GG501

1. Introduction: Concepts, approach & tools

INTRODUCTION TO THE COURSE

- Science → Graduate research, environmental/geographic research
- Spatial → data/observations that are geographically distributed
  - Place-based
  - Spatially-explicit
  - Geographic
- Knowledge Mobilization
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  - Place-based
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- Knowledge Mobilization
- SSHRC Definition:
- “an umbrella term encompassing a wide range of activities relating to the production and use of research results, including knowledge synthesis, dissemination, transfer, exchange, and co-creation or co-production by researchers and knowledge users”

COURSE COMPONENTS

1. Review readings w/ brief lecture/discussions
2. Exercises and code-reviews in class
3. Case studies – code and output reviews in class
4. Assignments
5. Term Projects

COURSE RESOURCES

1. Course website is central resource for materials: `jjvenky.github.io/GG501AW23/`
2. Zoom if needed for remote classes
3. Readings – free online textbooks
4. Your own computer with R/RStudio installed

LEARNING OBJECTIVES

- Describe basic knowledge mobilization concepts
- Understand how data visualisation fits within the environmental data analytics workflow
- Perform basic operations in R & RStudio on your own machine
- Access course resources

WHY SPATIAL KNOWLEDGE MOBILIZATION?

- Environmental research happens in places where people work and live, the results from all geographic/environmental research ultimately matter to a wide range of communities of interest, these include but are not limited to:
  - local community members, citizens
  - Indigenous communities
  - local government administrators / planners scientists
  - regional/provincial/territorial administrators / planners and scientists
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  - local government administrators / planners scientists
  - regional/provincial/territorial administrators / planners and scientists
- As scientists, we must be equipped with skills to communicate technical information and concepts to a wide range of audiences
  - co-creation of local significance of research results
  - appropriate interpretation of findings, uncertainties, etc.
  - appropriate acknowledgement of local involvement in research

DATA VISUALIZATION / VISUAL ANALYTICS

Visual analytics

- discovering new things through visualization of data and models
- exploratory data analysis
- exploratory spatial data analysis (ESDA)
- workflow is iterative and interactive
- aim is gaining insights (Mainly personal use)
- few scales and legends

within team

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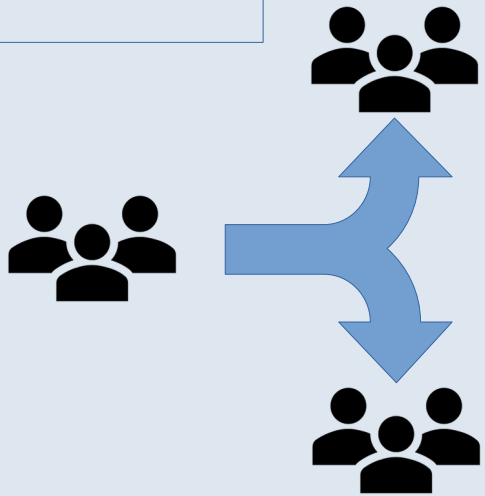
Visualisation

- aim is explicit communication to an audience
- extensive scales, grids and legends
- present results of an analysis of research project

