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Teaching Translation of Research through an Infographic: An Experiential Learning Assignment

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ABSTRACT. The National Council on Family Relations identified translation of research and dissemination of family science knowledge as critical skills for students and new professionals. To build these skills in future professionals, the authors developed an infographic assignment to teach students how to research and communicate a current family science topic to a non-academic audience of their choice. The assignment is a semester-long project grounded in experiential, constructivist learning theories. The authors provide students with step-by-step instructions for choosing a topic, writing a thesis statement, conducting background research, choosing how to highlight family research, creating an infographic using free software, and presenting their outcomes to fellow students. The authors include instructions for conducting and implementing the assignment, a sample grading rubric, and an example of student work. Anecdotal and experiential evidence supports the effectiveness of this assignment, although a systematic study is warranted to confirm instructor observations.

Keywords: infographic, experiential learning, teaching translational research

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The translation of research and dissemination of family science knowledge are critical skills for students and new professionals (National Council on Family Relations, 2014). Translational research refers to applying bench science in practice (Morris et al., 2011). Although family science has a history of translational research (Hamon & Smith, 2017), the focus on the need to bridge science and practice has been reenergized with recognition of the substantial gap between evidence-based science and on-the-ground application (Grzywacz & Allen, 2017; Morris et al., 2011). Leaders in family science have called for developing curricula in family science that teach translating research and synthesizing skills across disciplines (Grzywacz & Allen, 2017). The authors respond to that call, describing here an assignment that teaches principles of disseminating family science research clearly and informed by multidisciplinary perspectives.

In today's multiplatform, multimedia world, dissemination often requires simple, well-researched information that can be visually presented online for individuals to consume key messages quickly. Infographics can meet such a requirement, and their power to communicate public health messages has been recognized by policymakers, researchers, and government institutions (Otten et al., 2015). One powerful way to connect with families is through infographics that communicate a focused message and invite families to act (Smiciklas, 2012; Thompson, 2015). Infographics are graphic representations of information that simplify complex information using vibrant colors and visuals (graphics), typically in a vertical format (Thomson, 2015). Infographics are shown to have the potential to improve cognition because they graphically enhance people's ability to see patterns and trends visually (Thomson, 2015). Creating infographics is also referred to as data visualization, information design, or information architecture (Thomson, 2015). This paper describes integrating an infographic assignment into an introductory family science course to build skills in the visual representation of scientific knowledge.

Pedagogy

The infographic assignment is situated in an experiential learning model: a holistic approach to learning that aims to engage students in reflection on their experiences (Kolb, 2015). The dialectical process, or integration of two types of learning, combines abstract theoretical principles with concrete experiences. Instructors typically implement experiential learning through the following process:

- 1. Abstract conceptualization: Learners are taught a theory or model related to the concrete experience.
- 2. Active experimentation: Learners plan how to test a theory or model for a forthcoming experience (e.g., writing a paper, planning a research study).
- 3. Concrete experiences: Learners have the opportunity to actively experience an activity (e.g., laboratory sessions, analyzing real data).
- 4. Reflective observation: Learners consciously reflect on the concrete experience, either facilitated by the instructor or through individual, written reflection (Healey & Jenkins, 2000).

These four steps are rooted in the idea that learning is indeed a process, not just an individual outcome—that learning begins with the process of creating social knowledge, then such knowledge is recreated as personal knowledge (Kolb & Kolb, 2005). Students need assignments that connect their experiences with the abstract concepts they are learning in class. The infographic assignment gives students a structured opportunity to take an abstract conceptualization – a family science topic – and

then apply it by moving through the concrete experience of researching the topic and selecting the most important points to communicate to an audience. In creating their infographics, students are given opportunities to reflect throughout the process and engage in active experimentation as they create a way to communicate the research findings visually in an infographic.

