

Session 10: Assessment & Reflections

Overview

This session introduces students to an assessment tool, which they may use to reflect on how they present and communicate scientific ideas to the visitors. Students revisit the major ideas from the course, as a means to identify the key elements of the assessment tool. Students are introduced to the assessment tool – an observation instrument, which students will then use to observe their peers present their activity to the public. Instructors of the course may also consider using this observation instrument to assess how students communicate their scientific knowledge to the public and thus apply their understanding of the key concepts in this course.

Session Objectives

1. Review the major ideas on learning and teaching from this course.
2. Use an assessment tool to observe classmates present their activity and provide peer feedback.
3. Reflect on how students communicate their scientific knowledge using peer feedback.

Session Activities at a Glance

Quick Write (15 minutes)

Students do a Quick Write about how they would know their activity is successful.

Ponder This (15 minutes)

Students discuss what information would be helpful for them to let them know their activity and presentation are successful.

Observation Instrument (20 minutes)

Students are introduced to an Observation Instrument as an assessment and reflection tool.

Activity: Practicing with Video (35 minutes)

Students learn how to use the Observation Instrument by practicing with video clips.

Peer Observations (60 minutes)

Students take turns observing one another present their activities.

Debrief Observations (20 minutes)

Partners debrief their peer observations with one another; students do a whole group debrief.

Homework (5 minutes)

Students prepare written feedback to their peers.

Time Frame

Total session length: 2 hours 50 minutes

Quick Write (15 minutes)

Ponder This (15 minutes)

Observation Instrument (20 minutes)

Activity: Practicing with Video (35 minutes)

Peer Observations (60 minutes)

Debrief Observations (20 minutes)

Homework (5 minutes)

Materials Needed

- PowerPoint slides for COSIA Assessment Session
- Data Projector
- External speakers
- 1 copy of the Observation Categories per student
- 1 copy of the Written Feedback Questions per student
- 4 copies of the Observation Instrument per student
- 1 clipboard per student
- 2 5- to 7-minute video clip of an educator interacting with visitors at your institution
- Students' materials for their own presentations

Preparation of Materials

1. Select two 5- to 7-minute video clips of an educator interacting with visitors in the gallery spaces at your institution. Preferably, choose clips of the same educator and select from a video that is similar in nature to the hands-on cart activities that students do in this class.
2. Make copies of handouts
3. Instruct students to have their materials ready in order to present in the museum gallery during this session.

Instructor's Guide–Session Details

Quick Write. (15 minutes)

1. Participants do Quick Write. Students write for three minutes on the following questions:

- How do you know if your activity is successful?

2. Whole group share. Facilitate a brief discussion of the students' responses to the quick write using the Discussion Map below. Make a list of their ideas.

- Ask participants to share their ideas.
- Listen to their responses.
- Ask for agreements, disagreements, and alternative opinions & views.

Ponder this (15 minutes)

1. Small group discussions. Building on the quick write discussion, ask students to discuss the following questions in small table groups:

- What information would you want an observer to collect about your activity and presentation to help you determine whether your activity and presentation was successful?
- How can you use this information to improve your activity and communication skills?

2. Whole group discussion. Invite students to share their discussions. List their ideas on the whiteboard. Use the Discussion Map as a suggested guide to facilitate this discussion.

Discussion Map:

- Listen to their responses.
- Ask for evidence, explanation, or clarification.
- Ask for agreements, disagreements, and alternative opinions and views.
- Reference and cross-reference their comments to encourage students to respond to one another's comments.

Key ideas to address:

- Presenter asks questions.
- Learners ask questions.
- Learners are doing the activity.

- Learners are talking with one another and with the presenter.
- Learners are sharing their ideas.
- Presenter invites learners to participate.
- Presenter shares information, but does not dominate the conversation.
- Presenter and learners make connections to learners' prior knowledge.
- Presenter asks learners for their experiences and understanding.

3. Challenge students to think about observable actions. Set up the students to think about aspects and design of an observation instrument in the next task by challenging them to think about what an observer would look or listen for in order to determine success of their activity.

4. Connecting with the major ideas in the course. Display the "About learning" column of the table of major ideas explored in this course regarding learning and teaching. Lead a brief discussion about how each of these ideas about learning relate to ideas about teaching. Then display the "About teaching" column.

