



# Extension Education: How do we learn best?

Madalyn Soehner<sup>1,2</sup> and Dr. Wendy Johnson<sup>1</sup>

<sup>1</sup>Department of Entomology, College of Agriculture, Kansas State University  
<sup>2</sup>Department of Elementary Education, College of Education, Kansas State University



## Abstract

Due to the rise of new educational methods, one may begin to wonder, what is the best way to learn information? Can these new methods truly replace traditional methods? This experiment evaluated the effectiveness of an infographic to a text based on amount of information retained and personal preference. This study also examines if professional status has an effect on information retention. In order to answer these questions, subjects were given a copy of an infographic and a journal article covering the same information. The subjects were then given 5 minutes to look over both materials and to answer four comprehensive questions. After completing this portion, the subjects were then asked to complete a survey analyzing the effectiveness of the methods and their personal preferences. The results yielded that an infographic is a better than a journal article for distributing information to both students and extension personnel.

## Purpose

The purpose of this research is to determine the best way to present material for learning Extension related information.

## Questions, Hypotheses, and Predictions

**Question:** What is the best way to learn information?

**Hypothesis:** Do infographic or text versions of a concept provide better understanding? Does professional status (i.e. Extension personnel or student) affect learning preference and amount of information attained from infographic and text versions of a concept?

**Prediction:** Infographics will provide a better understanding of information. Students will prefer text and will get more information from it.

## Study System

In today's fast-moving society, and as more and more information becomes available, one begins to wonder: what is the best way to learn this information? Perhaps, traditional in-depth articles are no longer the best way to learn new information. As the average attention span of humans decreases, is it possible that there are new methods that increase knowledge in a shorter amount of time? "By using engaging and informative infographics, educators can better deliver messages to their specific audiences (Niebaum, Cunningham-Sabo, Carroll, Bellows, 2015). The use of graphics and images entices and engages the learner. "Images are powerful, which consequently makes the majority of people indicate that they are "visual-learners" (Dunlap and Lowenthal, 2016). In short, infographics could be the future of learning. In this study, we will examine how different audiences (i.e. Extension personnel and students) learn information from infographic and text versions of the same information. We will use a hands-on activity and survey to help determine which version is preferred for providing information in a clear and concise way. Specifically, we used a recent article in a pest management journal to create an infographic version of the text to help determine how learning is best achieved. The results will help Extension services provide the most effective material for delivering information to users.



Top Left: Focus Group Participants working with the materials. Bottom left: Pest Lab Students completing the survey portion of the experiment. Right: Explaining to an Extension Personnel the instructions for completing the survey.

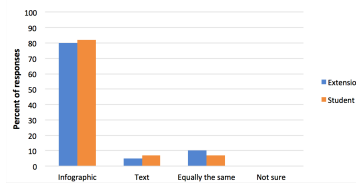
## Methods and Experimental Design

We conducted a quiz and anonymous survey that was approved from the KSU-IRB office to measure learning and obtain preference data from different user groups. In order to conduct this experiment, we first selected a recent journal article titled "Integrated Pest Management of the Brown Recluse" that would normally be distributed to research personnel (Figure A). For this experiment, our selected topic was about management of the residential pest, the brown recluse spider. Then, we created an infographic that contained all of the same information as the article, just in graphical form. The infographic layout captured all of key points of the article using concentrated text; and laid out in a logical order, grouped by subject heading (Figure B). Next, we wrote a short comprehensive quiz that contained four questions relative to the information found in both materials. The quiz asked the participant to indicate professional status (i.e. Extension personnel or student). We also created a short survey for participants to complete after the quiz activity. The questions were as follows:  
 •Did the infographic or text help you to better understand the information?  
 •Did you primarily use the infographic, the text, or both equally?  
 •Then, they were asked to rate the following on a scale of 1-5 (1-Strongly Agree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree): clarity of the infographic, aesthetic appeal of the infographic, and preference of the text versus the infographic.  
 •The participants were asked to rate their perceived mental effort using the Groningen Mental Effort Scale. This scale was included to certify the variance between locations did not have a large effect on the results of the survey.

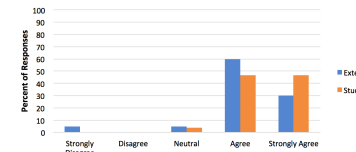
We conducted our quiz/survey three times. For our experiment, subjects would be given both materials, the quiz/ survey, and five minutes to complete it. On October 15, we surveyed a group of 5 research students in a small room type setting. On October 16, we had an exhibit table at the Kansas State University Research and Extension Annual Conference in the Kansas State University Union Ballroom. At this conference, extension agents were learning about various projects in a poster session as well as networking. In order to entice extension personnel to participate in our quiz/survey, they were given a free pair of gloves for completing the survey. On October 31, we conducted the survey with two lab sections of the Entomology 613 Pest Diagnosis class in Waters Hall.

