Which Esri™ Story Map Application Template Is Most Effective in Increasing the Public's Awareness and Knowledge of the Windom Park Historic Residential District in Winona, Minnesota?

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Abstract

In June 2015, the Heritage Preservation Commission of Winona aimed to educate the public on Winona's historic resources through an online platform. The Esri™ Story Map is one of many online platforms providing education and outreach through telling a story about a specific place. The main goal of this research was to determine which Esri™ Story Map application template is the most effective in increasing the public's awareness and understanding of the Windom Park Historic Residential District, a locally designated historic neighborhood located in central Winona. A voluntary and anonymous three-part survey was distributed to a sample population. During this survey, participants explored a randomly assigned Story Map (either a Story Map Journal[SM] or a Story Map Series[SM]) and provided feedback on functionality, design, and whether or not they learned about the Windom Park Historic Residential District. Through using the Wilcoxon Signed-Rank test and the Mann-Whitney U-test, it was determined both Story Map application templates provided education to the participants and were both engaging and easy to navigate.

Introduction

The Heritage Preservation Commission (HPC) is an advisory group for the City Council of Winona, Minnesota. The purpose of the HPC is to identify and protect historically significant resources in Winona (22.27c). In June 2015, feeling the public had little awareness of their mission and Winona's local history, a historic preservation consultant was hired to create a comprehensive and sustainable preservation education plan. This plan provided ways in which the HPC could demonstrate the significance and integrity of historic properties to both the public and the private property owners of Winona (Gaut, 2015). Within the short-term mission statement of the plan, it is stated that the HPC will:

- "…create a website which is an interactive entry point for information on all aspects of historic preservation in the city."
- "…work to deepen public appreciation of the value of preserving Winona's historically and architecturally significant sites by telling stories of the people who built, lived in, worked in, and cared about the buildings and places of Winona (Gaut, 2015)."

"[H]istoric preservation is the way in which physical structures, objects, and settings can be protected and used to 'tell the story of our collective experience'

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(Krepps, 2011)." Because the public has a stake in their local historic preservation, it is important for them to be informed. By increasing awareness of historic preservation, a community has the potential to retain their sense of place. A strong sense of place can lead to a sustainable cultural resource for future generations to learn about and enjoy (Krepps, 2011).

Storytelling

Storytelling has been referred to as one of the world's oldest professions, thus making it an integral part of human culture (Segel and Heer, 2010). Humans use storytelling to relate to others and help bridge misunderstandings. From cavemen to grandparents to journalists, storytellers provide insight and fulfill curiosities regarding the purpose and meaning of life. It is the storyteller's job to help guide the reader from interpreting the information to gaining the knowledge, and ultimately increasing the reader's wisdom (Popova, 2014). With the use of modern technology, many different elements (such as text, graphics, and video) can be used to tell a story (Strachan, 2014).

Likert Scaling

When it comes to measuring attitudes, opinions, or mental abilities, various scaling methods have been introduced since the early-to-mid 20th century (Harpe, 2015).

> …scaling was a process to assign a number to objects using some rule. Through defining measurement scales, any phenomenon could be "quantified" (Harpe, 2015).

According to Harpe (2015), the Likert scaling method is a fairly common measurement used when measuring attitudes, opinions, or mental abilities. Since the creation of Likert scales in 1932 (created by Rensis Likert), research has used the method to quantify qualitative data.

A Likert scale is comprised of related individual measures (or declarative statements) that are summated or aggregated to provide insight into an entire opinion, attitude, or mental ability of a survey participant. A response set (i.e. Strongly Disagree to Strongly Agree) can be comprised of varied options (e.g., include or exclude a neutral option) and appropriately assigned numbers (Harpe, 2015). Due to numbers being associated with each response set, arguments have been made that Likert scales are considered interval data; others argue that this type of response set provides ordinal data due to the lack of actual numerical measurements between response sets (Harpe, 2015).

A Likert-type response is similar to a Likert scale in terms of similar looking response sets (i.e. Strongly Disagree to Strongly Agree), but a Likert-type response (emphasize on the word "type") does not utilize the aggregated statement method and analysis. Instead, the Likert-type response statements stand alone and are analyzed independently of each other (Harpe, 2015). Multiple theories on how to measure Likert-type responses are present in the statistics community. Many studies claim no matter how data is presented, it is human nature to mentally add a number line when appropriate (Harpe, 2015), thus suggesting numbers can be assigned to the response set even though ordinal-type data is present (Harpe, 2015).

Purpose of Research

Due to the generational shift in the interactivity between humans and technology (known as Web 2.0), where humans want to be a part of the internet through dynamic interactive interfaces and collaboration with other internet users (Wolcott, 2007), utilizing a web resource like Esri™ Story Maps will provide an avenue for the HPC to tell the Windom Park Historic Residential District story in this Web 2.0 world. Determining the Story Map application template that will most effectively bring understanding and awareness of the Windom Park Historic Residential District to the public was the objective of this study. Utilizing both Likert scales and Likert-type responses provided insight into participants' views and opinions on a Story Map application template's functionality and design.

Methods

Data Gathering and Creation

Spatial Data

All of the spatial data used for this project had to be created. This included the boundary of the Windom Park Historic Residential District (Figure 1), the homes and carriage houses (now considered garages) inside the district, and the Windom Park boundary. Due to the data being hosted through an Esri™ ArcGIS Online subscription account, all of the spatial data was projected into the WGS 1984 Web Mercator (Auxiliary Sphere) projection. Boundaries were re-created from The Windom Park Local Historic District local designation form provided by the City of Winona (Kooiman and Van Cuick, 1995). The Esri™ World Imagery basemap was used as a reference when digitizing boundaries (Esri, 2016). Basic attribution (i.e. name of feature) was created for the Windom Park boundary and the Windom Park Historic Residential District boundary, while more complex attribution was created for the historic homes and carriage houses (Table 1); this attribution filled the pop-up windows used inside the Story Maps.

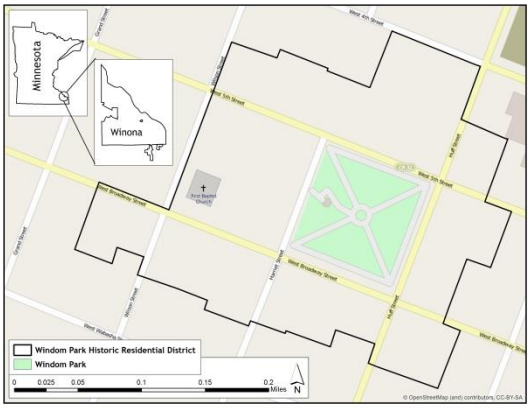

Figure 1. The boundary of the Windom Park Historic Residential District in Winona, MN; Windom Park is indicated in green.

