The Dynamics of Infographics:
Transforming Tabular Data into an Interactive Story

A Master’s Thesis
Presented to
the Information Design and Technology Program

In Partial Fulfillment
of the Requirements for the
Master of Science Degree

State University of New York
Polytechnic Institute

By
John Freiberger IV

May 2018
Approved and recommended for acceptance as a thesis in partial fulfillment of the requirements for the degree of Master of Science in Information Design and Technology

_________________________________

DATE

_________________________________
Ana Jofre, PhD
Advisor

_________________________________
Steven Schneider, PhD
Second Reader
The Dynamics of Infographics

ABSTRACT

Election campaigns can be heated, and sometimes controversial, where statements candidates make are dissected, analyzed, and scrutinized by news media, talk shows, publications, and now social media. The 2016 election between Donald Trump and Hillary Clinton was no different. Trump’s combustible use of Twitter as then-candidate and now-president continues to make headlines, fueling barrages of re-tweets, replies, memes, and so on.

This thesis project examines a tweet Donald Trump made about winning the 2016 election in a landslide and uses official election results published by the Federal Election Commission (FEC) to debunk that claim in an interactive infographic created in Tableau. This paper examines infographic design and highlights types of infographics, infographics and cognition, interactivity in infographics, and good design principles. This paper then walks through the construction of the interactive infographic in Tableau while noting the design process used and principles applied. An evaluation of Tableau as a visual design tool is also provided.
ACKNOWLEDGEMENTS

Many thanks to all of my professors in the Information Design & Technology (IDT) Program at SUNY Polytechnic Institute for helping me fulfill a long-sought goal of earning my Master’s degree. Special thanks to my girlfriend, Christine, and my family, who have given me their unwavering support and encouragement during this journey. To my daughters, Samantha and Sydney, I eagerly await to see what exciting things you accomplish in your bright futures.
The Dynamics of Infographics

TABLE OF CONTENTS

ABSTRACT .......................................................................................................................... III
ACKNOWLEDGEMENTS ................................................................................................. IV
INTRODUCTION .................................................................................................................. 1
   Overview ......................................................................................................................... 1
   Objectives of Thesis Project ......................................................................................... 2
LITERATURE REVIEW ....................................................................................................... 3
   Introduction .................................................................................................................... 3
   Types of Infographics ................................................................................................. 3
   Infographics and Cognition ....................................................................................... 4
   Interaction and Interactivity in Infographics ............................................................. 5
   Infographic Design: A Current State Assessment .................................................... 6
   Conclusion .................................................................................................................... 8
METHODOLOGY ............................................................................................................... 9
   Project Overview .......................................................................................................... 9
   Design Process ........................................................................................................... 9
   Design Principles ....................................................................................................... 21
PROJECT ANALYSIS ....................................................................................................... 26
   Usability Survey ......................................................................................................... 26
   Evaluation of Tableau ............................................................................................... 29
   Project Limitations .................................................................................................... 31
CONCLUSIONS .................................................................................................................. 35
   Meeting Objectives .................................................................................................... 35
   Future Project Considerations .................................................................................. 35
   Summary ..................................................................................................................... 36
REFERENCES ..................................................................................................................... 38
APPENDIX A: USABILITY SURVEY ............................................................................... 42
   Layout ........................................................................................................................... 42
   Visual Elements .......................................................................................................... 43
   Color ............................................................................................................................. 44
   Typography .................................................................................................................. 45
   Interactivity ............................................................................................................... 46
The Dynamics of Infographics

Overall ........................................................................................................................................47
Reactions to Infographic ...........................................................................................................48
## TABLE OF FIGURES

*Figure 1*: Post-election Tweet from Trump ................................................................. 10  
*Figure 2*: 2016 Election Results, Electoral and Popular Vote Counts, p.6 ........................................ 12  
*Figure 3*: 2016 Election Results, Popular Vote Percentages, p.189 ............................................... 13  
*Figure 4*: Interactive Slideshow Example .............................................................................. 15  
*Figure 5*: Early Sketch of Infographic ..................................................................................... 16  
*Figure 6*: Follow-up Sketch for Infographic ............................................................................. 17  
*Figure 7*: Introduction Slide .................................................................................................. 18  
*Figure 8*: Sample Election Slide ............................................................................................ 19  
*Figure 9*: Conclusion Slide .................................................................................................... 20  
*Figure 10*: Example of a Region Filter and Highlighting .......................................................... 22  
*Figure 11*: Example of Consistency ....................................................................................... 24  
*Figure 12*: Word Cloud based on Survey Results ..................................................................... 28  
*Figure 13*: Choropleth (geographic) Map on Left; Cartogram on Right ................................. 32  
*Figure 14*: Cartogram Created in Tableau .............................................................................. 33  
*Figure 15*: Order of States in Packed Bubbles Diagram .......................................................... 34
The Dynamics of Infographics

INTRODUCTION

Overview

From ancient cave paintings and hieroglyphics to modern bar graphs and pie charts, visual communication has been part of human history. Over the centuries, humans have been exposed to an abundance of information in the form of books, newspapers, magazines, radio and television broadcasts, websites, blogs, podcasts, and social media posts. With mobile devices that constantly ping networks for the latest news, updates, and alerts, information hits the brain like an avalanche. A way to communicate information quickly and efficiently is needed. Information graphics (infographics) can be the vehicle that delivers information in a concise, logical manner. A general definition of an infographic is a presentation of a large data set or complex concept in a simple, understandable, and appealing manner (Scott, Fawkner, Oliver, & Murray, 2017) (Yuvaraj, 2017). Infographic design is a discipline that attempts to apply logic and structure in a visual manner in order to make complex information easier to understand (Sun, Chen, & Chen, 2016). This thesis project examines how an interactive infographic based on tabular data helps foster new understandings and interpretations of the source data from a visual perspective.
The Dynamics of Infographics

**Objectives of Thesis Project**

The main objective of this thesis project is to design an interactive infographic that visualizes data provided solely in tabular form with the anticipation that new interpretations may arise that were not possible from the original source data.

A secondary objective is to broaden my knowledge of Information Design, specifically Infographic Design and related principles of Graphic Design. These are disciplines that have been of interest to me for quite some time, motivating me to seek formal education in them.

A final objective is to learn new skills while producing the project. Tableau is a visual design tool marketed toward designers who have compelling data-driven stories to tell, but may not have the necessary coding expertise to build such visualizations. I do not have such experience or knowledge, so Tableau was the right tool for my thesis project.
LITERATURE REVIEW

Introduction

The intent of this literature review is to examine scholarly and professional publications that discuss and assess types of infographics, the impact infographics have on cognition, interactivity in infographics, and infographic design best practices.

