigned for this role, attracting a broad audience to that area would be an attainable goal. However, in reality, the traffic turned out to be significantly lower than usual (see Context and Setting above) and the out-of-the way location meant very few people were in the area, resulting in canceling the simulation activity. For the same reason, the Situational Awareness table was eventually relocated to merge with the Pre- and Post-earthquake Planning station.

Young OMSI visitor engaging with the dollhouse activity

While each station contained a variety of activities to promote conversations with visitors on topics around earthquake preparedness, the EPIcenter team wanted to further reinforce that goal, and developed a set of conversation cards as an additional support tool to accompany the stations' activities (see Appendix D). Building on OMSI's prior research (Herrán et al., 2023) and Lownsberry's research on four dimensions of Disaster Risk Reduction (DRR) education - cognitive, behavioral, affective, and social (Lownsbery, 2024) - the conversation cards were intended to support the stations' facilitators by providing them with sets of prompts to guide discussions with visitor groups. Aligned with the four dimensions of DRR education (Lownsbery, 2024), each set of cards focused on one of the *topic areas* - knowledge, actions, roles, and emotions - and included at least three prompts per topic area. The team developed several possible approaches to using these prompts with visitor groups, however, those were not prescriptive, and it was agreed that eventually facilitators could modify any of them based on what seems to work best for each particular interaction

- **Facilitator pre-selects the topic area.** In this approach, the facilitator decides before or during the course of interaction which topic area they will guide the conversation toward and selects at least one prompt for this topic area that is well suited to their station theme.

- **Visitors select the topic area.** After a brief introduction to the activity, the facilitator shows the cards to the visitor group (laid out so that the prompts are covered, but the topic areas are visible) and asks them to choose one that they would be interested in discussing. Once they have selected, the facilitator asks them to read the prompt aloud and use that prompt to guide the conversation.
- **The topic area is identified through the interaction.** In this approach, the facilitator engages in a conversation with the group and relies on that discussion to identify the topic area of focus.

Evaluation

To better understand how the four different dimensions of DRR education (Lownsbery, 2024) affect the nature of conversations with/between visitors, the EPIcenter evaluation team developed a pilot study. This study utilized the topic areas and prompts from the conversation cards to streamline data collection. The findings are intended to inform future earthquake preparedness-focused programming to enhance public engagement and foster community resilience in the face of an earthquake.

Method and data analysis

The EPIcenter evaluation team used observations to track visitor engagement and conversations based on the topic area and how it is selected (either by facilitators, visitors, or emerging naturally). In addition to actively engaging visitors in conversations, station facilitators were instructed to observe and document each interaction by using a structured observation protocol (see Appendix E), focusing on the following aspects:

- Selected topic area and selection method: whether the topic area was chosen by the facilitator, the visitors, or emerged naturally.
- Conversation dynamics: Documenting who was active in the conversation and to what extent the facilitator was involved.
- Primary focus of conversations: Taking note of whether discussions centered around adults or children in the group.
- Earthquake preparedness subjects: Documenting subjects that came up in the conversation, such as past experiences, questions, concerns, plans for preparing or acting, etc.
- Perceived richness of the conversation: Rated on a 1–10 scale, where 1 indicated minimal engagement and 10 represented a highly interactive, in-depth discussion.

It's important to note that because this was a pilot study, data was collected only by those facilitators that had previous experience with data collection and/or expressed interest in

helping with data collection. For this reason, data is missing for several activities that were part of the Pre- and Post- earthquake Planning station, where facilitators chose not to participate in data collection.

The sample included 30 groups, primarily composed of intergenerational families and some adult-only groups. No demographic data, such as age and gender, was collected. Observations produced quantitative data, which were analyzed for frequency counts.

Results and interpretation

One of the purposes of this pilot evaluation study was to explore patterns of visitors' engagement in conversations based on topic areas, aligned with the four dimensions of DRR education, and the way they were selected.