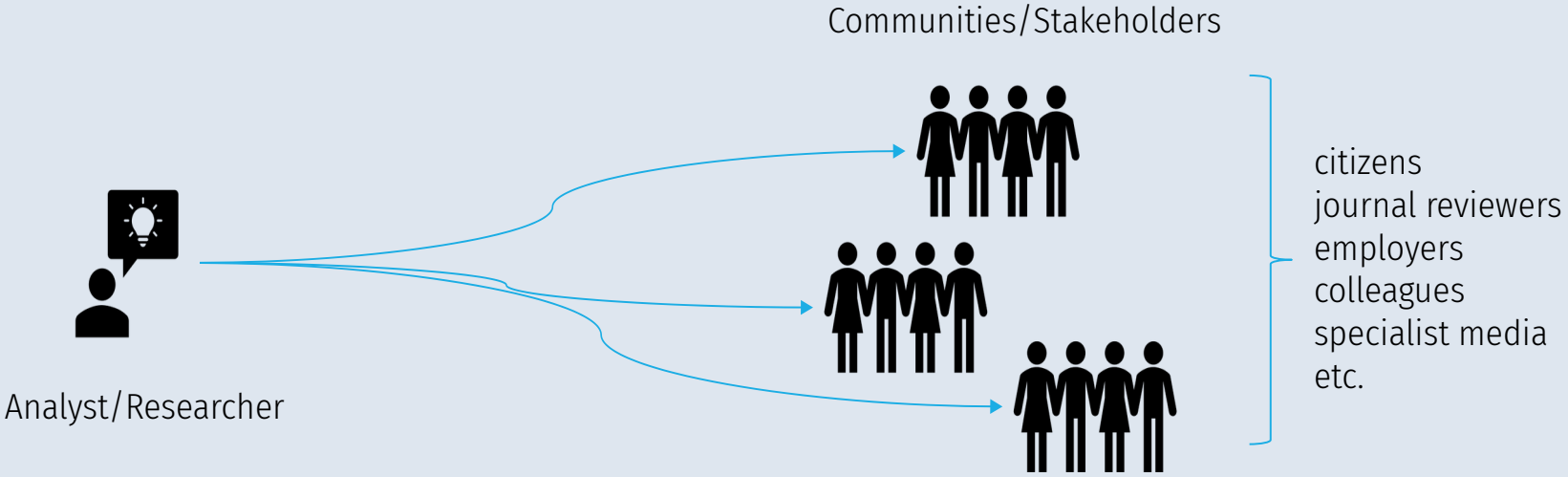
within team



between teams

TELLING STORIES WITH DATA

- Many visualizations exist for the purpose of communication



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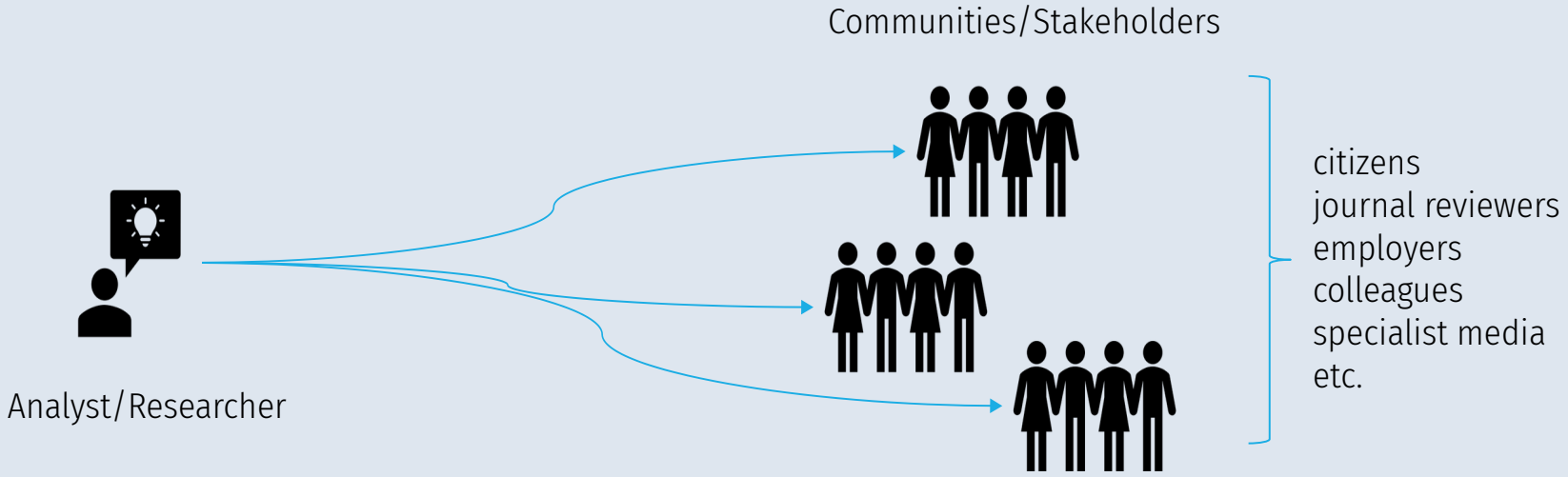

- A story is a set of observations, facts, or events which are presented in a way that create an emotional response
- Stories can be used as a way to frame the message, making it memorable & compelling

TELLING STORIES WITH DATA

- Stories have arcs – they build up tension and end at a resolution
- Can frame a data story as a sequence of steps
- Visualizations can be used to illustrate a specific step or stage in a story
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TELLING STORIES WITH DATA

- Stories have arcs – they build up tension and end at a resolution
- Can frame a data story as a sequence of steps
- Visualizations can be used to illustrate a specific step or stage in a story
  - usually data stories require multiple visualizations
  - ‘Data journalism’ has some excellent examples

TELLING STORIES WITH DATA

- Aim to keep distinct elements of your story as clear as possible – build toward complex messages that need to be conveyed
- Don’t need to visualize data dimensions that are tangential to the story
  - even if we have them and even if we could make a figure that showed them (very common graduate student problem is to try to show everything / all the work they’ve done)
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- Use a consistent visual language for the different parts of a larger figure or for different elements of a data story
  - e.g., use consistent settings for all figures in a thesis or a report (you will notice this in professional research reports)
  - ggplot2 themes make it very easy to build a set of visualizations with a consistent visual language

```
ggthemes
hrbrthemes
bbplot
ggpomological
```