Table 1. The boundaries for the homes and carriage houses inside the Windom Park Historic Residential District were given the following attribution. This attribution filled the pop-up windows used inside the Story Maps.

Field	Description
HouseName	name given to home
Address	address of home
ConDate	construction date of home
Owner1	name of first home owner
Owner1Occ	occupations of first home owner
Owner2	name of second home owner
Owner2Occ	occupations of second home owner
Owner3	name of third home owner
Owner3Occ	occupations of third home owner
HouseImg	image URL of house

Non-Spatial Data

The majority of the non-spatial data used for this project consisted of images (historic and present) and text, along with newspaper clippings and historic maps. The Winona County Historical Society Archives Department provided historical images of the people, the homes, and

views of the Windom Park. They also provided Sanborn Fire Insurance Maps from the mid to late 1800s, and text on certain people who lived in the district.

The Winona Newspaper Database, a service provided by the Darrell W. Krueger Library at Winona State University and the Winona Daily News (Darrell W. Krueger Library, Winona State University, 2015), is an online database of Winona city newspapers from 1855 through 1976. Clippings from newspapers pertaining to the study were used from this source.

Most of the text in the Story Maps came from a document sponsored by the Minnesota Department of Transportation (MNDOT) Federal Highway Administration titled, "Phase I and II Architectural History Evaluation for the Winona Bridge Study Winona, Winona County, Minnesota" (Zellie and Lucas, 2011). This document also provided historic and modern day images of homes and views of Winona. Another source of text came from the Windom Park Local Historic District local designation form provided by the City of Winona (Kooiman and Van Cuick, 1995).

Visit Winona provided modern day images of the homes inside the Windom Park Historic Residential District.

Esri™ Story Map Creation

Data Hosting and Publishing

All of the data (spatial, graphic, and textual) and the two Story Map application templates were hosted and published through the Esri™ ArcGIS Online platform in the same subscription account.
Story Map Application Templates

Once all the necessary data were gathered or created, and published as map services or uploaded as images, two Story Map applications were created based on two Story Map templates. The Story Map Journal℠ was used because of its intended purpose to tell a "compelling map-based narrative" (Esri™, 2015a), and the Story Map Series℠ was used because of its ability to display multiple sets of data in the same geographic location (Esri™, 2015b). The same story, along with the same data (i.e., text, images, and maps), was used in each Story Map template.

Despite both templates being comprised of the same data, each had their own style in displaying that data. This could have impacted how well the participant learned about the Windom Park Historic Residential District. For example, inside the Story Map "side panel" (where all of the text and some graphics can be displayed) each template has its own level of interactivity for the user. The Story Map Journal℠ allows the user the ability to click on text, which can link them to another location in the Story Map (Esri™, 2015a,b), while the Story Map℠ Series does not have that feature (Esri™, 2015a,b). The Story Map Series℠ has the option of letting the user keep their place on the interactive map (displayed on the Story Map "main stage") when switching between tabs, while the Story Map Journal℠ does not allow this because each "page" (or tab) is pre-set to a designated location on the interactive map (displayed on the Story Map "main stage").

Windom Park Historic Residential District Survey

A month was given (March 1st through March 31st, 2016) for public survey participants to complete the Windom Park Historic Residential District survey and Story Map exploration. The survey was created through a Survey Monkey

subscription account.

Before going public, the survey was approved and met the criteria for exemption from full review from the Saint Mary's University of Minnesota, Schools of Graduate and Special Programs, Research and Review Board (RRB) (Saint Mary's University of Minnesota, 2016). The RRB of Saint Mary's University of Minnesota, Schools of Graduate and Special Programs determined that the project complied with standards for the ethical conduct of research with human participants.

Due to the ultimate goal of the Story Map application being for public viewing, an effort was made to gather as many participants as possible with diverse backgrounds. The following sources were utilized for survey distribution:

- Mass email sent to members of Crossfit Warrior Risen
- Mass email sent to members of The Friendship Center
- Mass email sent to staff at GeoSpatial Services, Saint Mary's University of Minnesota
- Posting on Winona County Historical Society website and Facebook page
- Posting on personal Facebook page
- Handout and presentation given to "Connecting Winona" group

The aforementioned groups agreed to sign a Research Cooperation Agreement, which was a requirement for the Research Review Board's survey approval. This agreement articulated that the survey distributor was informed of the survey's content, its purpose, and that it was voluntary and anonymous. A personal email was sent to the distributors the last week of April that reminded them of the study and provided instructions on how to distribute the survey (i.e., introductory text and links that had to be included).

Survey Design

Each participant was first given information about the research, and then introduced to the people involved in performing the research, and also made aware of the survey being completely voluntary and anonymous. The survey was divided into three sections: 1) pre-application survey, 2) explore assigned Story Map application template, and 3) post-application survey (Appendix A).

Pre-application Survey

Prior to exploring the Story Map, the participant answered questions about their awareness and knowledge of the Windom Park Historic Residential District ("Education" measure of the research) and the HPC using a Likert-type response. Also, they were asked about their level of comfort with using general technology (e.g. Microsoft Word, mobile devices) and spatial technology (e.g. Google Earth, GPS). Before moving on to the second section of the survey, the participant had to provide the first letter of their last name. Based on their response, they were directed to a specific Story Map application template (i.e. A through M went to Story Map A [Journal^{SM}] and N through Z went to Story Map B [Series^{SM}]). This was done to ensure a random distribution of responses.

Exploration of Story Map Application Template

Instructions were given to the participant that once they completed the pre-application survey and clicked on the Story Map application web link, a new tab

would appear in their web browser displaying their designated Story Map template. They were asked to take their time in exploring the Story Map and learning about the Windom Park Historic Residential District. At the end of the Story Map application, instruction was given to return and finish the post-application survey (Figure 2).

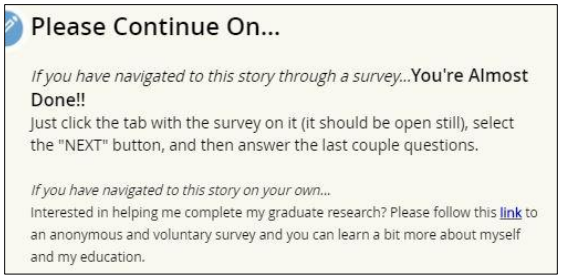

Figure 2. At the end of each Story Map template, instruction was given to the participant to return and complete the post-application survey.

Post-Application Survey

Due to the fact that Esri™ Story Map applications can be viewed on all types of devices (i.e. desktop, mobile device, tablet) (Esri™, 2015c), participants were asked which device they used to view the Story Map. Two Likert scales were used to gather opinions about the Story Map usability or functionality ("Function" measure of the research) and design or layout ("Design" measure of the research). The second half of the "Education" measure of the research was asked (using a Likert-type response) by gathering information on how much the participant felt they knew about the Windom Park Historic Residential District after using the Story Map. In addition, the survey inquired about their support for general historic preservation and asked if it increased, decrease, or stayed the same since viewing the Story Map. Finally, basic demographic questions were asked (i.e. home state, years [consecutive and non-consecutive] in Winona, age, and education).