Types of Infographics

Although infographics can come in many shapes, sizes, and styles, there are two main categories for digital infographics: static and dynamic (interactive). Whether printed or viewed online, a static infographic consists of fixed information that the user passively engages with by reading it. Even if the infographic is designed in a vertical format to aid in scrolling, only certain portions of the infographic can be viewed, thus forcing the user to scroll around to see it in its entirety (Uyan Dur, 2014) (Pinto, 2017). Also, the amount of information that can be included in a static infographic is limited by the borders of the page; if too much information is forced into the design, it will be incomprehensible and confusing.

Dynamic infographics, on the other hand, allow the user to actively engage with the design by scrolling, zooming, filtering, and manipulating the data (Uyan Dur, 2014) (Pinto, 2017). Dynamic infographics can also handle larger data sets than their static counterparts, but the information is never overwhelming since the design allows the user to filter out what is not important to them. Thus, the design is always clear and concise. With a dynamic infographic, there are different levels of interaction: instructional, in which the user clicks buttons to interact with the information and execute the actions; manipulative, in which the user can change the position, color, and size of objects and physical characteristics by moving and clicking on a design based on user experience and elements of real world; and explorative, in
The Dynamics of Infographics

which the user can manipulate the content in order to understand it (Walter Teixeira Lima Junior & Eduardo Fernando Uliana Barboza, 2015). When a dynamic infographic can actively engage the user, the user’s levels of attention and motivation increase. According to one study, dynamic infographics were found to be more engaging, informative, and appealing despite their complex nature (Locoro, Cabitza, Actis-Grosso, & Batini, 2017). With today’s advancements in computing technology, it is easier to produce dynamic infographics without the need to write elaborate code to execute the interactions and allow for data manipulation.

**Infographics and Cognition**

According to cognitive science, the human brain is the organ that “sees” information rather than the eyes, and the brain is better equipped to process visual information rather than textual information (Dunlap & Lowenthal, 2016) (Yuvaraj, 2017). Therefore, when trying to comprehend complex information, an infographic can aid cognition. Other factors aid cognition, and a well-designed infographic will enlist these other factors. For example, constructivist learning theory states that humans comprehend information by drawing upon past experiences and knowledge; past experience and prior knowledge are used to create metaphors and mental models to associate with the new complex information taken in, thus building context (Dunlap & Lowenthal, 2016) (Dur, 2014). An infographic that utilizes good design principles allows the user to draw upon past experiences and prior knowledge in order to understand it. Interest level is another factor that helps facilitate cognition; if the topic displayed in an infographic is of interest to someone, then that person is more likely to invest the time to read and analyze it. The Elaboration Likelihood Model (ELM) states that knowledge acquisition is attributed to attention (one’s ability to devote cognitive resources to a topic) and motivation (one’s interest level in the topic) (Lee & Kim, 2016). However, if the user has low attention and motivation, then the designer must rely on other factors to generate
The Dynamics of Infographics

interest in the infographic, such as using bright colors and eye-catching visual elements (Wansink & Robbins, 2016). Balance in design must be maintained otherwise the infographic could tax one’s cognitive resources and cause confusion.

**Interaction and Interactivity in Infographics**

As stated earlier, dynamic infographics allow the user to actively engage with the data. While “interactivity” and “interaction” are used interchangeably, the two terms are interrelated. **Interaction** refers to the various actions a user can take to interact with the infographic (for example, zoom, select, or filter), and **interactivity** refers to the level of interaction: lower interactivity implies a more passive relation between user and infographic; higher interactivity implies the user is more engaged and making discoveries by manipulating the data (Patwardhan & Murthy, 2015).

There are concerns over interaction in infographics. Some state that users may inadvertently gloss over dynamic infographics that are embedded with text (for example, in online news articles or blogs) (Boy, Eveillard, Detienne, & Fekete, 2016). Others state that interaction increases the complexity of the infographic, which can cause confusion and frustration in the user (otherwise known as cognitive overload). Even though the user can gain considerable insight on a topic by interacting with and manipulating the data in an infographic, experts believe that if the interactions in the infographic are too complex, the user will devote more cognitive resources to understanding how to apply the interactions rather than learn about the topic the infographic discusses, or could become overwhelmed by the design as a whole (Patwardhan & Murthy, 2015) (Wichmann & Timpe, 2015).

There is consensus in the field that prior knowledge about the subject of the infographic is essential when also learning how to manipulate the data (Patwardhan & Murthy, 2015) (Wichmann & Timpe, 2015). Others feel that higher cognitive effort on the part of the user
The Dynamics of Infographics
does not impede knowledge acquisition; in fact, it leads to “desirable difficulties” that are
cognitively engaging, may impede, but not prevent, learning, may contribute to errors, but
ultimately result in worthwhile learning (Wichmann & Timpe, 2015). While interactivity in
infographics may lead to increased cognitive effort and potential cognitive overload in the user,
adherence to best design practices during the development stage can help mitigate the risks to
cognition that interactivity might pose.

Infographic Design: A Current State Assessment

Advancements in computing technology and the proliferation of free online design tools
has made it easier than ever to create infographics. However, these free tools do not require any
knowledge or understanding of good design principles. The danger is that anyone can add
anything to a blank digital canvas and produce something, but without adherence to good
design principles, those productions could be what Alberto Cairo calls “eye candy” (Cairo,
2012), or what Edward Tufte calls “chartjunk” (Chen, 2017). With the widespread use and
influence of social media, a single infographic published online can reach up to 15 million
viewers (Wansink & Robbins, 2016). If the designer did not apply good design principles, that
infographic could cause an astonishing amount of confusion.

Whether designing a static or dynamic infographic, designers must adhere to clear,
cohesive guidelines in order to design infographics that clearly deliver their intended messages
(Wansink & Robbins, 2016). Everything in an infographic serves a purpose, from the layout to
the visual elements, to the colors, and to the typography selected. According to one study, the
layout should provide a hierarchical structure and identify a clear introduction, message, and
conclusion; the visual elements must appear to be organic to the design, and there must be
balance in the number of elements (too many will dilute the infographic; too few will create
information gaps); color must be carefully selected in order to effectively communicate the
intended message; finally, typography helps link all of the elements together and provide
direction through the design without overwhelming it (Arslan & Toy, 2015). Other studies
recommend only using text in the form of annotations and summaries to support the design
(Scott et al., 2017), and to use a short, action-oriented title to help the user more easily recall
the infographic (Wansink & Robbins, 2016). To ensure the visual elements are understandable,
perform the “no text test”: remove all text from the infographic to see if the visual elements
convey the main messages (Scott et al., 2017).