We analyzed the data using the Microsoft Program Excel. We entered the survey responses into Excel as a spreadsheet with responses to each question by subject (row). Each individual question of the survey was put into a bar chart separated into the student and extension personnel categories. The responses are shown as a percentage of total participants within each group because group sizes varied.

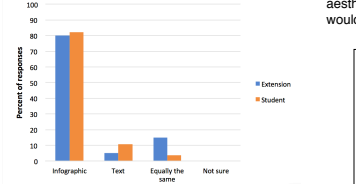
**Fig. 1** Did the infographic or text help you to better understand the information?



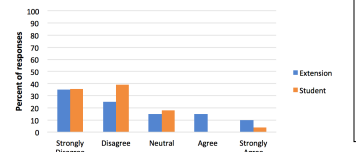
**Fig. 3** The infographic was clear.



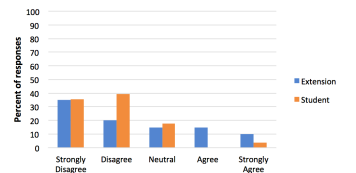
**Fig. 2** Did you primarily use the infographic, the text, or both equally?



**Fig. 4** The infographic had aesthetic appeal.



**Fig. 5** I preferred the text to the infographic.



## Results

According to Figure 1, both extension personnel and students indicated that the infographic helped them to better understand the information. Figure 2 indicates that infographic was used by both subjects more than the text. However, it is notable that a larger number of students indicated text as their primary source. While conducting the experiments we both observed the use of the text article among students. Figure 3 shows that a majority of participants either agreed or strongly agreed that the infographic was clear. This question was included in the survey because it corroborated that the infographic was comparable to the article. The results shown in Figure 4 were a little more skewed. The majority of participants either strongly disagreed or disagreed that the infographic has aesthetic appeal. Figure 1 indicates that the majority of people disagreed or strongly disagreed that they preferred the text to the infographic. The averages of the perceived mental effort resulted as 4.55 for extension personnel and 4.62 for students. These similar averages indicate that the location of the different test had little effect on the results, also that all of the results were relatively comparable. The students and extension personnel also had very comparable averages when looking at the percentage correct of answers to the comprehensive questions.

## Conclusions

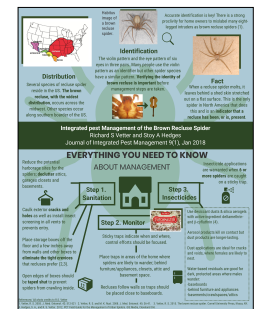
Perhaps, for best learning outcome, infographics should have more aesthetic appeal. Perhaps the reason that the results did not yield as large of a majority is because the infographic had less of an aesthetic appeal as desired. Overall, the results indicated that the infographic helped both students and extension personnel learn better and that it was the preferred material. Extension agents and educators can benefit from this study by delivering extension materials in the form of an infographic.

## Future Directions

To continue this experiment in the future, a larger data pool of students would be helpful since the students surveyed were from a small niche. Perhaps, a survey in which people were only given one material or the other and then the results of the comprehensive quiz compared would be an additional way of testing this question. From the feedback expressed, an infographic with better aesthetic quality would be needed for a future experiment. Assistance from graphic designers would help ensure the aesthetic quality.



**Fig. A** Journal Article



**Fig. B** Infographic

## References

- Crick, K. and Hartling, L. 2015. Preferences of Knowledge Users for Two Formats of Summarizing Results from Systematic Reviews: Infographics and Critical Appraisals. *PLoS ONE* 10(10): e0140029. <https://doi.org/10.1371/journal.pone.0140029>.
- Dunlap, J.C. and Lowenthal, P.R. 2016. Getting graphic about infographics: design lessons learned from popular infographics. *Journal of Visual Literacy*, 35:1, 42-59.
- Martin, L.J. 2018. Exploring the Role of Infographics for Summarizing Medical Literature. *Health Professions Education*. <https://doi.org/10.1016/j.hpe.2018.03.001>.
- Niebaum, K, Cunningham-Sabo, L, Carroll, J. and Bellows, L. 2015. Infographics: An Innovative Tool to Capture Consumers Attention. *Journal of Extension* 53(6):6T0T8.
- Ozdami, T., Kocakoyun, S., Sahin, T., and Akdag S. 2016. Statistical reasoning of impact of infographics on education. *apProcedia Computer Science* 102:370 – 377.

## Acknowledgements

Thank you very much to Dr. Wendy Johnson, Dr. Jeremy Marshall, and all who participated in the study.