Within the experiential learning framework, a constructivist classroom environment encourages students to be creative and bring their own experiences to the learning process (Kolb & Kolb, 2005). Assignments that engage creativity afford students the experience of integrating the abstract and concrete which, in turn, supports the experiential learning process. In other words, constructivist classrooms promote students' experience of constructing their own meaning with family science knowledge. Constructivism also assumes that learners need opportunities to ask questions and find answers, make mistakes and learn from them, reflect, organize and generalize experiences, and discuss ideas as a community or classroom (Fosnot & Perry, 2005). Students engaged in constructivist learning – learning that is active, authentic, and student-led with opportunities to engage with their peers in the creation of knowledge – also tend to enjoy the learning process, develop higher-order thinking skills, and reason more effectively (Splan et al., 2011). The Family Science Infographic Assignment provides an opportunity to engage in precisely the type of learning activities constructivism promotes. The assignment is student-driven, allows students to gain research and critical thinking skills, improves communication skills, and requires students to present findings to peers.

Translational Skills are Needed

Learning to translate research into digestible information for practitioners, policymakers, and families is a critical skill for family science students. In a special issue of Family Relations dedicated to advancing translational family science, Grzywacz & Allen (2017) report there is, on average, a 17-year gap between scientific findings and evidence-based practice (Morris et al., 2011). Learning to communicate in today's social media-saturated world is a basic and essential skill, one that should be integrated into every family science curriculum (Fischio et al., 2016). Further, today's students are likely to have job opportunities that specifically include the expectation to create infographics and translate research into multiple forms. The National Institute of Health has recognized the need to communicate through social media, for example, by sharing family information about Alzheimer's disease (National Institute on Aging, 2019) and healthy pregnancy via infographics (National Institute of Child Health and Human Development, 2017). The authors noted a recent job posting for a communication specialist in the Healthy Steps parenting program asking for visual communication aptitude and ability in social media outreach. Such skill expectations are increasingly common, with the ability to create online, visually appealing communication as a valuable, if not essential, skill for our family science graduates.

Infographic Assignment Objectives

This article presents the pedagogical background, a novel infographic assignment, and methods for implementing the assignment. The infographic assignment detailed in this paper was originally designed for a foundational family science course to introduce students to family theory, important current issues, cultural discourses about families, and skills needed for practitioners in the field serving or supporting families. The infographic assignment has three primary objectives:

- To critically analyze a current topic related to family science and prioritize findings that communicate an important message to families.
- To design an infographic with a clear, engaging message based on published research that could be posted online or printed for dissemination.

• To recognize current family science topics and understand the results of published research through peer presentations of infographics.

Methods

Each of the authors has taught a "Foundations of Family Studies" course and have followed the method described below for guiding students through infographic creation (Thomson, 2015) over eight weeks in our semester-long courses. First, the instructor introduces the assignment by sharing examples of infographics, for example: "Career Opportunities in Family Science" (NCFR, 2019) and "How to Spot Fake News" (International Federation of Library Associations, 2019). The instructor then reviews the assignment expectations with the class (Appendix A). The assignment consists of three stages: first, students must define the audience for their infographic; next, they conduct literature searches and research the content; and finally, students create their infographic. The instructor provides students with a worksheet (Appendix A) to help them gather and organize the research they will use to create the infographic and reviews this worksheet with students in class.

As part of this process, the instructor lectures and engages the class in a detailed discussion about how to know when a fact is a fact (Cherlin, 2015); how to critically analyze published, peer-reviewed research; and how to conduct a search for data on topics related to family science. Because the course is an introductory level, for many students, this is their first exposure to reading original research and understanding the practical nature of family theory. The instructor intentionally provides detailed structure and guidance as students begin consuming peer-reviewed family literature and exploring family topics and theories. For instance, as Appendix A reveals, students begin the process of research with these minimal requirements: finding one article about their topic from Pew Research Center (www.pewresearch.org), one article or research finding from any of the readings assigned in class, one article each by the Council on Contemporary Families (www.ccf.org), and one family theory. The instructor also teaches students how to do traditional literature searches, seeking peer-reviewed articles from family science and related journals.