Data from the observations indicate that "knowledge" and "actions" were the most frequently discussed topic areas - 45.2% and 35.7%, respectively (Figure 1). In most cases, topic areas emerged naturally (13 instances of the 25) or were pre-selected by facilitators (8 instances of the 25) (Figure 2). Across the four topic areas, the top three most frequently discussed subjects included "Plans for preparing or acting," (17 instances of the 30) "How earthquakes happen," (13 instances of the 30) and "Concerns they have" (11 instances of the 30) (Figure 3).

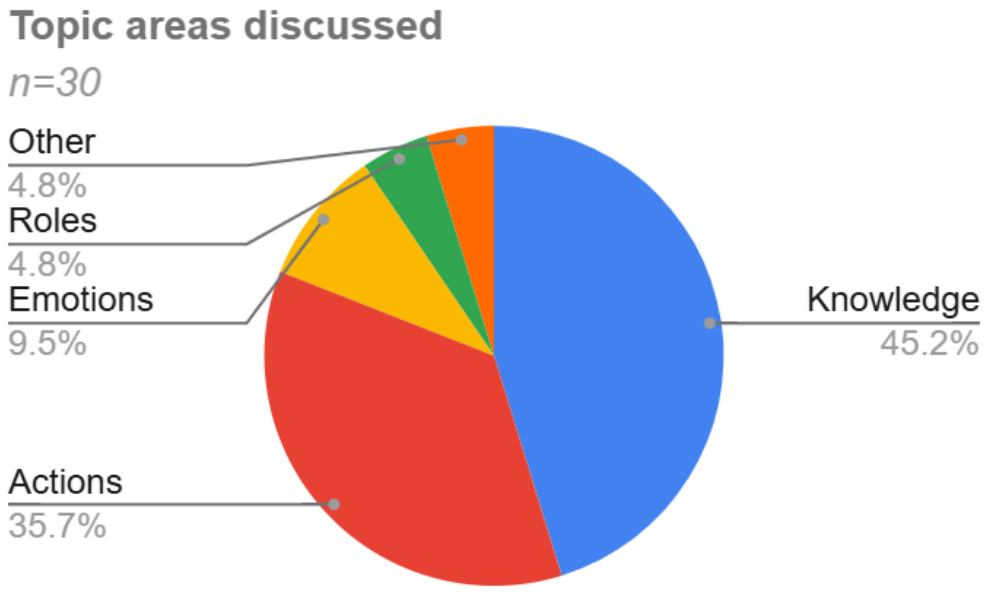


Figure 1. Topic areas discussed

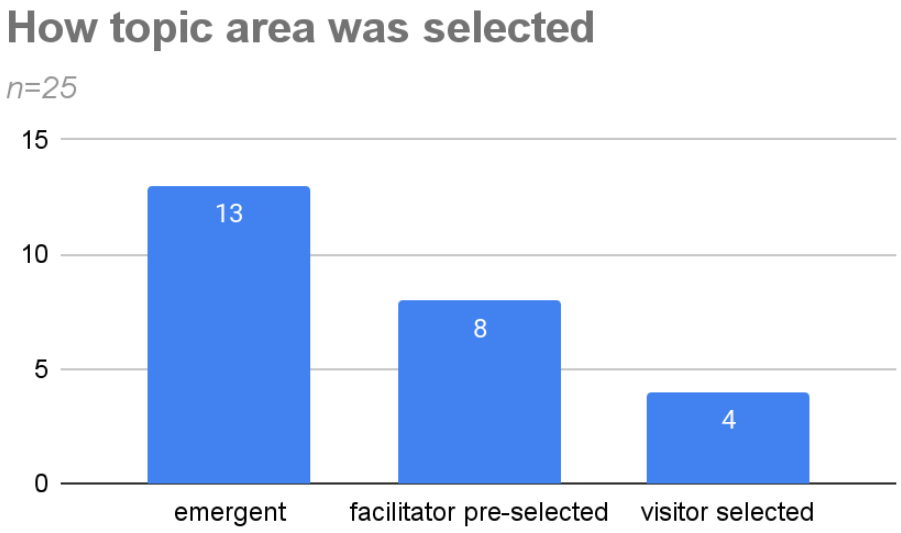


Figure 2. Method of topic area selection

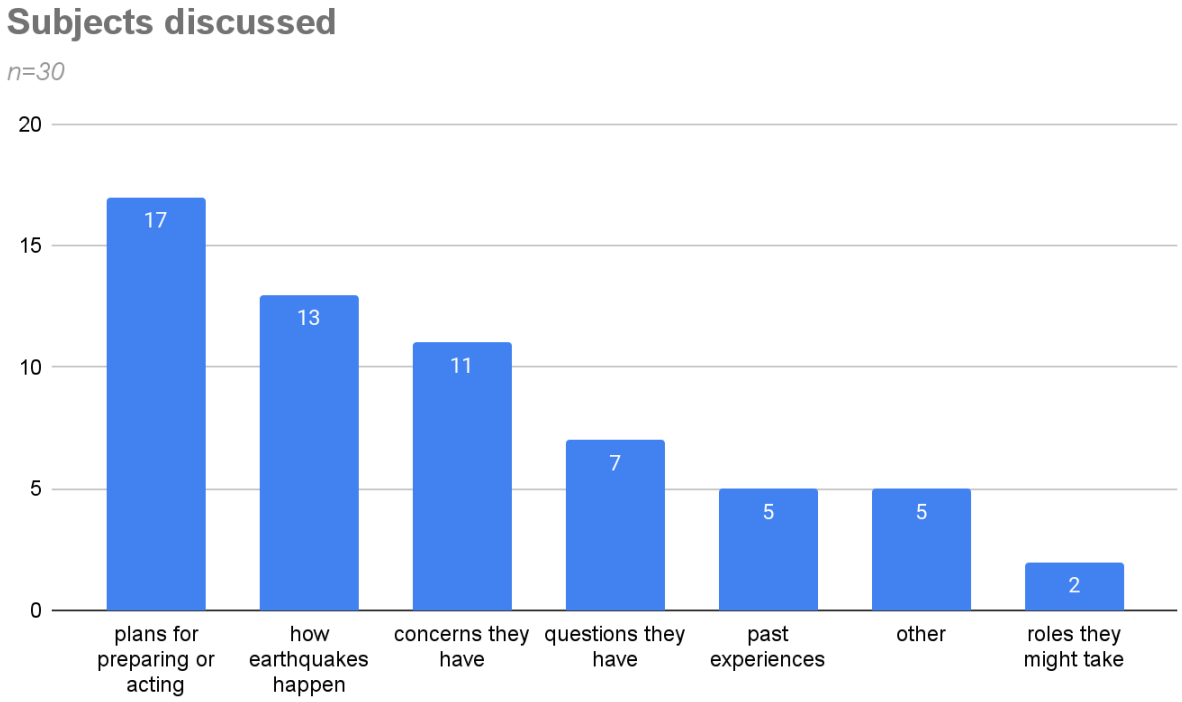


Figure 3. Earthquake preparedness subjects discussed

These results suggest that conversations tend to center around the content of the associated activity, unless the facilitator purposefully pre-selects a topic area, whose connection to the associated activity might not be as apparent (e.g. a facilitator at the

station that engages visitors in earthquake science demos decides that with the next group they will focus on "emotions" rather than "knowledge"). Along these lines, reflecting on the activities available to visitors at ShakeOut'24, it becomes clear that most were heavily oriented toward "knowledge" (e.g. how earthquakes happen, magnitude and intensity, types of waves, etc.) and "actions" (packing emergency kits, making communication plans, what to do in different situations, what to do after the shaking stops), thus unintentionally limiting spontaneous conversations about "emotions" and "social roles." Additionally, facilitator perspectives and/or comfort level with any given topic area may have influenced the flow of conversations, with facilitators inadvertently steering discussions toward familiar subjects.

