Illustrating Information: Developing Students as Consumers and Producers of Media through the Use of Infographics

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Abstract

Infographics are visual representations of information that can convey large bodies of data using design, illustration, tables, charts, and other graphics. As social media use has expanded in recent years, the presence and sharing of infographics has grown significantly [1]. Through formal and informal engagement with media, 21st century students are consuming graphic presentations of data in myriad ways and can benefit from developing critical analysis, numeracy, and visual literacy skills as both consumers as well as producers of infographics. We have developed a scaffolded assignment using infographics so that students become more critical consumers of data and information, can engage others in discussion and analysis of data visualizations, and can produce infographics collaboratively and independently that effectively communicate to a given audience. Rather than writing a traditional research paper, this learning sequence falls in the transformation portion of the SAMR framework, representing a significant task redesign that helps students achieve the top tiers of Bloom's taxonomy: analysis, evaluation and creation [2]. The skills gained in this sequence are beneficial to students not only in future classes, research, and scholarship, but are also desirable and sought-after in today's workplace [3].

Keywords: Infographic, data literacy, visual literacy, numeracy

1.   Introduction

Infographics are visual representations of information that convey large bodies of data using design, illustration, tables, charts, and other graphics. As early as 1786, when William Playfair published *The Commercial and Political Atlas*, a collection of tables, graphs, and other visual displays of information that detailed international trade, infographics have been used to influence practice and policy [4]. Beyond communicating mere statistical computations, Edward Tufte argues that "graphics reveal data" in ways that allow consumers to have more comprehensive understandings of patterns and relationships [5].

Data collection has grown, methods of dissemination have increased, greater numbers of people have access to increasing amounts of information and scholars are learning more about the ways humans understand and remember data. Because we perceive visual information more quickly and efficiently and remember it better than information conveyed in written or verbal formats, the value of infographics is increasingly clear [1]. Technological progress has facilitated growth in the use of data visualizations for communication as well. Inanc and Dur argue, "smart phones, touch screens, television, the Internet and social media brought visuality and visual communication to a more central place" [1] making the creation and dissemination of data visualizations more commonplace.

Though our students encounter data visualizations frequently, they may not have the skills to critically evaluate data, illustrations, and messages conveyed through infographics. As consumers of data and data visualizations, students are well served to develop their data and visual literacy skills with direct instruction on the analysis of imagery, similar to the instruction they receive on textual analysis [6]. Furthermore, the ability to access and understand data, interpret and communicate with it, and create data visualizations is a valuable skill set for 21st century employees [3]. For these reasons, we have developed a multi-stage assignment that helps students practice their skills at interpreting infographics and teaches them how to create infographics to communicate a body of information to others.

2.   The Assignment

This assignment helps students become more critical consumers of data and information and develops the skills to translate data to a wider audience through the creation of infographics by building on all levels of Blooms Taxonomy (Figure 1). Through a scaffolded learning sequence, students consume

information (in the form of existing infographics or articles) recognizing the facts within, understanding what those facts mean, applying and analyzing the information through the lens of course concepts, evaluating the information and, finally, creating their own infographics which communicate the synthesis of this process [7].
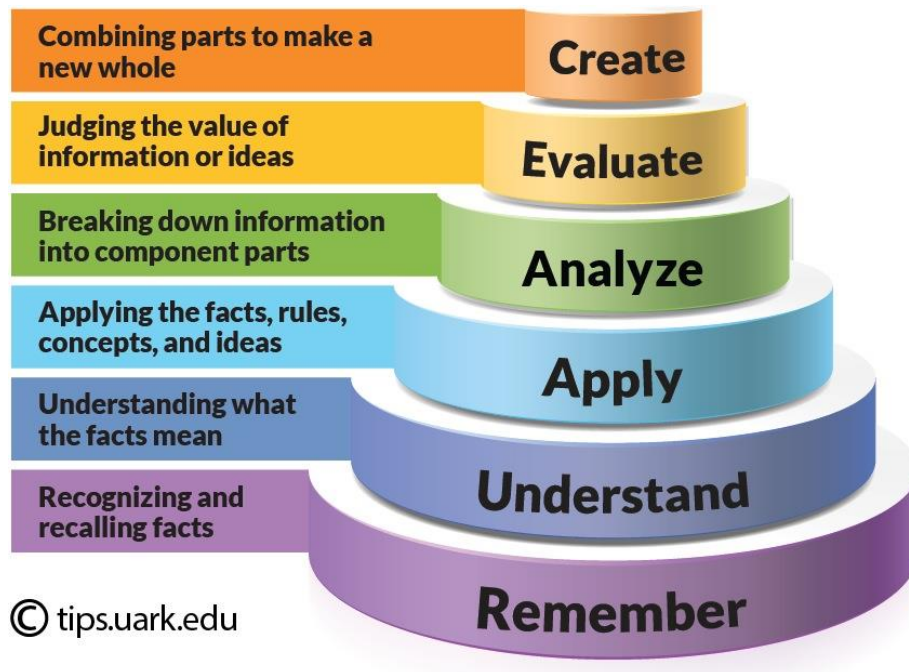

Figure 1. Source: Jessica Shabatura [7]

This assignment has three main parts that are intended to help students become better data consumers as well as infographic producers.

First, students engage with a "Graphic of the Week" assignment which requires students to collect data visualizations created by others and share them with the class. Visualizations are shared on a discussion board explaining the reason the visualization was chosen and analyzing its strengths and weaknesses. Subsequently, other students participate in the analysis by offering praise and critiques of the visualizations. These critiques allow students an opportunity to hone their skills as consumers by identifying more and less effective presentations of data.