Next, students have opportunities to present their chosen topic and their research progress throughout the process. Specifically, approximately two weeks into the assignment, each student verbally shares the topic they are beginning to research and a peer-reviewed article they have found on their topic. Approximately halfway through the assignment, the research worksheets are due, and at this point, students share what they have been working on in small groups with classmates.

As the students begin to work on their infographics, the instructor reviews the rubric for grading the material in class (Appendix B), including a focus on the accuracy of the information they are translating, the creativity and organization of the visual material, and the class presentation of their final product. Students are given examples of two no-cost websites with templates for creating infographics: Piktochart or Easely. Many options are available, but these are popular and user-friendly, even for students who may feel that they are not artistically gifted. Students are invited to share a draft of their infographic with the instructor before it is due to get constructive feedback. Typically, the instructor grades the research and visual portions of the infographic project separately. Doing so emphasizes the importance of each aspect of the infographic: the evidence-based information and the graphic representation. Students present their work in class on the day the assignment is due, allowing other students to also learn about current issues in family science through the research presentation and its translation by their peers.

Outcomes

The authors taught the infographic assignment over six semesters, resulting in more than 150 infographics. Students enrolled in the required introductory courses between 2015 and 2018, wherein infographics were created, reflected a largely female demographic (93%), homogenous (85% report primary ethnicity as White), and an average age of 25. Figure 1 is an example of a student infographic created for our classes, used with permission. Students not only learned valuable skills in creating infographics, but the printed versions of the assignment have served an additional value: increasing visibility of the interdisciplinary Family Studies program at the university. With the students' permission, the Director of Family Studies printed infographics for display at events where the department was being represented and displayed them in the department's lobby and hallway. Frequently, those passing by the hallways would stop to read and comment on the interesting content – at the time even inquiring about what the program in "Family Studies" is about. Students frequently commented about how proud they were to have their work on display at the university and by the department. The authors also invited students to post their own infographics on social media and include them in a portfolio of their work as they pursue post-graduation opportunities.

Student feedback via course evaluations and written reflections about the assignment reflects an extremely positive experience. Course evaluations were completed online, and students were provided time to complete the evaluation during class while the instructor was out of the room. The instructors compiled de-identified comments about the infographic assignment and chose representative comments. For example, students described the infographic assignment as "one of my favorite assignments of my college career" and "... teaching me skills I will use in every course and future jobs, for sure!"

The assignment also successfully integrates the four aspects of experiential learning (Healey & Jenkins, 2000). Through in-class readings and discussion, the authors introduce students to family theory, theoretical assumptions, and key theoretical concepts in contemporary family science, thereby beginning their engagement with *abstract conceptualization*. The assignment moves to *active experimentation* as students conduct their literature searches, read original research about the family issue they choose, and identify ways to translate key elements of their findings for an audience of their choice. Students venture into the *concrete experience* as they create the actual infographic – a process that allows each student to actively work with concepts and translate them into a visual format. After students present their infographics to their peers and the instructor, students discuss their process and product and reflect on their experience – a process of *reflective observation*.

Discussion

This infographic assignment meets the basic goals, as NCFR articulates, of training family science students to translate and disseminate "knowledge about families and family research" (National Council on Family Relations, 2014). Further, students are guided through a process of synthesizing research, communicating research to a target audience, and sharing their new knowledge with peers. Communicating science effectively is an acquired skill and an important part of the scientific process (National Academy of Sciences, 2017). Students who learn to communicate science using visual representations and social media channels can transfer the skills learned in this assignment to various career positions in the private, non-profit, and government sectors. The experience of creating an infographic can also be referenced on a resume, added to a portfolio, and discussed during job interviews.

Figure 1
Student Infographic on Alcoholism as a Family Problem



Note. Infographic used with permission from student creator. Created with Canva. View full image.