Regarding the risk interactivity in infographics may pose on cognition, one study
suggests to strike a balance between narrative structure and interaction, “Data stories appear to
be most effective when they have constrained interaction at various checkpoints within a
narrative, allowing the reader to explore the data without veering too far off from the intended
narrative,” (Segel & Heer, 2010). Select the narrative structure (for example, martini glass,
interactive slideshow, or drill-down story) that is most appropriate for the story, and then strive
for a combination of author-driven and reader-driven approaches (Segel & Heer, 2010). An
author-driven approach favors a distinct path through the narrative with heavy textual
support, has little-to-no interaction, and works best for infographics that focus on storytelling
or efficient communication; a reader-driven approach favors freedom from an ordered path
through the design, very little textual support, and heavy reliance on interaction allowing the
user to explore as desired (Segel & Heer, 2010). Once the structure and approach are set, the
designer must carefully select the interaction types that work best to allow the user to explore
the data. Interaction types include selecting portions of data, filtering the data by conscious
choice or condition, zooming into a pattern or portion of data for a deeper exploration,
hovering the cursor over data points to see more specific details (glossing), and reconfiguring
the data as needed to explore in greater detail (Cota, Rodriguez, Gonzalez-Castro, &
The Dynamics of Infographics

Gonclaves, 2017) (Fernandez & Fetais, 2017). Controlling how the data interactions occur, but not preventing them, allows the user to work through the data in layers that manages cognitive effort and prevents cognitive overload (Cota et al., 2017) (Wichmann & Timpe, 2015).

Conclusion

"Creating an effective and expressive visual design with a truthful message is a high priority in information visualization," (Chen, 2017). My intent for my thesis project is to create a dynamic infographic that adheres to the design standards discussed in this literature review in order to present the source data in a truthful manner, but also in a unique way that allows for new interpretations of the source data to arise. In this literature review, some concerns regarding the interactive nature of dynamic infographics were raised in addition to best practices to mitigate these concerns while designing an appealing, interesting, and engaging interactive visualization.
METHODOLOGY

Project Overview

This thesis project involved the creation of a dynamic infographic that investigated a tweet made by Donald Trump about winning the Electoral College vote in a landslide. Using official election results published by the Federal Election Commission (FEC), the infographic performed a comparative analysis of election results from 1980 through 2016, using Ronald Reagan’s 1980 and 1984 election victories, and George H. W. Bush’s 1988 victory, as benchmarks of landslide victories to compare against the other election results in this time range.

Since I had designed static infographics in past classes, the recommendation for this project was to develop new skills by creating an interactive visualization. The tool I chose for this project was Tableau. Tableau is a data visualization platform that helps people see and interpret data ("Mission," n.d.). Tableau is intended for people who may not have coding or programming experience, but have data-driven questions that they want to explore in a visual manner ("Tableau Public," n.d.).

Design Process

To create my infographic, I followed the design process that Cairo explains in his book, *The Functional Art*:

1. Identify and define the story to be told.
2. Research the story.
3. Sketch the design.
4. Develop a consistent visual style.
5. Design the visualization on the computer. (Cairo, 2012)
The Dynamics of Infographics

While Cairo focuses mostly on the design of static infographics, his process can be applied to the design of interactive infographics.

**Identify and Define the Story**

An infographic is a visual story, and to keep the user engaged, this story must be interesting yet concise and focused. The weight a nation bares when choosing its next leader makes for compelling stories. The 2016 election between Donald Trump and Hillary Clinton was no different. The heated nature of the campaign provided many options for compelling stories. However, the goal of my thesis project was to visualize a data-driven story. Therefore, I needed to focus on a data-driven aspect of the 2016 election. Trump’s tweet about winning the Electoral College vote in a landslide (Trump, 2016) provided some inspiration.

![Figure 1: Post-election Tweet from Trump](image)

Attempting to debunk a publicly-made statement from a sitting president makes for an intriguing story.
The Dynamics of Infographics

**Research the Story**

This step involves learning as much as possible about the topic as critical decisions must be made about the content that will be included in the infographic and the content that must be excluded. Conducting thorough research also helps shape and define the scope of the story, thus building on the work done in the first step.

The general topic of my thesis would involve, in some capacity, a study of the 2016 election. My research honed that topic down from an investigation of the use of social media during recent elections to the current topic of using official election results to see whether or not Trump’s statement about winning in a landslide manner was accurate. While there is no official definition of a landslide victory, most political experts agree that if a US presidential candidate wins at least 375 out of the 538 total electoral votes (70%) and beats his/her opponent by at least 15 percentage points in the popular vote, that candidate won the election in a landslide (Murse, n.d.). This accepted understanding further focused the scope of my story, and guided me to collecting reliable election data. The [official election results published by the FEC](https://www.fec.gov) provided the data I needed, including total counts percentages of Electoral College votes won by each candidate.
### 2016 PRESIDENTIAL ELECTORAL AND POPULAR VOTE

<table>
<thead>
<tr>
<th>STATE</th>
<th>ELECTORAL VOTE</th>
<th>POPULAR VOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trump (R)</td>
<td>Clinton (D)</td>
</tr>
<tr>
<td>AL</td>
<td>9</td>
<td>1,318,255</td>
</tr>
<tr>
<td>AK</td>
<td>3</td>
<td>163,387</td>
</tr>
<tr>
<td>AZ</td>
<td>11</td>
<td>1,252,401</td>
</tr>
<tr>
<td>AR</td>
<td>6</td>
<td>684,872</td>
</tr>
<tr>
<td>CA</td>
<td>55</td>
<td>4,483,814</td>
</tr>
<tr>
<td>CO</td>
<td>9</td>
<td>1,202,484</td>
</tr>
<tr>
<td>CT</td>
<td>7</td>
<td>673,215</td>
</tr>
<tr>
<td>DE</td>
<td>3</td>
<td>185,127</td>
</tr>
<tr>
<td>DC</td>
<td>3</td>
<td>12,723</td>
</tr>
<tr>
<td>FL</td>
<td>29</td>
<td>4,617,886</td>
</tr>
<tr>
<td>GA</td>
<td>16</td>
<td>2,089,104</td>
</tr>
<tr>
<td>HI</td>
<td>3**</td>
<td>128,847</td>
</tr>
<tr>
<td>ID</td>
<td>4</td>
<td>409,055</td>
</tr>
<tr>
<td>IL</td>
<td>20</td>
<td>2,146,015</td>
</tr>
<tr>
<td>IN</td>
<td>11</td>
<td>1,557,286</td>
</tr>
<tr>
<td>IA</td>
<td>6</td>
<td>800,983</td>
</tr>
<tr>
<td>KS</td>
<td>6</td>
<td>671,018</td>
</tr>
<tr>
<td>KY</td>
<td>8</td>
<td>1,202,971</td>
</tr>
<tr>
<td>LA</td>
<td>8</td>
<td>1,178,638</td>
</tr>
<tr>
<td>ME</td>
<td>1</td>
<td>335,593</td>
</tr>
<tr>
<td>MD</td>
<td>10</td>
<td>943,169</td>
</tr>
<tr>
<td>MA</td>
<td>11</td>
<td>1,090,893</td>
</tr>
<tr>
<td>MI</td>
<td>16</td>
<td>2,279,543</td>
</tr>
<tr>
<td>MN</td>
<td>10</td>
<td>1,322,951</td>
</tr>
<tr>
<td>MS</td>
<td>6</td>
<td>700,714</td>
</tr>
<tr>
<td>MO</td>
<td>10</td>
<td>1,594,511</td>
</tr>
<tr>
<td>MT</td>
<td>3</td>
<td>279,240</td>
</tr>
<tr>
<td>NE</td>
<td>5</td>
<td>495,961</td>
</tr>
<tr>
<td>NV</td>
<td>6</td>
<td>512,058</td>
</tr>
<tr>
<td>NH</td>
<td>4</td>
<td>345,790</td>
</tr>
<tr>
<td>NJ</td>
<td>14</td>
<td>1,601,933</td>
</tr>
<tr>
<td>NM</td>
<td>5</td>
<td>319,667</td>
</tr>
<tr>
<td>NY</td>
<td>29</td>
<td>2,819,533</td>
</tr>
<tr>
<td>NC</td>
<td>15</td>
<td>2,362,631</td>
</tr>
<tr>
<td>ND</td>
<td>3</td>
<td>216,794</td>
</tr>
<tr>
<td>OH</td>
<td>18</td>
<td>2,841,005</td>
</tr>
</tbody>
</table>