Statistical Analysis

Two non-parametric statistical tests were used in this project: the Wilcoxon Signed-Rank test and the Mann-Whitney U-test. The Wilcoxon Signed-Rank test was used for the "Education" measure of the research. It determined if the Story Map application templates (independent of each other) provided education on the Windom Park Historic Residential District to the public participants. Due to the Likert-type response style of questions used, ranks were assigned to the ordered statements for analytical purposes (Table 2).

Table 2. Likert-type responses for the Wilcoxon Signed-Rank test were assigned ranks to the ordered statements.

Rank	Likert-type response
0	**"**No, I didn't know Winona had a residential district**"**
	"I know there is a park called 'Windom Park', but didn't know there was a residential district.**"**
1	**"**A little**"**
2	**"**Below Average**"**
3	**"**Average**"**
4	**"**Above Average**"**
5	**"**A lot**"**

From there, the Mann-Whitney U-test was used for the "Function" and "Design" measures in the research. The test compared the two Story Map application templates. In order to complete the Mann-Whitney U-test, each Story Map application template was assigned a group (i.e. Story Map Journal^{SM} = Group 1; Story Map Series^{SM} = Group 2). Due to the use of Likert scales for both "Function" and "Design" measurements, the responses from the individual statements were summated. These summed values were used for input into

the Mann-Whitney U-test.

The results of these tests would provide insight as to which Story Map application template the public enjoyed using the most. Descriptive statistics were used for determining participant demographics and comfort levels with technology. All statistical calculations were completed in the International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) Statistics 22 program.

Results

A total of 208 participants started the survey for this study, but only 113 finished all three sections (85 from the Story Map Journal[SM] and 28 from the Story Map Series[SM]). The 95 participants that did not finish the post-application survey were removed from the research entirely; their responses were not included in the analysis.

Demographics

Participants' Age

When combining participants from both Story Map application templates (n=113), the largest percentage (30.09%) of participants fell between the ages of 65-74, while less than one percent (0.88%) were 17 years and younger. Figure 3 displays the participant age distribution for the individual Story Map application templates.

Participants' Education Level

Education levels varied between participants from both Story Map application templates. The largest percentage (32.74%) of participants' had a Bachelor's degree for their highest level of education, while a Master's degree ranked second at 25.66%. Only 6.19% of participants had a PhD for their highest level of education. Figure 4 displays the distribution of education levels for the individual Story Map application templates.

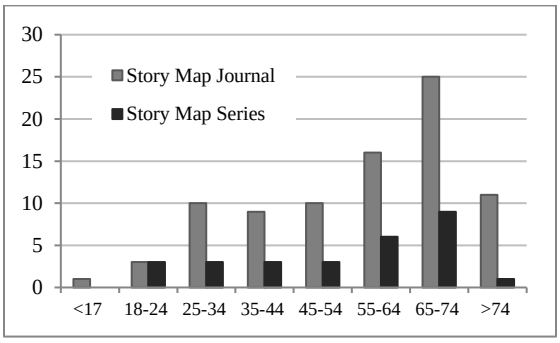

Figure 3. The majority of participants (from both Story Map application templates) were between the ages of 65-74, while the smallest number of participants were 17 years and younger.

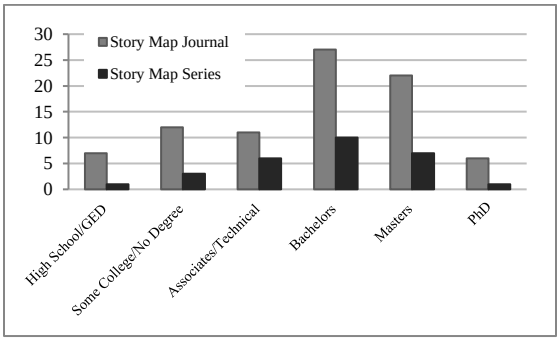

Figure 4. The majority of participants (from both Story Map application templates) had a Bachelor's degree for their highest level of education, while the smallest number had a PhD.

Participants' Home State

Over half (71.68%) of participants from both Story Map application templates considered Minnesota to be their home state (of those, 65.43% identified Winona as their hometown), while Wisconsin was the second highest at 14.16%. Iowa, Nebraska, and California fell slightly above one percent, and the following states all had less than one percent of participants who called it home: South

Dakota, North Dakota, New Jersey, Illinois, Michigan, Ohio, and Wyoming. Figure 5 and Figure 6 displays the distribution of participants' home states for the individual Story Map application templates.

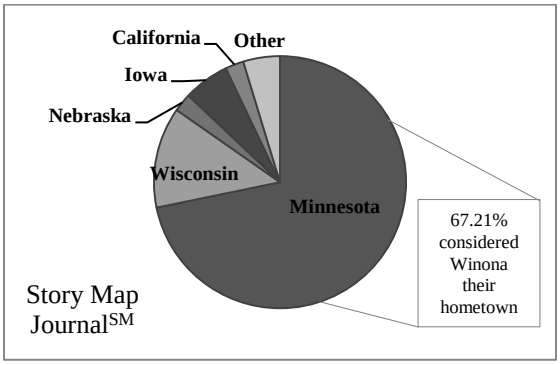

Figure 5. Most of the Story Map Journal℠ participants were from Minnesota and considered Winona as their hometown. 'Other' represents South Dakota, North Dakota, New Jersey, and Illinois.

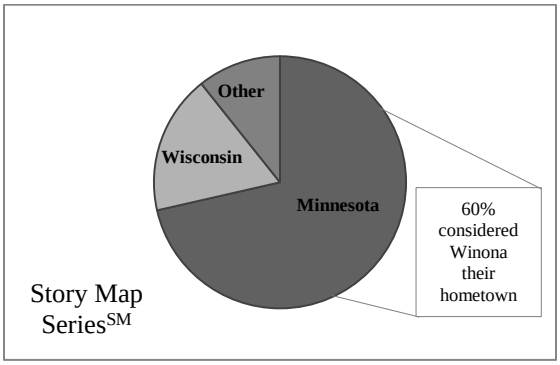

Figure 6. Most of the Story Map Series℠ participants were from Minnesota and considered Winona as their hometown. 'Other' represents Michigan, Ohio, and Wyoming.

Years (Consecutive and Non-Consecutive) Lived/Worked in Winona, Minnesota

When combining participants from both Story Map application templates, 35.40% of participants had lived and/or worked in Winona between 20 and 40 years, while only 4.42% were between five and ten years. Figure 7 displays the number of years (consecutive and non-consecutive) participants from each Story Map application template had lived and/or worked in Winona, Minnesota.