Major Ideas from Course:

About learning	About teaching
Learners construct their own understanding	Connect to learners' <u>prior knowledge</u>
Knowledge construction requires dialogue	Encourage learners to <u>participate in the conversation</u>
Knowledge construction requires action	Engage learners in <u>actively doing something</u>

5. Focus on presenters' actions related to major ideas about teaching. Ask students to describe what sorts of things a presenter might do that would show an observer that they were focusing on the three major ideas listed in the "About teaching" column. Ask the students the following series of questions interspersed with opportunities for them to briefly share their ideas: what would a presenter be doing if they were a) connecting to learners' prior knowledge, b) encouraging learners to participate in the conversation, and c) engaging learners in actively doing

something? Depending on what the students say, some key ideas to address include:

- Connect to learners' prior knowledge
 - Presenter asks learners for their experiences and understanding.
 - Presenter and learners make connections to learners' prior knowledge.
- Encourage learners to participate in the conversation
 - Presenter asks questions.
 - Learners ask questions.
 - Learners are talking with one another and with the presenter.
 - Learners are sharing their ideas.
 - Presenter shares information, but does not dominate the conversation.
- Engage learners in actively doing something
 - Presenter invites learners to participate.
 - Learners are doing the activity.

Observation instrument (20 minutes)

1. Getting feedback for improvement. Let students know that getting feedback from peers and instructors is a critical way for improving their communication skills. As they have already discussed, feedback gives them information about their understanding and performance so they know how they are doing and consider how they may want to make improvements.

2. Assessment as information for self-reflection. Display the statement about assessment and self-reflection.

- Assessment is commonly thought of as the means to find out whether individuals have learned something – that is, whether they can demonstrate they have learned the information, concepts, skills, procedures, etc., targeted by an educational effort {National Research Council, 2009}.
- Reflection is a way of helping practitioners understand better what they know and do as they develop their knowledge and skills through reconsidering what they learn in practice (Loughran, 2002).

Let students know that assessments may typically include tests and written papers. In this course, there have been different types of assessments to provide students feedback on their performance and understanding of the concepts. These assessments include their Activity

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Design Starter, Activity Write-up, and informal observations of their presentations. Self-reflection is something that practitioners in many professions from medicine to teaching do, as a means to learn about how they do their work, whether their performance is in alignment with their goals and understanding, and make improvements to what they do. Students should use the assessments as information for them to reflect on how they understand the concepts in this course.

3. Assessment for reflection in this session. Let students know that in this session, we introduce another type of assessment, an observation instrument, which is intended to provide them information about how they are applying concepts in this course in their presentations.

4. Introduce observation instruments. Let students know that an observation instrument is simply a “worksheet” with pre-determined questions and categories of information that guides the observer as she or he watches behavior.

5. Analogy to animal behavior research. Ask students if they are familiar with animal behavior research. Ask them to consider how scientists investigate behavior such as mating, feeding, and social group interactions among dolphins, birds, and other animals. Scientists identify categories of behaviors and record the amount of time individuals spend doing each type of behavior. This allows them to quantify and analyze something that is otherwise difficult to compare between individuals or groups. Our observation instrument is designed with a similar goal in mind: to look objectively at complex behaviors and interactions.

6. Distribute observation instrument. Distribute the observation instrument: one copy of category descriptions and two copies of the observation sheet per student. Let students know that this observation instrument is based on the ideas on learning and teaching that have been discussed in this class. Give students some quiet time to review the instrument, and then allow them to ask questions about the categories and how to use the instrument.

7. Three major categories. Share with students that there are three major categories in the observation instrument that relate to the three major ideas in this course. The categories of information that the instrument aims to collect are similar to the list they generated in the previous discussion, but are more specific to the contents of the course.

- Connect to learners’ prior knowledge
 - Presenter elicits learners’ prior knowledge, or encourages learners to elicit their prior knowledge.

- Presenter elicits learners' prior knowledge and connects it with ideas and tasks in the activity.
- Encourage learners to participate in the conversation
 - Presenter engages in a conversation with learners.
 - Presenter asks learners focus and broad questions.
 - Learners ask questions.
 - Presenter identifies, describes, and explains ideas.
 - Learner identifies, describes, and explains ideas.
 - Presenter directs the conversation so that the pattern of talk is IRE/IRF and reflective discourse, not just an educator monologue.
- Engage learners in actively doing something
 - Presenter encourages learners to engage actively with the objects in the activity.
 - Learners use their senses to engage with the objects in the activity.
 - Learners manipulate and make comparisons between objects in the activity.
 - Learners experiment with and make changes to the objects in the activity.
 - Learners talk about the objects with the presenter and other learners.
 - Presenter invites learners to do the activity by modeling and prompting them.
 - Presenter encourages learners to interact with one another as they do the activity.