*Figure 2: 2016 Election Results, Electoral and Popular Vote Counts, p.6*
The Dynamics of Infographics

For the popular votes, these results tallied the counts by state as well as nationally, and provided percentage totals as well.

![Table showing 2016 election results](image.png)

*Figure 3: 2016 Election Results, Popular Vote Percentages, p.189*
The Federal Elections series influenced the range of elections I used in my infographic by providing me with the data needed to compare and contrast the 2016 election results against presidential election results dating back to 1984. However, there was one limitation with this source: the series was first published starting with the midterm elections in 1982, which meant that it did not include data from the 1980 election, which was Ronald Reagan’s first-term election victory, and his first-term victory met the criteria of a landslide election victory. Since the 2016 election was Trump’s first-term victory, I wanted to visually compare the 2016 results to the results of previous first-term elections. Doing so meant I would need to procure the 1980 election results elsewhere. After searching for the 1980 election results and comparing them to the FEC’s results, the results published by The American Presidency Project appeared to be the most similar to the FEC.

To add perspective to the results covered in my infographic, I included rankings compiled by John J. Pitney, author and professor of American politics at Claremont McKenna College. Pitney ranked every presidential election based on Electoral College share won (Pitney, n.d.). Pitney’s rankings help provide context to the election numbers presented in the captions on the election slides.

**Sketch the Design**

The purpose of this step is to sketch the design using pencil and paper, get feedback on the sketch, and revise it until there is a clear understanding of what the design will look like. Cairo advises not doing this step on the computer because it is too easy to get caught up in aesthetics, which is not the focus at this point (Cairo, 2012). It is more important to set the foundation of the design, experiment with the layout, and understand where the visual elements will be placed. This step may have many iterations until that level of satisfaction is reached.
The Dynamics of Infographics

Since my design would be an interactive infographic that compares and contrasts election results against an accepted definition of a landslide victory, I needed a framework that would provide a good balance between author-driven and reader-driven approaches (Segel & Heer, 2010). A narrative genre that supports this balance is the interactive slideshow (Segel & Heer, 2010). The interactive slideshow mimics a standard slideshow presentation, like a slide deck created in Microsoft PowerPoint or Google Slides, but it provides interaction points within each slide. The structure and order of the slides creates a clear path through the presentation (author-driven approach), whereas the interaction points allow the user to freely explore the data (reader-driven approach). Below is an example of an interactive infographic that uses the interactive slideshow model (Segel & Heer, 2010).

![Budget Forecasts, Compared With Reality](image)

*Figure 4: Interactive Slideshow Example*
The Dynamics of Infographics

The example shown in Figure 4 is simple, yet elegant and effective. It consists of a short, concise title with a single line of introductory text; a navigation bar that supports the author-driven approach by providing a Next button, while also supporting the reader-driven approach by allowing the user to click the numbered buttons in any order; and slides that change when a button is clicked. The user can engage with the data in the slides by hovering over or clicking on data points, repositioning the slider, or watching animations on certain slides – all examples of the reader-driven approach.

The sketch in Figure 5 is based on the interactive slideshow model shown in Figure 4.

Figure 5: Early Sketch of Infographic
The Dynamics of Infographics

The sketch in *Figure 6* is a revision of the initial sketch. In *Figure 6*, I focused more on the placement of the visual elements whereas I only described them in *Figure 5*.

*Figure 6: Follow-up Sketch for Infographic*

**Develop a Consistent Visual Style**

The purpose of this step is to define the visual style, or aesthetic presentation, of the design. Cairo advises that careful, deliberate decisions must be made regarding the layout and the colors, typeface, fonts, and shapes to be used (Cairo, 2012). Everything used must look as if it belongs in the design, as if it fits together and is organic; this level of attention is what makes designs that follow good design principles stand apart from designs that do not follow such principles (Arslan & Toy, 2015).
The Dynamics of Infographics

**Design on the Computer**

According to Cairo, this step is similar to Step 3 with the hand sketches, but now the design work is done on the computer (Cairo, 2012). Like Step 3, this step can take several iterations until the design reaches a satisfactory level of maturity and completion. My infographic can be viewed online at Tableau Public. *Figure 7* through *Figure 9* are samples from the infographic.

*Figure 7* shows the introduction slide. It presents the story that the infographic will tell and provides the essential explanatory information. A navigation bar is present, giving the user a clear understanding of how to progress through the infographic while also specifying the length of the infographic.

![Introduction Slide](image)

*Examining the 2016 Election: Was Trump's Victory a Landslide?*

Shortly after winning the 2016 election to become the 45th President of the United States, Donald Trump claimed to have won in a landslide over Hillary Clinton.

While there is no official definition of a "landslide election," political experts agree that a landslide election occurs when a candidate wins at least 376 out of 538 electoral votes (70%).

**How accurate is Trump's statement?** Let's see where his numbers rank in comparison to the results of recent first-term elections.

John J. Pitney, an author and professor of American Politics at Claremont McKenna College, has ranked all 58 US presidential elections based on the winning candidate's percentage of Electoral College votes. These rankings will also be noted in this visualization.

*Figure 7: Introduction Slide*
The Dynamics of Infographics

*Figure 8* shows Slide 2 in the infographic, which is the first election slide. This slide consists of a heading to identify the election year and candidates, a stylized illustration of the winning candidate, and a caption about the election. If the candidate was re-elected, information about the re-election is included. Following the caption are brief instructions on how to use the visual elements: a geographic map depicting the Electoral College victories by candidate, a packed bubbles diagram that represents the states proportionally sized to their Electoral College values, and a vertical bar graph comparing the popular vote percentages. Each visual element has a region filter that allows the user to select a geographic region (Midwest, Northeast, Pacific, South, or West) and focus on the results from that region. Slides 3 through 7 use the same layout as Slide 2.