Implications

In addition to learning marketable skills, the Family Science Infographic Assignment promotes creativity in communicating and disseminating information about families and family research. Assignments that allow students to be creative and organize their research in a new way increase student learning (Splan et al., 2011). Furthermore, because the assignment required four different experiential learning processes – abstract thinking, experiencing, feeling, and reflecting – the assignment is designed to meet the needs of students with different learning styles (Kolb, 2015). Ultimately, the assignment allows students to "take charge of their own learning" (Kolb, 2015, p. 299), a form of self-authorship that allows them to better learn from their own experiences.

Limitations

Building upon anecdotal evidence, a more formal, data-driven evaluation is needed to confirm implications for student learning. Specifically, a systematic study analyzing the impact of this assignment on student learning objectives and ability to communicate science effectively is needed; a quasi-experimental evaluation design is currently being planned for future classes where the infographic is assigned. In this study, the authors will evaluate the assignment in a public university with a more diverse student body than the university where it was first implemented. They will use pre-post surveys in one class and compare outcomes to another section of the same course that is assigned an alternate activity (e.g., book review) and a section with an additional test rather than an application assignment. Findings from such data can and should be used to improve the assignment and determine the extent to which the infographic assignment is an effective constructivist approach to teaching family science students. Based on the definition of the scholarship of teaching and learning (SoTL) defined by Potter and Kustra (2011), the results should be shared and disseminated to family science educators through peer-reviewed journals and presentations. Finally, a clear limitation is that the anecdotal evidence emerges from a homogeneous group of students, those in classes the six semesters we piloted the assignment. As reported, the population of students was largely female and not significantly diverse in age or ethnicity. Securing a more diverse sample – across institutions and even in other types of family science courses – will yield additional insight into ways this assignment could be expanded, edited, or improved.

Conclusion

In this paper, the authors presented an infographic assignment designed to improve students' skills in translating basic family science into a visual, digestible format for online or other public dissemination. Experiential learning theory informed the assignment's design. To promote mastery (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010), the assignment directions broke down the steps of creating an infographic with interim check-ins for accountability. By scaffolding the process of translating research, instructors support the learning of complex skills and increase the likelihood that students will remember the information they learned (Kolb, 2015). The assignment is popular with students and adds variety to traditional assignments. In subsequent semesters, we paired the assignment with research papers, which allowed them to visually communicate what they had learned. Students also enjoy the process, as do the instructors.

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Appendix A

Infographic Assignment Instructions

What is an infographic? Information graphics or "infographics" are graphic visual representations of information, data, or knowledge intended to present complex information quickly and clearly. They can improve cognition by utilizing graphics to enhance the human visual system's ability to see patterns and trends. The process of creating infographics is also referred to as data visualization, information design, or information architecture. You have the chance to create an "Information Graphic" about a topic reflecting the general theme "Family Matters!" (In other words, any topic related to family is fair game if it "matters" to you and other researchers/writers.)

Who is your audience? You should create your infographic with the following potential audience members: our university's faculty, staff, students, and/or a general population of young adult or older peers, family members, neighbors, roommates, and/or colleagues.

But I'm not an artist/designer! How do I create an infographic? Not to worry! This project is first and foremost about identifying an important and interesting current family issue or topic, then researching the best empirical and theory-driven knowledge, discerning the contemporary discourse on the topic, and then summarizing and presenting the "data" into a visual and verbal presentation. The "visual" part is important, of course, and you will have the support of free online infographic-creator sites to guide you! You can select from one of the following free sites (or others you find) for creating your infographic for this assignment:

Easel-ly
http://www.easel.ly
or
Piktochart
http://piktochart.com/

Ok, I'm excited! So, what's the process, and how do I start and complete this assignment? Just follow the step-by-step instructions and guidelines on the "Background and Research Worksheet" (below) and note the deadlines on the syllabus. You must upload a typed document with the eight elements on the Background & Research Worksheet to Canvas.

Background and Research Worksheet

- 1. Your **general topic area** (what your infographic is "about," in general):
- 2. Your one-sentence thesis statement. This single, tight, descriptive sentence must capture the essential "point" based on the data from the articles you select that will be "represented" or "argued" in your infographic. Note: This thesis statement won't necessarily be put on your infographic but should guide every choice you make in creating your infographic. It's the glue, the compass, the guiding light! It might be something you want to include somewhere on the actual infographic.

