Using EM to Drive Effective Data Visualization: Additional Resources

 Data Visualization

* *Storytelling with Data* (Wiley 2015) by Cole Nussbaumer Knaflic
	+ This book is an excellent resource for learning the basics of data visualization (from chart types, to focusing attention, to storytelling). It’s easy to read. The techniques in these chapters will be most relevant for working on a thesis or other project that allows you to define your own research question.
	+ The Storytelling with Data team has a website that includes a useful blog and exercises that you can go through to practice:<https://www.storytellingwithdata.com/> While there is a subscription option for more access to information and webinars, much of the work is available for free. In addition, the team has a YouTube channel with various workshops and tip videos. It can be found here: [https://www.youtube.com/@storytellingwithdata](https://www.youtube.com/%40storytellingwithdata)
	+ Search for *Storytelling with Data* in your university library, or it can be ordered online.
	+ For additional practice exercises (and to see the exercise included in the workshop), see Knaflic’s followup workbook: *Storytelling with Data: Let’s Practice!* (Wiley 2020)
* *The Big Picture* (MyGraw Hill 2021) by Steve Wexler
	+ This book breaks down data visualizations to help readers develop better graphical literacy. The examples are clear, and the explanations are thorough. Wexler goes through different types of graphs and shows variations of those graphs that can be used in different situations to great effect.
	+ Steve Wexler presents to a Power BI usergroup here, going over many of the principles from the book [start at 11:35]: https://www.youtube.com/watch?v=eIhPmMsbWl8
* *How Charts Lie: Getting Smarter about Visual Information* (W.W. Norton & Company 2019) by Alberto Cairo
	+ This book discusses the ethics of graphs and charts and provides a detailed breakdown of how data visualizations can influence our perception of information - in both positive and negative ways.
	+ Cairo summarizes a lot of his findings in this video: <https://www.youtube.com/watch?v=Low28hx4wyk>

Exploring Entrepreneurial Mindset

* The KEEN Framework: A Guide for Entrepreneurial Mindset<https://engineeringunleashed.com/framework>
	+ The framework of entrepreneurial mindset is presented here in terms of engineering design but the key concepts of curiosity, connections, and creating value are also important in research.

Tools for Data Visualization

* Software such as Tableau or Excel
	+ Many university libraries teach workshops on these tools.
* LinkedIn Learning and other curated educational material.

Sample Datasets for Visualization practice

* Tableau: <https://www.tableau.com/learn/articles/free-public-data-sets>
* Google: <https://datasetsearch.research.google.com/>
* Government: <https://data.gov/>
* NASA: <https://www.earthdata.nasa.gov/>
* WHO: <https://apps.who.int/gho/data/node.home>

Examples of Impressive Data Visualizations

* Cell Towers Map of the World: <https://alpercinar.com/open-cell-id/>
* 200 Countries, 200 Years, 4 Minutes: <https://www.youtube.com/watch?v=jbkSRLYSojo>
* Every Satellite Orbiting Earth:
* <https://qz.com/296941/interactive-graphic-every-active-satellite-orbiting-earth>
* Why Buses Bunch: <https://setosa.io/bus/>
* How the US Generates Electricity: <https://www.carbonbrief.org/mapped-how-the-us-generates-electricity/>