*Figure 8: Sample Election Slide*
The Dynamics of Infographics

*Figure 9* shows the conclusion slide. This slide summarizes the main points made in the introduction slide while providing a final visual element that ranks all included elections based on the winning candidate’s Electoral College and popular vote percentages.
The Dynamics of Infographics

**Design Principles**

I attempted to apply several design principles in order to present the information in a logical, structured, and appealing manner.

**Logic and Structure**

According to the **Five Hat Racks** principle, information can be organized by category, time, location, alphabetical, or continuum (highest to lowest, best to worst, etc.) (Lidwell, Holden, & Butler, 2010). Since the focus of my infographic was to debunk Trump’s claim of an Electoral vote landslide victory, I arranged the election slides in order of magnitude from most electoral votes won for a first-time victorious candidate (Reagan, 1980, 489 electoral votes) to the fewest won (Bush, 2000, 271 electoral votes). In this arrangement, the 2016 election dashboard was second-to-last as Trump won 304 electoral votes.

**Layering** is another design principle I applied to help manage information. Layering is defined as “...organizing information into related groupings and then presenting or making available only certain groupings at any one time,” (Lidwell et al., 2010). There are different types of layering. I applied **two-dimensional layering**, which is when information is presented in a way that only one layer is visible at a time (Lidwell et al., 2010); the information is revealed in a non-linear fashion, which means the information displayed reinforces relationships with information in other layers (Lidwell et al., 2010). An example of this application are the region filters on the election slides. If “All” is selected, then all of the states are shown in each element; if “Midwest” is selected, then only the states that belong to the Midwest region are displayed. Setting each filter to the same region allows the user to compare information about an election across the specified region.
The Dynamics of Infographics

As shown in Figure 10, when one or more states in a region are selected on the geographic map, those states are then highlighted in the packed bubbles diagram and on the popular vote bar graph. Hovering over a state provides pop-up information as well.

Figure 10: Example of a Region Filter and Highlighting

This application of layering allows the user to control the amount of information displayed on the slide at any given time.
Aesthetic Appeal

A hallmark of good infographic design is consistency. In fact, Cairo references consistency in his design process in terms of defining a consistent visual style (Cairo, 2012). For example, if a certain typeface is used for headings, then that typeface must be consistently used in that manner and not in other applications such as body text. Consistency aids in comprehension, “Consistency enables people to efficiently transfer knowledge to new contexts, learn new things quickly, and focus attention on the relevant aspects of a task,” (Lidwell et al., 2010). I applied two types of consistency in my design: functional, which refers to consistency in function and meaning, and aesthetic, which refers to consistency in style and appearance (Lidwell et al., 2010). For functional consistency, I wanted the election slides (Slides 2-7) to have the same look and feel so the user would know how to interact with one after interacting with an earlier slide. The heading, stylized illustration, caption, and visual elements are all in the same approximate positions. This effort toward a consistent structure allows the user to move from slide to slide without needing to relearn the layout. In other words, functional consistency not only supports, but enables, a reader-driven approach.
The Dynamics of Infographics

Figure 11: Example of Consistency
The Dynamics of Infographics

For aesthetic consistency, I focused on color choice. In fine art and information design, color is used to attract attention, indicate meaning, and enhance aesthetics (Lidwell et al., 2010). I limited my color choices to red and blue, which have been linked to the Republican and Democratic parties respectively. I applied the appropriate party colors to the names of the candidates, their election numbers, the stylized illustrations, and respective properties in the visual elements. Research revealed that “Republican red” has an RGB value of 254, 0, 0; “Democrat blue” is 0, 0, 254 (Schloss & Palmer, 2014). I created a custom color palette in Tableau and used those colors throughout the infographic.

I also tried to apply the design principles of Rule of Thirds and Alignment to my infographic to identify the best locations to place the visual elements on each slide. The Rule of Thirds is a grid technique in which the medium, or canvas, is divided into thirds, both horizontally and vertically; gridlines are applied at the dividing marks and where the lines intersect are the most aesthetically appealing spots to place objects (Lidwell et al., 2010). Alignment consists of placing objects so that edges line up along a common row, column, or center position (Lidwell et al., 2010). However, trying to apply these principles in Tableau was extremely difficult to do. I will discuss these project limitations in more detail on page 31. The combined application of Rule of Thirds and Alignment would have improved the overall aesthetic appeal of my infographic.
Usability Survey

Overview of Survey

I received good feedback from my advisors during the development of my infographic, but it was agreed upon that conducting a usability survey on a population that had not seen the infographic at all was necessary in order to get unbiased feedback. According to my research, infographics can encounter usability problems when choices made about the design’s layout and uses of color, typography, and visual elements do not adhere to good design principles (Arslan & Toy, 2015). As discussed previously, I applied several design principles while developing my infographic, but a usability survey based on a Likert scale would provide a quantitative evaluation of my design. Based on the discussion by Arslan & Toy, I created the survey and administered it using Survey Monkey from April 2, 2016 until April 13, 2016. Undergraduate students of my thesis advisors served as the participants. The survey consisted of the following sections:

- Statements about the layout, visual elements, color, typography, and interactivity in the infographic that the participants rated using a standard Likert scale with ratings from 1 (Strongly Disagree) to 5 (Strongly Agree).
- A series of adjectives from which the participants selected five that best described their overall experience with the infographic; the results were scored and turned into a word cloud using Wordle.
- An optional free-response entry in which participants could share any comments they wished regarding their experience with the infographic.

Analysis of Results

Overall, the feedback I received from the survey was positive. The layout section consisted of three questions for a total possible score of 15. I received a score of 13.04 or 87%.
The Dynamics of Infographics

According to these results, my layout was well-planned, there was a clear hierarchy and path through the information, and the layout helped the participants find information and understand it.

The visual elements (for example, image, charts, and graphs) section consisted of four questions for a total possible score of 20. I received a score of 12.65 or 63%. While this seems low, it is somewhat misleading. The last two questions asked whether or not there were too few visual elements, thus creating information gaps, or too many visual elements, thus diluting the infographic. The majority of the participants rated these questions as “Strongly Disagree” (score of 1) or “Disagree” (score of 2). This means that the participants were not overwhelmed by the number of visual elements that I used in my infographic. The participants also felt that the visual elements looked as if they belonged in the infographic (for example, they did not clash with each other or look out of place), and that the visual elements used were easy to understand.

The color section consisted of three questions for a total possible score of 15. I received a score of 12.84 or 86%. The participants felt that the colors I chose complemented the visual elements, attracted their attention, and provided balance to the infographic.

The typography section consisted of six questions for a total possible score of 30. I received a score of 23.57 or 79%. The participants felt the title of my infographic was direct and concise, that the text helped link the visual elements together, and that it provided a direction through the information. Some felt the text was hard to read (some free-text responses mentioned the application of color to text made it hard to read; others thought the text size was too small), and few felt the font used was appealing.

The interactivity section consisted of four questions for a total possible score of 20. I received a score of 17.15 or 86%. The participants were not overwhelmed by the amount of
The Dynamics of Infographics

interactivity in my infographic, and that the different types of interactivity allowed them to dig deep into the data and learn something new about the topic in general.