To broaden the range of topic areas discussed, future public engagement efforts could integrate activities directly addressing emotions and social roles in earthquake preparedness. For instance, an activity like Jenga, with color-coded blocks linked to specific conversation prompts, could encourage discussions around various preparedness aspects, including emotional responses and social responsibilities.

Data on conversation dynamics indicates varying levels of visitor engagement, with numbers being roughly split between groups engaging primarily among themselves (10 instances of the 30) and those relying on facilitators' guidance (12 instances of the 30). A slightly smaller portion (8 instances of the 30) had a balanced interaction between individuals in the group and the facilitator (Table 1).

Conversation dynamics (n=30)	
Mostly or entirely between individuals in the group	10
Mostly or entirely between facilitator and the group	12
Roughly balanced	8

Table 1. Conversation dynamics

These results can be interpreted from different perspectives. For instance, one explanation could be that in cases where the interaction was mostly group-led, groups might have felt more comfortable exploring activities independently perhaps due to prior knowledge or personal experience. Another explanation could be that some activities may have

appeared more self-explanatory than others, requiring less explanation. While the study didn't track these variables, these findings still provide some valuable insights for future engagement efforts. For example, if the goal is to achieve a particular conversation dynamic, such as groups engaging primarily among themselves, facilitators can be trained in strategies that can help them transfer ownership of the discussion to members of the group, stepping away from being the leader in the discussion. In addition, future activities could include options that allow for both facilitated and self-guided exploration.

Conversations were balanced in terms of focus. In 14 instances of the 30, the discussion was primarily directed toward the adults in the group. In 12 instances, the focus was primarily on engaging the children in the group. Lastly, in four instances, both adults and children participated equally in the interaction, without a clear focus on one group over the other (Table 2).

Focus of the conversation (n=30)	
Mostly or entirely adults in the group	14
Mostly or entirely children in the group	12
Roughly balanced	4

Table 2. Focus of conversations

These findings may reflect how some activities were inherently geared more toward either children (e.g. science demos, dollhouse) or adults (e.g. discussions about preparedness plans), thus not being able to engage both simultaneously. Facilitator tendencies could have also influenced the focus of conversations, with some facilitators gravitating more toward interactions with adults or, in reverse, focusing on children when they were more visibly engaged. Going forward, future activities could be developed with adaptable levels or variations tailored to different age groups to ensure that both children and adults can participate simultaneously in a meaningful way.