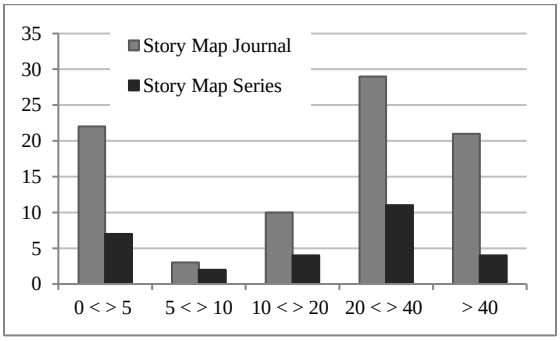

Figure 7. Between 20 and 40 was the most frequent answer given for the number of years (consecutive and non-consecutive) a participant (from both Story Map application templates) had lived and/or worked in Winona, Minnesota.

Participants' Comfort Level with Technology

Almost half (43.6%) of the participants from both Story Map application templates used a desktop computer to explore the Story Map and complete the survey. Mobile devices and tablets were used the least. Figure 8 displays the breakdown of devices used between each Story Map application template.

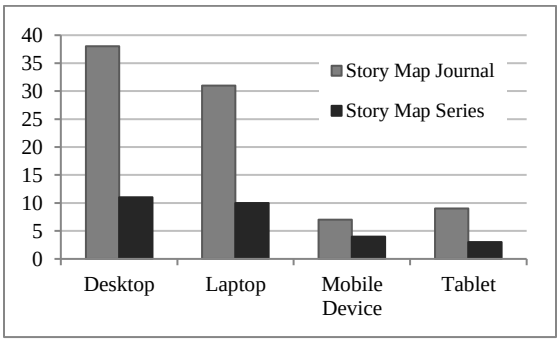

Figure 8. The most popular device used to explore the Story Map (from both Story Map application templates) and complete the survey was a desktop and laptop computer.

Almost half of the participants from both Story Map application templates claimed they had a moderate comfort level

with general (e.g. Microsoft Word, mobile devices) and spatial (e.g. Google Maps, GPS) technology (general = 49.56%; spatial = 47.79%). The second highest answer given was different between general and spatial technology; for general technology, 33.62% of participants felt they had a high comfort level, while for spatial technology, 30.09% felt they had a low comfort level with technology. A small number of participants (9.73%) claimed they have never heard of or they avoid using spatial technology. Figure 9 displays the distribution of general technology comfort levels from each Story Map application template. Figure 10 displays the distribution of spatial technology comfort levels from each Story Map application template.

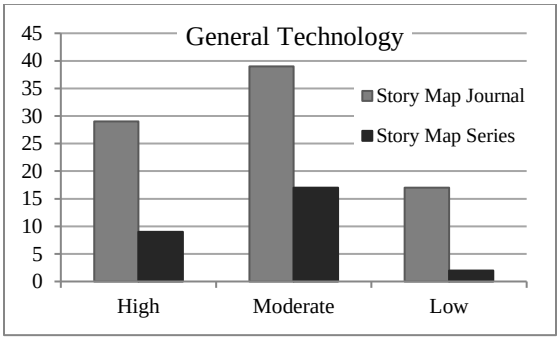

Figure 9. The majority of participants (from both Story Map application templates) felt they had a moderate comfort level with general technology (e.g. Microsoft Word, mobile devices).

Education

The Wilcoxon Signed-Rank test was used to determine if both Story Maps (independent of each other) provided education to the participant. This nonparametric test was used due to the presence of paired sets of data (Zar, 2010) within each independent Story Map template. Paired (or connected) data refers to the questions asked about a participant's knowledge on the Windom Park Historic Residential District in the pre-application survey and then asked again in the post-application survey. A confidence interval of 95% was applied to both Story Map templates; the alpha value was 0.05.

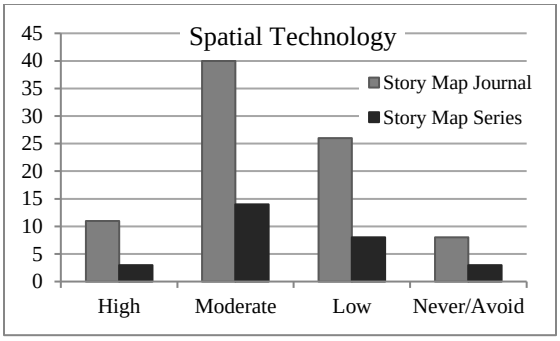

Figure 10. The majority of participants (from both Story Map application templates) felt they had a moderate comfort level with spatial technology (e.g. Google Maps, GPS).

Story Map Journal[SM]

A two-tailed hypothesis statement was used for the Wilcoxon Signed-Rank test:

> H_O: The Story Map Journal[SM] did not have an impact on the participants' education of the Windom Park Historic Residential District.
>
> H_A: The Story Map Journal[SM] did have an impact (either positive or negative) on the participant's education of the Windom Park Historic Residential District.

According to the Wilcoxon Signed-Rank test performed in the IBM SPSS Statistics software, the data suggested to reject the null hypothesis which means the Story Map Journal[SM] had an impact on the participants' education of the Windom Park Historic Residential District. When analyzing responses, the general trend showed increased knowledge after exploring the Story Map Journal[SM]

(Appendix B). This implies the Story Map Journal[SM] was successful in providing education on the Windom Park Historic Residential District to participants.

Story Map Series[SM]

A two-tailed hypothesis statement was also used for the Wilcoxon Signed-Rank test:

> H_O: The Story Map Series[SM] did not have an impact on the participants' education of the Windom Park Historic Residential District.
>
> H_A: The Story Map Series[SM] did have an impact (either positive or negative) on the participants' education of the Windom Park Historic Residential District.

According to the Wilcoxon Signed-Rank test performed in the IBM SPSS Statistics software, the data suggested to reject the null hypothesis which means the Story Map Series[SM] had an impact on the participants' education of the Windom Park Historic Residential District. When analyzing responses, the general trend showed increased knowledge after exploring the Story Map Series[SM] (

Appendix C). This implies the Story Map Series[SM] was successful in providing education on the Windom Park Historic Residential District to participants.

Function

The Mann-Whitney U-test was used to determine if the Story Maps were functional and usable for participants. This nonparametric test was used because both Story Map template results were independent of the other (Zar, 2010) (i.e., a participants' response in the Story Map Journal[SM] had no relationship with a participants' response in the Story Map Series[SM]). A confidence interval of 95% was applied to both Story Map templates; the alpha value was 0.05. A two-tailed hypothesis was used for the Mann-Whitney U-test:

> H_O: There is no difference between the function of the Story Map Journal[SM] and the Story Map Series[SM].
>
> H_A: There is a difference between the function of the Story Map Journal[SM] and the Story Map Series[SM].

