Improving Data,
Improving Outcomes
Virtual Convening
October 19 - 22
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Unlocking the Power of Qualitative Data with Data Visualization

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SRI Education
A DIVISION OF SRI INTERNATIONAL

IDIO Virtual Convening
October 19-22, 2020

Agenda

Welcome & Objectives – 15 min

Presentation – 25 min

Colorado – 20 min

Activity – 25 min

Conclusion – 5 min

Objectives

1. Define qualitative data and qualitative data visualization
2. Describe purpose and benefits of using qualitative data viz
3. Identify frameworks for qualitative data viz and examples
4. Explore methods for sharing qualitative data meaningfully

Getting to Know You

Poll: What is your role?

Describe how the COVID-19 pandemic has affected your early childhood data or activities.

"Change in billing and coding in our DB"

"Delayed services/assessment. Lower referrals"

"Low referrals, more exits"

"MUCH more direct communication with the field"

"back up on data entry, missing information"

"low referrals and delayed data entry"

"More Exits"

"More family involvement in activities"

"Change in environment for Indicator 6 part b"

"Concerns about transitions c to b"

"Decrease in referrals"

"Teleworking can prove to be an issue with regards to data entry"

"More telemedicine and billing issues around it"

Describe how the COVID-19 pandemic has affected your early childhood data or activities.

"More meetings and less time for dedicated data work"

"We are using data more frequently now and basing system decisions on available information"

"We are unclear about the environment or setting when clinic-based providers use virtual service delivery accessed by the family in their home."

"referral decrease" "Uncertain of data reliability" "Virtual fatigue" "Has made us have more conversations about data"

"Lower referrals. No specific fields available for needed COVID circumstances." "Remote services" "Changes to family survey process."

"Decrease in referrals that are now increasing." "Develop new data points" "COVID-19 issues taking time away from analysis"

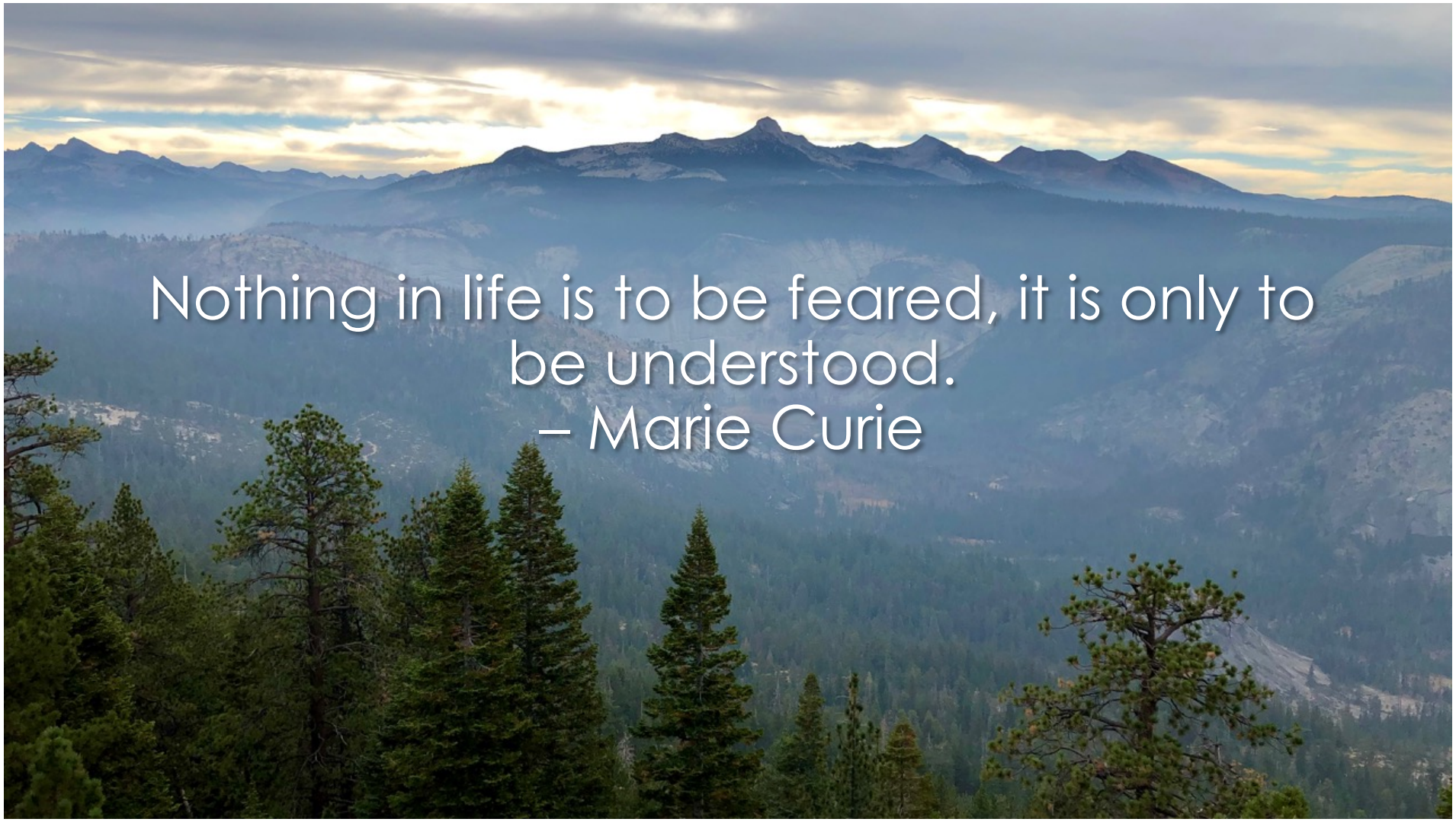
"Referrals are down over 25%"

"Referrals to EI dropped to 60%"

"Collecting the data has been a challenge."

"Activities have all gone virtual." "Decrease in referrals" "No way to capture the frustration" "referrals have dropped by more than 25%"

"Data comparison issues"


Nothing in life is to be feared, it is only to be understood.
– Marie Curie

What Is Qualitative Data?

Image source: David McCandless "365 Days of Beautiful News"
https://informationisbeautiful.net/beautifulnews/

Qualitative Data	Quantitative Data
Descriptive or categorical data	Numerical data
Describes characteristics or qualities which often cannot be expressed or easily understood through numbers (e.g., opinions, views, attitudes)	Describes quantities or characteristics that can expressed numerically (e.g., numbers, counts, percentages, demographics, census data)
Examples of qualitative data collection: • Questionnaires (i.e., open-ended survey questions) • Interviews • Focus groups • Observations	Examples of quantitative data collection: • Questionnaires (i.e., closed-ended survey questions) • Longitudinal studies • Randomized control trials
Examples of qualitative data visualization: • Word clouds • Timelines • Matrices	Examples of quantitative data visualization: • Bar graphs • Pie charts • Scatter plots
Used to generate hypotheses	Used to test hypotheses

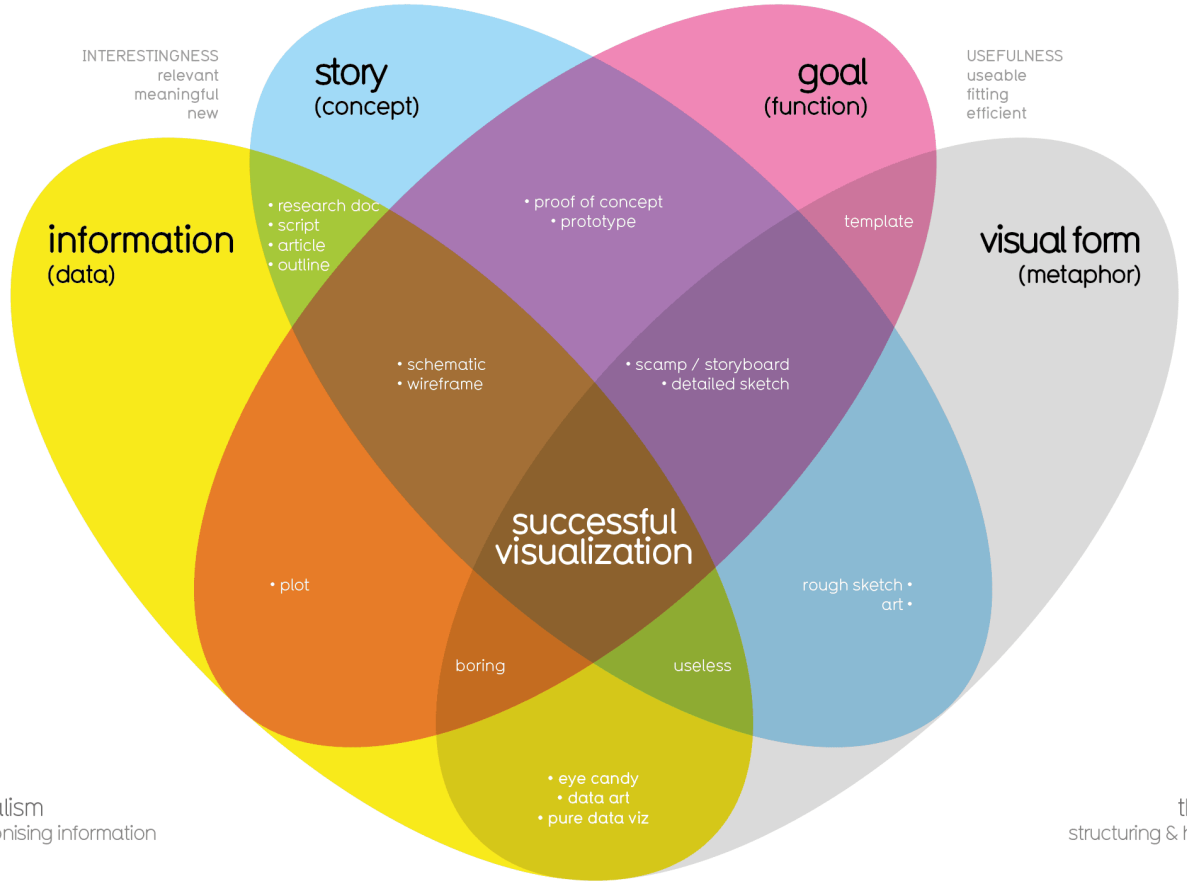
What Is Data Visualization?

