Carpentries Instructor Training

8 & 9 October 2018

Day 2	09:00	Welcome Back	What have we learned so far? What will we focus on today?
	09:10	Building Teaching Skill: Lesson Study	How should I use learning objectives when preparing to teach? How can I adapt my teaching in response to formative assessment?
	09:55	Building Teaching Skill: Live Coding	Why do we teach programming using live coding?
	10:55	Morning Coffee	Break
	11:10	Building Teaching Skill: Performance Revised	How did you change your teaching in response to feedback?
	11:50	Lunch	Break
	12:50	The Carpentries: Workshop Introductions	How do you actually start a workshop?
	14:00	The Carpentries: How We Operate	How are Software, Data, and Library Carpentry organized and run?
	15:05	Afternoon Coffee	Break
	15:20	The Carpentries: Teaching Practices	How are the teaching practices we've learned used in our workshops? What do I do if there is a Code of Conduct violation?
	15:50	Afternoon Wrap-Up	What do I need to do to finish certifying as a Carpentry instructor?
	16:35	Post-training survey	Please fill out our pre-training survey before the start of the course.
	16:50	Finish	

What we learned yesterday

- instructors guide learners to construct the proper big picture (accurate mental model) of the topic rather than focus on details
- instructors rely on frequent feedback from learners to monitor their own presentation of the material
- instructors introduce a few concepts at a time to avoid cognitive overload
- the best way to motivate learners? Show them how to do something they can immediately put to use and be enthusiastic about it
- teaching is a learned skill

Building Teaching Skill: Lesson Study

Learner Profiles

Learner profile example

João is an agricultural engineer doing his masters in soil physics. His programming experience is a first year programming course using C. He was never able to use this low-level programming into his activities, and never programmed after the first year.

His work consists of evaluating physical properties of soil samples from different conditions. Some of the soil properties are measured by an automated device that sends logs in a text format to his machine. João has to open each file in Excel, crop the first and last quarters of points, and calculate an average.

Software Carpentry will show João how to write shell scripts to count the lines and crop the right range for each file, and how to use R to read these files and calculate the required statistics. It will also show him how to put his programs and files under version control so that he can re-run analyses and figure out which results may have been affected by changes.

Learning Objectives

Bloom's Taxonomy - Action verbs

Verbs that demonstrate *Critical Thinking*

KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION
					Appraise
				SYNTHESIS	Argue
				Arrange	Assess
			ANALYSIS	Assemble	Choose
			Analyze	Collect	Compare
		APPLICATION	Appraise	Combine	Conclude
		Apply	Categorize	Comply	Estimate
	COMPREHENSION	Complete	Compare	Compose	Evaluate
	Compare	Construct	Contrast	Construct	Interpret
KNOWLEDGE	Describe	Demonstrate	Debate	Create	Judge
List	Discuss	Dramatize	Diagram	Design	Justify
Name	Explain	Employ	Differentiate	Devise	Measure
Recall	Express	Illustrate	Distinguish	Formulate	Rate
Record	Identify	Interpret	Examine	Manage	Revise
Relate	Recognize	Operate	Experiment	Organize	Score
Repeat	Restate	Practice	Inspect	Plan	Select
State	Tell	Schedule	Inventory	Prepare	Support
Tell	Translate	Sketch	Question	Propose	Value
Underline		Use	Test	Setup	

Designing Good Challenges

Example MCQ

Challenge 4

Given the following code:

```
m <- matrix(1:18, nrow=3, ncol=6)
```

```
     [,1] [,2] [,3] [,4] [,5] [,6]
[1,]    1    4    7   10   13   16
[2,]    2    5    8   11   14   17
[3,]    3    6    9   12   15   18
```

Which of the following commands will extract the values 11 and 14?

A. `m[2,4,2,5]`
B. `m[2:5]`
C. `m[4:5,2]`
D. `m[2,c(4,5)]`

Faded Example

Challenge 3

Fill in the blanks below to plot the minimum GDP per capita over time for all the countries in Europe. Modify it again to plot the maximum GDP per capita over time for Europe.

```
data_europe =
pandas.read_csv('data/gapminder_gdp_europe.csv',
index_col='country')
data_europe.____.plot(label='min')
data_europe.____
plt.legend(loc='best')
plt.xticks(rotation=90)
```

Building Teaching Skill: Live Coding

Live Coding: Top Ten Tips

1. **Stand up and move around the room if possible**
2. **Go slowly (don’t copy & paste)**
3. **Mirror your learner’s environment**
4. **Use your screen wisely**
5. **Use illustrations**

Live Coding: Top Ten Tips

6. **Turn off notifications**
7. **Stick to the lesson material**
8. **Leave no learner behind**
9. **Embrace mistakes**
10. **Have fun!**

Coffee Break

Building Teaching Skill: Performance Revised

Coffee Break