

Welcome

Carpentries Instructor Training

Cora Assmann

9 June 2022



**FRIEDRICH-SCHILLER-
UNIVERSITÄT
JENA**



1. Welcome – Organisational part

- Introduction to [collaborative document](#) (see link in the chat)



- [Code of Conduct](#)

1. Welcome – Introduction of instructors



Cora Assmann

Friedrich-Schiller University Jena
Germany



Christian Knüpfer



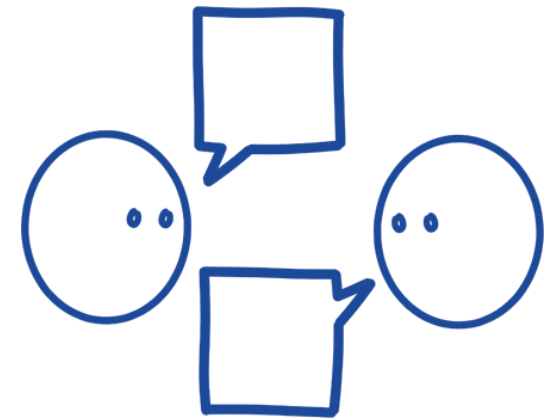
Mateusz Kuzak

eScience center
Netherland

1. Welcome – Introduce yourselves

Introduce yourselves:

- ***Say your first name***
- ***explain your work in 3 words and***
- ***say something you are proud of
(not necessarily related to your work)***



max. 1min per Person

1. Welcome- Reviewing The Carpentries Experience and Goals

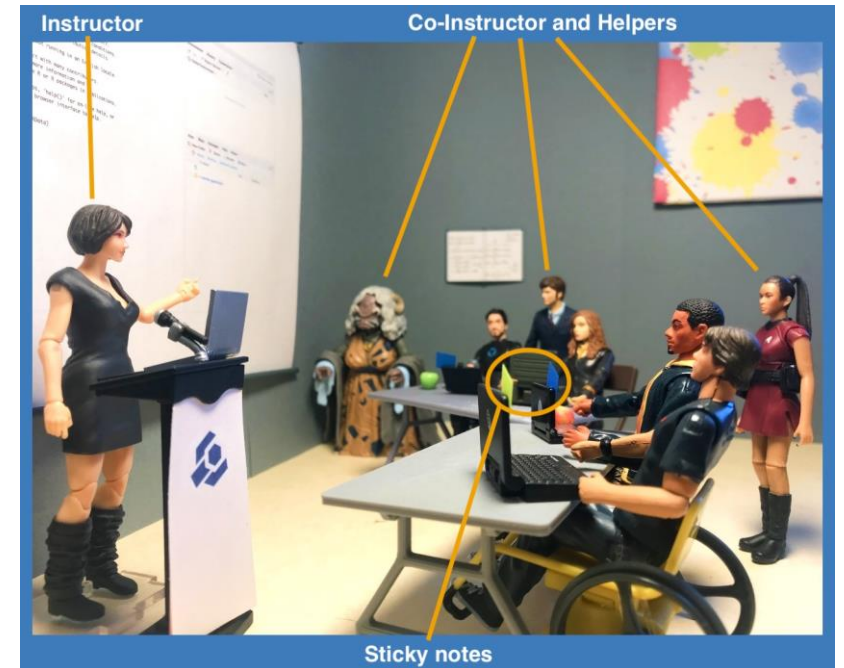
- 1) Have you ever participated in a Software Carpentry, Data Carpentry, or Library Carpentry Workshop?***
- 2) Which of these most accurately describes your teaching experience?***
- 3) Why are you taking this course?
What goals do you have for today and tomorrow?***



go to the pad, 5min

1. Welcome - What is The Carpentries and how do we approach teaching?

*The Carpentries is a **global community of volunteer researchers, educators, and others** oriented around improving basic computing and data skills for researchers through intensive, short-format workshops.*



1. Welcome - Instructor Training Workshop Overview

Four main themes of workshop content:

1. How Learning Works
2. Building Teaching Skills
3. Creating a Positive Learning Environment
4. The Carpentries History and Culture

We will **NOT** be going over Data Carpentry, Library Carpentry or Software Carpentry workshop content in detail!

