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Are Infographics Worth It?: An Assessment of Information Retention in Relation to Information Embedded in Infographics

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Abstract

Infographics are an effective means to communicate with audiences, draw attention, and make concepts digestible in a quick and straightforward way. This study explores students' opinions on infographics used in library instruction, and provides quantitative data to help librarians determine whether these tools will help students engage with text and retain key concepts. Based on research conducted with undergraduate music students at two universities, DePauw University and the University of Minnesota, Twin Cities, this paper examines how students understand and interact with content embedded in infographics, and measures retention of information presented in either plain-text or infographic form.

Keywords

Infographics, information literacy, library instruction, retention, music students

Introduction

To a librarian, infographics may seem like the perfect tool to disseminate information. Infographics, which are graphic visual representations of information, data, or knowledge, are particularly effective at cutting through the clutter to communicate with audiences, draw readers' attention, and make concepts more digestible in a quick and straightforward way. But do students think so? More importantly, is it worth the time to create infographics if students do not retain key concepts after viewing them?

This paper presents a case study, conducted during the 2019-2020 academic year with undergraduate music students at DePauw University (Greencastle, IN) and the University of Minnesota, Twin Cities (Minneapolis, MN), and examines the retention of information disseminated via infographics. The present study builds upon earlier survey-based research done at DePauw University, which found that undergraduate music students preferred information disseminated via infographics.[1] After gathering data through this earlier research, the authors sought to investigate whether students' preference for information displayed in an infographic format warrants the time spent on creating the images. Pivoting from our initial qualitative research approach, the present study explores students' retention of information presented in either plain-text or infographic form by testing their recall through quantitative means. Through retention-specific questions and a survey that asked study participants about their perceptions of and opinions on plain-text or infographic formats, the authors collected empirical data that will help librarians to gain a better understanding of how to help students engage with text. The data collected through this study demonstrates how students interact with, understand, and retain information embedded in infographics, and it can provide librarians with context when deciding whether or not to create plain-text or infographic materials for use in their instruction activities.

Literature Review

Infographics are versatile tools that can be presented in print format or as part of a digital guide, virtual handout, or website, and free or low-cost tools like Canva and Piktochart have streamlined the infographic creation process.[2] According to Matrix and Hodson, "an infographic, otherwise known as a data visualization, is created using graphic design software, and uses pie charts, icons, decorative fonts, diagrams (and the like) to illustrate information and statistics –

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[1] Z. Sylvia Yang, "Are Infographics Worth It? An Assessment of Embedded Infographics in Libguides" (poster, Music Library Association Annual Meeting, St. Louis, MO, February 22, 2019, http://dx.doi.org/10.17613/8j8p-8a63).

[2] At the time of writing, Canva (https://www.canva.com/) and Piktochart (https://piktochart.com/) are examples of free online tools that can facilitate infographic creation. Both are fast, easy to use, and do not require previous design experience. Tool selection may depend on personal preference; understanding the features of each tool and how they apply to individual needs will help with tool selection.

creating a visual narrative."[3] Providing visual stimuli helps bridge the gap between knowledge producers and those who consume it, the latter of whom are often inundated with information. Because of this, educators in many different disciplines have used infographics to encourage students' engagement with content, motivation to learn, retention of information, and academic success. Previous studies in this area have addressed the use of infographics in medical contexts,[4] to support students with various learning styles,[5] as instructional aids for math,[6]

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[3] Sidneyeve Matrix and Jaigris Hodson, "Teaching with Infographics: Practicing New Digital Competencies and Visual Literacies," *Journal of Pedagogic Development* 4, no. 2 (July 2014): 17-18, http://hdl.handle.net/10547/335892.

[4] Lynsey J. Martin, Alison Turnquist, Brianna Groot, Simon Y.M. Huang, Ellen Kok, Brent Thoma, and Jeroen J.G. van Merriënboer, "Exploring the Role of Infographics for Summarizing Medical Literature," *Health Professions Education* 5, no. 1 (March 2019): 48-57, https://doi.org/10.1016/j.hpe.2018.03.005; Ivan Buljan, Mario Malički, Elizabeth Wager, Livia Puljak, Darko Hren, Frances Kellie, Helen West, Žarko Alfirević, and Ana Marušić, "No Difference in Knowledge Obtained from Infographic or Plain Language Summary of a Cochrane Systematic Review: Three Randomized Controlled Trials," *Journal of Clinical Epidemiology* 97 (May 2018): 86-94; Michaela Kiernan, Marily A. Oppezzo, Kenneth Resnicow, and Gwen L. Alexander, "Effects of a Methodological Infographic on Research Participants' Knowledge, Transparency, and Trust," *Health Psychology* 37, no. 8 (August 2018): 782-86, https://doi.org/10.1037/hea0000631; Jilpa H. Patel, David R. Moles, and Susan J. Cunningham, "Factors Affecting Information Retention in Orthodontic Patients," *American Journal of Orthodontics and Dentofacial Orthopedics* 133, no. 4 (April 2008): S61-S67, https://doi.org/10.1016/j.ajodo.2007.07.019.

[5] Cyril Brom, Tereza Hannemann, Tereza Stárkova, Edita Bromová, and Filip Děchtěrenko, "Anthropomorphic Faces and Funny Graphics in an Instructional Animation May Improve Superficial Rather than Deep Learning: A Quasi-Experimental Study," in *The Proceedings of the 10th European Conference on e-Learning* (Reading, UK: Academic Conferences and Publishing International Limited, 2016), 89-97, https://ksvi.mff.cuni.cz/amulab/index.php/publications/.

[6] Hasan Ozdal and Fezile Ozdamli, "The Effect of Infographics in Mobile Learning: Case Study in Primary School," *Journal of Universal Computer Science* 23, no. 12 (December 2017): 1256-75, https://doi.org/10.3217/jucs-023-12-1256.

languages,[7] social sciences,[8] agricultural science,[9] science and technology,[10] nursing,[11] anatomy,[12] and most recently, to support distance learning.[13] There is, however, a dearth of literature focused on the application of these tools in the instruction of arts students, and the use of infographics as an aid for instruction in music has not yet received scholarly attention. While it is not focused on arts students' interactions with infographics in information literacy learning settings, the extant literature on this topic does provide keen insights on design and its relationship to student engagement, communicative competences, and retention that can be helpful to instruction librarians working in the humanities. Information literacy instruction in STEM fields overlaps with this work in arts-related disciplines in many ways, and surfacing an alternative perspective on how music students interact with and perceive these learning tools will provide a new facet to the growing body of research on the use of infographics in information literacy instruction.

We believe the present study will be helpful for music librarians, who often face the challenge of working within limited time frames to introduce students to the many formats and tools necessary for conducting music research. Like instruction librarians in all fields, music librarians must address students' needs for guidance on conducting research, but this task is made more complicated by the sheer number of material types that music students must learn to use.[14] As described by Myers and Ishimura,

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[7] Mohd Fauzi Abdul Hamid, Zulazhan Ab. Halim, and Muhammad Sabri Sahrir, "An Insight on Needs Analysis Towards the Development of Animated Infographic Module in Arabic Grammar Learning," *Journal of Language and Linguistics Studies* 16, no. 3 (October 2020): 1387-1401, https://doi.org/10.17263/jlls.803813; Undarmaa Maamuujav, Jenell Krishnan, and Penelope Collins, "The Utility of Infographics in L2 Writing Classes: A Practical Strategy to Scaffold Writing Development," *TESOL Journal* 11, no. 2 (June 2020): 1-13, https://www.doi.org/10.1002/tesj.484; Truly Almendo Pasaribu, "Challenging EFL Students to Read: Digital Reader Response Tasks to Foster Learner Autonomy," *Teaching English with Technology* 20, no. 2 (April 2020): 21-41; Lyaylya Tarkhova, Sergey Tarkhov, Marat Nafikov, Ilshat Akhmetyanov, Dmitry Gusev, and Ramzid Akhmarov, "Infographics and Their Application in the Educational Process," *International Journal of Emerging Technologies in Learning* 15, no. 13 (2020): 63-80, https://doi.org/10.3991/ijet.v15i13.14647; Olga Fragou and Maria Papadopoulou, "Exploring Infographic Design in Higher Education Context: Towards a Modular Evaluation Framework," *Journal of Visual Literacy* 39, no. 1 (April 2020): 1-22, https://doi.org/10.1080/1051144X.2020.1737904; Ozdal and Ozdamli, 1256-75.
    [8] Ozdal and Ozdamli, 1256-75.
    [9] Kassie Waller, Nellie Hill, Courtney Meyers, Amber McCord, and Courtney D. Gibson, "The Effect of Infographics on Recall of Information about Genetically Modified Foods," *Journal of Agricultural Education* 61, no. 3 (2020): 22-37, https://doi.org/10.5032/jae.2020.03022.
    [10] Ozdal and Ozdamli, 1256-75.
    [11] Jennifer Chicca and Kristy Chunta, "Engaging Students with Visual Stories: Using Infographics in Nursing Education," *Teaching and Learning in Nursing* 15, no. 1 (January 2020): 32-36, https://doi.org/10.1016/j.teln.2019.09.003.
    [12] Fezile Ozdamli, Senay Kocakoyun, Turker Sahin, and Sahin Akdag, "Statistical Reasoning of Impact of Infographics on Education," *Procedia Computer Science* 102 (2016): 370–77, https://doi.org/10.1016/j.procs.2016.09.414.
    [13] Sarika S. Gupta and James Lewin-Smith, "Employing Design-Thinking to Create Opportunities for ECSE Teacher Candidate Reflection Through Infographic Design in an Online Course," *Distance Learning* 17, no. 2 (2020): 11-23.
    [14] In 1994, Jane Gottlieb described the various formats frequently used by performers at The Juilliard School, and the vast majority of the formats she describes as being crucial to the study of music

Music students work in a unique landscape of information. They need to navigate a complex network of printed music and sound recordings as a part of their formal study of music and performance practice. In addition, they need to be able to access and select music as professional musicians and performing artists. To prepare for their musical careers, students must learn how to make the best use of relevant resources for music research and performance practice and therefore it is crucial for them to develop information literacy skills (i.e., skills in utilizing information effectively and efficiently) for successful studies.[15]

In order to help students to traverse this complicated terrain, music librarians can use infographics as a tool to communicate with students and connect them with information quickly in situations where instruction time may be in short supply. By incorporating the use of infographics to present topics for which they are appropriate, either during synchronous instruction sessions or by encouraging students to engage asynchronously with digital tools that include infographics, music librarians may be able to help students to more rapidly and easily understand complex concepts, a strategy that could leave more time for discussion and collective knowledge-building around the many formats and tools necessary for music research. Additional research is needed on the various ways that music and performing arts students interact with infographics, and the applicability and utility of these instructional tools in music and arts settings.