Either way, it must be a single, declarative, guiding sentence that you are attempting to "represent" accurately on your entire infographic.

- 3. The Pew Research Center article from which you are developing your infographic
 - a. Citation (list citation here in APA style):

- b. Explain in a few sentences: Why did you pick this article? How does it support your thesis?
- c. The article from the textbook you have chosen to integrate into your infographic
- d. Citation (list citation here in APA style):
- e. Why did you pick this? How does it support your thesis?
- 4. The CCF article you have chosen to integrate into your infographic
 - a. Citation (list citation here in APA style):
 - b. Why did you pick this? How does it support your thesis?
- 5. The **theory** you will in integrate into your infographic:
 - a. Citation (list citation here in APA style):
- 6. Explain why you have **chosen the above theory**, and then specifically **identify 1-3 key phrases, concepts, tenets, or terms from the theory** you will highlight in your infographic.

Why this theory?

What **key theoretical terms/ideas/concepts/definitions** are to be used? *Be sure to offer much detail here, and write in complete sentences:*

- a.
- b.
- c.
- 7. Based on the above articles and theory you are using as sources for your infographic, **list all the primary findings and ideas** (in full sentences) you want to incorporate in the infographic from these sources.

After each finding or idea, **offer a brief explanation of why and how** this finding/idea supports your thesis, and **specifically why you choose it** for your infographic over other ideas/findings/results. Add more space or items if needed.

a. Finding/Idea:

Explanation of your choice:

b. Finding/Idea:

Explanation of your choice:

c. Finding/Idea:

Explanation of your choice:

d. Finding/Idea:

Explanation of your choice:

e. Finding/Idea:

Explanation of your choice:

f. Finding/Idea:

Explanation of your choice:

(Add more to this list if you need to!)

Appendix B Infographic Grading Rubric

	Research Choices	Accuracy	Creativity, Organization, Attention to Details	Presentation
A	Teaches us something critical about families. It is a "timely" topic, relevant to family's lives in 2020, and demonstrates why families matter. Theory is cleverly integrated into the infographic.	Excellent attention to critical research choices and thoughtful/accurate representation of ideas. Information and citations are accurate and smartly match background sheet. Sources are clearly and subtly included for images.	Visually attractive—colors, images, and text are cohesive and eye-catching. They work together to deliver a focused, powerful message. Arranged in a highly unique and thought-provoking way. Reflects professionalism and attention to detail.	A thorough explanation of infographic choices is provided. The presentation is highly professional, reflecting practice and an in-depth understanding of the chosen topic.
В	Teaches us something meaningful about families and is relevant to families in 2020. Theory is represented in some way.	Research choices are solid, and ideas are represented accurately. Citations from background sheet are used correctly. Some sources for images are unclear.	Visually pleasing—the colors, images, and text work together. The main message is clearly communicated with visuals arranged thoughtfully without obvious mistakes.	Infographic choices are clearly presented. The presentation is smooth and reflects understanding of the chosen topic.
С	Information is related to families in some way or is outdated. Theory is not integrated compellingly.	Some research choices are unclear and may not be completely accurate. Citations/sources may not be used correctly.	Lacks visual cohesion of color, image, and text. The main message is unclear. Lacks professionalism and may have some mistakes.	Some of the infographic choices are explained. The presentation lacks polish, and presenter appears uncertain about the topic.
D or below	Information is irrelevant to families, or messaging may harm family dynamics. Theory is ignored or represented incorrectly.	Research choices are questionable. Inaccuracies are evident, and citations are not used. Sources for images are missing.	Visually colors, images, and text clash. There does not appear to be a main message. Marked by unprofessionalism and distracting mistakes.	Infographic choices are not explained. The presentation is rough, awkward, and understanding of the topic is lacking.