2. Building Skill With Practice - The Acquisition of Skill

- Dreyfus model of skill acquisition



- three stages of experience levels
- novices are the main target group of the carpentries
- how a person feels is **Not** included in this definition

2. Building Skill With Practice - Building a Mental Mode

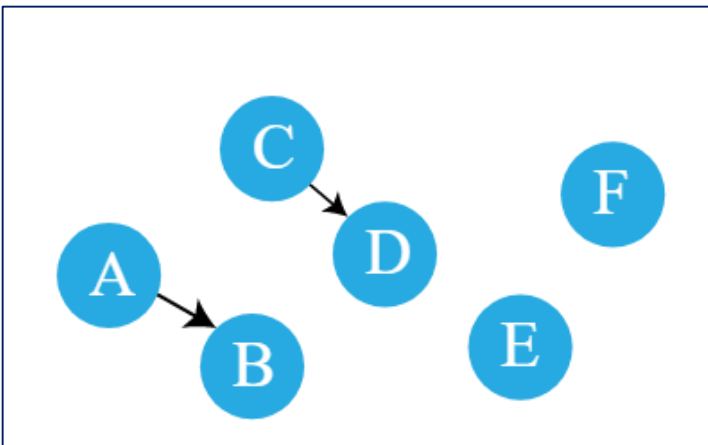
All models are wrong, but some are useful.

George Box, statistician

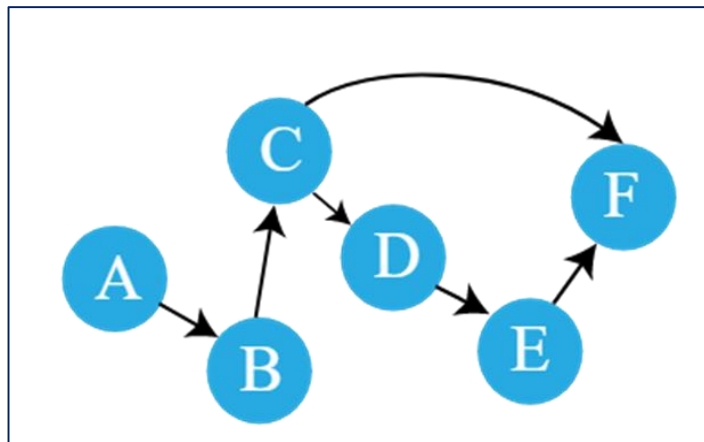
2. Building Skill With Practice - Mapping a Mental Model

- a mental model can be represented as a collection of concepts and facts, connected by relationships