According to the Mann-Whitney U-test performed in the IBM SPSS Statistics software, the data suggested to accept the null hypothesis. This means that there was not a difference in function and usability between each Story Map template. According to participant responses, both Story Map templates were easy to use and maneuver around in (Figure 11).

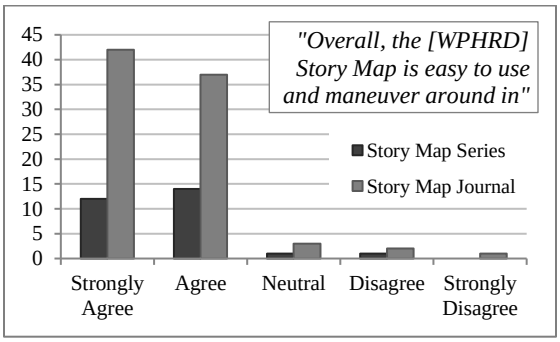

Figure 11. Approximately 93% of the participants from both Story Map templates felt the Story Maps, overall, were easy to use and maneuver around in.

Design

The Mann-Whitney U-test was used to determine if the layout and design of the Story Maps were interesting and if they were aesthetically pleasing for the participants. This nonparametric test was used because both Story Map template results were independent of the other (Zar, 2010**)** (i.e. a participants' response in the Story Map Journal[SM] had no relationship with a participant's' response in the Story Map Series[SM]). A confidence interval of 95% was applied to both Story Map templates; the alpha value was 0.05. A non-directional hypothesis was used for the Mann-Whitney U-test:

> H_O: There is no difference between the design of the Story Map Journal[SM] and the Story Map Series[SM].
>
> H_A: There is a difference between the design of the Story Map Journal[SM] and the Story Map Series[SM].

According to the Mann-Whitney U-test performed in the IBM SPSS Statistics software, the data suggested to accept the null hypothesis. This means there also was not a difference in design and layout between each Story Map template. According to participant responses, both Story Map templates were engaging and attractive (Figure 12).

Historic Preservation

In the post-application survey, the participant was asked if their support for historic preservation had increased since becoming aware of one of Winona's historical resources. In order for the public to have stake in their local historic preservation, it is important for them to be informed of their surrounding historic resources. By increasing awareness and understanding on historic preservation, a community has the potential to retain their sense of place. A strong sense of place can lead to sustained cultural resources for future generations to learn about and enjoy (Krepps, 2011). For both Story Map templates, participants' felt their support for historic preservation had increased after becoming aware and gaining an understanding of one of many historic resources (Story Map Journal[SM] [61.6%] and Story Map Series[SM] [64.3%]).

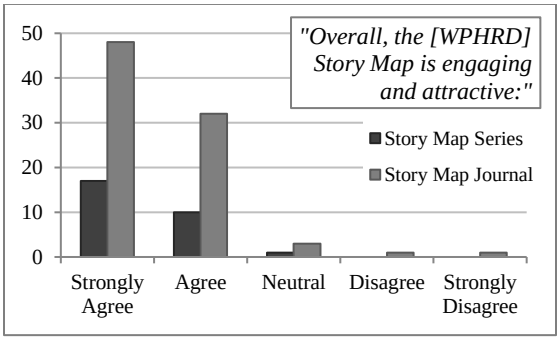

Figure 12. Anywhere from 94-96% of participants from both Story Map templates felt the Story Maps, overall, were engaging and attractive.

Discussion

Demographics

There were similarities for participant demographics between each Story Map template. The largest age group of participants was in the range of 65 to 74, and the second largest age range was 55 to 64. The majority of participants came from Minnesota, and of those participants, most of them considered Winona their hometown. Despite a high number of Winona participants, it did not necessarily mean they were aware of Winona's history; one participant commented, "Really interesting. I've lived in Winona much of my life and never knew the majority of the information."

A Bachelor's degree was found to be most abundant between all participants, and when combining consecutive and non-consecutive years, most participants had spent between 20 and 40 years living and/or working in Winona.

When looking at participants' comfort level with technology (general and spatial), most participants' said they had a moderate comfort level. Between the two types of technology (general and spatial), spatial technologies tended to receive most responses in the low to never have used category, while general technologies tended to receive most responses in the high to moderate category.

Errors

Esri™ Story Map

Once the survey was up and running, participants' commented on issues they had with viewing both Story Map application templates on tablets and mobile phones. Also, some desktop computers (maybe due to screen resolution or screen size) would distort the Story Map application. For example, one participant pointed out that the satellite imagery interactive web map shown on their screen had a smaller scale than originally specified during the design. They could still maneuver around and zoom in and out, but at first glance they had a hard time understanding what they were looking at.

Windom Park Historic Residential District Survey

After the survey was completed, it was discovered that errors had occurred during survey creation. There was no "W" option in the first letter of last name list for participants' to select. Also, the education list could have been more comprehensive; an M.D. was suggested to be included since it did not fit into any other category.

The "Education" measure of this study had an error as well in terms of user response options in the Likert-type response. In the post-application survey, an option of "Nothing" (0) should have been included. This would have provided a more comprehensive Wilcoxon Signed-Rank test analysis.

Recommendations

Of the 208 people that started the Windom Park Historic Residential District survey, only 54.33% (113 participants) finished by completing all three sections. Helping the participant navigate between the three parts was difficult to organize. This problem could be resolved through providing more instruction than was done for this project, or developing a website where the participant would have one location or interface to focus on instead of three. Also, due to this being a voluntary study, participants' could have also left because of lack of time or patience.

This analysis could be further enhanced by determining how much each Story Map application template provided education, functionality, or design rather than just whether or not it provided education or had suitable function and design.

Conclusions

The HPC of Winona wanted to educate the public on Winona's historic resources, including the Windom Park Historic Residential District. Through hiring a consultant to create a comprehensive and sustainable preservation education plan (Gaut, 2015), it was determined that the

HPC needed to build a website that could hold information on all aspects of Winona's history (Gaut, 2015). The consultant also mentioned that storytelling would be an effective method to deepen public appreciation for historic resources and preservation (Gaut, 2015). The main goal of this research was to determine which Esri™ Story Map application template would be most effective in increasing the public's awareness and knowledge on the Windom Park Historic Residential District.

In exploring participant learning (before and after exploring one of the Story Map application templates), and their opinion on the functionality and design of a randomly assigned Story Map application template, findings suggest both Esri™ Story Map application templates (Story Map Journal[SM] and Story Map Series[SM]) increased understanding and provided education, were easy to use, and were engaging. Through increasing awareness and knowledge of the Windom Park Historic Residential District, over half of the participants' felt their level of support for historic preservation had increased.

