

LECTURE / SESSION¹ PLAN

Name Lecturer: Sofia Gil-Clavel	Date session: 3	Expected number of students: 20
Course title	R-Workshop	
Topic of lecture or session	Data Visualization using ggplot2	
Situational factors (e.g. group size, prior knowledge, expected motivation)	The class lasts 2hrs. The students are in different career stages, from PhD students to professors. The students have different backgrounds, from qualitative researchers that have never used R to quantitative researchers that want to learn new topics or move out of SPSS/STATA. The students use different Operating Systems (Windows, Mac, or Linux).	
Intended learning outcomes of this session	At the end of the session the students will be able to: <ol style="list-style-type: none">1. Understand the relevance of visualizing data and situate it as part of the data science pipeline.2. Express visualizations using the grammar of graphs.3. Translate the grammar of graphs into an actual plot using ggplot on data frame.4. Use geometries depending on the type of statistical variables.5. Map data points into scales.6. Visualize more than one category using facets.7. Modify the appearance of a graph using themes.8. Save their graphs to their computer.	
Learning material (book, chapters, ...)	The lecture is based on the books:	

¹ A session means a teaching and learning session for university students in the bachelor or master. It can be a lecture, a seminar or a specific type of educational meeting with a group of students that is relevant for the discipline where the lecturer can demonstrate a whole range of teaching skills. It means that in one session each of the six didactic elements appears at least once. Your lesson plan should show that you are using a powerful learning environment and that students are activated.

	<ul style="list-style-type: none"> Wickham, Hadley, Mine Çetinkaya-Rundel, and Garrett Grolemund. R for data science. " O'Reilly Media, Inc.", 2023. Accessed May 7, 2024. https://r4ds.hadley.nz/. Wickham, Hadley. Ggplot2. Use R! Cham: Springer International Publishing, 2016. https://doi.org/10.1007/978-3-319-24277-4.
Media, equipment, tools	<p>The students use their own laptops.</p> <p>The teacher needs access to a projector and a whiteboard.</p>
Preparation for students	<p>The students have access to the slides and codes before the class:</p> <p>https://github.com/SofiaG11/R_Course/tree/master/R4SocialScientists/Session3_DataViz</p>

Time ² (min.)	Didactic element (goal) ³ and topic ⁴	What the teacher does ⁵ (teacher activity)	What students do (learner activity)	Evaluation ⁶ (feedback/assessment)
20	<ul style="list-style-type: none"> Recap of the previous session. 	<ul style="list-style-type: none"> The teacher uses the slides to remind the students what they learned the previous session: <ul style="list-style-type: none"> Tidymvers Data pipelines The teacher will open RStudio and together with the students create the R-script where code class code will be written. 	<ul style="list-style-type: none"> Before telling each element the students learned, the teacher waits some seconds for the students to fill out the information out loud. The students open and follow the steps that the teacher is explaining. 	<ul style="list-style-type: none"> The students will use these concepts during the workshop. So, the teacher will detect when a student confuses them. Based on these confusions the teacher will be able to correct the student. The teacher walks around the classroom to check on the

² Indicate the planned duration in minutes

³ State the number(s) of the relevant ILO at each didactic element

⁴ Only key words

⁵ Specify the type of activity and write down also the questions that you prepared to ask in the session

⁶ Specify the type of evaluation, i.e. the way in which you assess if the objective(s) has/have been achieved

				students and provide feedback when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
10	<ul style="list-style-type: none"> Understand the relevance of visualizing data and situate it as part of the data science pipeline. 	<ul style="list-style-type: none"> The teacher uses the slides to explain the relevance of visualizing data and situate it as part of the data science pipeline. 	<ul style="list-style-type: none"> The students passively digest what the teacher is explaining. 	<ul style="list-style-type: none"> The students will use these concepts during the workshop. So, the teacher will detect when a student confuses them. Based on these confusions the teacher will be able to correct the student.
10	<ul style="list-style-type: none"> Express visualizations using the grammar of graphs. 	<ul style="list-style-type: none"> The teacher uses the slides to explain what the grammar of graphs is and the different elements that compose it: <ul style="list-style-type: none"> Data Layers Scales Facets Themes 	<ul style="list-style-type: none"> The students passively digest what the teacher is explaining. 	<ul style="list-style-type: none"> The students will use these concepts during the workshop. So, the teacher will detect when a student confuses them. Based on these confusions the teacher will be able to correct the student.
10	<ul style="list-style-type: none"> Translate the grammar of graphs into an actual plot 	<ul style="list-style-type: none"> The teacher uses the slides to explain the function ggplot and how it works together with a data frame. 	<ul style="list-style-type: none"> The students follow the steps in their computers. 	<ul style="list-style-type: none"> The teacher walks around the classroom to check on the students and provide feedback when something is not

	using ggplot on data frame.			working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
20	<ul style="list-style-type: none"> Use geometries depending on the type of statistical variables. 	<ul style="list-style-type: none"> The teacher uses the slides to explain what a geometry is and the connection between them and the type of statistical variables that are analyzed. 	<ul style="list-style-type: none"> The students perform an exercise where they choose geometries from two different groups: <ul style="list-style-type: none"> one continues variable one discrete one continuous variables The students describe out loud what they found and exchange some ideas on where they would use the geometries. 	<ul style="list-style-type: none"> The teacher walks around the classroom to check on the students and provide feedback when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
20	<ul style="list-style-type: none"> Map data points into scales. 	<ul style="list-style-type: none"> The teacher uses the slides to explain the different scales (color, shape, size, alpha, fill, etc..) and the connection between them and the data points. 	<ul style="list-style-type: none"> The students perform an exercise where they use different scales available to the geometries they chose in the previous exercise. The students describe out loud what they found and exchange some ideas on when they would use the different scales. 	<ul style="list-style-type: none"> The teacher walks around the classroom to check on the students and provide feedback when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
20	<ul style="list-style-type: none"> Visualize more than one 	<ul style="list-style-type: none"> The teacher uses the slides to explain the different facets and 	<ul style="list-style-type: none"> The students perform an exercise where they use different facets depending on 	<ul style="list-style-type: none"> The teacher walks around the classroom to check on the students and provide feedback

	category using facets.	the connection between them and the categorical variables.	the number of categories a variables has. <ul style="list-style-type: none"> The students describe out loud what they found and exchange some ideas on how useful a facet is depending on the problem. 	when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
15	<ul style="list-style-type: none"> Modify the appearance of a graph using themes. 	<ul style="list-style-type: none"> The teacher uses the slides to explain how to modify the appearance of a graph using the function themes. The teacher shows the predefined themes that ggplot2 offers. 	<ul style="list-style-type: none"> The students perform an exercise where they create the most horrible graph. The idea is that they modify all possible elements of the graph. 	<ul style="list-style-type: none"> The teacher walks around the classroom to check on the students and provide feedback when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
5	<ul style="list-style-type: none"> Save their graphs to their computer. 	<ul style="list-style-type: none"> The teacher uses the slides to explain how to use the function ggsave to save a graph. 	The students save their “horrible” graph to their computers.	<ul style="list-style-type: none"> The teacher walks around the classroom to check on the students and provide feedback when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.