The final section of the Likert scale questions consisted of four questions that looked at the infographic as a whole. For this section, I received a score of 17.4 out of 20, or 87%. The participants agreed that the infographic told a clear story and was informative, and found it appealing and engaging. Overall, out of a total possible score of 120, I received a score of 96.65 or 81%.

The next question asked the participants to pick five adjectives from a list that best described their experiences with my infographic. Figure 12 is a word cloud that depicts the results of this question. I used Wordle to create the word cloud.

![Word Cloud](image)

*Figure 12: Word Cloud based on Survey Results*

The final question allowed participants to enter any comments that they had that may not have been addressed in the survey. This question was optional. There were several constructive comments that I will address in the final version of my infographic:

- The flag on the first slide obscured some of the text; remove the flag
- Color applied to text made the text hard to read; remove color from text
- Some confusion over the purpose and ordering of the election slides; add an overview of the slides to the introduction slide and revise the titles of the election slides to include the number of electoral votes won
The Dynamics of Infographics

Overall, the usability survey provided constructive criticism on my infographic in terms of issues to fix and positive comments. As this was my first attempt at creating an interactive infographic using a program I had to teach myself to use, I am pleased with the feedback I received. Survey results are available in Appendix A on page 42.

Evaluation of Tableau

Product Overview

Tableau is a visualization tool that is intended for users who want to create appealing and engaging data visualizations without the need for prior knowledge or expertise in programming languages such as JavaScript, R, or Python (Federer & Joubert, 2018). Tableau offers several product options to fit the needs of a single designer (Tableau Public and Tableau Desktop) or a design team spread across the world (Tableau Server and Tableau Online). Tableau supports multiple data source types, ranging from static sources like a spreadsheet or PDF to a live database that can stream fresh data to the visualization and update it in real time (Federer & Joubert, 2018). Tableau boasts more visualization options than similar products on the market (Federer & Joubert, 2018) that are easy to use, attractive, and functional (Fernandez & Fetais, 2017). Visualizations created in Tableau can also be scaled to fit multiple platforms, including desktop, browser, and mobile (Cota et al., 2017).

Despite the numerous advantages Tableau has, it does have some disadvantages. While designed for those who do not have programming expertise, Tableau does require practice and patience as its learning curve can be steep (Federer & Joubert, 2018). The numerous visualization options will satisfy most users with little modification, but for users who are looking for elaborate visualizations that require complex modifications, such work may require a deep coding skill set (Cota et al., 2017) (Federer & Joubert, 2018). Tableau can export to a PDF format, but in doing so, some data is lost as it is only accessible via the interactivity;
The Dynamics of Infographics

Tableau visualizations are primarily intended for online consumption (Federer & Joubert, 2018).

**My Experiences with Tableau**

Tableau’s workspace consists of worksheets, dashboards, and stories. In this hierarchy, the worksheet is the smallest workspace and it consists of a single visual element (for example, a map or bar graph). Worksheets can be combined together onto a dashboard, which can be enhanced with text and images. Dashboards can then be published as is, or they can be combined to create stories, which provide a distinct path for the user to progress through. I constructed my infographic as a story.

Overall, I agree with the evaluations made in the sources I found during my research. Tableau was the right tool for me since I do not have a coding background. A new Tableau user must be patient when learning how to arrange the data in the data source. I needed to reorganize my data many times so that Tableau would give me the necessary dimensions and measures in order to create the geographic maps, packed bubble diagrams, and vertical bar graphs, and then apply colors as I needed. What helped speed up my development effort was the ability to duplicate worksheets. For example, once I created the 1980 geographic map, I simply right-clicked on the worksheet, selected **Duplicate**, and then changed the dimensions and measures so the new map reflected the 1988 election results. I did the same with the other visual elements as well. I also found the online help, user forums, and tutorial videos on Tableau’s website to be extremely valuable resources. To supplement Tableau’s content, I relied on some videos I found on YouTube.

With some patience and willingness to learn from one’s mistakes, I believe anyone can learn how to use Tableau to create engaging and appealing interactive visualizations.
Project Limitations

The limitations I encountered while working on this project involve the use of Tableau as my visual design tool, and many of those limitations can be attributed primarily to me being a first-time user. I learned of Tableau during the Fall 2017 semester while taking IDT 530 Research Methods. I spent some time during that semester and a considerable amount of time during the break in between semesters trying to familiarize myself with Tableau. While that gave me some confidence to move onto my own project, I was still learning as I went. While I am pleased with the overall appearance and level of interactivity I implemented in my infographic, I recognize that I am merely scratching the surface of Tableau’s potential. Some ideas to capitalize on Tableau’s untapped possibilities are discussed in the Future Project Considerations section on page 35.

Not all of the limitations I encountered can be attributed to my lack of experience with Tableau. In fact, three of them were shortcomings in the product that, based on activity in the online forums, other users have requested be implemented in Tableau. Those shortcomings are the lack of an alignment tool, the inability to control the arrangement of bubbles in a packed bubbles diagram, and to accurately and consistently size elements across dashboards.

Tableau does not provide any type of align tool similar to tools found in programs like Adobe Illustrator or Adobe Photoshop. Nor was there an ability to view and customize grid lines. The lack of these standard design tools made applying the Rule of Thirds or Alignment principles very difficult. Every detail on my slides were manually placed and aligned. The Duplicate feature helped as I could create copies of each dashboard, but once I brought in the appropriate visual elements onto the new dashboards, their sizes and locations reverted to default settings, which forced me to manually resize and re-position again. The absence of object dimensions also prevented me from resizing elements in a more precise manner.
The Dynamics of Infographics

Programs such as Adobe Illustrator and Photoshop, and even Microsoft Word, allow the user to see an object’s dimensions and apply them to other objects for a consistent appearance. A careful examination of the election slides will reveal these shortcomings.

My original plan for the infographic was to create choropleth (geographic) maps and cartograms that showed the distribution of Electoral College votes won by each candidate; the choropleth maps would mimic the standard maps used to illustrated elections outcomes; the cartogram would show the same results, but the states would be scaled proportionally to match their Electoral College value. *Figure 13* is an example of such maps from the 2008 presidential election (Katz, 2012).