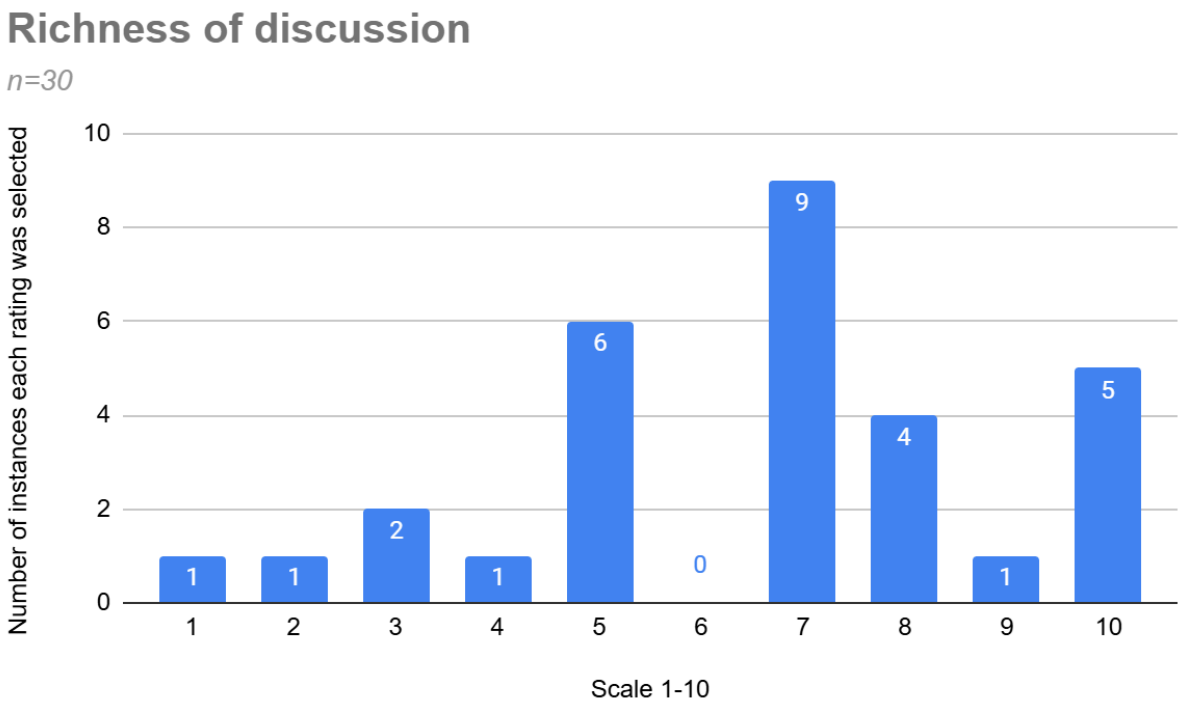


Figure 4. Richness of discussion on a scale 1–10

The average richness of conversations as perceived by the facilitators themselves was rated at 6.5, with a median of 7 (Figure 4). Topic areas discussed most frequently - in particular, knowledge and actions - had a wider range of richness than those that were discussed less (emotions and roles). Overall, the richness did not seem to be directly connected to the topic area discussed, suggesting that conversation depth may depend more on variables such as group dynamics, facilitator skills, or visitors' personal interests and background knowledge rather than the specific topic alone.

Reflections and Recommendations

Activities Overall

Based on our experience organizing and implementing these ShakeOut activities, we have gathered insights that may benefit individuals and organizations interested in facilitating similar, conversation-driven earthquake preparedness activities in the future:

- **Planning.** Start planning well in advance. The early stages should focus on establishing a central theme, conceptualizing the content, promoting the activities, and coordinating with other departments. The final few weeks before ShakeOut are

ideal for refining the initial plan and making adjustments as needed. Flexibility is also essential to address any last-minute changes.

- **Assigning roles and responsibilities.** When working with a team, assign specific roles and responsibilities. Regular check-ins can be helpful in keeping everyone aligned and ensuring that team members stay on track.
- **Aligning goals with activities.** Each activity should be carefully considered in light of the overall intended goals. For example, if the goal is to have conversations around earthquake safety, prepare hands-on activities that reinforce key messages and support the intended discussions.
- **Anticipating visitor traffic variations.** When planning the location of activities, consider factors such as visitor traffic in different areas and potential variations due to weather conditions (e.g., sunny vs. rainy days). This planning can help maximize engagement by ensuring that activities are accessible to as many visitors as possible.
- **Promoting the activities.** Collaborating with the Marketing team can help increase awareness and attendance. Utilizing multiple channels (e.g. social media, flyers, signage, including digital signage (e.g. Yodeck stations)) and promoting multiple times is recommended.

Conversation Cards

The conversation cards were designed to help enhance conversations about earthquake preparedness during the ShakeOut'24. With some improvements, they could become a more effective tool for engaging visitors in meaningful discussions going forward. Below are some ideas for refining their design and use:

- **Making cards double-sided.** Having a clear, visually appealing "cover" on one side, indicating the topic area (e.g., "knowledge," "emotions"), could help facilitators and visitors quickly identify the cards' focus without flipping through multiple options, ensuring smoother interactions.
- **Incorporating cards into activities.** Embedding conversation cards into interactive elements, such as a Jenga game with color-coded blocks linked to specific conversation prompts, or pairing them with hands-on activities like emergency kit packing could help make the prompts feel more engaging and relevant to the activities.
- **Arranging cards in an interesting format.** Using stands, magnetic boards, or other setups could increase visibility and spark visitors' curiosity and interest in engaging with the cards. Alternatively, select prompts could be displayed on a stand with larger fonts, visible from the distance, allowing visitors to engage passively by reflecting on the prompts without having to interact with the facilitators directly.