"Data display in a graphic format is a way of portraying information succinctly and efficiently, illustrating details provided in longer textual information."

Source: Verdinelli, S., & Scagnoli, N. I. (2013)

What Makes a Good Visualization?

explicit (implicit)



information
the art of journalism
structuring & harmonising information

visualization
the art of design
structuring & harmonising visuals

David McCandless
InformationisBeautiful.net

taken from new book
Knowledge is Beautiful

find out more
bit.ly/KIB_Books

Image source: https://unsplash.com/photos/iMdsjoiftZo

When Should We Use Qualitative Data Viz?

Qualitative data visualization can be useful when:

- Much of the information you will be collecting is not numerical
- You want to explore the data in a creative way to your audience or stakeholders
- You want to show connections in the data and/or generate hypotheses

Source: Henderson, S. & Segal, E. (2013); Verdinelli, S., & Scagnoli, N. I. (2013)

What Can You Do with Qualitative Visual Displays?

Can be used to:

- Reduce and focus text
- Highlight themes and patterns in the data
- Identify outliers
- Convey a message, discovery, or particular perspective
- Introduce new levels of understanding
- Purpose of "illuminating rather than obscuring the message"

Source: Henderson, S. & Segal, E. (2013); Verdinelli, S., & Scagnoli, N. I. (2013)

How Does Qualitative Data Visualization Benefit Our Audiences?

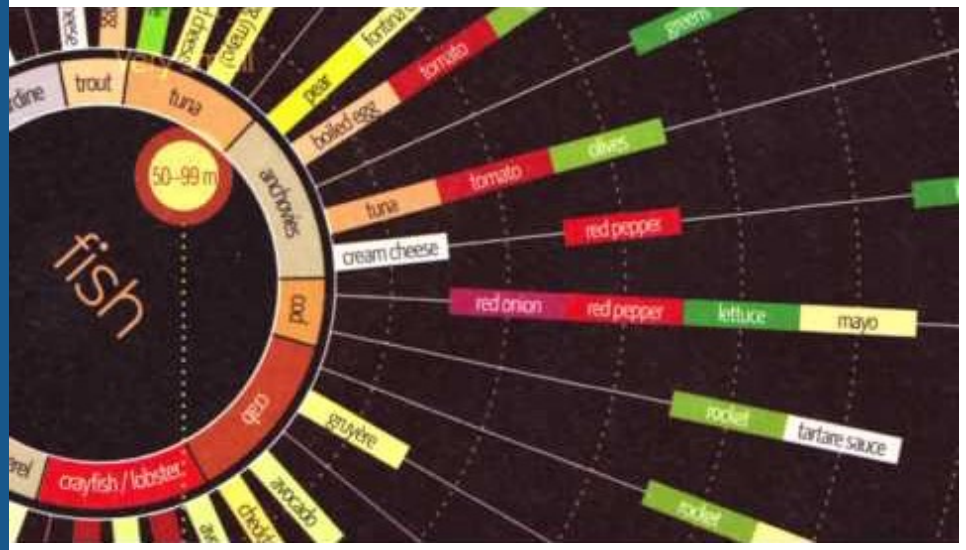
Audiences can:

- Acquire new insights
- Develop elaborate understanding
- Appreciate new knowledge
- Build theories
- Draw conclusions
- Take action

Source: Henderson, S. & Segal, E. (2013); Verdinelli, S., & Scagnoli, N. I. (2013)

David McCandless

Making Data into Art

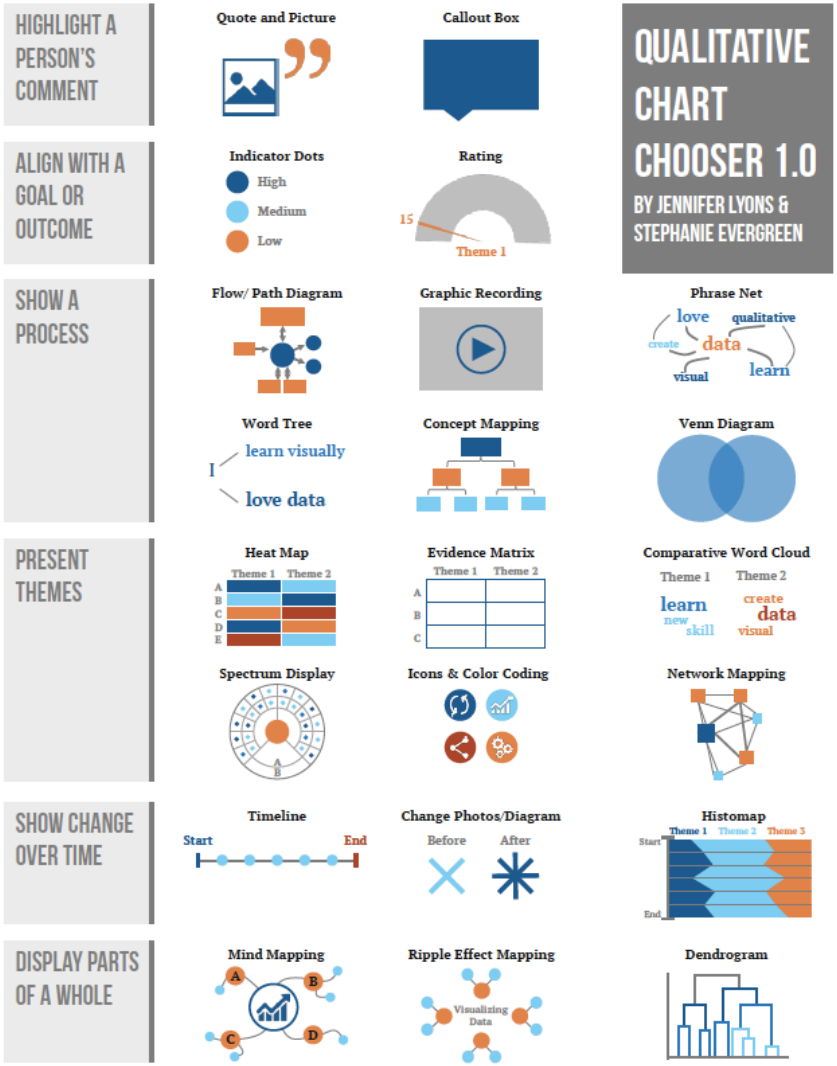


Video: https://informationisbeautiful.net/visualizations/making-data-out-of-art-a-short-film/

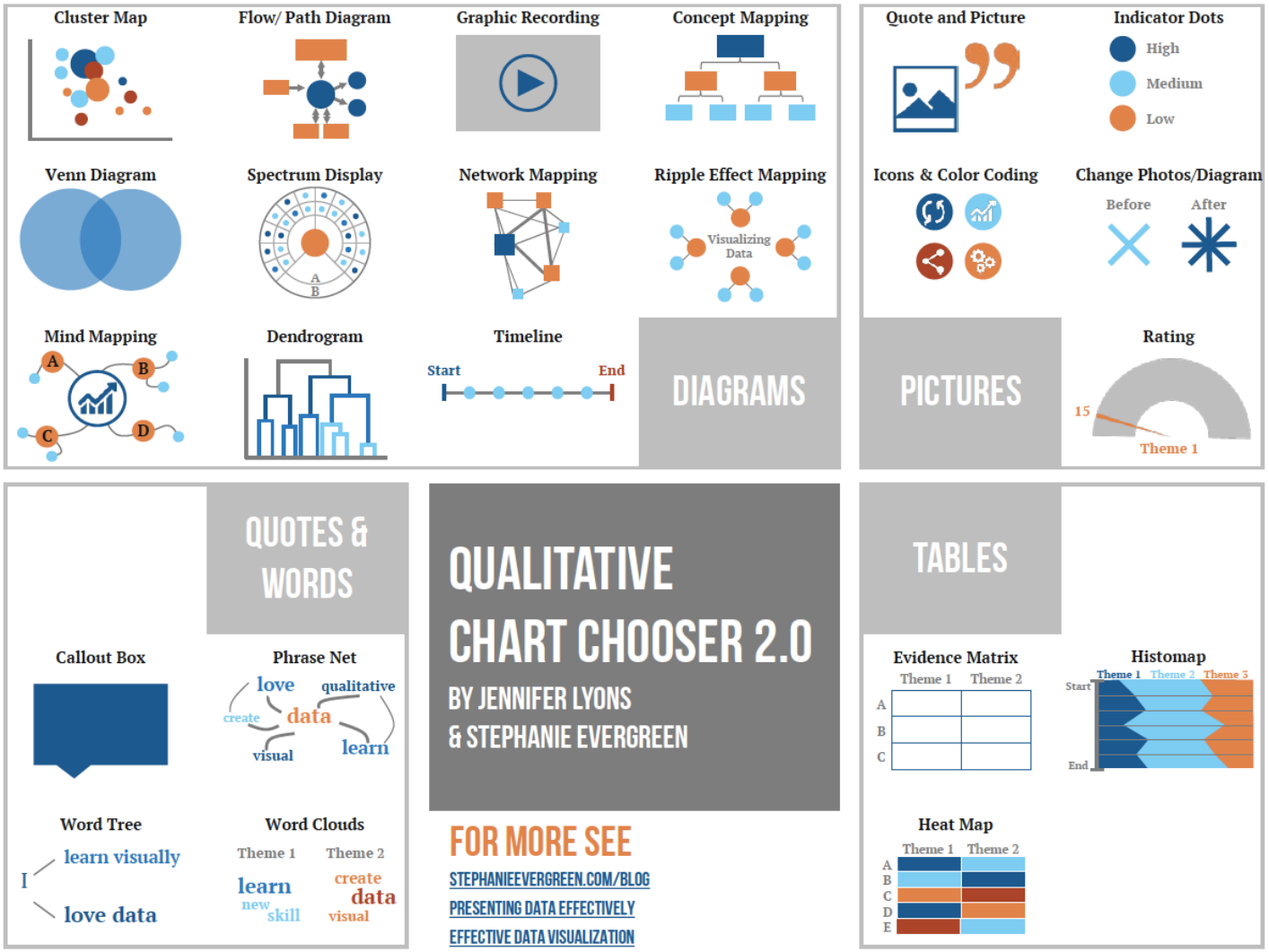
Image source https://www.humansofnewyork.com/