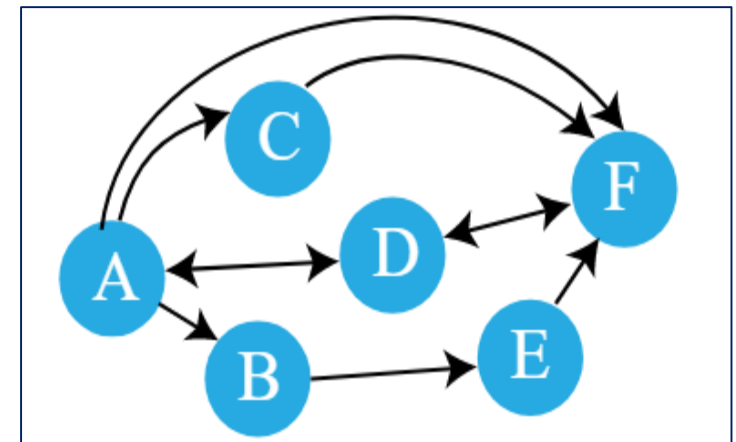
Novice



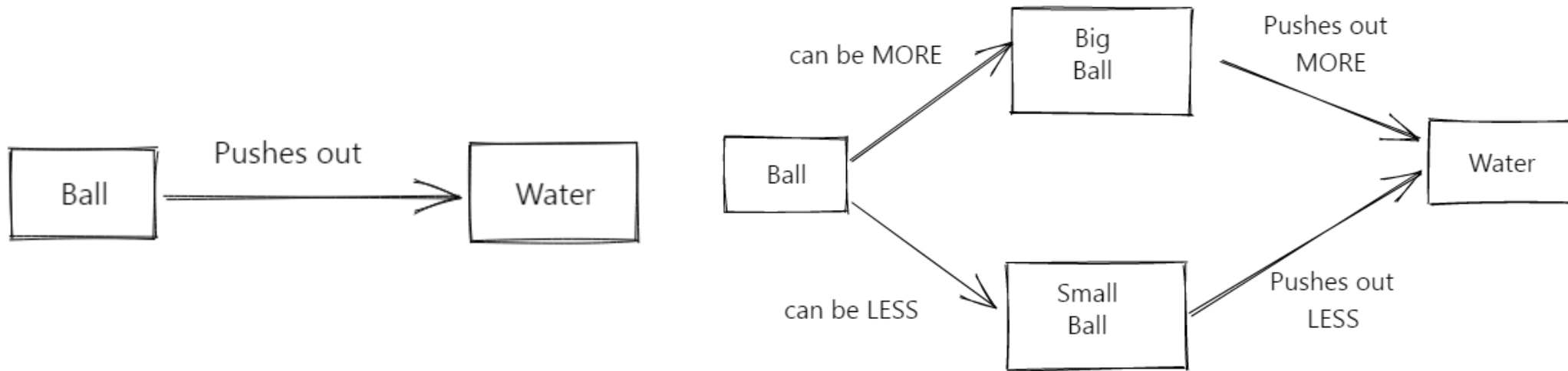
Competent practitioner



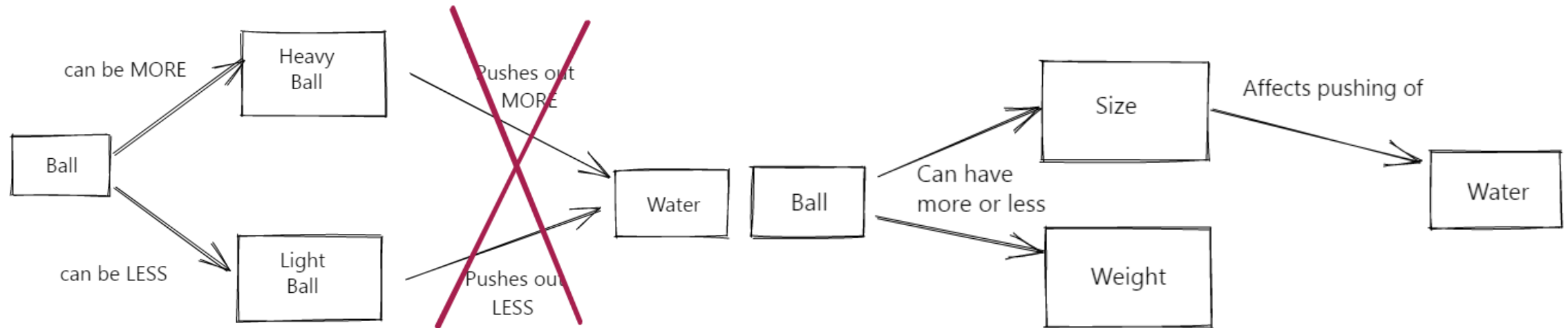
Expert



2. Building Skill With Practice - Misconceptions



2. Building Skill With Practice - Misconceptions



2. Building Skill With Practice - Misconceptions

Describe a misconception you have encountered as a teacher or as a learner.



go to the pad, 5min

2. Building Skill With Practice - Using Formative Assessment to Identify Misconceptions

How can an instructor find out about the misconceptions of his learners?

- the answer is feedback
 - feedback that allows us to assess the developing mental model of a trainee in highly specific ways
 - to verify that learning is proceeding according to plan
 - feedback while we teach so that we can respond to that information and adapt our instruction
-
- formative assessment is applied during learning to form the practice of teaching and the experience of the learner

Feedback from formative assessment illuminates misconceptions for both instructors and learners!

2. Building Skill With Practice - Misconceptions

***Based on your previous educational experience
what types of formative assessments do you know
about?***



go to the pad, 5min

2. Building Skill With Practice -Importance of Going Slowly

If someone feels it is too slow, they will be a bit bored. If they feel it is too fast, they will never come back to programming. Kunal Marwaha, SWC Instructor

2. Building Skill With Practice - Summary

- Our goal when teaching novices is to help them construct useful mental models.
- Exploring our own mental models can help us prepare to convey them.
- Constructing a useful mental model requires practice and corrective feedback.
- Formative assessments provide practice for learners and feedback to learners and instructors.