- **Providing facilitator notes.** Including additional talking points or background information for facilitators to use during the interaction could offer example responses or detailed explanations, allowing facilitators to address complex questions or guide deeper conversations effectively.

Conclusion

OMSI's ShakeOut 2024 aimed at fostering public engagement with earthquake preparedness through conversation-driven activities. Grounded in prior research (Herrán et al., 2023), OMSI's ShakeOut featured conversation stations, which were organized to encourage discussions around the four dimensions of DRR education (Lownsbery, 2024), including knowledge, actions, emotions, and social roles. Findings from the accompanying pilot evaluation study highlighted the activities' success in engaging visitors in knowledge and action-focused discussions, while revealing opportunities to expand engagement with the dimensions of emotions and social roles. This echoes findings from Lownsbery's research (2024) highlighting "minimal representation of the affective and social dimensions" in the existing DRR education. Overall, key insights from this evaluation provide a valuable foundation for refining future public engagement efforts, ensuring they are interactive and effective in building community earthquake resilience.

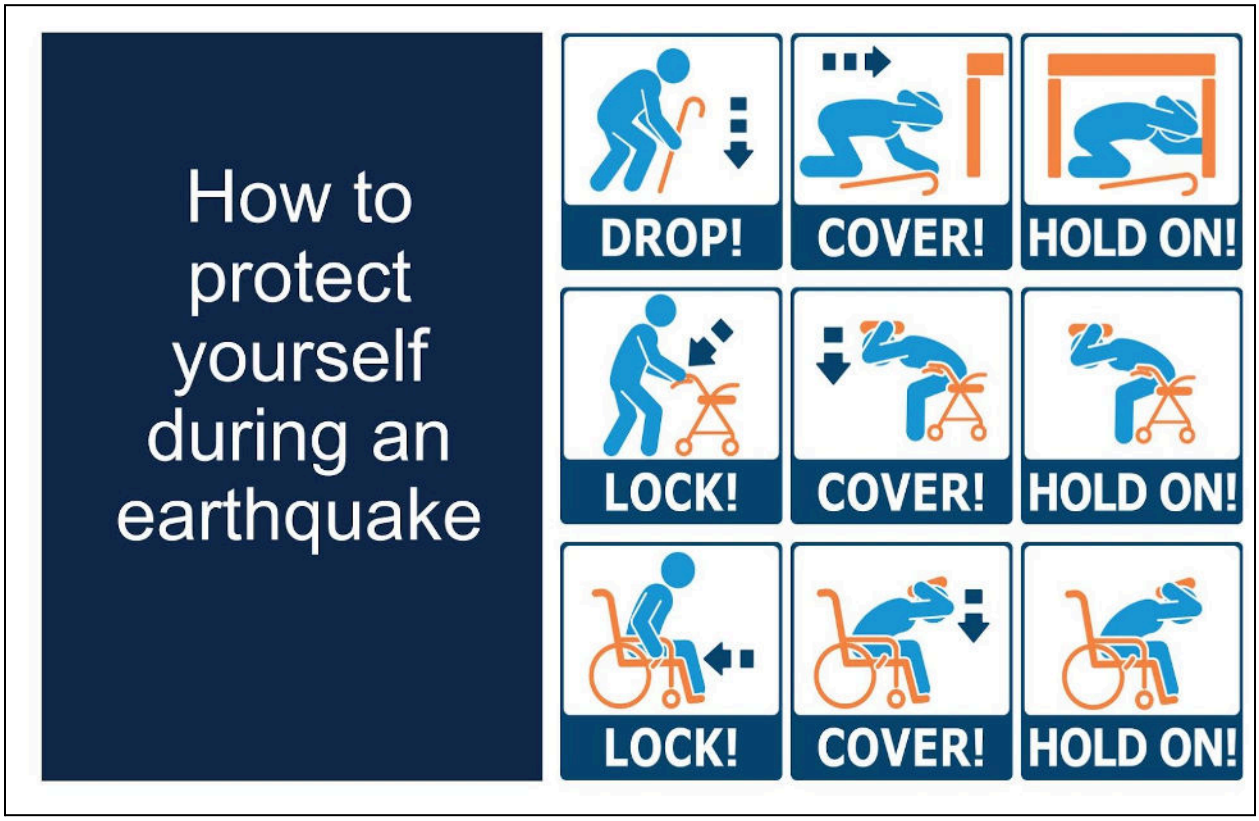
References

Herrán, C., Crayne J., & Benne, M. (2023). ShakeOut *En Comunidad*: Participatory research for museum-based earthquake learning. Internal research report, Oregon Museum of Science and Industry [Unpublished].

Lownsbery, D. (2024, March 8). *Disaster risk reduction education literature review and proposed research agenda* [Conference presentation]. NARST 2024 Virtual Conference. https://www.playbacknarst.com/narst2401-105