Qualitative Chart Chooser

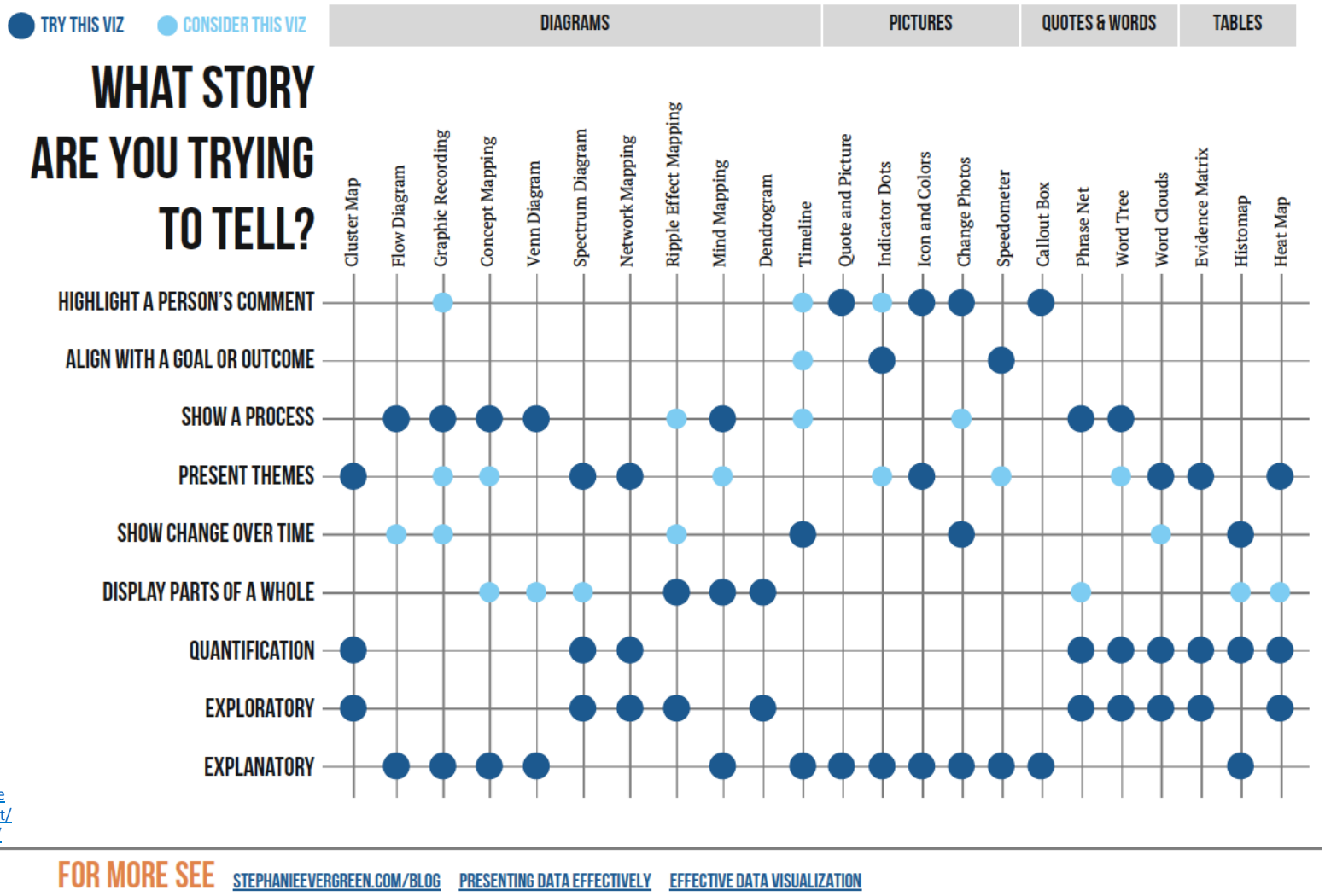
Stephanie Evergreen



Source: http://stephanieevergreen.com/wp-content/uploads/2016/11/Qualitative-Chooser-1.0.pdf



Source:
http://stephanieevergreen.com/wp-content/uploads/2016/11/Qualitative-Chooser-2.0.pdf



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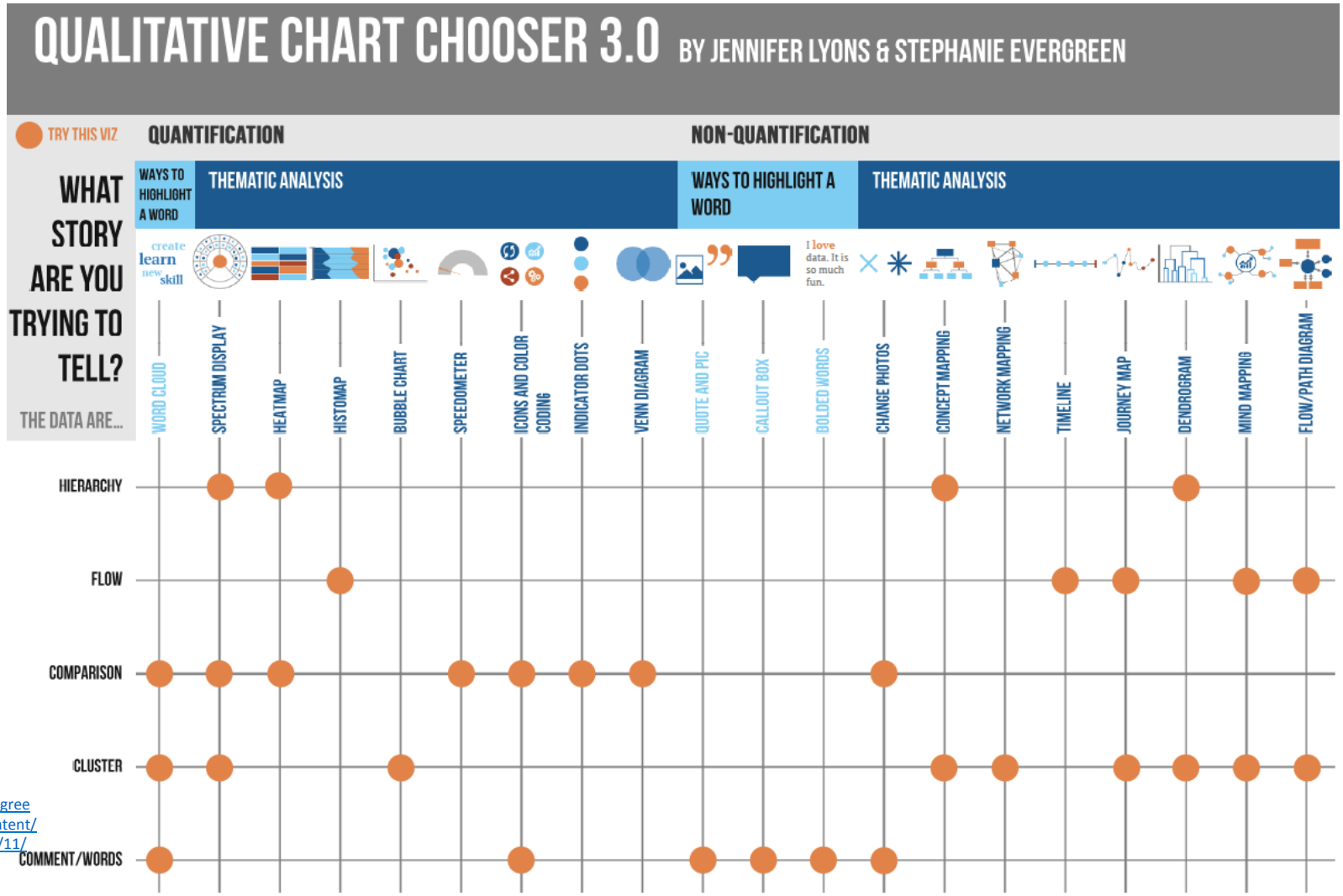
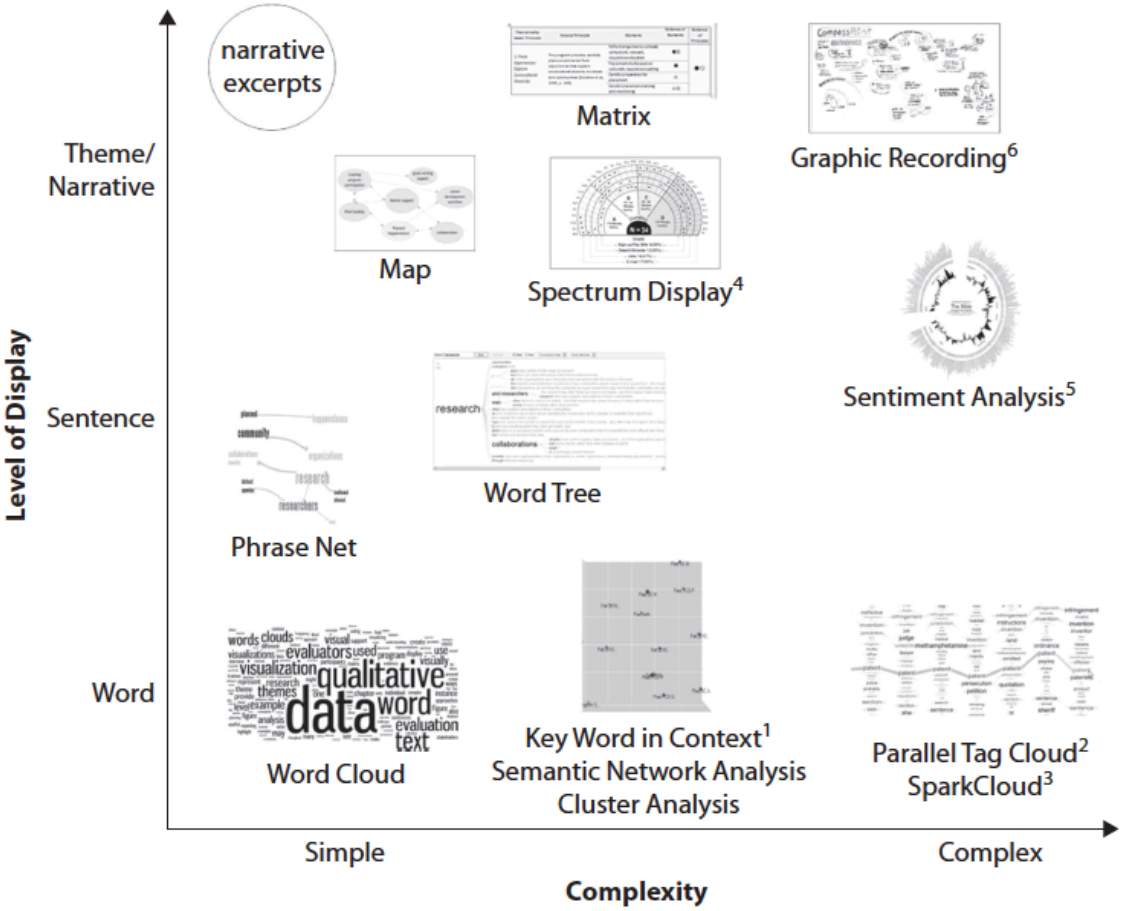