No matter the field of study, infographics "[deliver] the maximum amount of content in the least amount of space while still being precise and clear; because they are visual presentations as opposed to oral or text presentations, they can quickly tell a story, show relationships, and reveal structure."[16] Heer, Bostock, and Ogievetsky address how well-designed visual media like infographics can improve comprehension, memory, and decision making, all of which are overarching goals for many library information literacy sessions.[17] Although the presentation of information will vary based on the subject, purpose, scope, and audience, the ultimate goals of all infographics are retention ("memorability of the knowledge presented"), comprehension ("how the knowledge is communicated . . . enabl[ing] clarity in understanding the information"),

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are still in use by music researchers today: "The provision of library services to performing musicians presents unique challenges. Firstly, it involves the management of collections consisting of materials in various formats: scores of musical works (which often include parts); recordings (collection of which may include 78s, 33 rpm lps, compact discs, cassette, reel-to-reel and DAT tapes); videos (both commercial and non-commercial); books; archival documents; and "ephemeral" materials such as program notes, clippings, and brochures." Jane Gottlieb, "Reference Services for Performing Musicians: Understanding and Meeting their Needs," *Reference Librarian* 47 (January 1994): 47-48.

[15] Amanda Myers and Yusuke Ishimura, "Finding Sound and Score: A Music Library Skills Module for Undergraduate Students," *Journal of Academic Librarianship* 42, no. 3 (2016): 215.

[16] Joanna C. Dunlap and Patrick R. Lowenthal, "Getting Graphic about Infographics: Design Lessons Learned from Popular Infographics," *Journal of Visual Literacy* 35, no. 1 (September 2016): 42, https://doi.org/10.1080/1051144X.2016.1205832.

[17] Jeffrey Heer, Michael Bostock, and Vadim Ogievetsky, "A Tour Through the Visualization Zoo," *Communications of the ACM* 53, no. 6 (June 2010): 59, https://doi.org/10.1145/1743546.1743567.

and appeal ("how the visualization should engage an audience").[18] Dunlap points out that "[f]rom an instructional perspective, infographics support attention, minimize cognitive load, create aesthetically appealing artifacts, activate or build schemas by using objects and information known to learners, and motivate."[19]

Effective infographics are based on principles from the fields of psychology, visual literacy, usability, and graphic design, and are configured to reduce barriers to understanding such as the experience of information overload or the limited time users may have to absorb data. Otten, Cheng, and Drewnowski call attention to the ways in which data visualization combines principles from psychology, usability, graphic design, and statistics to highlight important information in accessible and appealing formats: "Because infographics leverage the brain's most dominant capacity - visual processing - they can be a faster and more effective way of communicating information than text alone."[20] In their discussion of using visual cues like graphics to illustrate text in learning objects, Clark and Mayer champion the multimedia principle; this philosophy, which is based on cognitive theory, states that "people learn better from words and pictures than from words alone."[21] According to the multimedia principle,

> people are more likely to understand materials when they can engage in active learning—that is, when they engage in relevant cognitive processing such as attending to the relevant material in the lesson, mentally organizing the material into a coherent cognitive representation, and mentally integrating the material with their existing knowledge. Multimedia presentations can encourage learners to engage in active learning by mentally representing the material in words and in pictures and by mentally making connections between the pictorial and verbal representations. When learners mentally connect words and pictures, they are engaged in meaningful learning that is more likely to support understanding, as measured by transfer tests. In contrast, presenting words alone may encourage learners—especially those with less experience or expertise—to engage in shallow learning, such as not connecting the words with other knowledge.[22]

In an exploration of the use of infographics to summarize medical literature conducted by Martin et al., readers reported a lower cognitive load, or working memory processing, when asked to rate infographics versus text-only content. These researchers posited that "the brief statements and images found in infographics could potentially be easier for working memory to process

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[18] Silvia Elena Gallagher, Mairtin O'Dulain, Niamh O'Mahony, Claire Kehoe, Fintan McCarthy, and Gerard Morgan, "Instructor-Provided Summary Infographics to Support Online Learning," *Educational Media International* 54, no. 2 (August 2017): 133, https://doi.org/10.1080/09523987.2017.1362795.

[19] Dunlap and Lowenthal, 45.

[20] Jennifer J. Otten, Karen Cheng, and Adam Drewnowski, "Infographics and Public Policy: Using Data Visualization to Convey Complex Information," *Health Affairs* 34, no. 11 (November 2015): 1902, https://doi.org/10.1377/hlthaff.2015.0642.

[21] Ruth Colvin Clark and Richard E. Mayer, *E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*, 4th ed. (Hoboken, New Jersey: Wiley, 2016), 90.

[22] Clark and Mayer, 71.

which could lead to improved information retention."[23] According to Gómez Aguilar et al.,"augmenting the cognitive reasoning process with perceptual reasoning through visual representations permits the analytical reasoning process to become faster and more focused."[24] Incorporating infographics into the presentation of complex materials is one way to support the visualization information, which, in turn, can help with focus and decrease the time it takes to understand data and statistics, and to find correlations. In addition to a reduction of cognitive load, infographics may also affect students' motivation to retain information. Sung and Mayer theorize the following:

> Graphics produce motivational effects (i.e., affecting the amount of effort the learner is willing to devote to cognitive processing during learning) and cognitive effects (i.e., affecting how the learner allocates effort during learning, such as toward appropriate cognitive processing that supports the learning goal or inappropriate cognitive processing that does not support the learning goal.)[25]

By employing learning objects that encourage retention of information via visual cues, instructors can support and motivate students' efforts to remember more of what they see during a lesson or study session.

Although these versatile tools can help instructors to present many types of information in visually appealing and memorable formats, there are some stumbling blocks that those designing infographics for use in information literacy instruction should avoid. When condensing a large amount of information into a single visualization, a designer can easily oversimplify data and lose vital details. Otten, Cheng, and Drewnowski also point out that the creation of infographics can involve synthesizing and interpreting numerical data, which can "easily be distorted or made misleading (unintentionally or otherwise). Numbers can also be made to appear more precise than they really are."[26] Illustrations and graphics, which can serve as useful devices for cueing recall, may also hinder the learning process if they overwhelm the information or are purely aesthetic. Sung and Mayer studied respondents' perceptions of online lessons that contained instructive graphics ("directly relevant to the instructional goal"), seductive graphics ("highly interesting but not directly relevant to the instructional goal"), decorative graphics ("neutral but not directly relevant to the instructional goal"), and no graphics; these researchers found that while participants who viewed a version of the lesson including any kind of graphics reported higher satisfaction with the content than the group that did not see graphics, the respondents who viewed instructive graphics performed more effectively on a posttest measuring recall.[27] Though this study's participants responded more positively to the

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[23] Martin et al., 49, 52.

[24] Diego Alonso Gómez Aguilar, Cristóbal Suárez Guerrero, Roberto Therón Sánchez, and Francisco García Peñalvo, "Visual Analytics to Support E-Learning," in *Advances in Learning Processes*, ed. Mary Beth Rosson (London: IntechOpen, 2010), 207, https://www.doi.org/10.5772/7932 .

[25] Eunmo Sung and Richard E. Mayer, "When Graphics Improve Liking but Not Learning from Online Lessons," *Computers in Human Behavior* 28, no. 5 (September 2012): 1619, https://doi.org/10.1016/j.chb.2012.03.026.

[26] Otten, Cheng, and Drewnowski, 1902.

[27] Sung and Mayer, 1619.

versions of the lesson that included graphics, Clark and Mayer state that "students appear to have difficulty in distinguishing illustrations that help them learn from those that do not help. For this reason, we recommend using only highly relevant, instructional illustrations and even pointing out in the text what to look for in the illustrations."[28]

The extant literature on infographics presents a number of best practices that provide a roadmap for librarians creating learning objects for information literacy instruction. Infographics should focus on specific investigative questions, and Otten, Cheng, and Drewnowski suggest employing them to "communicate the most important and actionable results to a specific audience in ways that are appropriate to their level of knowledge."[29] Impactful infographics help viewers to recognize relevant patterns and visualize relationships, and they should also be tailored to the medium of communication. If used in a presentation and accompanied by a spoken explanation, they can be "made bold for visual impact and succinct for quick comprehension."[30] If used in publications or on digital guides, infographics can include more detail. When choosing how and when to incorporate illustrations in infographics, Clark and Mayer encourage instructors to plan the text and images simultaneously in order to create optimal meaning for the viewer.[31] Designers of infographics should also choose graphics, icons, diagrams, etc. that have specific relevance to the topic of the learning object in order to foster psychological engagement and deeper cognitive processing of the material. Avoiding purely decorative illustrations or those that simply represent a single object or idea and instead prioritizing graphics that work together with text to help learners to interpret or organize information supports knowledge construction and active sense-making.[32]

Canva, a popular digital tool that provides built-in functionality to streamline the creation of infographics, publishes a blog that provides tips on a number of best practices for design.[33] These suggestions include creating a wireframe and having a clear story in mind prior to beginning design work in order to assess the flow of information and relationships between concepts; formatting with purpose by using "diagrams, pie charts, flow charts, and maps" where appropriate; being intentional about tone and its relationship to the subject matter of the infographic to ensure clarity for readers; leveraging visuals ("illustrations, charts, icons, and graphics") and text elements to inspire engagement; utilizing white space and choosing colors that will work well on a screen and provide necessary contrast; and testing infographics by showing draft projects to others during the design process to avoid information overload and reader confusion.[34] Each of these suggestions provides a valuable point of entry for librarians designing infographics for use in information literacy instruction.[35]

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[28] Clark and Mayer, 90.

[29] Otten, Cheng, and Drewnowski, 1902.

[30] Otten, Cheng, and Drewnowski, 1902.

[31] Clark and Mayer, 70.

[32] Clark and Mayer, 72, 76; Sung and Mayer, 1619-20.

[33] Caitlin Jordan, "How Designers Do It: 15 Easy Steps to Design an Infographic From Scratch," *Canva - Learn* (blog), accessed March 16, 2022, https://www.canva.com/learn/create-infographics/.

[34] Jordan, "How Designers Do It."