For the second part of the scaffolded assignment, the Group Infographic, students work in small groups with peers to read and analyze assigned news articles, looking for data and experimenting with communicating this in visual ways. First, students work together to identify a single data point and convert it to a graphic visualization. Other students provide feedback on this first graphic visualization and groups subsequently use feedback to revise and expand their graphics with additional data points. Ultimately, these small groups translate the news articles into full infographics to convey the thesis, data, and conclusions offered in the articles. Working with a group allows students to collaborate on understanding and interpreting the news article, learning and using the software for the creation of infographics, and experimenting with and discussing the advantages and disadvantages of various visualization styles.

These first two assignments give students instruction and practice translating a series of data points into graphic displays. The third part, the Independent Infographic, expands research and communication efforts by allowing students to select their own research topic. They conduct research on the topic using previous literature and other sources to collect data and write a research brief with a thesis, supporting information, and conclusion for the course instructor. The research brief is translated into an infographic
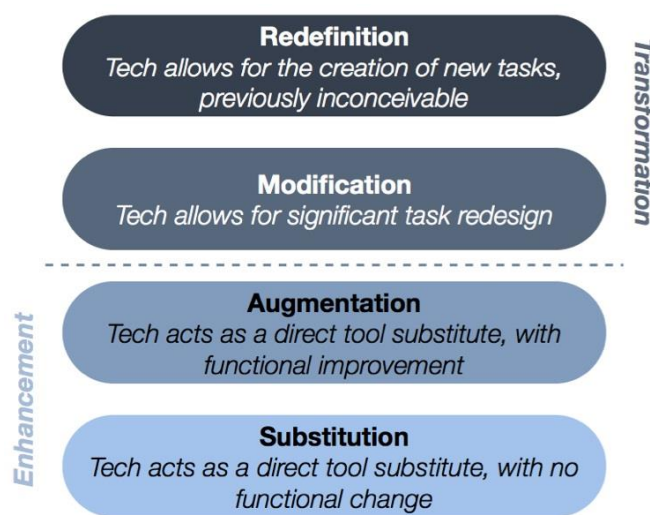
that is shared with other students for peer review. This review stage allows students to get feedback from their peers on the strengths and weaknesses of their infographic, similar to the constructive critiques offered during the Graphic of the Week assignment. The review exercise has the added advantage of allowing the students to become teachers and convey additional content related to the course that may not have been covered in class. Based on the peer review feedback, students are afforded the opportunity to revise their infographic before submitting it to the instructor for evaluation and grading.

The stages of these assignments as well as samples of student work are shared on a webpage (https://eanderson3101.wixsite.com/introtosoc) in order to share the research and infographic creations with a wider audience.

3.   SAMR

When developing this learning sequence, we considered not only the design and structure of the assignments, but also the role that technology would play within them. Thoughtful reflection about the use of technology in this sequence allowed us to structure the assignments in a way which offered technological support and instruction at key intervals in the students' learning process. The SAMR model is a useful framework for such reflection (Figure 2). SAMR helps educators determine whether the use of a particular technology *enhances* learning by substituting or augmenting learning activities that remain functionally unchanged by the introduction of a technology, or whether the introduction of a particular technology *transforms* learning by modifying or redefining the learning activity in a way which would not otherwise be possible without the technology as an integral part of the assignment [8].

Redefinition
Tech allows for the creation of new tasks, previously inconceivable

Modification
Tech allows for significant task redesign

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Substitution
Tech acts as a direct tool substitute, with no functional change

Transformation

Enhancement

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Figure 2. Source: Ruben Puentedura [8]

The infographics learning sequence falls into the transformation portion of SAMR, representing a significant task redesign—from a traditional research paper to the creation of an infographic—which would not be possible without the use of technology. End-user, web-based graphic design programs such as Piktochart (www.piktochart.com), Easelly (www.easel.ly), and Canva(www.canva.com) make the process of creating infographics accessible and achievable for students. Not only do these platforms allow students to create their infographics for free, but they are also web-based, meaning that students will not have to install software on their computers to be able to utilize the design platform. Finally, the built-in design assets provided by the platforms help to remove artistic barriers to facilitate the creation of effective infographics.

4.   Design & Technological Instruction

It is important to note that students require instruction in basic graphic design concepts and training in the use of the technologies used to complete this assignment. We were careful not to under-value the critical role graphic design plays in the successful communication of data and ideas throughout this learning sequence. The inclination to allay student anxiety surrounding communicating through a visual medium by reassuring students that "it doesn't matter how it looks" or not grading the visual aspects of the infographics would diminish the power and potential of visual communications [9] and be antithetical to our goal that students would become critical consumers and producers of infographics. Instead, we offered students a variety of supports and instruction to help them develop skills and understandings to produce effective infographics. Throughout this learning sequence students received this instruction from one of the college's instructional technologists. Students viewed two instructional videos that outline infographic design schemas using the LATCH framework [10] and introducing basic graphic design concepts such as typography, iconography, color, and layout. Students received two in-class instruction sessions: the first focused on the use of Piktochart to design infographics and the second focused on tips and tricks to enhance infographic design. Several working sessions were also scheduled outside of class time so that students have dedicated time to work on their infographics with the support of their professor and an instructional technologist.

5.   21st Century Skills

Infographic assignments such as this one help students to develop not only valuable skills that enable them to communicate scholarly research to a lay audience but also engage students in "critical content analysis, audience identification, and message construction that can help students learn a variety of skills related to professional communication"[11]. Beyond calling on students to convey course concepts through a visual medium, this infographics assignment sequence presents opportunities for students to develop data literacy, critical thinking, creativity, collaboration and technological skills which are desirable in the contemporary workplace [12].

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