Source: http://stephanieevergreen.com/wp-content/uploads/2017/11/Qualitative-Chooser-3.pdf

Qualitative Visualizations by Display and Complexity

Visualizing Qualitative Data in Evaluation Research (2013) by Stuart Henderson & Eden H. Segal

Figure 3.1. Graph Showing Variety of Qualitative Visualizations by Display and Complexity



Types of Qualitative Visual Displays and Purposes

Data Display in Qualitative Research (2013) by Susanna Verdinelli & Norma I. Scagnoli

Visual Display	Purpose
Boxed Display	To highlight a specific narrative considered important and frame it in a box
Decision Tree Modeling	To describe options, decisions, and actions
Flow Chart	To illustrate directional flow and show pathways of different groups
Ladder	To represent the dimensions of the progression of certain phenomenon through time or to show levels or stages
Matrix	To cross two or more dimensions, variables, or concepts of relevance to the topic of interest
Metaphorical Visual Display	To depict in a metaphorical way the topics or themes found
Modified Venn Diagram	To indicate shared or overlapping aspects of a concept, a category, or a process
Network	To depict relationships between themes and subthemes or categories and subcategories
Taxonomy	To classify or organize information

Boxed Display

- Text framed within a box
- Highlights a specific narrative considered important
- Simplest form of display

Quick-Reference Statistics (2018-19)

- 29,360 total authorized CPP positions
- 27,530 total children served in CPP
- 1,829 children served with two CPP positions for full-day services (12 percent of positions/7 percent of funded children)
- 5,586 ECARE positions used for full-day kindergarten (19 percent of all CPP positions/20 percent of all preschoolers and kindergarteners funded by CPP)
- 175 out of 179 school districts participating in CPP
- $122.5 million in total program funding
- $4,171 average funding per CPP position ($4,448 average funding per child)

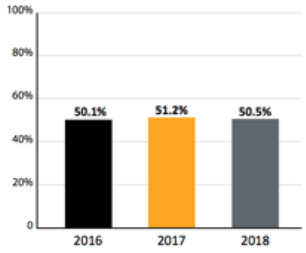
Figure 16: Uses of Per-Pupil Intervention Funds Along with Examples of Allowable and Non-allowable Uses of Funds.

INTERVENTIONS	Full-day Kindergarten	Purchased Tutoring Services	Summer School Literacy Program	Other Targeted Approved by the Department	Literacy Specialist (Small Rural Schools Only)
EXAMPLES OF ALLOWABLE USE OF FUNDS	• Reading intervention programming and materials • Teacher salaries for extended day • Transportation cost for eligible students	• Contracted services for tutoring • Instructional materials to support tutoring in reading	• Reading intervention programming and materials • Teacher salaries for summer school contract • Transportation costs for eligible students	• Reading intervention programming and materials • Salaries for staff providing intervention services outside the classroom • Diagnostic assessments	• Contracted services of Literacy Specialist
EXAMPLES OF NON-ALLOWABLE USE OF FUNDS	• General classroom supplies and materials • Transportation for all kindergarten students • Library books, teacher professional development	• General classroom instruction	• General summer school that is not focused on literary/ reading interventions • General classroom supplies and materials, transportation for all students, non-reading intervention materials, teacher professional development	• General classroom supplies and materials • Teacher professional development • Non-evidence based or scientifically based instructional programming	

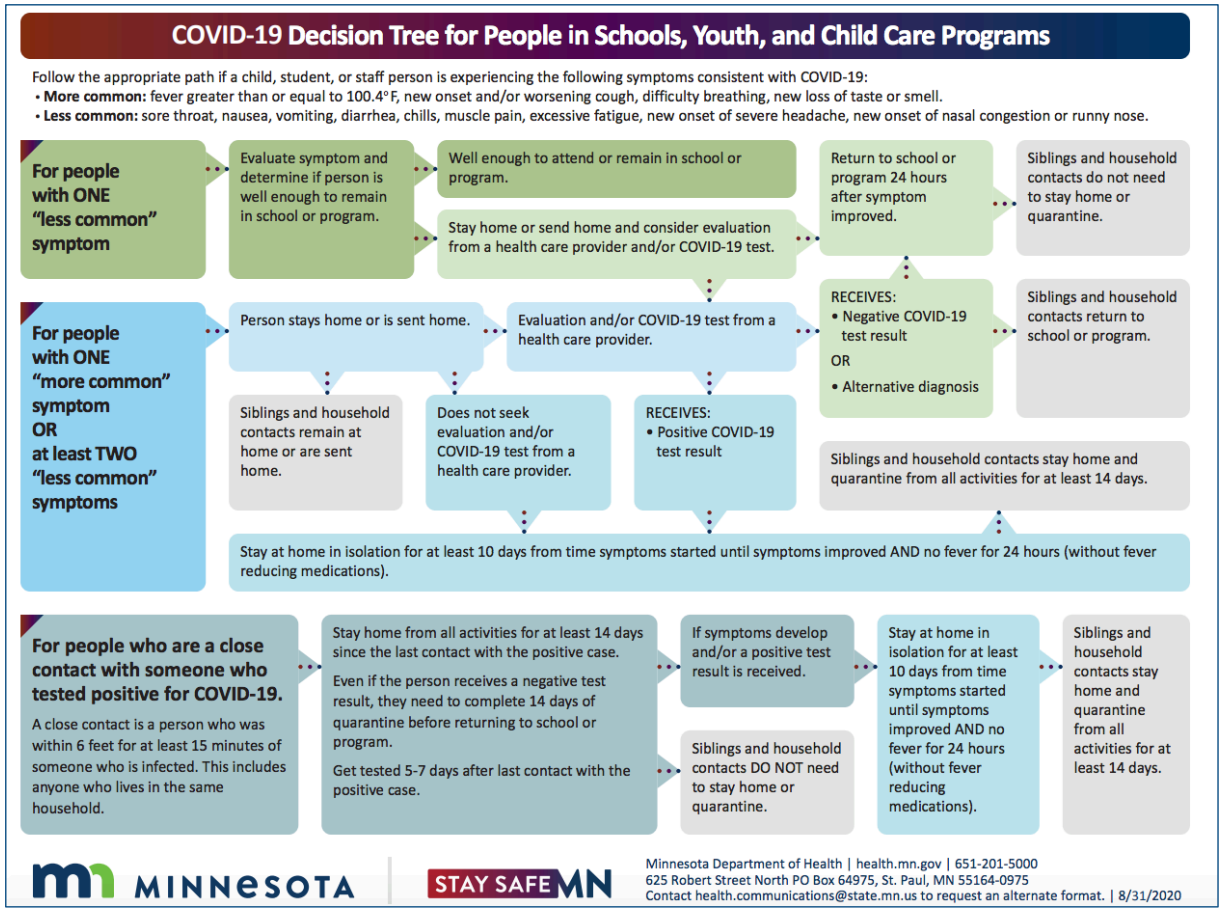
Trends across Demographic Groups

Analyses of READ data shows some important trends within and across demographic groups.