[35] As discussed in the Future directions section below, considerations for accessibility and universal design in the creation of infographics are out of scope for the present study. We hope that future

Research on the effectiveness of visual communication (including infographics) in various educational disciplines is ongoing, and is likely to continue to grow in breadth and depth as distance learning becomes more ubiquitous. A greater understanding of how infographics can enhance digital learning objects like LibGuides, videos, and slide presentations will help librarians and other instructors to become more efficient as we share information with students outside of the traditional classroom space. The present study contributes to our greater understanding of the impact of infographics on student learning, and it represents the first exploration of this research focused on music students. The results can be taken together with studies of learners in other disciplines to create a more vibrant picture of how infographics can help engage students and support their retention of information.

Research questions

Though infographics are easy for librarians and educators to design, our purpose in conducting this research was to ascertain whether creating infographics for use in information literacy instruction is worth the time needed to produce these materials. In order to better understand student retention of information embedded in infographics, we conducted a study with undergraduate music students at DePauw University (Greencastle, IN) and the University of Minnesota, Twin Cities. This research built on work previously done at DePauw to gather students' opinions on infographics,[36] and the present study uses a mixture of qualitative phenomenology and correlational quantitative methodology, exploring additional questions about students' perceptions and testing their retention of information as it relates to information disseminated via infographics.

Our research questions (RQ) were as follows:

> RQ1. How does formatting affect students' perception of text?

> RQ2. Does the mode of presentation - infographic format vs. plain text - affect students' retention of information?

Our goal in addressing these questions was to gather empirical evidence that would benefit librarians and instructors as they make a decision about whether or not to take the time to generate infographics for use in their pedagogical work.

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researchers will explore these important concepts further in order to provide additional best practices to assist librarians working on projects of this nature.

[36] Yang, "Are Infographics Worth It? An Assessment of Embedded Infographics in Libguides."

Materials and methods

Ethics statement

The Institutional Review Boards (IRB) of both DePauw University (IRB ID 091919Y) and the University of Minnesota (IRB ID STUDY00007581) reviewed this study, and determined it to be exempt from IRB review. An informed consent form was presented to all participants, and written consent was received when participants agreed to respond to the survey.

Data collection

The study consisted of a survey that remained open from October 21 through November 15, 2019, and the survey instrument was distributed online via Google Forms. The authors sent an invitation email with a link to the survey to potential participants via university-sponsored email lists for undergraduate music students, and potential participants received one email reminder through the same university-sponsored email lists. Furthermore, we recruited undergraduate music students by word of mouth. We were specifically interested in how music and arts-focused students would perform in this study, both because those are the primary populations with which we work and because arts students are a demographic that has not previously received attention in the study of infographics and retention.

Once study participants consented to participate in the survey, the survey instrument employed skip and display logic to ensure that participants were shown only relevant questions based on their responses to previous questions. Respondents were asked to complete the survey in one attempt. Upon completion of the survey, students could submit their email address to be entered into a random drawing for one of four $25 gift cards to the University bookstore at their institution.

Sample

To be sure that we gathered a sample of study participants that would be broadly representative of today's student body, we surveyed a voluntary sample of undergraduate students from both a small liberal arts university (DePauw University) and a large state institution (University of Minnesota, Twin Cities). Our intention was to create a pool of study participants with a wide range of past experiences with information literacy instruction. Approximately 350 people were

reached, and we received 78 responses for a response rate of 22.3%.[37] Of the 78 responses, 100% were usable. The respondents sample is characterized as follows:

Year of Study: All students confirmed that they were over the age of 18, and distribution of year of study (1st through 4th and other) was fairly even, though low for 1st years at UMN:

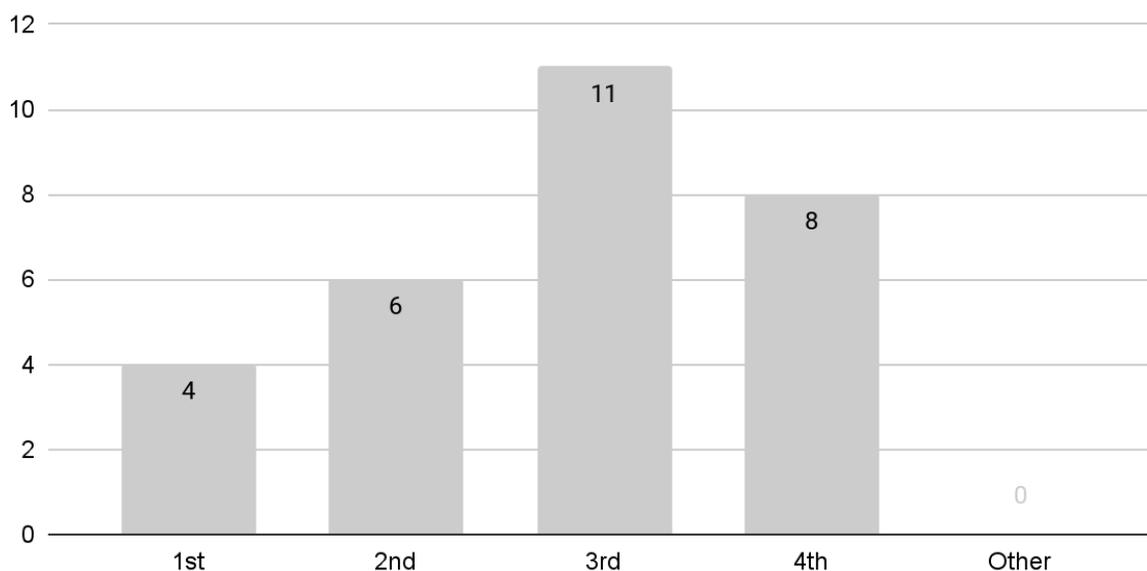## Demographic information for University of Minnesota-Twin Cities Participants (29)

Figure 1: Demographic information for University of Minnesota, Twin Cities Participants (29)

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[37] The researchers wish to acknowledge the risk of bias due to the relatively small sample size in this study. As defined by Case and Ambrosius, "An underpowered study does not have a sufficiently large sample size to answer the research question of interest." L. Douglas Case and Walter T. Ambrosius, "Power and Sample Size," in *Topics in Biostatistics*, ed. Walter T. Ambrosius (Totowa, NJ: Humana Press, 2007), 377. We believe that, despite its relatively small size, the sample in our study provides adequate data to answer our research questions and to guard against unreliable results.

Demographic information for DePauw University Participants (49)
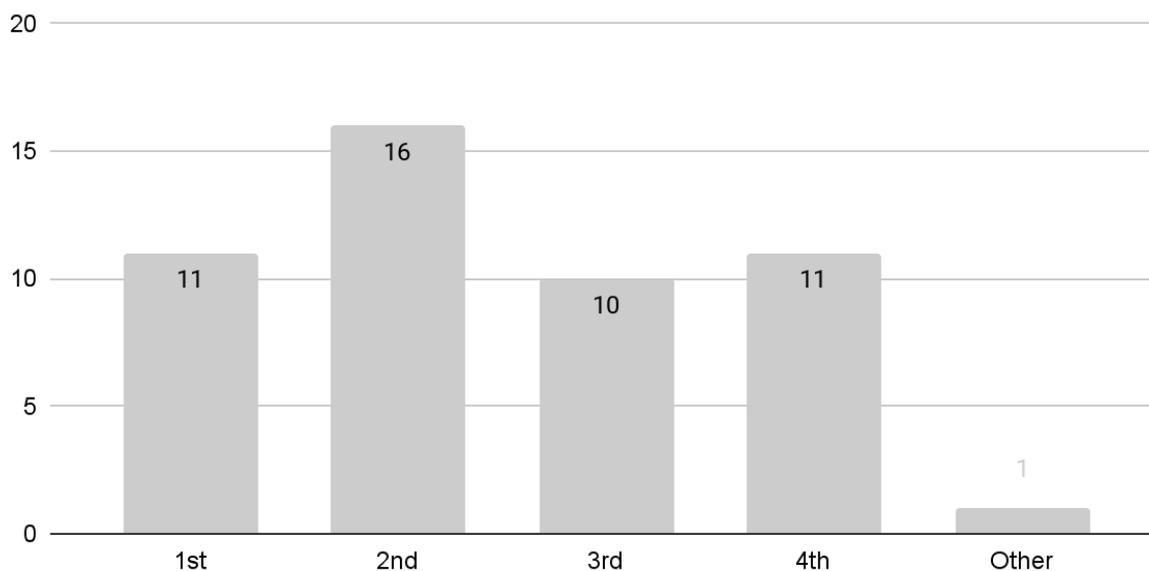
Figure 2: Demographic information for DePauw University Participants (49)

Self-Identified Majors: The majority of participants were music majors (including music education, music therapy, music performance, etc.), though some respondents were music minors and some were double majors that included studies in a field outside of music.

Procedure

Participants were asked to acknowledge informed consent documentation; after this acknowledgement, participants were asked to fill out a brief survey about general demographic information. Following the demographic information, a skip logic question separated participants into two independent groups. One group was shown a plain-text narrative of the content that included no graphic design elements; the other stimulus was an infographic presenting the same information as the plain-text narrative.[38] A combined number of thirty-five participants at the two institutions viewed the plain-text narrative and forty-three viewed the infographic. This study included two treatment groups and no control group.

Immediately after viewing the assigned stimulus, the participants were presented with a series of questions gauging their opinion on the content they had just viewed. This survey section allowed the authors to both build on the data previously collected from DePauw students about

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[38] See Appendix A for examples of these stimuli.

their perceptions and preferences as related to the use of infographics for learning, and to break up participants' exposure to the stimulus content and clear their working memory before they engaged with a quiz about what they had read. This short quiz provided a means of determining if participants had more success with retaining information presented in infographic or plain-text format, and we measured "retention" by survey respondents' ability to recall information presented via the stimuli.

Using Canva, the researchers created the infographic stimuli (one featuring DePauw University colors and the other featuring University of Minnesota colors) specifically for use in this study; the plain text stimulus was presented using the Google Forms native interface. We chose the topic ("Starting a Research Project") because of its applicability to students at all stages of their academic careers. The infographics were designed to create a balance between text and design elements like font cues, color contrast, and illustrations, and to encourage recall and recognition. The infographics and text used in this study were not presented in conjunction with actual library instruction sessions; rather, both were presented to study participants solely within the context of the survey. For the purpose of ensuring that all study participants received the same information, the infographic used was more substantial than best practice suggests.

Opinion survey

The opinion-related portion of the survey included four questions that allowed participants to rate their responses using a Likert scale from one to five:

- Survey Q1: "Does the formatting break up the text?"
- Survey Q2: "How difficult or easy is it to locate information presented in this format?"
- Survey Q3: "How engaging or not engaging is information presented in this format?"
- Survey Q4: "How likely do you feel you'd be to remember information presented in this form after reading it once?"