3. Morning Break

4. Expertise and Instruction - What Makes an Expert?

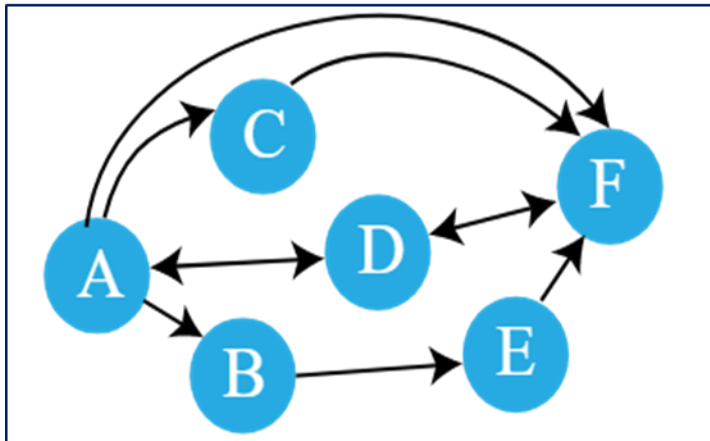
***What is something that you are an expert in?
How does your experience when you are acting as an expert differ from when you are not an expert?***



go to the pad, 5min

4. Expertise and Instruction - What Makes an Expert?

Expert



The greater connectivity of a mental model allows experts to:

- see connections between two topics or ideas that no one else can see
- see a single problem in several different ways
- know how to solve a problem, or “what questions to ask”
- jump directly from a problem to its solution because there is a direct link between the two in their mind

4. Expertise and Instruction – Expert Awareness Gaps

Experts are frequently so familiar with their subject that they can no longer imagine what it is like to not understand the world that way. This phenomenon is known in the literature as an ***expert blind spot***.

-> ***expert awareness gap (Carpentries Community)***

A -> F, B and C before

It is important to explain what you are doing step-by-step, and how each step leads to the next one!

4. Expertise and Instruction – Expert Awareness Gaps

- 1. Is there anything you are learning how to do right now? Can you identify something that you still need to think about, but your teacher can do without thinking about it?***
- 2. Think about the area of expertise you identified for yourself earlier. What could a potential awareness gap be?***



go to the pad, 7min

4. Expertise and Instruction – What a Problem?

What is an error message that you encounter frequently in your work? (These are often syntax errors.)

Take a few minutes to plan out how you would explain that error message to your learners. Explain the error and your explanation to the group.



Group work
in breakout rooms, 10min

4. Expertise and Instruction – “Just” and Other Dismissive Language

- Example for dismissive language: the word “just” in explanations, as in, “**Look, it is easy, you just...**”
- try to avoid dismissive language and replace it with more positive and motivating word choices like:
 1. “We only need to learn two new commands to accomplish the next task.”
 2. “This task may feel like it will take you all year to learn, but in my experience it will take you a lot less time than that to master it.”

4. Expertise and Instruction - Summary

- Experts face challenges when teaching novices due to expert awareness gaps.
- Things that seem easy to us are often not experienced that way by our learners.
- With practice, we can develop skills to overcome our expert awareness gaps.

5. Memory and Cognitive Load – Types of memory



Long-term memory:

- persistent information are stored like our friends' names, home address
- it is unbounded (barring injury or disease)
- we will die before it fills up
- it is slow to access



Short-term memory:

- used to actively think about things
- often called working memory
- it is much faster, but also much smaller and limited

5. Memory and Cognitive Load – Test your working memory

This website implements a short test of working memory: <https://miku.github.io/activememory/> (see Link in the chat)