![Figure 13: Choropleth (geographic) Map on Left; Cartogram on Right](image)

While the choropleth map accurately identifies the states won by each candidate, the issue is that there is no correlation between the geographic size of the state and its Electoral College value; the cartogram proportionally shows the quantitative data in relation to the geographic shape depicted (Katz, 2012). A cartogram is not an option that Tableau provides as a visualization option. However, users have created them in Tableau. *Figure 14* shows a cartogram of the 2016 election (Chambers, n.d.).
Creating a cartogram in Tableau requires experience using third-party tools to convert an SVG file into a shapefile, then converting the shapefile to a CSV file that Tableau can interpret as a data source (Chambers, n.d.). These are skills I do not possess and would not have been able to develop within the timeframe of this thesis project. I resorted to another option that Tableau does support: the packed bubble diagram. With this diagram, I was able to use the dimensions and measures that Tableau interpreted from my spreadsheet to create circles for each state that were proportionally sized to their Electoral College values. However, Tableau uses an internal algorithm to pack the bubbles in as tightly as possible (“Bubble chart / Repositioning of bubbles [Tableau Community,” n.d.). This meant that the locations of the circles/states did not match their locations on the geographic (choropleth) map, and the order of the circles changed from one diagram to the next based on the electoral vote values assigned to each state in each election depicted. Figure 15 shows an example of this issue.
Figure 15: Order of States in Packed Bubbles Diagram

Not being able to reposition the bubbles in the packed bubbles diagram so they match the location of each state in the geographic map is a limitation for my infographic that I must accept. However, I believe this limitation is mitigated by positioning the packed bubble diagram just below its corresponding geographic map. Both the map and the packed bubbles diagram identify the state when it is hovered over. Also, the filtering and highlighting functions help correlate geographic state to bubble.
CONCLUSIONS

Meeting Objectives

The objectives of this thesis project were as follows: (1) to develop an interactive infographic that provided the opportunity to glean new insights on data that was initially provided in tabular format; (2) to broaden my knowledge of Information Design, Infographic Design, and Graphic Design; (3) to learn new skills related to the aforementioned design fields while producing the project.

The finished project meets the first objective as it brings static, tabular data to life in an interactive visualization that allows the user to compare election results from different years and across different geographic regions. The combination of this visualization, the accepted understanding of a landslide election, and the rankings of elections based on Electoral College vote shares helps the user come to a conclusion about a statement made by our current president, and possibly learn something about the elections covered or elections in general that he/she did not previously know.

The other objectives were met through the production of the infographic: I followed the design process from a known expert in the field, Alberto Cairo, to develop my design while finding opportunities to apply relevant design principles to enhance the overall usability and appeal of the design. I learned how to use a new design tool, Tableau, and developed skills associated with the production of online interactive infographics.

Future Project Considerations

While this project thoroughly explored the statement made by Donald Trump about winning the 2016 election in a landslide, there are opportunities to revise and improve this project. One consideration would be to refine the application of filters in the visualization. For
example, filter by state and election year to compare how a state has voted over the years. Another option is to filter by political party and election year. Instead of presenting the results in a story format as I chose, present the results in a single dashboard view where all of the visual elements are presented and the application of filters is used to change what is displayed.

If the story format is retained as I presented my infographic, a better application of the continuum strategy from the Five Hat Racks principle would be to provide a slide for each election, first-term and re-election where applicable, and order each slide by the number of Electoral College votes won by the winning candidate. The title of each slide would be in the following format: Name of winning candidate, # of Electoral College votes won, election year. For example, “Ronald Reagan, 525, 1984” would be one slide, and “Ronald Regan, 489, 1980” would be another slide. This structure would require an overhaul on how I organized the data in my spreadsheet, but would be fairly easy to do and it would provide a slide for each election, whereas I only visualized first-term elections with mentions of the re-elections where applicable.

A final opportunity for future development would be to create cartograms in Tableau. As described earlier, cartograms in Tableau can be done but require skills and experience with other file types and tools, but creating cartograms should yield a visualization that is more accurate to the data variable being depicted (for example, Electoral College vote value per state).

Summary

Overall, I feel my interactive infographic on the outcome of the 2016 election in relation to a statement about landslide elections made by Donald Trump would be of interest and value to many different audiences: those who are interested in data analysis, those interested in politics and elections, and those interested in social media and the ramifications of
The Dynamics of Infographics

posts made on social media platforms (Trump issued his statement via Twitter) are only a few examples of audience types who may find my infographic engaging and informative. I believe that the knowledge and skills regarding infographic design that I developed during my course of study in the Information Design & Technology program at SUNY Polytechnic Institute have helped me produce an engaging, informative, and appealing capstone project.
The Dynamics of Infographics

REFERENCES


The Dynamics of Infographics


The Dynamics of Infographics


Trump, D. J. (2016, November 27). In addition to winning the Electoral College in a landslide, I won the popular vote if you deduct the millions of people who voted illegally [Tweet]. Retrieved March 30, 2018, from https://twitter.comrealDonaldTrump?lang=en

The Dynamics of Infographics


The Dynamics of Infographics

APPENDIX A: USABILITY SURVEY

The weighted average for each question is shown along the vertical scale in the bar graphs below.

Layout

<table>
<thead>
<tr>
<th>Question</th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER AGREE OR DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>TOTAL</th>
<th>WEIGHTED AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The layout appears to be well-planned.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>7.65%</td>
<td>30.77%</td>
<td>61.54%</td>
<td>26</td>
<td>4.54</td>
</tr>
<tr>
<td>The layout creates a clearly defined hierarchy of information in the</td>
<td>0.00%</td>
<td>7.08%</td>
<td>3.85%</td>
<td>42.31%</td>
<td>40.15%</td>
<td>26</td>
<td>4.27</td>
</tr>
<tr>
<td>infographic (introduction, message, and conclusion).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The layout helps me easily find information and understand it.</td>
<td>3.85%</td>
<td>3.85%</td>
<td>3.85%</td>
<td>42.31%</td>
<td>48.18%</td>
<td>26</td>
<td>4.23</td>
</tr>
</tbody>
</table>
The Dynamics of Infographics

Visual Elements

<table>
<thead>
<tr>
<th>Statement</th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER AGREE NOR DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>TOTAL</th>
<th>WEIGHTED AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The visual elements look as if they belong in the design.</td>
<td>0.00%</td>
<td>3.85%</td>
<td>7.66%</td>
<td>25.02%</td>
<td>81.54%</td>
<td>26</td>
<td>4.46</td>
</tr>
<tr>
<td>I understand what the visual elements are trying to</td>
<td>0.00%</td>
<td>7.69%</td>
<td>3.85%</td>
<td>50.00%</td>
<td>38.46%</td>
<td>26</td>
<td>4.19</td>
</tr>
<tr>
<td>There are too many visual elements, diluting the infographic.</td>
<td>19.23%</td>
<td>42.31%</td>
<td>30.77%</td>
<td>7.69%</td>
<td>0.00%</td>
<td>26</td>
<td>2.27</td>
</tr>
<tr>
<td>There are too few visual elements, creating information gaps.</td>
<td>20.77%</td>
<td>65.38%</td>
<td>3.65%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>26</td>
<td>1.73</td>
</tr>
</tbody>
</table>
The Dynamics of Infographics