8. Highlight patterns of talk. Draw students' attention to the question about patterns of talk in the Conversation section of the observation instrument. Ask someone to recap what are the three patterns of talk discussed in class. Ask follow up questions to encourage students to share how they would distinguish between each pattern.

9. Peer observation task. Remind students that they will observe one another to provide feedback to their peers for reflections. Let students know they will work with their partners to observe another pair of classmates as they present their activity. They will use this observation instrument to guide and record their observations. At the end of the observation, partners will share their observation data with one another in order to develop one set of peer observation feedback to the classmates they observe.

10. Using the instrument requires practice. Explain to students that using observation instruments to observe behavior requires comfort and

familiarity with the categories, as well as takes time and practice. Let students know that they will have the opportunity to practice using the instrument with a video of one of the instructors engaging with the public using an activity from the course before they do their peer observations. There will be two video clips to practice.

Note: Prepare two five to seven minute interactions of the same activity and instructor for students to practice observing with the observation instrument.

Practicing with videos (35 minutes)

1. Video 1 with instrument. Give students a chance to review the category descriptions and instrument again. Let students know they will watch the video twice. For the first time, just watch the clip to get a sense of what is going on without collecting information. The second time, they will use the observation instrument. When students are ready, play the video.

2. First watch. Do not collect data.

3. Second watch. Play immediately after first watch; no discussion is necessary before watching the second time.

4. Discuss with your partner. After watching the first video for the second time, ask students to confer with their partner about the data they collected. Explain to students that it is very likely that the data they collected would be different for each of the observers (and even by the same observer each time he or she observes the video clip) because the observers could interpret the presentation differently. Hence the discussion afterwards is essential for the observers to talk about what they saw and how they categorized different instances in the presentation based on their interpretation of the categories in the instrument itself. The goal is to work towards having the data sheets match up as much as possible, but in order for that to happen, the observers need to have a shared understanding of the categories and how to mark them. Ask them to discuss the following:

- Did both of you mark similar behaviors for each category? Be sure to reference specific instances in the video.
- What were some challenges you faced with marking the behavior for each category?
- Review your understanding of the descriptions for each code in the categories. Determine additional examples for each code.

5. Whole group discussion. Invite students to share their experiences with using the observation instrument and share their small group discussions. In particular, encourage them to discuss the distinctions between the codes and provide additional examples for the codes. Use the Discussion Map as a suggested guide to facilitate this discussion.

Discussion Map:

- Listen to their responses.
- Ask for evidence, explanation, or clarification.
- Ask for agreements, disagreements, and alternative opinions and views.
- For each of the three categories, list additional examples.

6. Video 2 with instrument. Let students know they will watch another video clip and collect observation data for the same categories. Similar to before, they watch the video twice. For the first time, just watch the clip to get a sense of what is going on without collecting information. The second time, they will use the observation instrument. When students are ready, play the video.

7. First watch. Do not collect data.

8. Second watch. Play immediately after first watch; no discussion is necessary before watching the second time.

9. Small group discussion of two categories. At the end of the second video, ask students to confer with their partner again. Remind students to focus on the code descriptions and how they mark the talk or actions into the codes. Ask them to discuss the following:

- Are your markings for each code more similar to your partner's than they were with the first video?
- Discuss how you coded the talk and actions in the video using the additional examples you generated in the previous discussion.
- Review your understanding of the descriptions for each code in the categories.

10. Whole group discussion. Invite students to share their small group discussions. Again, focus on their understanding of the code descriptions, as well as generating examples from the video clips to help them make distinctions between codes.

Peer observations. (60 minutes)

1. Set up. Let students know that it is time to use the instrument to observe one another. Remind students that half the class will present first while the other half of the class will observe them using the observation instrument. After about 20 minutes, the groups will switch.

2. Assign peer observers. To ensure that each team of students is observed, assign the peer observers.

3. The task. Explain to students that their task for this session is to work with their partner to observe one pair of classmates as they present their activity. They will use the observation instrument to collect information about the way their classmates communicate, and then use that information to answer questions and provide written feedback to their classmates. They will be graded on the quality of the feedback they provide to their classmates.

4. Distribute 2 copies of observation instrument per student. Explain to students that they should use a new observation sheet when observing a new group of visitors. That means, if in the 20 minutes of observation, a student pair present their activity to two groups of visitors, then their observer should have completed two observation instruments – one sheet for each group of visitors.

4. The presentations. Once each team of students knows whom they are assigned to observe, let students set up their activities on the gallery floor and begin their presentations and observations.