Figure 9: Percentage of K-3 Students Eligible for Special Education Services with an SRD from 2016 to 2018[1]



Sources: https://www.cde.state.co.us/coloradoliteracy/19readreportpdf and https://www.cde.state.co.us/cpp/cpplegreport



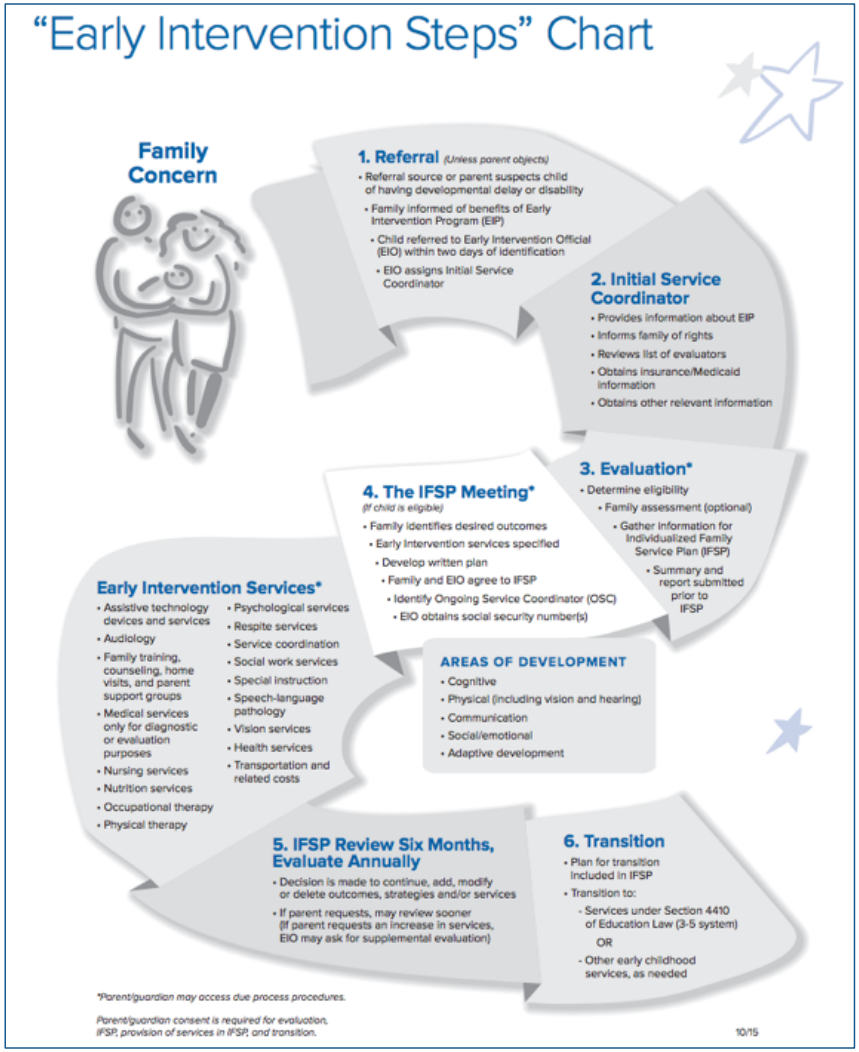
Decision Tree Modeling

- Describes options, decisions, and actions

Source: https://www.health.state.mn.us/diseases/coronavirus/schools/exguide.pdf

Flow Chart

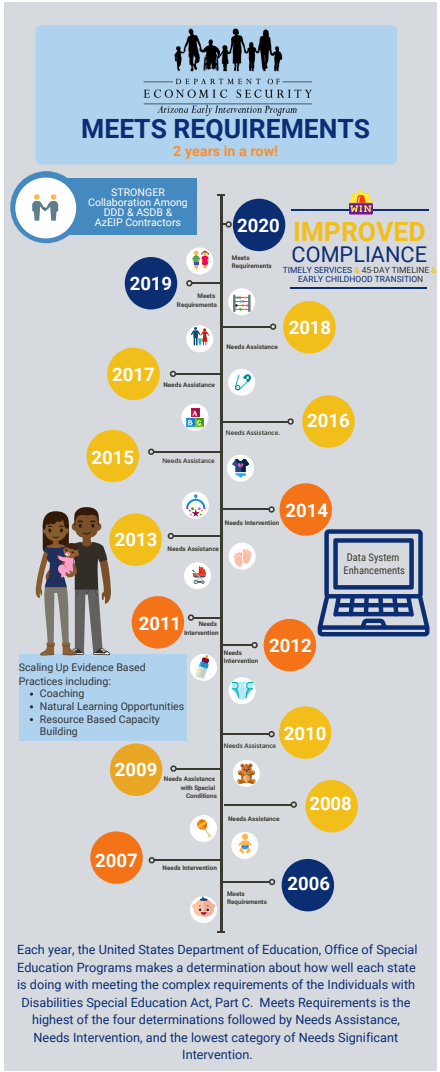
- Illustrates directional flow
- Arranged in terms of their relationships in a process or through time rather than as static entities



Sources: https://nirn.fpg.unc.edu/module-5/introduction and https://www.health.ny.gov/publications/0532.pdf

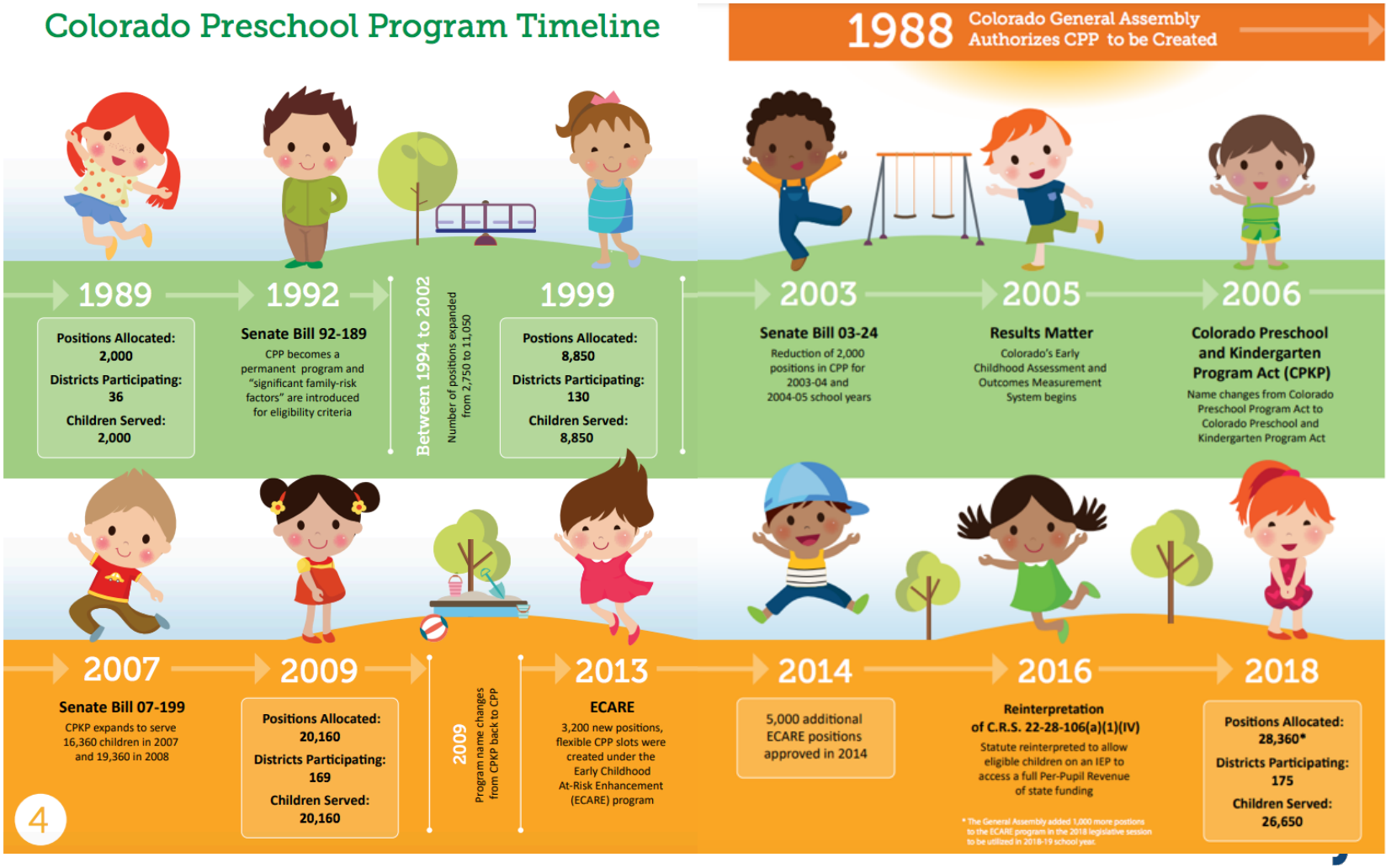
Ladder or Step-by-Step Process

- Represents the progression of certain phenomenon through time to show levels or stages
- Additionally, indicates the level of change at each step
- Ladders are unidirectional