Following this, respondents were asked "Thinking about the content and the time it took you to read through it, which statement most applies to you?" (Survey Q5) and provided the following response options:

- "I feel like it didn't take me very much time to read this."
- "I feel like it took me a short amount of time to read this."
- "I feel like it took me the right amount of time to read this."
- "I feel like it took me a long amount of time to read this."
- "I feel like it took me too much time to read this."

Retention posttest

To test recall of information, participants were then shown four multiple-choice questions and prompted to enter answers based on their memory of the information presented via infographic or plain-text narrative. In order to streamline the data review process, the researchers chose to provide multiple-choice questions rather than blank text boxes for participants to fill in. These quiz questions were:

- Quiz Q1: "What's the first step to starting a research project?"; multiple-choice answers included:
    - "Searching the Libraries catalog for relevant books and media."
    - "Organizing your research"
    - "Identifying a topic." (correct answer)
    - "Gathering background information."
    - "Identifying key concepts."

- Quiz Q2: "Why is gathering background information a helpful step in the research process?"; multiple-choice answers included:
    - "It's a great way to identify specialists in your proposed topic's field, and learn about who's leading the discussion and the language or keywords they are using to describe or discuss the topic.:
    - "Reading about others' ideas can help you to formulate your own."
    - "JSTOR will help you broaden or narrow your topic after you have gathered background information."
    - "A and B." (correct answer)
    - "A, B, and C."

- Quiz Q3: "Where should you start searching for books and media that are relevant to your topic?"; multiple-choice answers included:
    - "Library databases and indexes."
    - "Library catalogs and WorldCat." (correct answer)
    - "RILM."

- Quiz Q4: "What should you be looking for in your initial appraisal of a source?"; multiple-choice answers included:
    - "Authenticity."
    - "Authority."
    - "Suitability."
    - "All of the above." (correct answer)
    - "None of the above."

The survey ended with an open-ended question that prompted students to provide their opinions on organizing research materials (Quiz Q5: "We'd like to hear your opinion! The reading

suggests you find an organization method that works for you. Based on what you read, how would you plan to organize your research?"). We chose to include this question in order to develop a sense of students' critical thinking about starting a research project after being exposed to our advice for this task via a plain-text or infographic stimulus.

Results

Data was collected using Google Forms and analyzed using this tool's built-in response visualization and spreadsheet functions.

Opinion survey

The portion of this research that involved collecting data on students' perceptions of content presented in infographic and plain-text formats produced surprising results. When asked about whether they believed the formatting broke up the text (Survey Q1), study participants in both the plain-text and infographics groups reported they felt that it did; 71.4% (n=25) of the participants sorted into the plain-text group and 90.7% (n=39) of the participants in the infographics group chose 4 or 5 on the Likert scale provided for them to rate how well the formatting divided the text.

Plain-Text Group Survey Q1: Does the formatting break up the text?
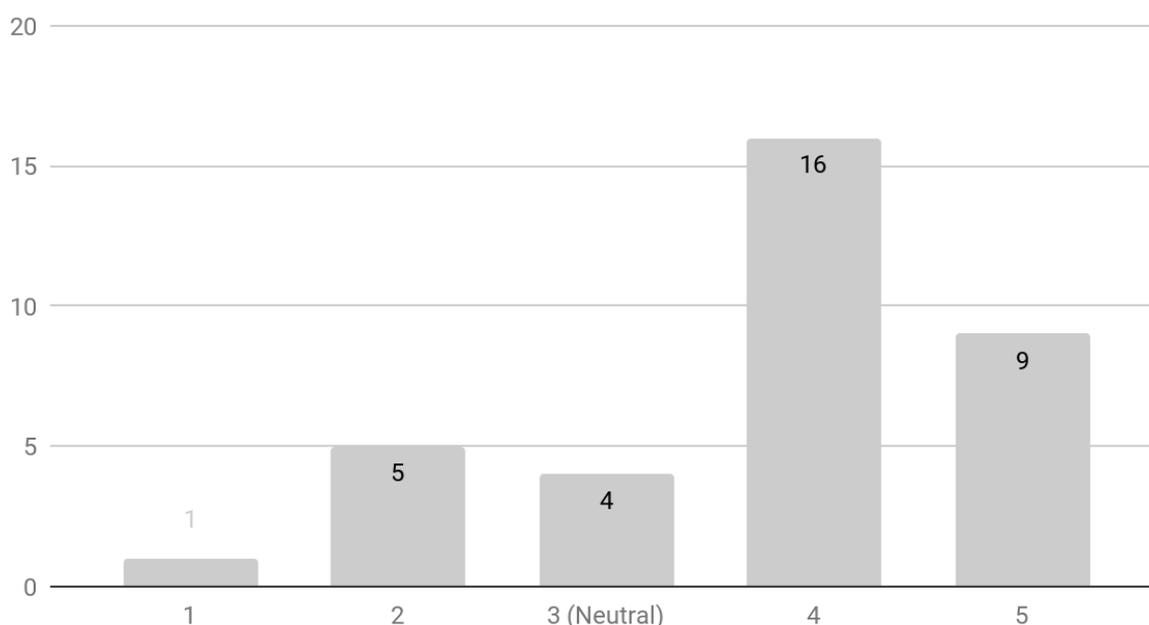
Figure 3: Plain-Text Group Survey Q1: Does the formatting break up the text?

Infographics Group Survey Q1: Does the formatting break up the text?
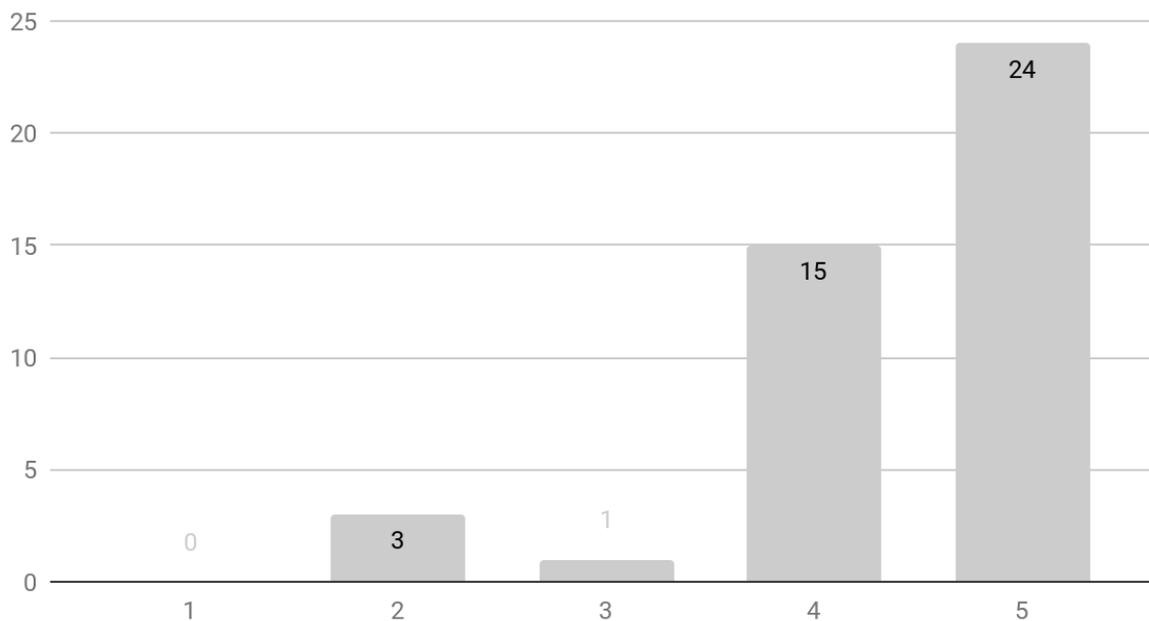
Figure 4: Infographics Group Survey Q1: Does the formatting break up the text?

We included Survey Q1 ("Does the formatting break up the text?") in order to gauge study participants' general opinions about presentation of information in infographic or plain-text form, as well as to investigate whether responses aligned with data gathered in Yang's previous research on students' opinions about whether infographics provided more clear delineation of sections in text.[39] The response of participants in the present study's infographics group paralleled Yang's results, but the high rating of the plain-text stimulus in breaking up the text was unexpected. The presentation of the plain-text content included spacing, and in the absence of an infographic version of the stimulus with which to compare it, participants may have felt that the formatting divided the text enough to make it easy to comprehend.

The researchers also found study participants' response to Survey Q2 ("How difficult or easy is it to locate information presented in this format?") to be unexpected. Over half of the participants who viewed the plain-text stimulus - 54.3% (n=19) - indicated that information was easy or fairly easy to locate by choosing 4 or 5 on the Likert scale. The combined distribution for the infographics groups at both institutions indicated that a large percentage of respondents felt that information was easy or fairly easy to locate in the infographic version (65.1% [n=28] chose 4 or 5 on the Likert scale), but the number of respondents who indicated that they felt like information was difficult or fairly difficult to locate by choosing either a 1 or a 2 on the Likert scale in response to this question was unforeseen. In the plain-text group, 28.6% (n=10) chose

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[39] Yang, "Are Infographics Worth It? An Assessment of Embedded Infographics in Libguides."

a 2 on the scale (no respondents from the plain-text group chose a 1), and 21% (n=9) chose a 1 or 2 on the scale in response to this question.