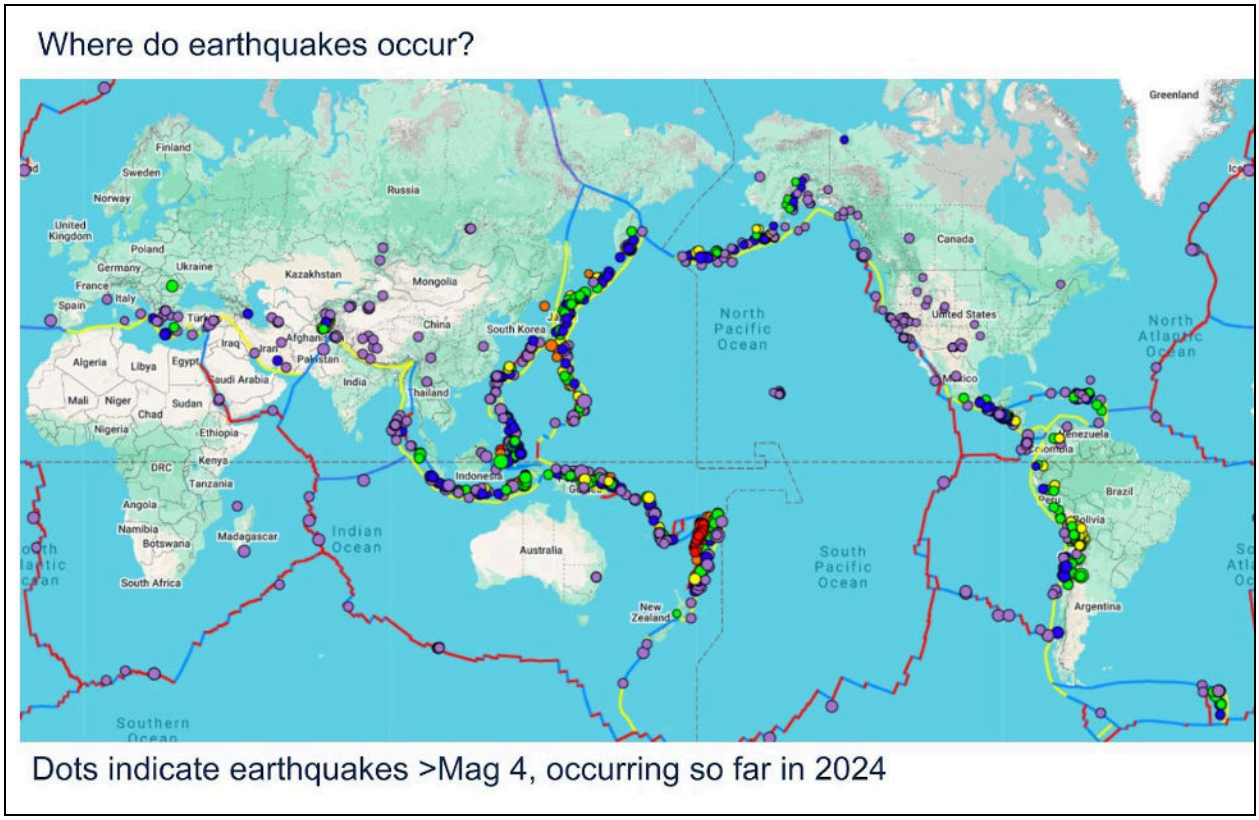
Appendix A. Welcome station materials

- Rocket rules books[2] and crayons for coloring
- ShakeAlert Quick Facts sheet[3]
- ShakeAlert postcards[4]
- Earthquake machine for demonstration of the movement of earth's crust
- Seismic slinkies for demonstration of the types of waves[5]
- Images of Drop Cover Hold on options placed in a large acrylic stand
- Mapping of earthquakes in 2024 placed in a large acrylic stand



Drop, Cover, Hold on (DCHO) options

[2] https://rocketrules.org/earthquake-activity-books-videos/
[3] https://www.shakealert.org/education-and-outreach/messaging_toolkit/
[4] https://drive.google.com/drive/folders/16I7JCKis4GkBcyBRLw4C6EkbEPZz_ZuT
[5] https://omsi.edu/wp-content/uploads/2023/07/ShakeAlert-Interactive-Demos-v.-Jul-2023.pdf



Earthquakes around the world as of September 2024

Appendix B. Pre- and Post-earthquake Planning station materials

- Emergency Supplies[6] handout
- "What to do after the shaking stops" magnatile activity materials:

Magnatiles activity intro

Magnatiles labels[7]

[6] https://www.publicalerts.org/supplies

[7] Note that we also had a few tiles with blank labels where people could write their own steps

Appendix C. Protective Responses station materials

- Be prepared for an earthquake[8] handout
- Community Resilience Workbook[9]
- Examples of discussion prompts to debrief the simulation activity:
    - *Who noticed the earthquake alert? What were your thoughts when you saw/heard it? If you got an alert like that on your phone, what would you think?*