Source: Arizona Early Intervention Program (AzEIP)

Colorado Preschool Program Timeline

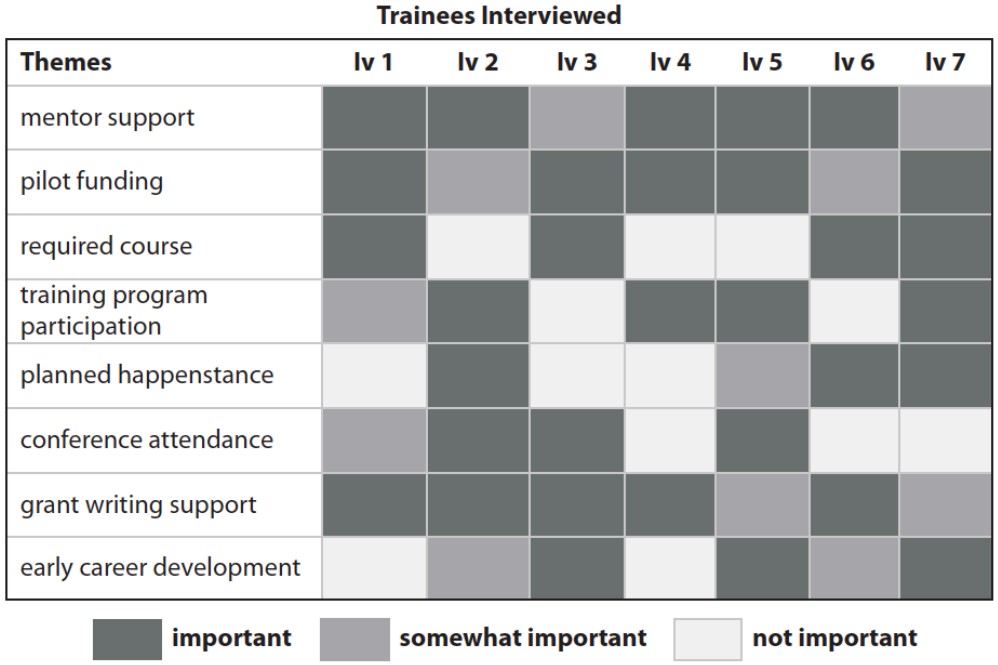


Source: https://www.cde.state.co.us/cpp/cpplegreport

Matrix

- Cross-classification of two or more dimensions, variables, or concepts of relevance to the topic of interest

Figure 3.5. Matrix Displaying the Level of Importance of Themes Uncovered in Interviews With Training Program Participants



Note: Iv# is the number of each trainee. Darker shades indicate increased importance of theme.

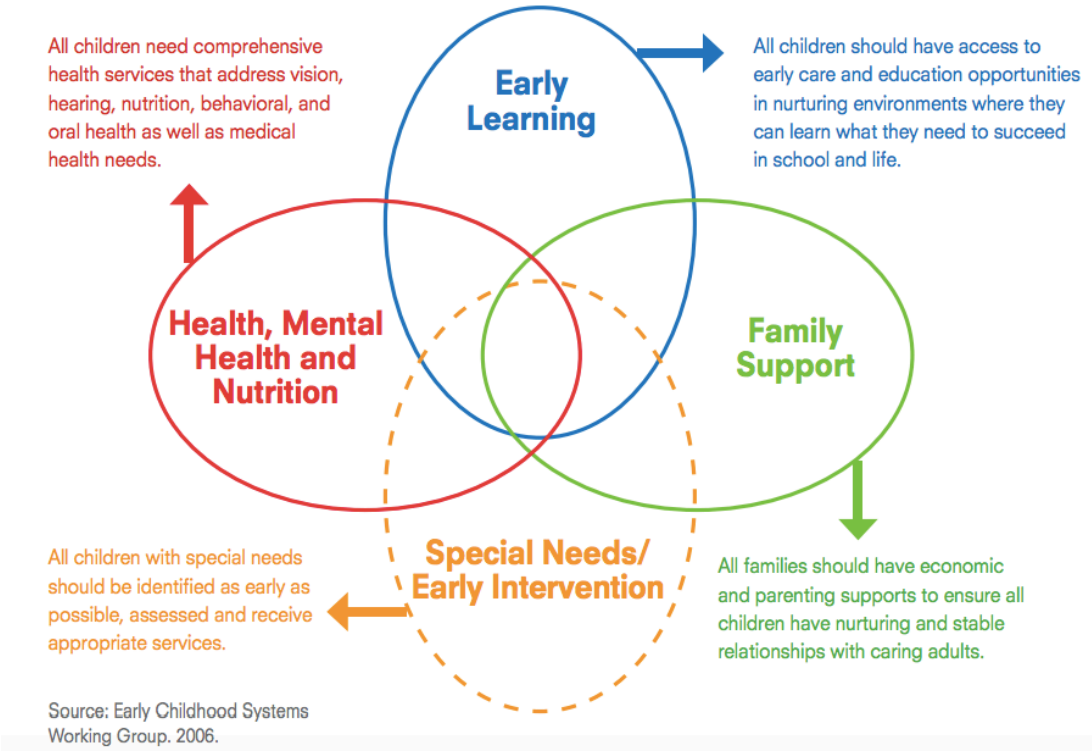
Source: Henderson & Segal (2013)

Metaphorical Visual Display

- Depicts topics or themes in a metaphorical way

Modified Venn Diagram

- Indicates shared or overlapping aspects of a concept, category, or process
- Often used to depict a model or conceptual framework



Source: Early Childhood Systems Working Group. 2006.

Comparative Word Cloud

- Visual display of word counts

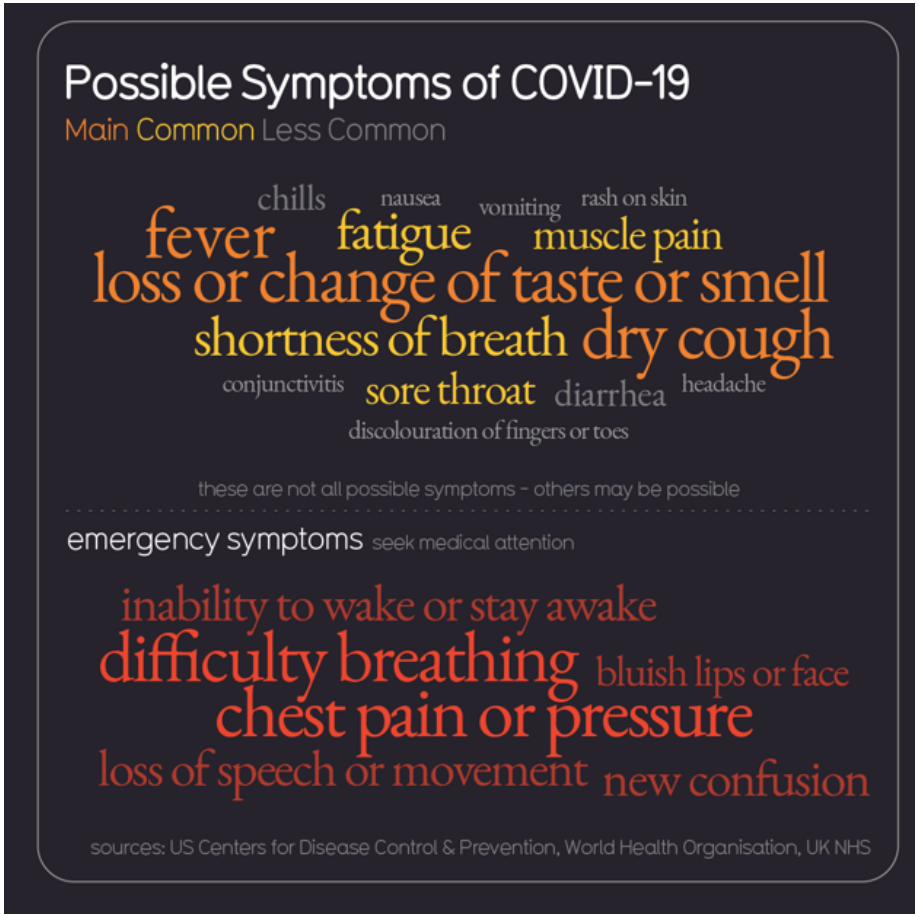
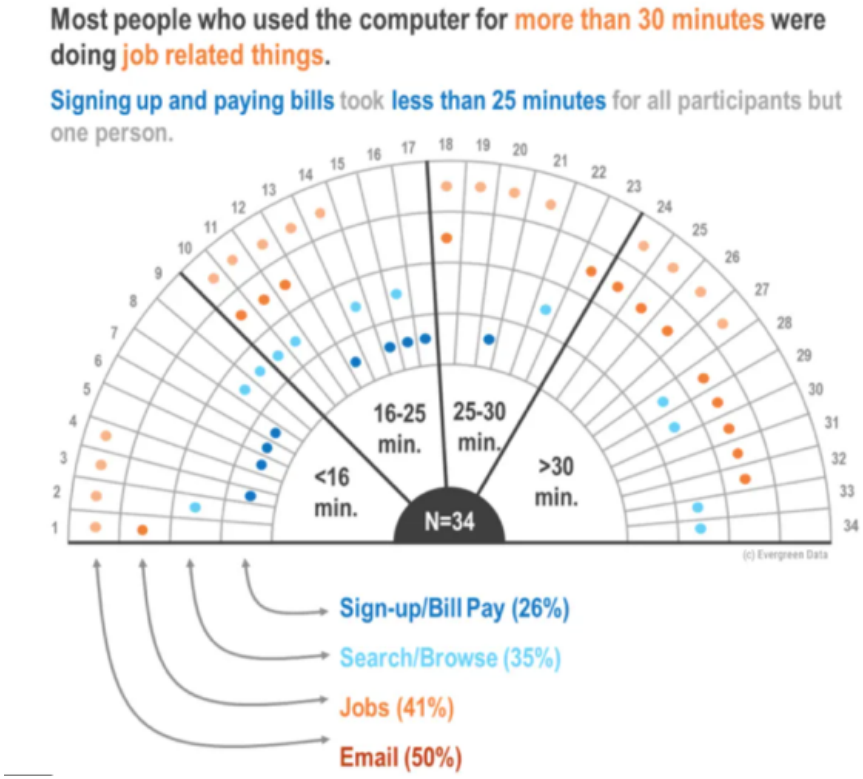