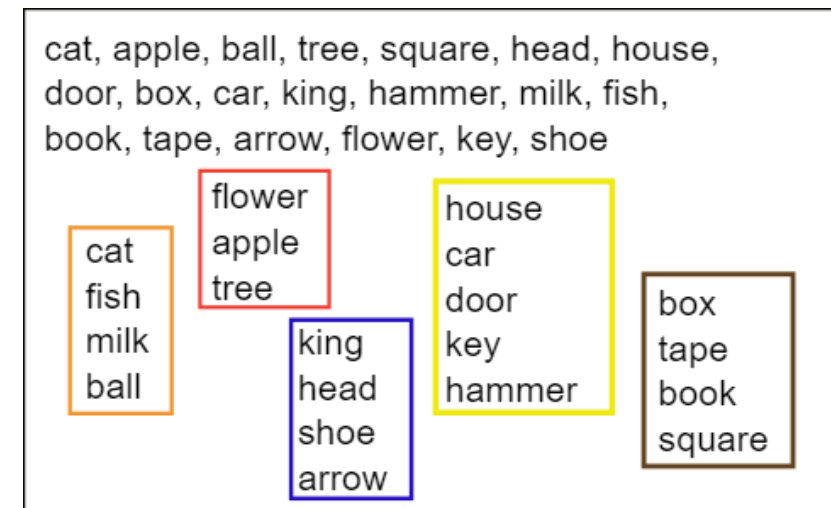
What was your score? If you are comfortable, share your answer in the Etherpad. What were your experiences when you did the test again?



go to the link and
pad, 5min

5. Memory and Cognitive Load – Strategies for Memory Management

- Limit concepts-teach fewer concepts
- **Chunking:** minds can store larger numbers of facts in short-term memory by creating chunks, or relationships among separate items
- Conduct frequent formative assessment
- Group work
- Opportunities for Reflection



5. Memory and Cognitive Load – Attention is a Limited Resource: Cognitive Load

While many people believe that they can “multi-task”



the reality is that attention can only focus on one thing at a time.

Source: freepik: https://de.freepik.com/vektoren-kostenlos/frau-arbeitet-multitasking-aktivitaeten_12067497.htm#query=multitasking&position=3&from_view=search

5. Memory and Cognitive Load – Attention is a Limited Resource: Cognitive Load

Theory of Cognitive Load from [Sweller](#):

People have to attend to three types of things when they are learning:

1. Things they have to think about in order to perform a task (“intrinsic”).
2. Mental effort required to connect the task to new and old information (“germane”).
3. Distractions and other mental effort not directly related to performing or learning from the task (“extraneous”).

5. Memory and Cognitive Load – Attention is a Limited Resource: Cognitive Load

Formative Assessments can help to avoid cognitive overload!

Examples are:

- targeted multiple choice question
- [faded examples](#): worked examples with targeted details “faded” out – essentially fill-in-the-blank programming blocks
- [parson's Problems](#): out-of-order code selection & sorting challenges
- labelling diagrams or flow charts (may also be organized as a fill-in-the-blank)

5. Memory and Cognitive Load – Attention is a Limited Resource: Cognitive Load

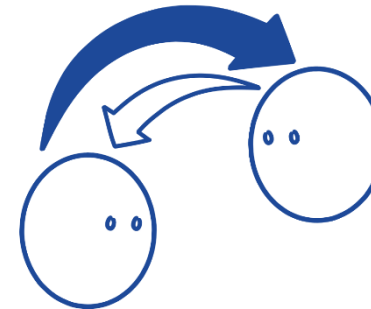
What to display during a workshop?



NOT displaying
Carpentries curriculum



visual environment
should be focused
on what you are teaching



split-attention effect

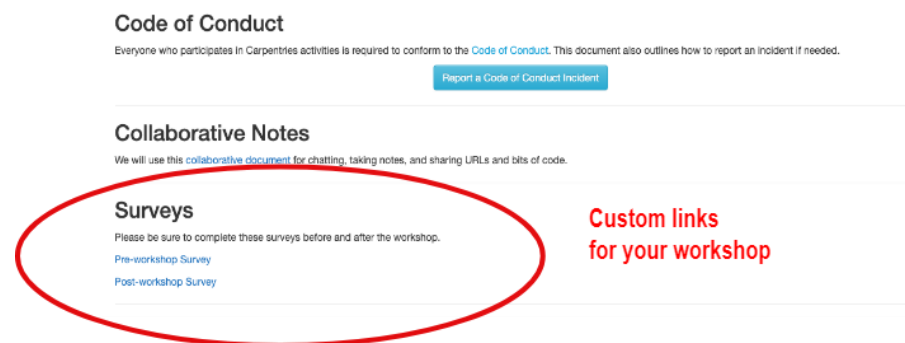
5. Memory and Cognitive Load – Summary

- Most adults can store only a few items in short-term memory for a few seconds before they lose them again.
- Things seen together are remembered (or mis-remembered) in chunks.
- Cognitive load should be managed through guided practice to facilitate learning and prevent overload.
- Formative assessments can help to consolidate learning in long-term memory.