    - *What did you notice about your own and/or others' responses? How did you respond? Do you think you'd do the same or different in a real-life situation?*
    - *If you had less than 5 seconds to prepare for shaking that was about to start, how would you feel?*
        - *What can you do now to feel more calm and prepared?*
    - *How do you think other people's presence and actions might affect you emotionally?*
    - *If you were to do it again, what would you do differently?*
    -

[8] https://www.ready.gov/sites/default/files/2021-12/ready_earthquake-information-sheet.pdf
[9] https://www.earlylearningmultnomah.org/sites/default/files/2022-01/community-resilience-workbook_web.pdf

Appendix D. Conversation cards

Appendix E. Conversation station facilitator reflection form

Station: Welcome wall Pre/post planning Drill Situational awareness

Facilitator initials: _____ Time: _____

How many people in the group? _____ Adults only Intergenerational

What topic area was picked? Emotions Knowledge Actions Roles

How was the topic area selected? Facilitator pre-selected Visitor selected Emergent

Conversation dynamic

Between individuals in the group

Between the facilitator and the group

Who was the primary focus of the conversation?

Adult(s) in the group

Child(ren) in the group

What was discussed (circle all that apply)

Past experiences Questions they have Roles they might take

Concerns they have How earthquakes happen Plans for preparing or acting

Other: _____

How would you rate the richness of discussion?

Very Superficial

Very rich

1 2 3 4 5 6 7 8 9 10