Image source: https://informationisbeautiful.net/visualizations/covid-19-coronavirus-infographic-datapack/

Spectrum Display

- A data display which allows you to display individual data in a way that tells a story



Resources/Tools

- DaSy Data Visualization Toolkit https://dasycenter.org/data-visualization-toolkit-2/qualitative-data/
- David McCandless – Information is Beautiful website https://informationisbeautiful.net/
  - VizSweet tool https://vizsweet.com/
- Stephanie Evergreen – Evergreen Data Academy https://academy.stephanieevergreen.com/
- Google Charts https://developers.google.com/chart/interactive/docs/gallery
- Tableau Public https://public.tableau.com/en-us/s/

Sources: https://dasycenter.org/data-visualization-toolkit-2/ and https://developers.google.com/chart/interactive/docs/gallery

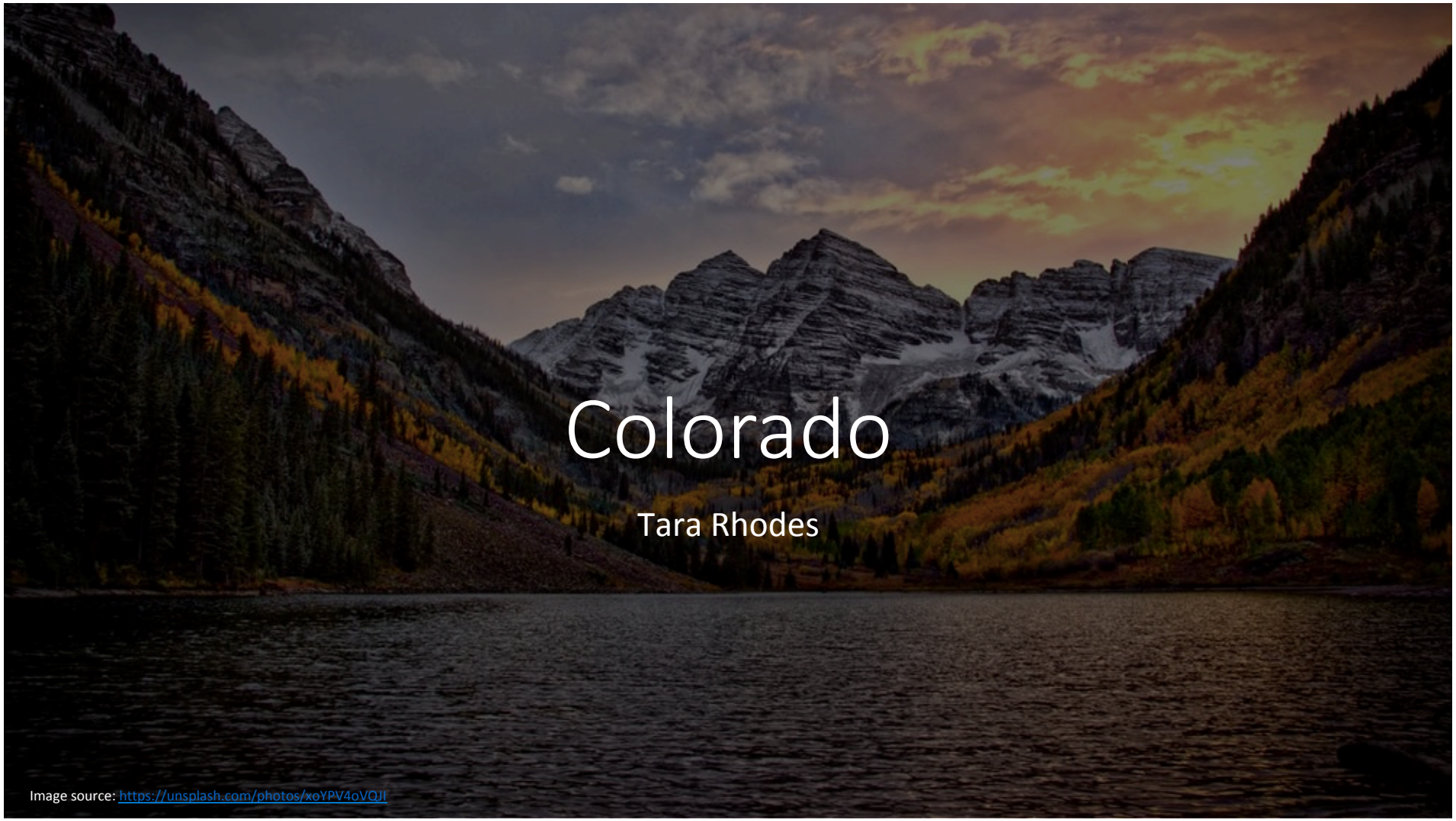
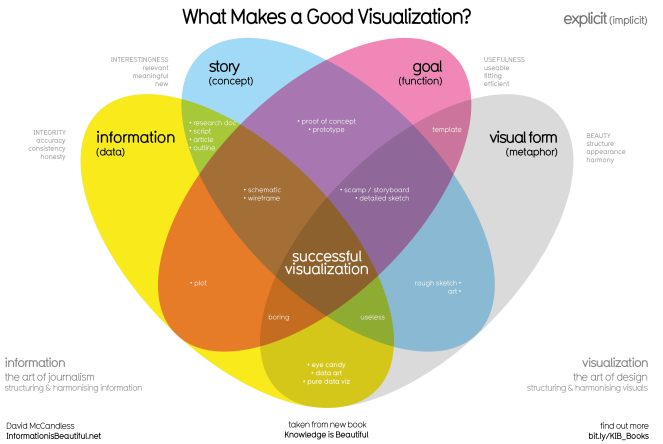


Image source: https://unsplash.com/photos/xoYPV4oVQJI

Colorado Process

- Information
  - Wanted a way to communicate preschool outcomes to those directly working in programs
- Story
  - Created a visual that included various Excel visualizations
- Goal
  - Realized some inefficiencies in communication, out-of-date visuals, tedious process
- Visual Form
  - End result: Colorado's Indicator 7 Data Quality Profiles in Tableau



Overview

2019-20 OSEP Preschool Outcomes (Indicator 7) Profile Results, Descriptive Statistics and Data Quality

IDEA Part B/Section 619. Preschool Outcomes (Indicator 7) are tied to child progress made between entry to preschool special education services and exit from preschool special education services.

All states are required to report on three global outcomes. Outcome A refers to self-regulation and social relationships, Outcome B refers to content areas and discreet knowledge, and Outcome C refers to self-help and independence. For each outcome, two summary statements are also generated. Summary Statement 1 measures the percentage of students who made greater than expected growth. It states the following: "Of those preschool children who entered or exited the preschool program below age expectations in each outcome, the percent who substantially increased their rate of growth be the time they turned 6 years of age or exited the program". Summary Statement 2 measures achievement and states the following: "The percent of preschool children who were functioning within age expectations in each outcome by the time they turned 6 years of age or exited the program".

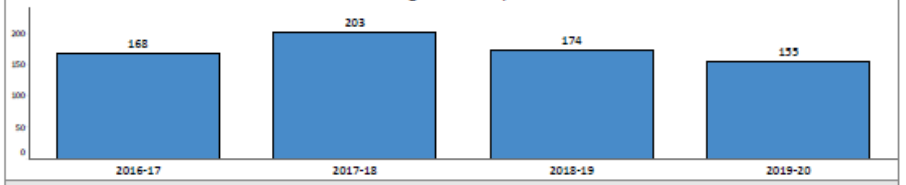
Percentages for the outcome-specific summary statements are calculated from child-level progress category designations, a lettering system between "a" and "e" that seeks to describe the developmental trajectory on a child-level by outcome. A more in-depth look at these developmental trajectories can be found on page 2 of this report.

The specific AU results, along with some state results, are shown in the following pages. These data points make up the Indicator 7 reporting process, which is one of 16 indicators for the Special Education State Performance Plan.

For more information on this report or the Indicator 7 process, please contact Tara Rhodes, *Rhodes_t@cde.state.co.us*

1234 Sample District

Number of Children Exiting Preshool Special Education Services



Outcome A: Positive Social-Emotional Skills, including Self-Regulation and Social Relationships.

	Percent of Students with Exit Scores Less Than Entry Scores	Percent of Students with Equal Exit and Entry Scores	Percent of Students with Exit Scores More Than Entry Scores	Percent of Students At or Above Level Expectations
Sample District	7.10%	30.97%	61.94%	41.29%
Statewide	9.11%	26.09%	64.80%	26.76%

Outcome B: Knowledge and Skills.