Acknowledgements

This research project could not have been done alone; it was a collaborative community effort. Thanks needs to be given to the Heritage Preservation Commission of Winona for allowing me to help them with their mission of increasing public awareness on Winona's history. To all of the people and organizations that provided data: the City of Winona, the Winona County Historical Society, Visit Winona (special thanks to Mary Farrell for taking beautiful pictures), and the Darrell W. Krueger Library at Winona State University and the Winona Daily News. Thank you to the GIS staff at Winona County for allowing the Story Map to be hosted through their ArcGIS Online account. A big thank you to the people and organizations that helped with survey distribution: Crossfit Warrior Risen, The Friendship Center, GeoSpatial Services Saint Mary's University of Minnesota, Winona County Historical Society, and Visit Winona. An even bigger thank you goes to all of the public participants that took time out of their day to be a part of this research. It could not have been completed without their help and input. Appreciation goes to my parents and sister for helping with paper revisions, survey logic, and Story Map flow and order. Finally a huge thanks to my academic advisor, Greta Poser, M.S. GIS, for guiding me through this whole process and bringing me back to reality when things would get too complicated.

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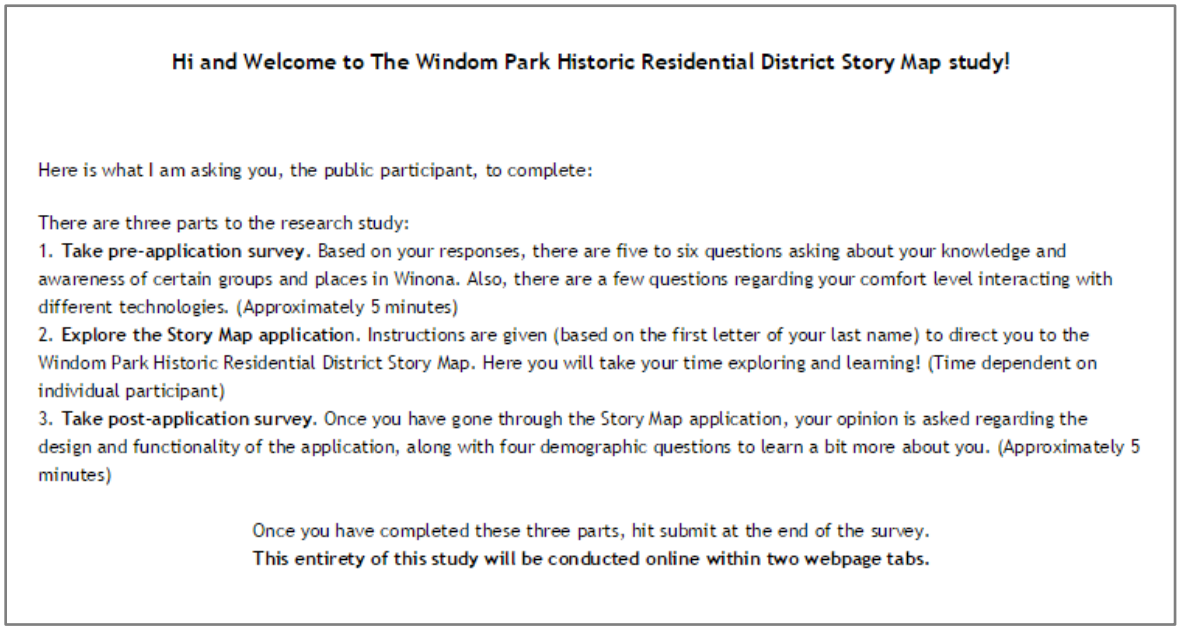
Appendix A. The three-section survey that was distributed to public participants.

Introduction Page



Hi and Welcome to The Windom Park Historic Residential District Story Map study!

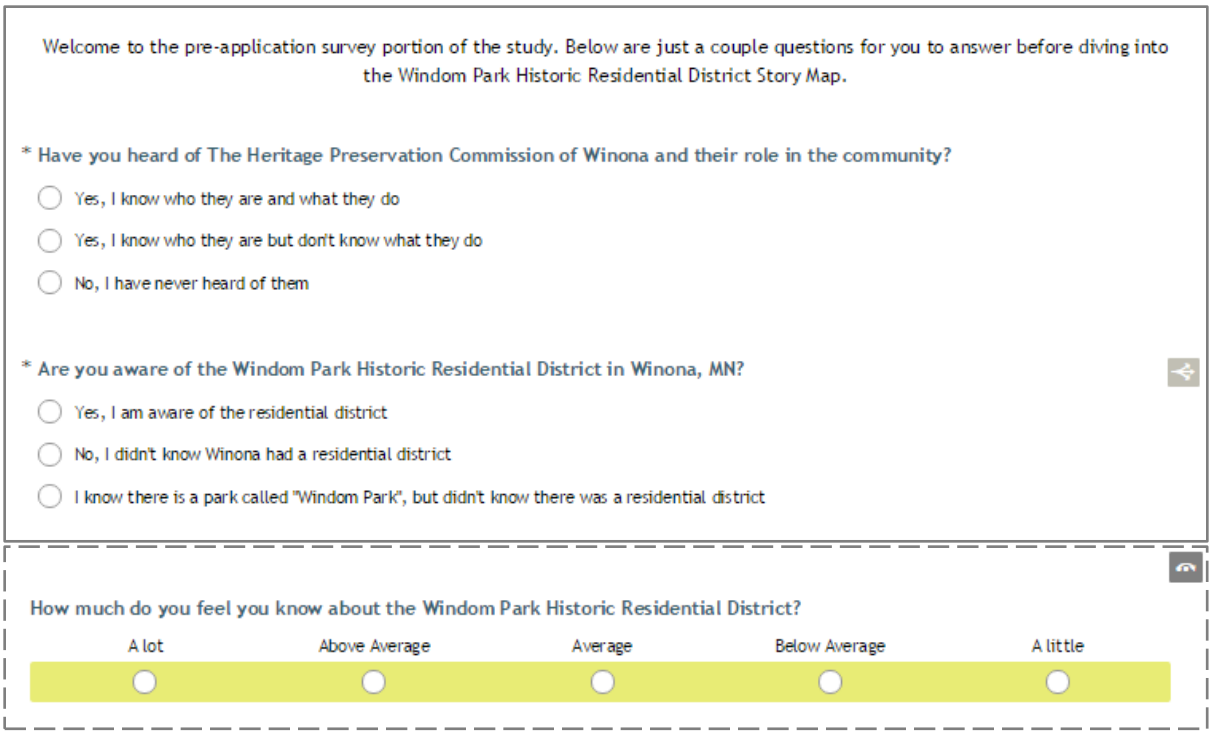
Here is what I am asking you, the public participant, to complete:

There are three parts to the research study:
1. **Take pre-application survey**. Based on your responses, there are five to six questions asking about your knowledge and awareness of certain groups and places in Winona. Also, there are a few questions regarding your comfort level interacting with different technologies. (Approximately 5 minutes)
2. **Explore the Story Map application**. Instructions are given (based on the first letter of your last name) to direct you to the Windom Park Historic Residential District Story Map. Here you will take your time exploring and learning! (Time dependent on individual participant)
3. **Take post-application survey**. Once you have gone through the Story Map application, your opinion is asked regarding the design and functionality of the application, along with four demographic questions to learn a bit more about you. (Approximately 5 minutes)

Once you have completed these three parts, hit submit at the end of the survey.
This entirety of this study will be conducted online within two webpage tabs.