Responses to the questions about whether students found the stimulus presented to them engaging (Survey Q3) and if they felt they would remember content presented in the format they saw (Survey Q4) also presented unanticipated results. The data regarding the level to which the infographics group found the stimulus they saw to be engaging (Survey Q3) does not clearly support a consensus that infographics are more visually interesting to learners than plain text. On a Likert scale of 1 to 5, with 1 equating to "Not engaging at all" and 5 as "Very engaging," the distribution was surprisingly even among respondents who chose a rating of 2, 3, or 4:

Infographics Group Survey Q3: How engaging or not engaging is information presented in this format?
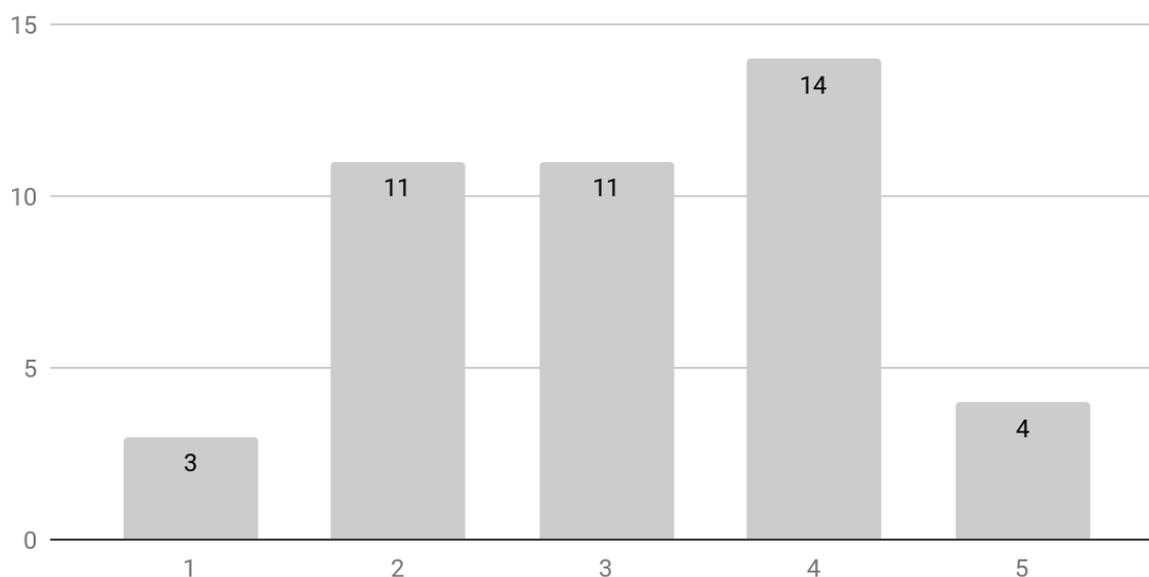
Figure 5: Infographics Group Survey Q3: How engaging or not engaging is information presented in this format?

The response of the plain-text group to Survey Q3 was expected: only 6.3% (n=2) of participants in the plain-text group chose a 4 on the Likert scale asking them to rate how engaged they felt by the stimulus they viewed, and no participants chose a rating of 5. Of those participants who viewed the plain-text stimulus, an overwhelming 84.4% (n=27) of respondents chose 1 or 2 on the Likert scale to describe the level of engagement they felt with the content.

Plain-Text Group Survey Q3: How engaging or not engaging is information presented in this format?
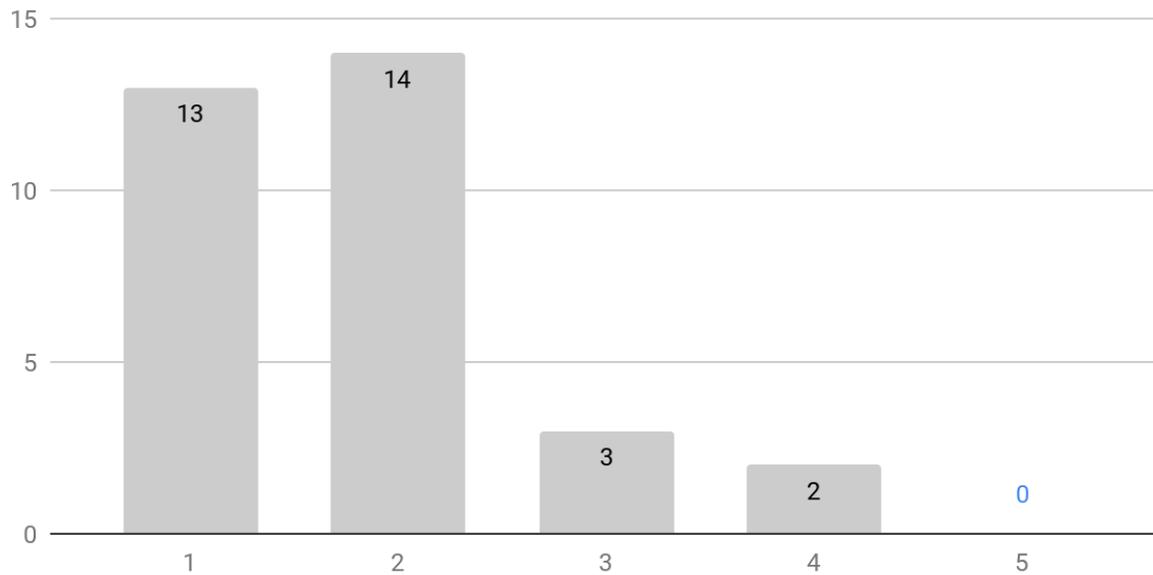
Figure 6: Plain-Text Group Survey Q3: How engaging or not engaging is information presented in this format?

Most of the respondents in the plain-text group indicated that they would be less likely to remember information presented in plain-text form after reading it once (Survey Q4); 48.6% (n=17) of the plain-text group's respondents chose 1 or 2 on the Likert scale in response to this question, in which 1 indicated "I would NOT remember any of it" and 5 indicated "I would remember all of it." We observed a surprising datapoint, however, when when the results were broken down by institution; about half of the plain-text group respondents from DePauw (41.2%, n=7) indicated that they would be fairly likely to remember information presented in plain-text form after reading it once by choosing 4 or 5 on the Likert scale in response to this question.

DePauw Response: How likely do you feel you'd be able to remember information presented in this format after reading it
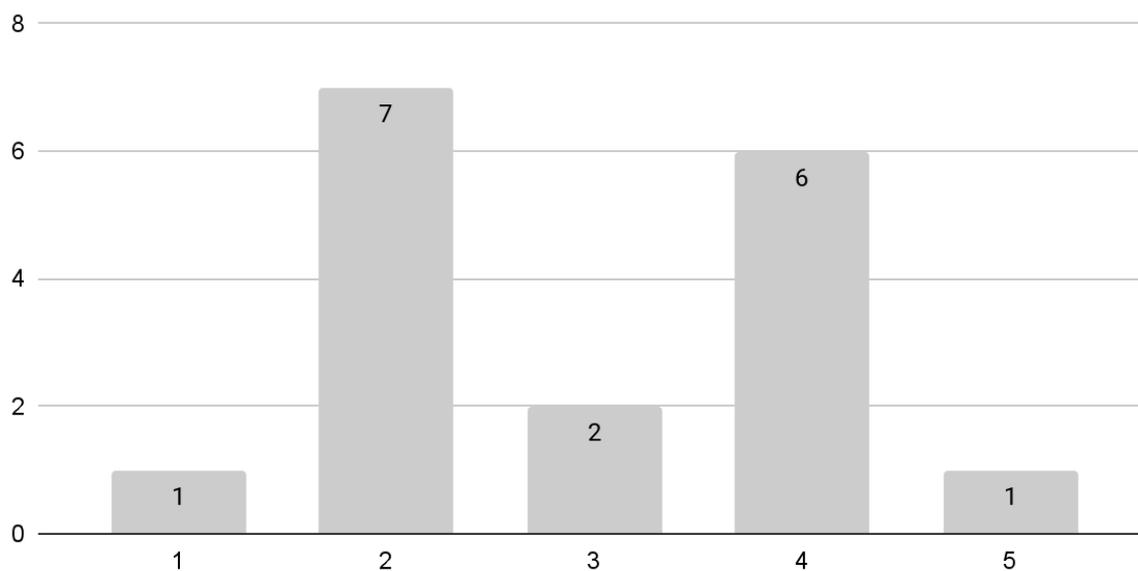

Figure 7: DePauw Response, Survey Q4: How likely do you feel you'd be able to remember information presented in this format after reading it once? (Choose 3 if you feel "neutral" about this.)

In response to the same question (Survey Q4), the study participants in the infographics group also provided unexpected feedback. Respondents were split or neutral on whether they would remember information presented to them as an infographic after reading it once, and very few indicated they would be very unlikely to remember it (4.7%, n=2) or very likely to remember it (0%, n=0). The researchers expected that most participants would feel they'd be more likely to remember information presented as an infographic, so these responses were surprising. The results of a survey posttest, presented below, indicate that study participants in both the infographic and plain-text groups had a fairly similar level of success in retaining information after viewing their assigned stimulus. Therefore, there was not a demonstrated correlation between respondents' estimation of whether they would remember information presented to them in a specific format and their level of success when faced with this task.

Infographics Group Survey Q4: How likely do you feel you'd be to remember information presented in this form after reading it once?
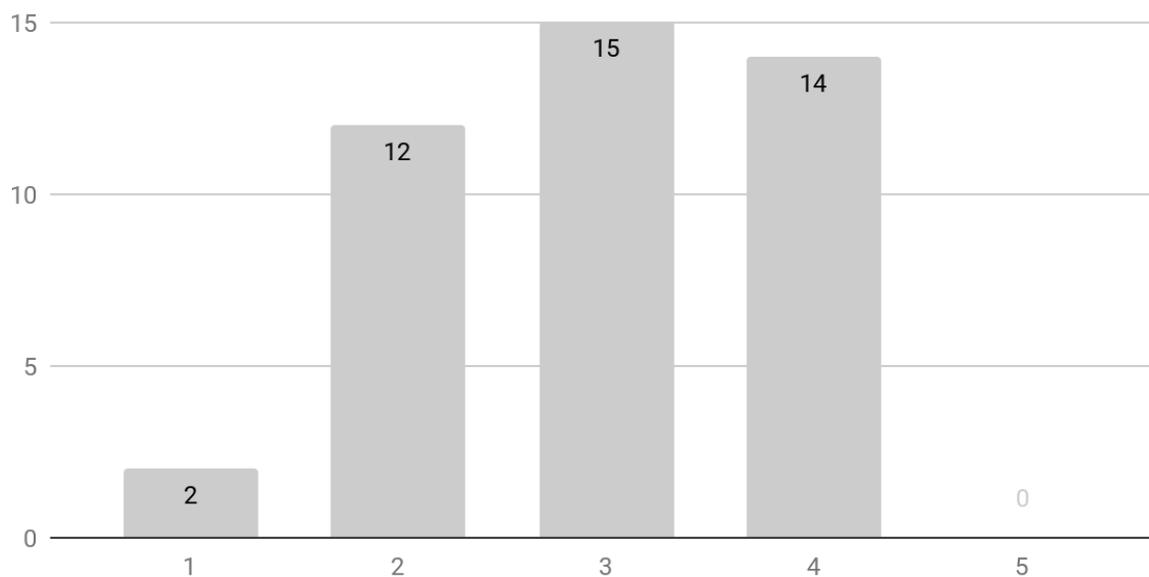
Figure 8: Infographics Group Survey Q4: How likely do you feel you'd be to remember information presented in this form after reading it once?