	Percent of Students with Exit Scores Less Than Entry Scores	Percent of Students with Equal Exit and Entry Scores	Percent of Students with Exit Scores More Than Entry Scores	Percent of Students At or Above Level Expectations
Sample District	4.52%	31.61%	63.87%	41.94%
Statewide	7.48%	24.85%	67.67%	24.83%

Source: Colorado Data Quality Profile – OSEP Preschool Outcomes (Indicator 7)

Progress Categories

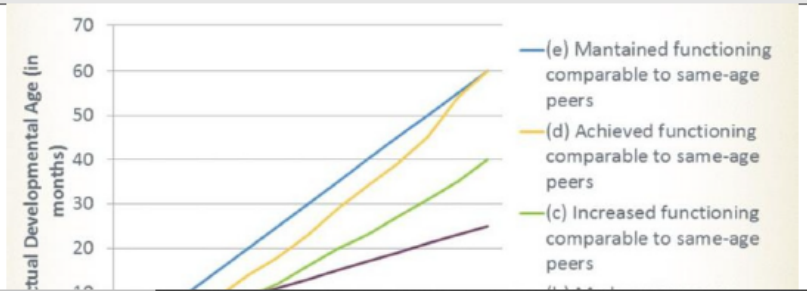
2019-20 OSEP Preschool Outcomes (Indicator 7) Profile Results, Descriptive Statistics and Data Quality
Progress Categories

a = percent of children who did not improve functioning.
b = percent of children who improved functioning but not sufficient to move nearer to functioning comparable to same-aged peers.
c = percent of children who improved functioning to a level nearer to same-aged peers but did not reach.
d = percent of children who improved functioning to reach a level comparable to same-aged peers.
e = percent of children who maintained functioning at a level comparable to same-aged peers.

1234 Sample District

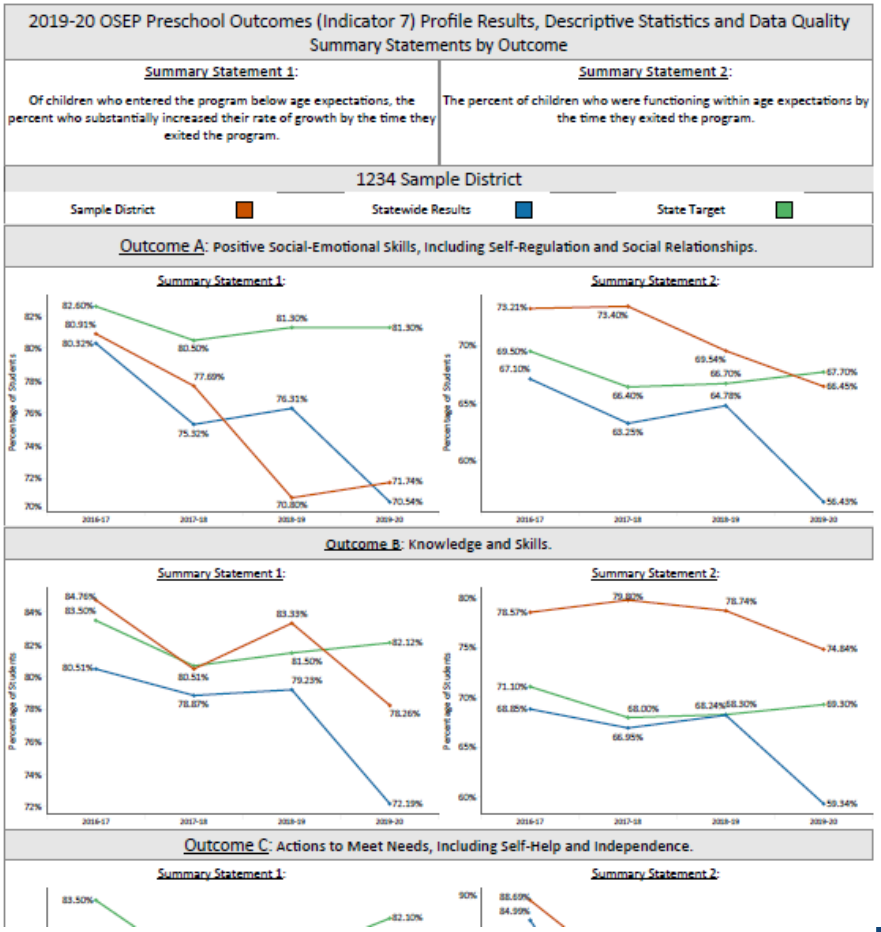
	Outcome A		Outcome B		Outcome C	
	Sample District	Statewide	Sample District	Statewide	Sample District	Statewide
a	8 (5.16%)	274 (6.14%)	7 (4.52%)	289 (6.47%)	9 (5.81%)	335 (7.50%)
b	18 (11.61%)	668 (14.96%)	13 (8.39%)	611 (13.68%)	24 (15.48%)	703 (15.74%)
c	26 (16.77%)	979 (21.92%)	19 (12.26%)	893 (20.00%)	31 (20.00%)	1,153 (25.82%)
d	40 (25.81%)	1,438 (32.20%)	53 (34.19%)	1,610 (36.05%)	55 (35.48%)	1,512 (33.86%)
e	63 (40.65%)	1,004 (22.48%)	63 (40.65%)	960 (21.50%)	36 (23.23%)	660 (14.78%)

Developmental Trajectories of the Progress Categories



Source: Colorado Data Quality Profile – OSEP Preschool Outcomes (Indicator 7)

Summary Statements



Source: Colorado Data Quality Profile – OSEP Preschool Outcomes (Indicator 7)

Data Quality Information

2019-20 OSEP Preschool Outcomes (Indicator 7) Profile Results, Descriptive Statistics and Data Quality Comparisons of Entry and Exit Scores

As mentioned in the first section of this report, preschool outcomes (Indicator 7) are tied to child progress made between entry to preschool special education services and exit from preschool special education services. Another way to visualize this information is a comparison table between scores at entry and scores at exit. These tables, organized by outcome, have been provided below.

One reason to review scores in this way is to evaluate the quality of the data collected. Typical growth is described as staying within four levels of the scale (ranging from 1 to 7) from the entry score. Progressing beyond four levels from the entry score would be considered atypical growth. While this is possible, it is highly improbable. CDE recommends evaluating the entry and exit scores for data quality concerns for the children identified as outside the typical growth ranges.

1234 Sample District

Outcome A: Positive Social-Emotional Skills, Including Self-Regulation and Social Relationships.

(*Orange* highlights the number of students outside of typical growth ranges)

	Exit Score						
Entry Score	1	2	3	4	5	6	7
1	4	2		5			
2	1	3	2	1	1		1
3		2		2	3	3	
4		2	2	3	10	7	5
5				1	7	11	13
6					1	15	30
7						2	16

Outcome B: Knowledge and Skills.

(*Orange* highlights the number of students outside of typical growth ranges)

	Exit Score						
Entry Score	1	2	3	4	5	6	7
1	4	2					
2	1	2		2	3	1	
3		1	1	1	7	1	1
4				3	4	8	8
5				1	5	13	21
6					2	7	27
7						2	27

Outcome C: Actions to Meet Needs, Including Self-Help and Independence.

(*Orange* highlights the number of students outside of typical growth ranges)

	Exit Score						
Entry Score	1	2	3	4	5	6	7

Source: Colorado Data Quality Profile – OSEP Preschool Outcomes (Indicator 7)

Activity

What are your reactions?

Qualitative Data Visualization

How have you used qualitative data viz in your state?

- COVID CIRCUMSTANCES hardly any - some polling in trainings and meetings like the word cloud (+6)
- Mostly for public reporting (+0)
- Reporting back COM results to LEAs (+0)
- legislative reporting (+0)
- Getting data buy-in from local programs. Sharing themes from surveys. (+0)
- Public Report, Stakeholder feedback for APR, feedback for developers (+0)

What's worked well? What have been the benefits?

- LISTS OF CONDITIONS (AS IN WORD CLOUD) (+0)
- More interest in data from local programs and stakeholders. (+0)
- People have been more interested in the data (+2)
- The ease of use (+0)

What types of data viz are you interested in learning more about or trying?

- Word Tree, Rating (+2)
- Heat Maps, contrasting word clouds (+2)
- Before and After to illustrate differences between data captured in 2019 vs. 2020 (+3)
- Have been working on producing more infographics, using a variety of the approaches shared today (+2)
- Geographical maps for regional comparisons (+0)

What's unclear? What support would you like?

- BI SOFTWARE OPTIONS AND CAPABILITIES (+1)
- Programs that can help with producing some of the items described today (+0)
- Power BI, 508 Compliance, visualization best practices (colors, size, etc.) (+0)

Conclusions

- Qualitative data describes characteristics or qualities which often cannot be expressed or easily understood through numbers
- There are a wide variety of methods that can help display non-numerical information, all of which can be effective when used appropriately
- Understanding qualitative data visualization can provide you with more tools to increase understanding of early childhood data among your stakeholders

Making data mean more through storytelling | Ben Wellington | TEDxBroadway

Video: https://www.youtube.com/watch?v=6xsvGYIxJok

508 Compliance & Accessibility Resources

- https://osepideasthatwork.org/resources-grantees/508-resources
- https://www.section508.gov/create/video-social
- https://accessibility.digital.gov/visual-design/getting-started/
- https://www.aucd.org/docs/lend/distance_tech2017/3_accessibility_resources2017.pdf
- http://www.storytellingwithdata.com/blog/2018/6/26/accessible-data-viz-is-better-data-viz
- https://www.thinkingondata.com/something-about-viridis-library/

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Evaluation Reminder

Thank you

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