Pre-application Survey

The second question listed in this first screenshot was the first part to the "Education" measure.



Welcome to the pre-application survey portion of the study. Below are just a couple questions for you to answer before diving into the Windom Park Historic Residential District Story Map.

* Have you heard of The Heritage Preservation Commission of Winona and their role in the community?

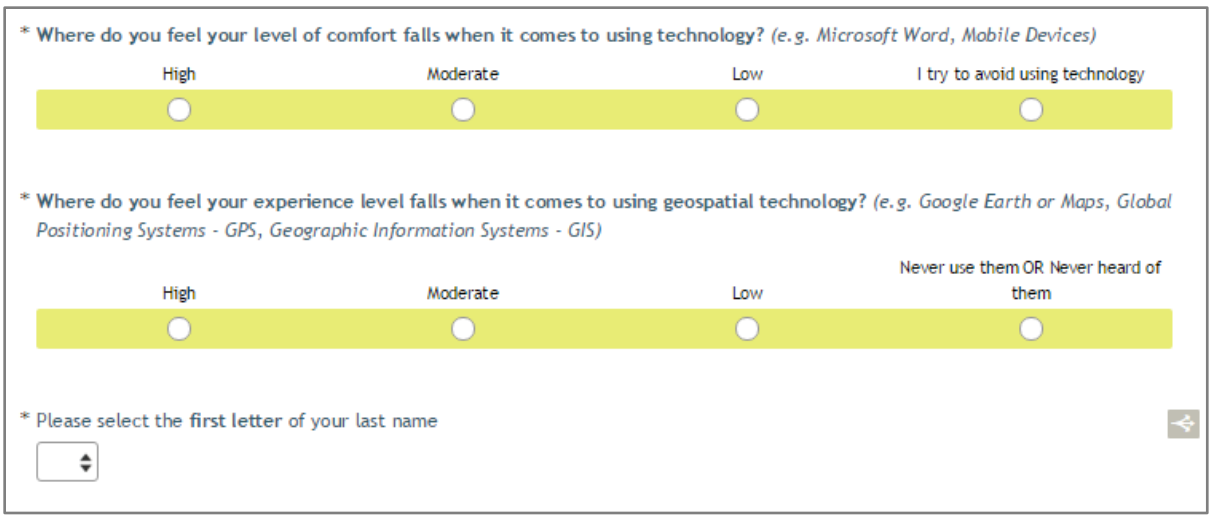
- ○ Yes, I know who they are and what they do
- ○ Yes, I know who they are but don't know what they do
- ○ No, I have never heard of them

* Are you aware of the Windom Park Historic Residential District in Winona, MN?

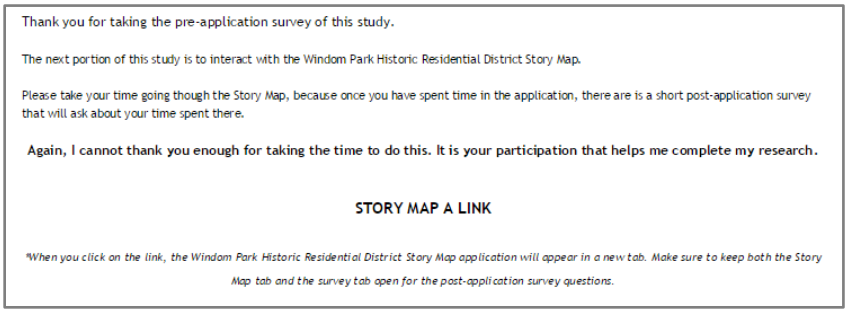
- ○ Yes, I am aware of the residential district
- ○ No, I didn't know Winona had a residential district
- ○ I know there is a park called "Windom Park", but didn't know there was a residential district

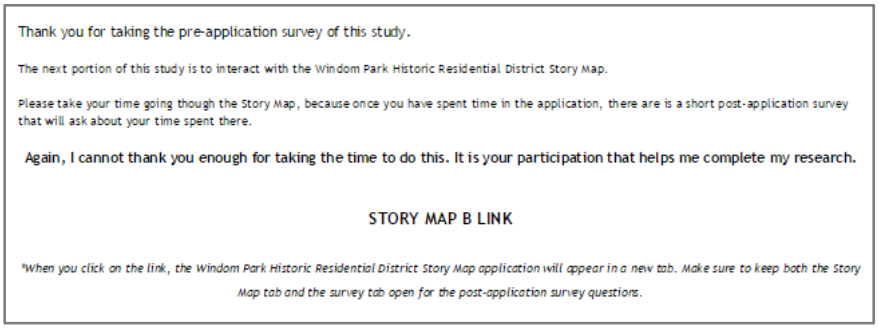
How much do you feel you know about the Windom Park Historic Residential District?

A lot	Above Average	Average	Below Average	A little
○	○	○	○	○

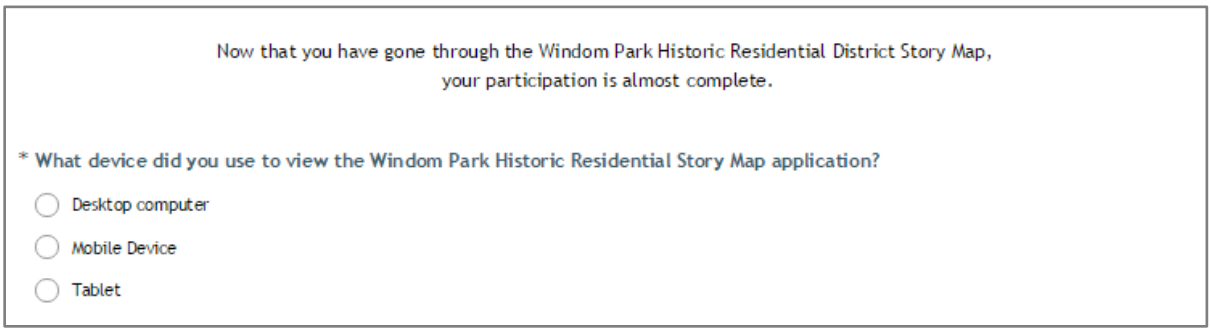


A through M: Story Map A (Journal[SM])
N through Z: Story Map B (Series[SM])