5. Peer observations. Half the student teams present while the other half observe. After about 20 minutes, have the teams switch. The student teams may be ready to switch at different times, as visitors and activities may vary. It may be necessary to tell the teams individually when it is time to switch.

Debrief peer observations. (20 minutes)

1. Partners debrief the peer observations. After all student teams have presented and observed their peers, and students have cleaned up and packed away their activities, give partners a chance to debrief with one another and begin thinking about and preparing their written feedback to their classmates. Distribute the *Written Feedback Questions* for partners to use as they discuss the observations.

2. Whole group debrief peer observations. Give students a chance to comment on their experience observing one another and gathering observation data. What did they notice about the activities and the way their classmates presented? What can they apply in their own presentations from what they noticed? Remember to use the Discussion Map to help facilitate the conversation.

Homework

1. Written feedback. Let students know that each team will need to prepare one written feedback to the team of students they observed. They should use the observation data they collected to provide thoughtful responses to the feedback questions. Instructors may choose the method for students to send feedback to each other and the instructor in a manner that is most convenient and consistent with the way in which students have been submitting homework and communicating with the instructor. These options may include:

- Students email the team and cc the instructors
- Students submit the feedback to the instructors who distribute it to the teams
- If using web-based course interface, such as Blackboard, Sakai, or bSpace, place the feedback in the student drop box.

Observation Categories

Code	Description	Example
PRIOR KNOWLEDGE: How is facilitator connecting with learners' prior knowledge?		
Mention only	Mention (or elicits) personal experience or previous understanding related to the topic.	What do you remember about the sand when you were at the beach? Have you touched sea stars before?
Mention & Connect	Mention (or elicits) personal experience or previous understanding related to the topic, and states that these are related.	Have you noticed how the sand at the beach may be different from sand along a river? Here is sand from different places, & notice how they are different. Have you ever seen <i>Finding Nemo</i> ? Well Nemo & his dad lived in a coral reef, just like what we have here.

CONVERSATIONS: How are learners & facilitator talking during the interaction?

Identification	Calling out or naming objects, or parts of objects.	- This is a fiddler crab. - There's the honeybee. - That is the operculum of a fish.
Description	Elaborating upon elements or details of the object.	- The whelk has a soft body and a hard shell. - The bee is taking nectar from the flowers.
Explanation	To make clear the cause, origin, or reason of; to account for. Reasoning causal relations, processes, scientific principles, and analogies.	- Dead zones means there is no oxygen in the water, and this is bad because animals cannot live without oxygen in the water. - Oh, see!? He [the bee] takes nectar and the pollen gets stuck on him, and then he goes to another flower and another flower. That's how pollen gets spread.

ENGAGEMENT: How are the learners engaging with the objects?

Sense	Examines object—listen, touch, smell, & look at (sensory).	- Learner touches, smells, looks at, or listens to object.
Manipulate	Manipulates, or makes changes to, objects in order to think about the topic from a new or different perspective—compare & contrast.	- Learner compares features or characteristics between objects.
Experiment	Makes a hypothesis about an observation and tests it out—"I wonder if"	- Learner makes a hypothesis, controls variables, and tests ideas.
Discuss	Talks about the object.	- Learner converses about what she or he senses, does, or thinks about the objects.

Observation Instrument

Observer:

Group observed:

The purpose of this observation instrument is to collect information about how students present their activities to the public. The observer focuses on three categories of communicating that have been explored in class.

PRIOR KNOWLEDGE

Tally frequency of each.
How are **(learners // facilitators)** connecting learners' prior knowledge to the activity?

Mention only	Mention & connect
/	/

CONVERSATION

Tally frequency of each.
How are **(visitors // facilitators)** talking during the interaction?

Question	Identify	Describe	Explain
/	/	/	/

Rate the pattern of talk.
What is your overall sense of the facilitators' conversations?

0	1	2	3	4
Never occurred		Sometimes occurred		Occurred consistently

Educator Monologue
IRE/IRF
Reflective Discourse

ENGAGEMENT

Tally frequency of each.
How are the learners engaging with the objects & activity?

Sense	Manipulate	Experiment	Discuss
/	/	/	/

Rate the facilitation.
What is your overall sense of how the educator facilitated learners' engagement?

0	1	2	3	4
Never occurred		Sometimes occurred		Occurred consistently

Educator models engagement
Educator prompts engagement
Educator encourages social interactions between learners

7. Did you see evidence that the facilitators were helping visitors build an understanding of the science concepts? If yes, what did you see? If no, what suggestions do you have for the facilitators? What do you think the visitors took away from the interaction?