Lastly, the survey asked students to rate the amount of time it took them to read the stimulus presented to them (Survey Q5), ranging from "I feel like it didn't take me very much time to read this" to "I feel like it took me too long to read this." We did not use survey software that timed respondents' engagement with the stimuli, so this question recorded only participants' perception of the amount of time that it took them to read their assigned stimulus rather than the actual amount of time this task took to complete. Most respondents in the plain-text group indicated that they felt like it took them the right amount of time to read the stimulus, while the responses from the infographics group were fairly evenly distributed.

Plain-Text Group Survey Q5: Thinking about the content and the time it took you to read through it, which statement most applies to you?
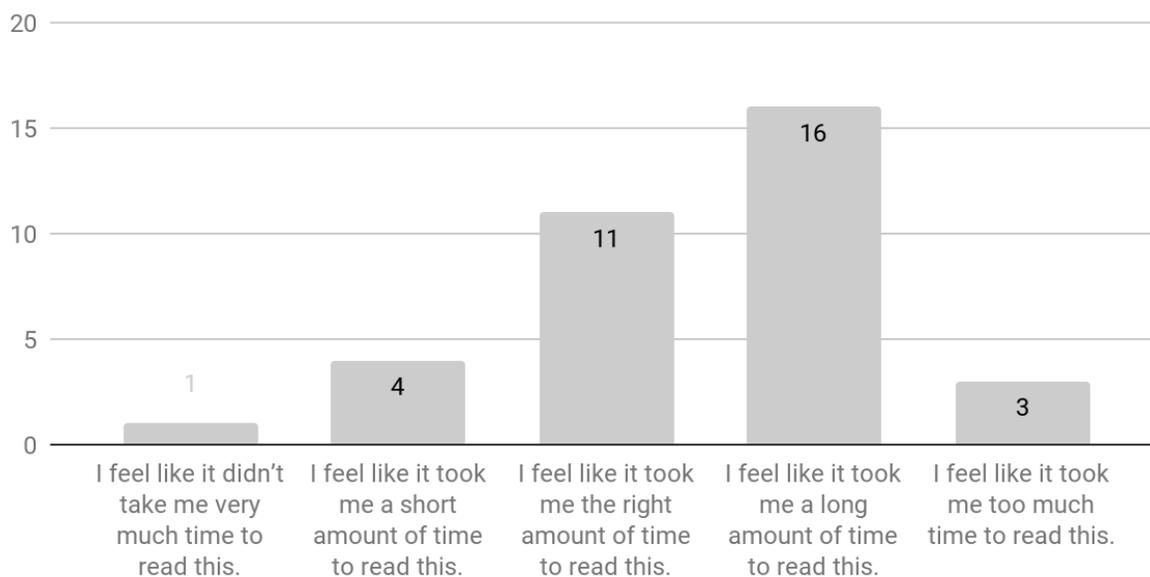
Figure 9: Plain-Text Group Survey Q5: Thinking about the content and the time it took you to read through it, which statement most applies to you?

Infographics Group Survey Q5: Thinking about the content and the time it took you to read through it, which statement most applies to
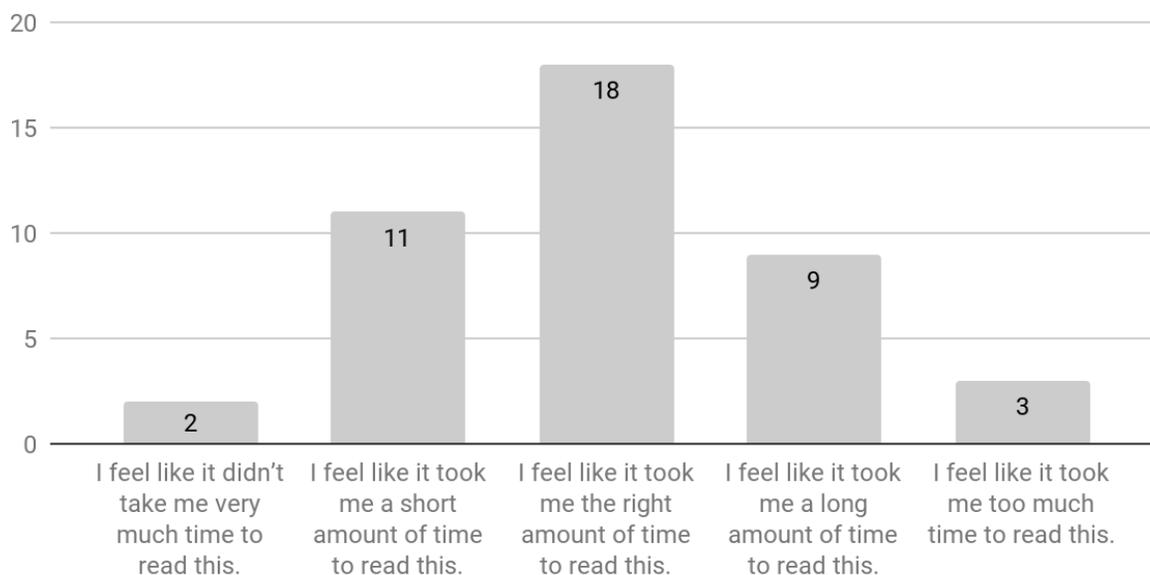
Figure 10: Infographics Group Survey Q5: Thinking about the content and the time it took you to read through it, which statement most applies to you?

Retention posttest

The quiz portion of this study indicated that overall, participants retained a similar amount of information after viewing information presented as an infographic as they do when viewing a plain-text stimulus. Most respondents in both groups selected the correct answers to the questions Quiz Q1: "What's the first step to starting a research project?" (91.4% [n=32] of respondents in the plain-text group and 86.4% [n=38] of those in the infographic group selected Option 3: "Identifying a topic") and Quiz Q4: "What should you be looking for in your initial appraisal of a source?" (88.6% [n=31] of respondents in the plain-text group and 95.3% [n=41] of those in the infographics group selected Option 4: "All of the above"). However, respondents' answers to Quiz Q2: "Why is gathering background information a helpful step in the research process?" and Quiz Q3: "Where should you start searching for books and media that are relevant to your topic?" resulted in data that was somewhat unanticipated. In response to Quiz Q2, most participants in both groups submitted the correct answer (Option 4: "A and B."), but 37.2% (n=20) of respondents who viewed the infographic stimulus selected the incorrect answer to this question. Also of note is the fact that fewer plain-text group participants selected incorrect answers to this question than those who viewed the infographic. The reason for these results is unclear, and may have been a result of how the question or multiple-choice options for responses were worded.

Plain-Text Group Quiz Q2: Why is gathering background information a helpful step in the research process?
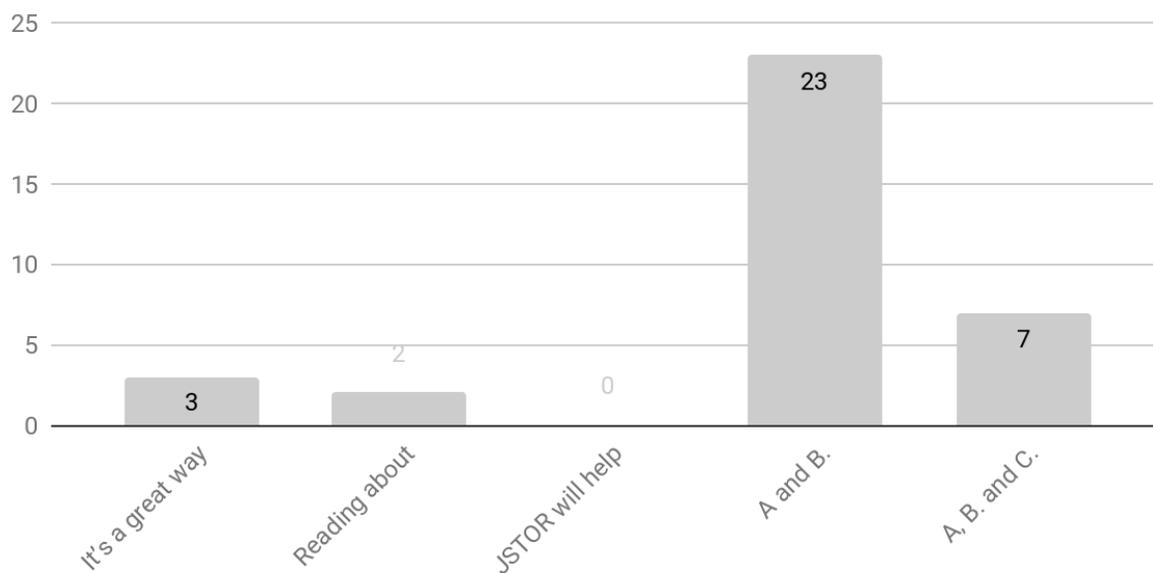

Figure 11: Plain-Text Group Quiz Q2: Why is gathering background information a helpful step in the research process?

Infographics Group Quiz Q2: Why is gathering background information a helpful step in the research process?
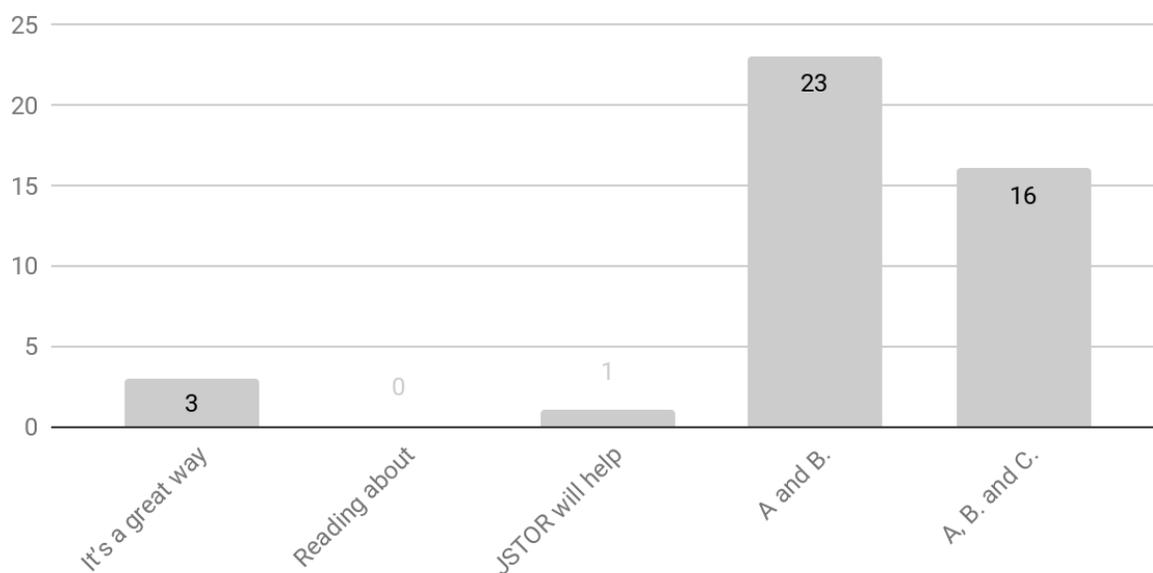
Figure 12: Infographics Group Quiz Q2: Why is gathering background information a helpful step in the research process?