6. Building Skill With Feedback -How can I get feedback from learners?

Surveys:

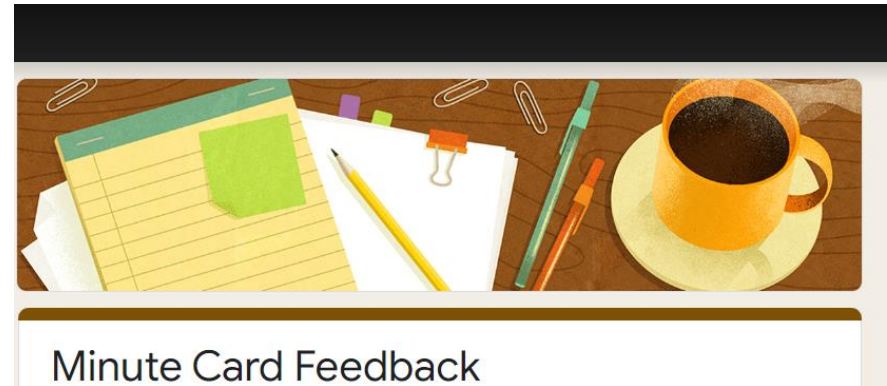
- [Preview: Pre-workshop survey](#)
- [Preview: Post-workshop survey](#)
- [dashboard displaying the last year of data for carpentries workshop surveys](#)
- surveys for your workshop
- Survey response dashboard



6. Building Skill With Feedback - How can I get feedback from learners?

Minute Cards:

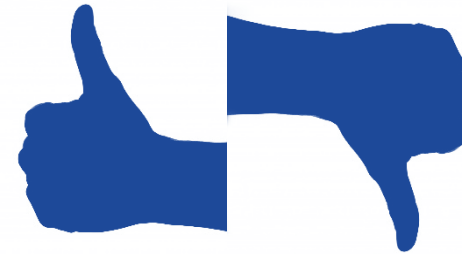
- [Virtual Minute Card Template](#) on Google Forms.
- **Example positive prompts:**
 - One thing you liked about this section of the workshop
 - The most important thing you learned today
 - A new skill, command, or technique you are most excited about using
- **Example constructive prompts:**
 - One thing you did not like or would change about this section of the workshop
 - One thing that is confusing / you would like clarification on.
 - One question you have



6. Building Skill With Feedback - How can I get feedback from learners?

One-Up, One-Down:

- the instructor asks the learners to alternately give one positive and one negative point about the day, without repeating anything that has already been said
- forces people to say things they otherwise might not: once all the “safe” feedback has been given, participants will start saying what they really think
- the instructor writes down the feedback in the Etherpad or a text editor, but does not comment on the feedback while collecting



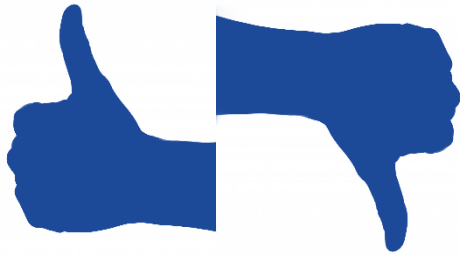
<https://www.publicdomainpictures.net/de/view-image.php?image=199187&picture=silhouette-der-daumen-nach-oben-hand>

6. Building Skill With Feedback – Take home message

- Get feedback from your learners.
- Give your learners time to fill out the post-workshop survey at the end of your workshop.
- Take the time to respond to your learners' feedback.

6. Building Skill With Feedback – Your Feedback for us!

1.



One- Up one Down

2.



Virtual Minute Card
(see link in the Chat)