**Color**

<table>
<thead>
<tr>
<th></th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER AGREE NOR DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>TOTAL</th>
<th>WEIGHTED AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The colors chosen complement the visual elements and message of the infographic.</td>
<td>0.00% 0</td>
<td>3.65% 1</td>
<td>3.65% 1</td>
<td>34.82% 9</td>
<td>57.69% 15</td>
<td>26</td>
<td>4.46</td>
</tr>
<tr>
<td>The colors used in the infographic attract my attention.</td>
<td>0.00% 0</td>
<td>3.65% 1</td>
<td>11.54% 3</td>
<td>46.15% 12</td>
<td>38.86% 10</td>
<td>26</td>
<td>4.19</td>
</tr>
<tr>
<td>There is balance in the number of colors used and how they are applied.</td>
<td>3.65% 1</td>
<td>0.00% 0</td>
<td>7.69% 2</td>
<td>50.00% 13</td>
<td>35.46% 10</td>
<td>26</td>
<td>4.19</td>
</tr>
</tbody>
</table>
The Dynamics of Infographics

Typography

<table>
<thead>
<tr>
<th>Statement</th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER AGREE NOR DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>TOTAL</th>
<th>WEIGHTED AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The title is short, clear, and action-oriented.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>11.54%</td>
<td>61.54%</td>
<td>26.92%</td>
<td>26</td>
<td>4.75</td>
</tr>
<tr>
<td>The text links the visual elements together.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>26.82%</td>
<td>30.77%</td>
<td>42.31%</td>
<td>26</td>
<td>4.15</td>
</tr>
<tr>
<td>The text provides direction through the visualization.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>15.38%</td>
<td>61.54%</td>
<td>23.08%</td>
<td>26</td>
<td>4.06</td>
</tr>
<tr>
<td>The text is not visually overwhelming.</td>
<td>3.85%</td>
<td>7.69%</td>
<td>11.54%</td>
<td>38.46%</td>
<td>38.46%</td>
<td>26</td>
<td>4.00</td>
</tr>
<tr>
<td>The font is legible and easy to read.</td>
<td>0.00%</td>
<td>7.69%</td>
<td>15.38%</td>
<td>57.69%</td>
<td>10.23%</td>
<td>26</td>
<td>3.68</td>
</tr>
<tr>
<td>The font used in the infographic is appealing.</td>
<td>0.00%</td>
<td>15.38%</td>
<td>42.31%</td>
<td>36.46%</td>
<td>3.35%</td>
<td>26</td>
<td>3.31</td>
</tr>
</tbody>
</table>
The Dynamics of Infographics

**Interactivity**

![Bar chart showing interactivity scores](image)

<table>
<thead>
<tr>
<th>Statement</th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER AGREE NOR DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>TOTAL</th>
<th>WEIGHTED AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did not feel overwhelmed by the interactivity.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>3.33%</td>
<td>42.31%</td>
<td>53.85%</td>
<td>28</td>
<td>4.50</td>
</tr>
<tr>
<td>I learned something about this topic that I did not already know by using the types of interaction.</td>
<td>0.00%</td>
<td>3.33%</td>
<td>0.00%</td>
<td>61.54%</td>
<td>34.82%</td>
<td>28</td>
<td>4.27</td>
</tr>
<tr>
<td>There is a good balance among the types of interaction used.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>11.54%</td>
<td>53.85%</td>
<td>34.82%</td>
<td>28</td>
<td>4.23</td>
</tr>
<tr>
<td>The types of interaction provide a deeper exploration of the data.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>10.23%</td>
<td>46.15%</td>
<td>34.82%</td>
<td>28</td>
<td>4.16</td>
</tr>
</tbody>
</table>
The Dynamics of Infographics

Overall

<table>
<thead>
<tr>
<th></th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER AGREE NOR DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>TOTAL</th>
<th>WEIGHTED AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The infographic was informative.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>38.48%</td>
<td>61.64%</td>
<td>26</td>
<td>4.62</td>
</tr>
<tr>
<td>There is a clear story being told in</td>
<td>0.00%</td>
<td>0.00%</td>
<td>3.85%</td>
<td>57.69%</td>
<td>38.46%</td>
<td>26</td>
<td>4.35</td>
</tr>
<tr>
<td>the infographic.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>3.85%</td>
<td>61.54%</td>
<td>34.62%</td>
<td>26</td>
<td>4.31</td>
</tr>
<tr>
<td>The infographic was engaging.</td>
<td>0.00%</td>
<td>3.85%</td>
<td>11.84%</td>
<td>83.85%</td>
<td>30.77%</td>
<td>26</td>
<td>4.12</td>
</tr>
</tbody>
</table>
The Dynamics of Infographics

Reactions to Infographic

From the following list, select five words that best express your reactions to this infographic.

Answered: 25  Skipped: 0

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informative</td>
<td>84.62%</td>
</tr>
<tr>
<td>Organized</td>
<td>84.62%</td>
</tr>
<tr>
<td>Straight-Forward</td>
<td>69.23%</td>
</tr>
<tr>
<td>Consistent</td>
<td>65.36%</td>
</tr>
<tr>
<td>Stimulating</td>
<td>50.00%</td>
</tr>
<tr>
<td>Efficient</td>
<td>34.62%</td>
</tr>
<tr>
<td>Appealing</td>
<td>26.52%</td>
</tr>
<tr>
<td>High Quality</td>
<td>23.08%</td>
</tr>
<tr>
<td>Attractive</td>
<td>10.23%</td>
</tr>
<tr>
<td>Busy</td>
<td>15.39%</td>
</tr>
<tr>
<td>Predictable</td>
<td>15.39%</td>
</tr>
<tr>
<td>Simolistic</td>
<td>15.39%</td>
</tr>
<tr>
<td>Complex</td>
<td>11.54%</td>
</tr>
<tr>
<td>Overwhelming</td>
<td>7.69%</td>
</tr>
<tr>
<td>Frustrating</td>
<td>7.69%</td>
</tr>
<tr>
<td>Inviting</td>
<td>3.85%</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>3.85%</td>
</tr>
<tr>
<td>Confusing</td>
<td>3.85%</td>
</tr>
<tr>
<td>Patronizing</td>
<td>3.85%</td>
</tr>
<tr>
<td>Intimidating</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Total Respondents: 26
VITA

John Freiberger IV was born in Rochester, New York. After graduating Palmyra-Macedon High School in 1989, he started his college education at Monroe Community College in September 1989. He completed his undergraduate studies in secondary education at SUNY Oswego, and received a Bachelor of Arts degree in May 1993. John worked primarily as a substitute teacher and summer school teacher while attending graduate school at SUNY Geneseo, but switched careers in 1997. Since then, he has been a technical writer for several companies in the Rochester, NY area. John has also been an active member in the Rochester chapter of Society for Technical Communication (STC), serving as a judge for the Technical Publications Competition in 2006, 2008, and 2009, and as a conference speaker at Spectrum 2009, Spectrum 2010, TechComm Showcase 2017, and Spectrum 2018. In August 2014, John returned to graduate school at SUNY Polytechnic Institute in Utica, NY.

Permanent Address: 323 N. Washington Street, East Rochester, NY 14445

This thesis was typed by the author.