Equally unexpected was the large number of study participants who selected the wrong answer to the question about where to start searching for books and media (Quiz Q3). A large number of respondents in both the plain-text and infographics groups did not select "Library catalogs and WorldCat," which may have been a result of the fact that this information was not presented in either stimulus as an ordered list. We also acknowledge that this question and both the plain-text and infographic stimuli include library jargon like "databases and indexes" and "library catalogs and WorldCat," and this may have contributed to participants' confusion. Because these stimuli were not accompanied by synchronous instruction, we did not have the opportunity to clarify the differences between these tools in order to help respondents differentiate between them.

Plain-Text Group Quiz Q3: Where should you start searching for books and media that are relevant to your topic?
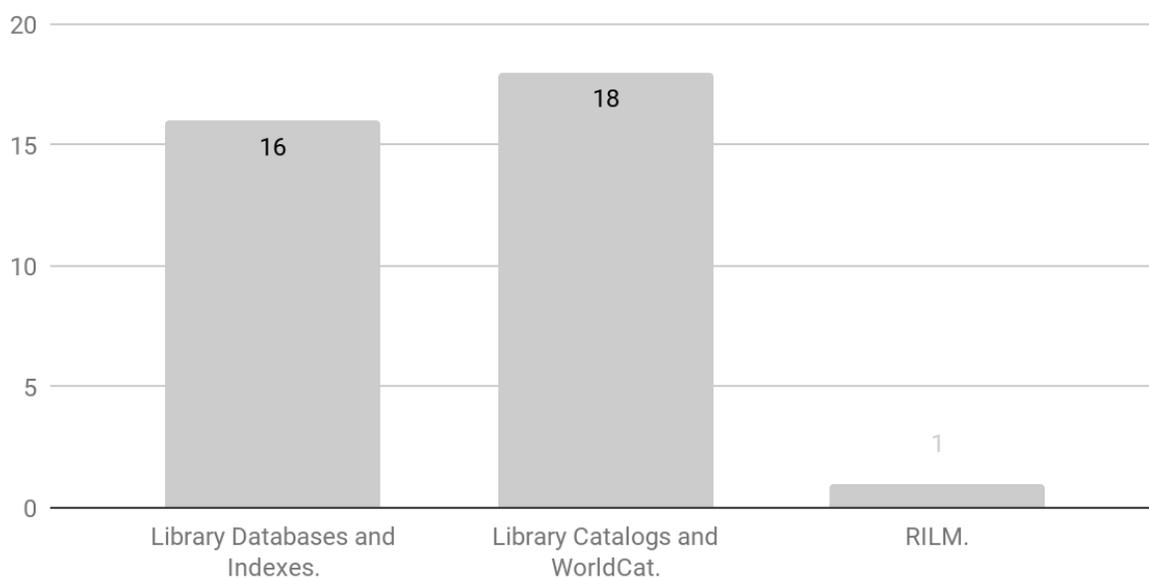
Figure 13: Plain-Text Group Quiz Q3: Where should you start searching for books and media that are relevant to your topic?

Infographics Group Quiz Q3: Where should you start searching for books and media that are relevant to your topic?
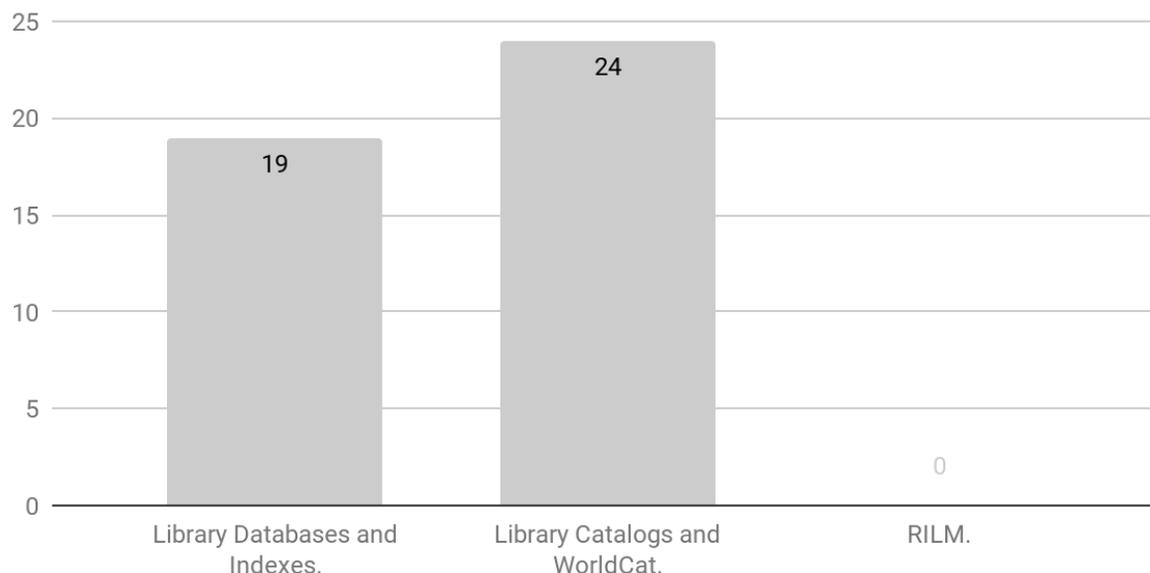

Figure 14: Infographics Group Quiz Q3: Where should you start searching for books and media that are relevant to your topic?

The survey concluded with an open-ended question asking respondents how they would organize their research after viewing the assigned stimulus (Quiz Q5: "We'd like to hear your opinion! The reading suggests you find an organization method that works for you. Based on what you read, how would you plan to organize your research?"). The researchers found it surprising that many participants' responses did not relate to content from the plain-text or infographic stimuli. While the goal of the readings was to present a guide to starting a research project that was both comprehensive and specific, we observed that many study respondents had their own creative ideas about how to approach the task of beginning a research project that did not connect to the content presented in the study's stimuli.

Discussion

In their discussion of unresolved issues inherent to incorporating graphics into instruction materials, Clark and Mayer ask, "What is the return on investment of graphics? Explanatory visuals can be time-consuming to produce and require an investment in graphic design resources. What are the cost benefits for creating customized visuals to illustrate technical

content?"[40] Though these questions specifically focus on graphics, they can also apply to the infographics, and the present study seeks to address the question of a librarian's return on investment of time when considering the creation of these materials. The results of our survey indicate that the creation and incorporation of infographics into information literacy instruction is not necessary, but can be worth the effort when the instructor's goal is to help students connect with information quickly and easily.

RQ1. How does formatting affect students' perception of text?

Because the majority of study participants reported higher satisfaction with the infographic stimulus than the plain-text stimulus when asked to rate how effectively the formatting broke up the text,[41] to indicate how easy or difficult it was to locate information in it,[42] and to provide feedback on the amount of time it took to read,[43] librarians may find infographics to be an effective means to help students make quick connections with material. Since much of the information literacy instruction presented by music librarians happens in one-shot instruction sessions and/or in condensed periods of time, and because music librarians must cover a wide range of material types and tools in these sessions, infographics may provide a more effective means to make information discoverable easily and quickly than a plain-text presentation of the same content.

The question of student engagement with material is one that concerns many librarians who conduct instruction activities, and it is a question that infographics may help to address. In a study of learners' satisfaction with various types of graphics (instruction, seductive, decorative, and no graphics) and their performance on a posttest after viewing a lesson with one of these approaches, Sung and Mayer conclude: "If the main goal of a lesson is to promote enjoyment, then adding nearly any kind of graphics may be appropriate. Enjoyment may be an important objective because enjoyable graphics may produce motivational benefits that keep the learner willing to continue."[44] Sung and Mayer's conclusions about the inclusion of graphic elements into instruction materials aligns with the present study's findings about participants' engagement with infographic content when compared to a plain-text stimulus. When asked to rate the level of

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[40] Clark and Mayer, 84.

[41] When asked "Does the formatting break up the text?," 90.7% (n=39) of respondents in the infographic group chose a rating of 4 or 5. Of the participants who viewed the plain-text stimulus, 71.4% (n=25) chose a rating of 4 or 5.

[42] When asked "How difficult or easy is it to locate information presented in this format?," 65.1% (n=28) of respondents in the infographic group chose a rating of 4 or 5. Of the participants who viewed the plain-text stimulus, 54.3% (n=19) chose a rating of 4 or 5.

[43] When asked "Thinking about the content and the time it took you to read through it, which statement most applies to you?," 72.2% (n=31) in the infographic group selected "I feel like it didn't take me very much time to read this," "I feel like it took me a short amount of time to read this," or "I feel like it took me the right amount of time to read this." 45.7% (n=16) of participants in the plain-text group chose those responses to the same question.

[44] Sung and Mayer, 1623.

their engagement with the assigned stimuli (Survey Q3), 41.9% (n=18) of respondents in the infographic group selected 4 or 5 on a five-point Likert scale; this is in stark contrast to 6.3% (n=2) of the plain-text group selecting a favorable rating in response to this question (this percentage only reflects participants who selected a rating of 4; no participants in the plain-text group selected a rating of 5 for this question). Though the present study did not specifically ask participants for their opinions on the inclusion of graphics, this result seems to align with Sung and Mayer's conclusion that the inclusion of graphic design elements like color and images promotes learners' enjoyment of and engagement with the content they view. Librarians wishing to promote learner enjoyment and engagement may benefit from incorporating infographics into their teaching activities.

The opinion-based portion of the survey also asked participants to rate how likely they thought they'd be to remember information presented in the assigned stimulus after reading it once (Survey Q4). Of the respondents who viewed our plain-text stimulus, 25.8% (n=9) selected a rating of 4 or 5 on the Likert scale, compared to 32.6% (n=14) of study participants in the infographics group (this percentage only reflects participants who selected a rating of 4; no participants in the infographics group selected a rating of 5 for this question). The researchers were curious to know if respondents' opinions on how much they would retain from viewing the assigned stimulus would align with their success on the posttest, and the results of this comparison will be discussed below. Librarians considering whether or not to create infographics for use in instruction may be interested to note that students report *feeling* like they will be more likely to retain information presented as an infographic.

RQ2. Does the mode of presentation - infographic format vs. plain text - affect students' retention of information?

The results of the present study's posttest, in which both groups of participants performed similarly, do not provide conclusive evidence that librarians should put effort into creating infographics. They do, however, show that presenting information in infographic format does not hinder learners' retention of information. Taken together with the results of our companion survey of respondents' opinions on these learning objects, these results provide evidence that the use of infographics in music library instruction may promote enjoyment of and engagement with content. Though not necessary for ensuring learners' retention of content, infographics may help librarians to connect more effectively and quickly with students during short or infrequent instruction sessions.

We also conclude that the responses to our open-ended question that asked about strategies for organizing research projects (Quiz Q5) may help librarians to gain a more nuanced understanding of how to pair infographic content with synchronous instruction activities. Many study participants provided answers to this question that centered on logistics and tools (using Google Docs or Word documents for separating notes from sources and their own ideas/drafts of their projects, creating categories or sections in their notes for different sources, creating and

adding to an annotated bibliography, utilizing folder structure on their computer or a citation manager for organizing sources, etc.), but few addressed the searching and evaluation strategies presented in the assigned stimuli. Responses to this question did not provide conclusive evidence that the information that study participants viewed in infographic or plain-text format affected their conception of strategies for beginning research projects, and we theorize that at the time they responded to this prompt, the majority of study participants had not yet internalized the search strategies presented in the infographic or plain-text stimulus that they viewed. This supports the conclusion that whether content is presented as an infographic or in plain-text format, learners will benefit from additional reinforcement through synchronous instruction.

Contributions

In addition to producing useful data on students' opinions and ability to recall what they read in the assigned stimuli, the present research also provided the researchers with useful information regarding study design (e.g., dissemination of announcements about research studies via University-sponsored student list-servs; encouraging participation via an incentive in the form of a drawing for a university bookstore gift card). However, the researchers noted several design limitations to address in future studies of this nature. As noted above, the authors could have worded several questions and their possible answers in the quiz-like portion of the survey more clearly to ensure study participants' understanding of what they were being asked (e.g., Quiz Q2: "Why is gathering background information a helpful step in the research process?" and its multiple-choice answer options). In regard to study design, the treatment groups were created by means of a skip logic design in which participants self-selected into two independent factions via a question about their preferences for apples or oranges. Early results indicated that an overwhelming number of study participants at the University of Minnesota were choosing apples, skewing the results toward a single treatment group.[45] Though the number of participants in each treatment group became more even by the end of the survey period, the researchers suggest presenting a more neutral choice for study participants to use in self-selecting into treatment groups. The researchers also observed accessibility limitations stemming from the simplicity of the Google Form design interface. At the time we conducted our survey, Google Forms did not allow text formatting like bold font or use of heading structure, a restriction that made the plain-text stimulus harder to scan and less accessible for participants using screen readers or other assistive technologies.

Despite these limitations, the present study makes several contributions to our understanding of the pedagogical approach of using infographics in information literacy instruction. This research

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[45] Local preference for apples over oranges may result from the popularity of apples cultivated through the University of Minnesota's Apple Breeding Program, and the recent release of the Rave and First Kiss apple varieties in 2017. "All U of M Apple Varieties," Minnesota Agricultural Experiment Station, University of Minnesota, accessed March 16, 2022, https://mnhardy.umn.edu/varieties/fruit/apples/all-apple-varieties.

serves as the first exploration of the use of infographics in information literacy instruction for music students, and surfacing an alternative perspective on this topic contributes to our greater understanding of student engagement and of knowledge acquisition and retention. The data gathered for this study also adds to the growing corpus of general knowledge on infographics and of their impact and effectiveness in teaching and learning activities. Taken together with results of studies with learners in other disciplines, our conclusions can contribute to a more complete picture of how educators can effectively incorporate infographics into instruction work to encourage understanding and retention of information. Finally, this research provides librarians with data on which to base a decision of whether or not to spend time creating infographics for use in their teaching activities.

Future directions

Though out of scope for the present study, future research in this area could expand educators' understanding of pedagogical applications for infographics in a number of ways. Additional data collection and analysis of learners' opinions after they have compared plain-text and infographic stimuli that present identical content would be useful for librarians and educators wishing to create more targeted and effective infographics. As noted in the Results section above, infographics should align with best practices for design. The infographic used in this study includes more text than recommended, and we suggest that future researchers should employ best practices as articulated by experts in the field of design in the process of creating infographics. Future surveys should also refine opinion and posttest questions to ensure that no ambiguity is present, and interviewing students about their ideas and experience with infographic vs. plain-text stimuli would provide researchers with a broader and deeper comprehension of how study participants perceive the effect formatting may have on their understanding and retention of information. Future studies that include quiz-like components would benefit from the inclusion of both cued-recall questions (e.g., "What do you remember about how to evaluate sources?") and free-recall questions (e.g. "List any information you can recall from what you viewed."), as well as from a balance of multiple choice and free-text cued-recall questions.[46] This distribution would provide researchers with a more thorough understanding of study participants' absorption and understanding of the information presented in the stimulus or stimuli viewed. Long-term retention of information is also an area ripe for exploration; the present study focused on participants' recall of content almost immediately after viewing the assigned stimulus, and additional data is needed to understand the effectiveness of infographics on long-term retention and learning. Building in a retest or longer delay between exposure to a stimulus would elucidate a new facet of knowledge acquisition via infographic, and working with a semester-long class to administer quiz-like surveys to the same group of participants over a longer period of time would provide longitudinal data on how use of

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[46] Waller et al. is a particularly effective example of a study on infographics and retention that incorporates free-recall questions. Kassie Waller, Nellie Hill, Courtney Meyers, Amber McCord, and Courtney D. Gibson, "The Effect of Infographics on Recall of Information about Genetically Modified Foods," *Journal of Agricultural Education* 61, no. 3 (2020): 22-37, https://doi.org/10.5032/jae.2020.03022.

infographics in instruction can support learning. Lastly, research on the effectiveness of infographics in information literacy instruction may benefit from a comparison of data gathered from studies of performing arts students and research participants from a general population or other specific disciplines.

Further research is also needed to determine how infographics can be paired with instruction sessions to serve students most effectively. Clark and Mayer address the differences between the use of images or graphics in combination with text to support knowledge building for novices, who have low levels of knowledge about the domain, and advanced learners with high levels of knowledge on the topic at hand; Clark and Mayer caution educators to be sensitive to students' level of prior knowledge, and they recommend supplementing text-based content with coordinated images for low-knowledge learners while considering mostly text or mostly graphics-based materials for more experienced audiences.[47] This suggests that instruction librarians and other educators who employ infographics in their teaching activities might approach this task differently depending on the audience. Lastly, additional research is also needed on how instructors can make infographics universally accessible, particularly for neurodiverse learners.[48] Future studies should consider exploring these topics in order to contribute to a more thorough understanding of how infographics can function within the context of information literacy instruction.

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[47] Clark and Mayer, 80-81.
[48] Current scholarship regarding the creation of accessible infographics is scarce; consider reaching out to campus accessibility services or advocates at your institution, or engage with organizations such as the Bureau for Internet Accessibility (https://www.boia.org/) or WebAIM (https://webaim.org/) to remain up to date on accessible design standards as they continue to evolve.

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Appendix A: Survey stimuli

Infographic stimulus

Figure 15: DePauw University-Specific Infographic Stimulus

Plain-text stimulus

Figure 16: DePauw University-Specific Plain-text Stimulus; Includes both Screenshot of the Plain-Text Stimulus and Complete Plain-Text Stimulus

Please review the following text: "How to start a research project"

Starting a Research Project:

If you feel overwhelmed and you're not sure where to start, follow these five simple steps to begin your next music research project!

Step 1: Identify your Topic

The first thing you need to do when starting a new research project is to identify your topic. Choose something that interests you – this will make your research more engaging and fun. It's important to brainstorm a couple of different topics, ask questions about those topics, think about how in depth your research needs to be, how long your final project is going to be, and how much time you have to complete your research.

Step 2: Gather Background Information

Once you've selected a topic, it's time to start your preliminary research by gathering background information and identifying key concepts. This is a great way to identify specialists in your proposed topic's field: Who is leading the discussion? What language or keywords are they using to describe or discuss your topic? Reading about others' ideas can help you to formulate your own. Use reference sources, like Grove Music Online, The Oxford History of Western Music, or even Google, to learn about the people, places, and subjects that relate to your topic. Be prepared to broaden or narrow your topic after you have gathered background information as your research question evolves.

Step 3: The Search

Use Catalogs to Find Relevant Books and Media:

Once you have a cursory understanding of your research topic, it's time to start searching for books and media in the library's online catalog and WorldCat. The catalog search will show you what we have available in our library. WordCat will show you resources available in other libraries; you are able to request these items via Interlibrary Loan. When looking at catalogs, keep track of the subject headings that appear in the records. You can click on the headings to see related items in the catalog and they might even help you find new search terms or strategies.

Use Databases and Indexes to Find Articles:

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Use Databases and Indexes to Find Articles:

With music specific research, you will want to use online music indexes including RILM Abstracts of Music Literature and Music Periodicals Database. It's important to note that indexes and databases are used to quickly locate data; you will always find abstracts of resources, but not always the resource in its entirety.

Search Full Text Databases:

When searching full text databases you may want to start with ProQuest Dissertations & Theses Global. Dissertations and Theses can be super relevant, recently released resources. They usually feature current bibliographies and may help you focus your topic or provide you with resources you may have not found in your previous searches.

JSTOR and Project Muse are examples of online journal archives with full-text content.

Step 4: Evaluate your Findings

Evaluating sources when doing research can be a really complicated process but it's important to recognize that the credibility of your research depends on the reliability of the information you use to support your points. Evaluation generally incorporates an initial appraisal and a content analysis.

Your initial appraisal should confirm source authenticity, authority, and suitability: Does the author have authority in the field? Is this resource peer reviewed or published by a reputable group? Is this information current? Look at subject headings or tags: Do the subject headings and tags seem relevant to your topic?

Your content analysis should be a little more thorough: Read a review, summary, abstract, or the table of contents -- this will help you identify if the source pertains to your research needs. Who is the intended audience? What is the purpose of the information?

Step 5: Select and Organize Your Research

When you start gathering your sources make sure that you have an organization method in mind and stick with it. Have a dedicated folder for all articles and a space for your books. Use a citation manager like Zotero. Find some sort of organizational method that works for you and stick with it.

Start working on a bibliography of all of your sources. Cite your resources consistently and start adding annotations or brief notes to articulate how you plan on using your sources in your project.