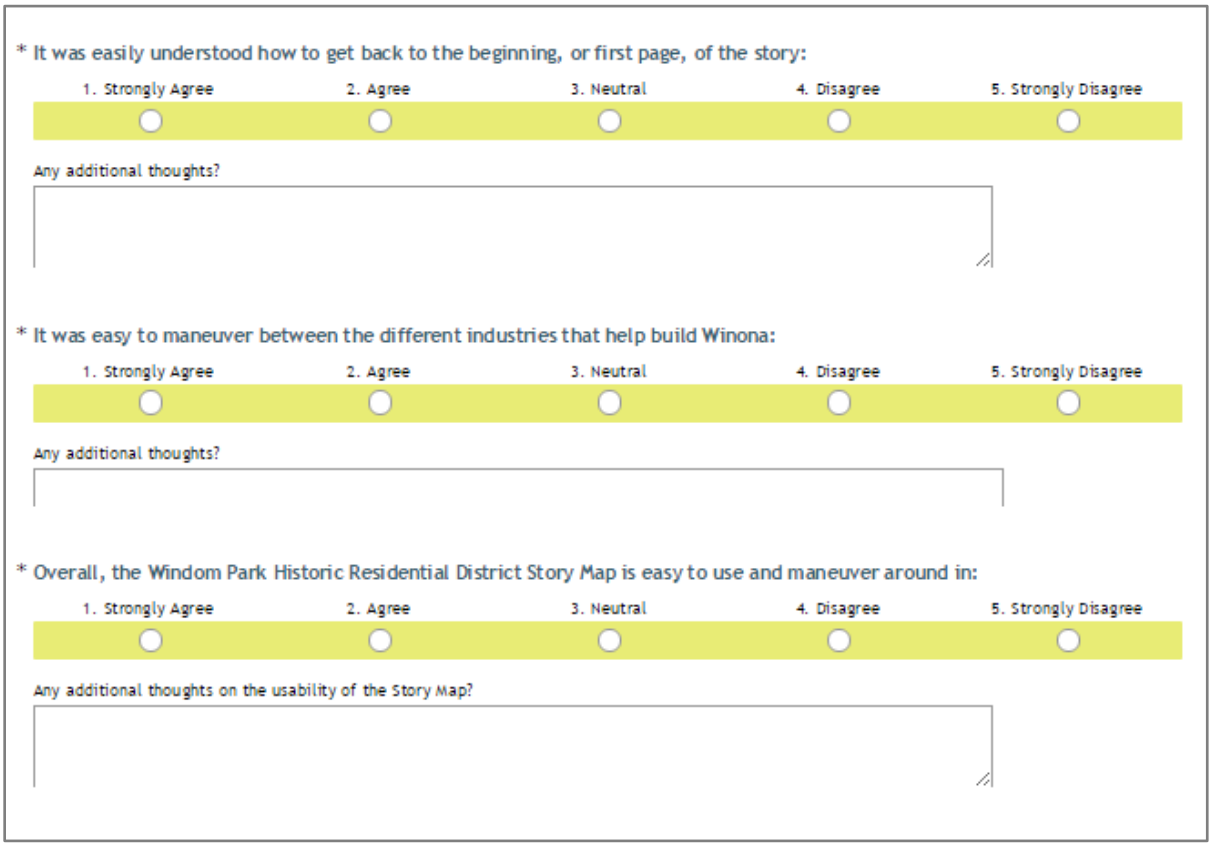




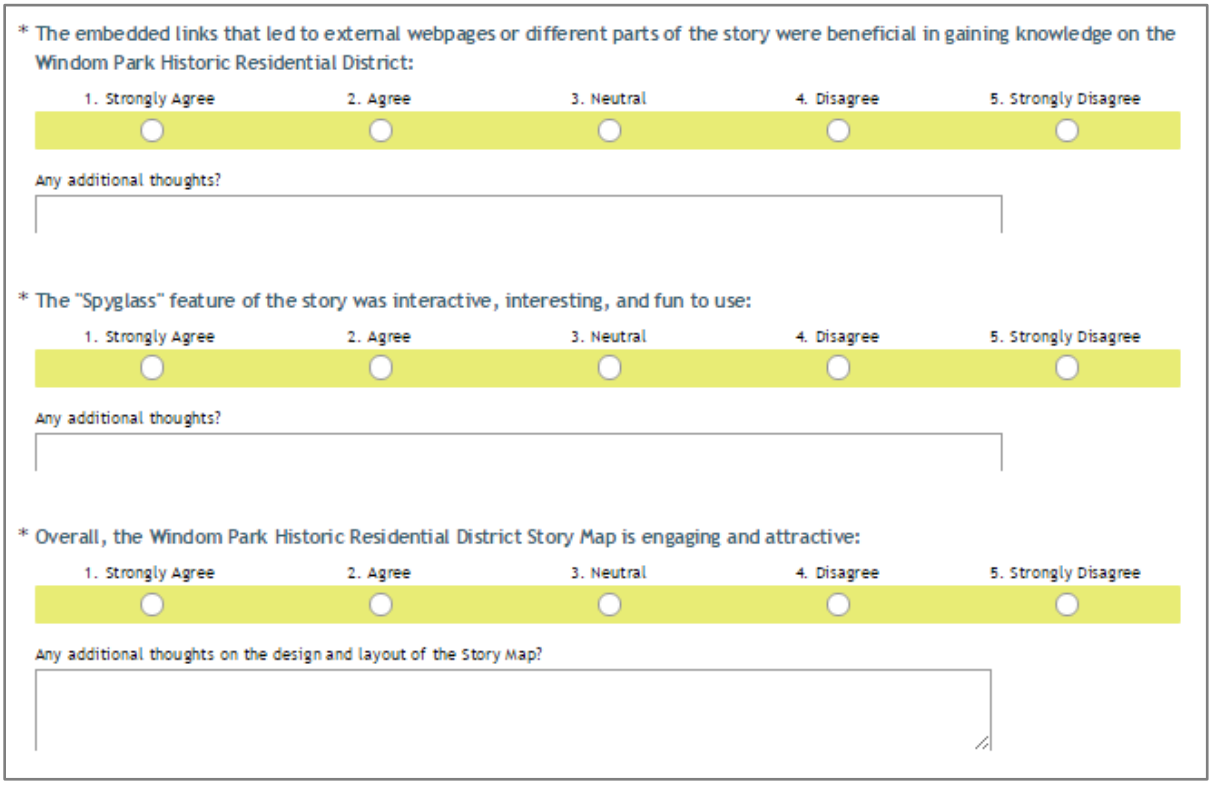
Post-application Survey
(Same for both Story Map templates)



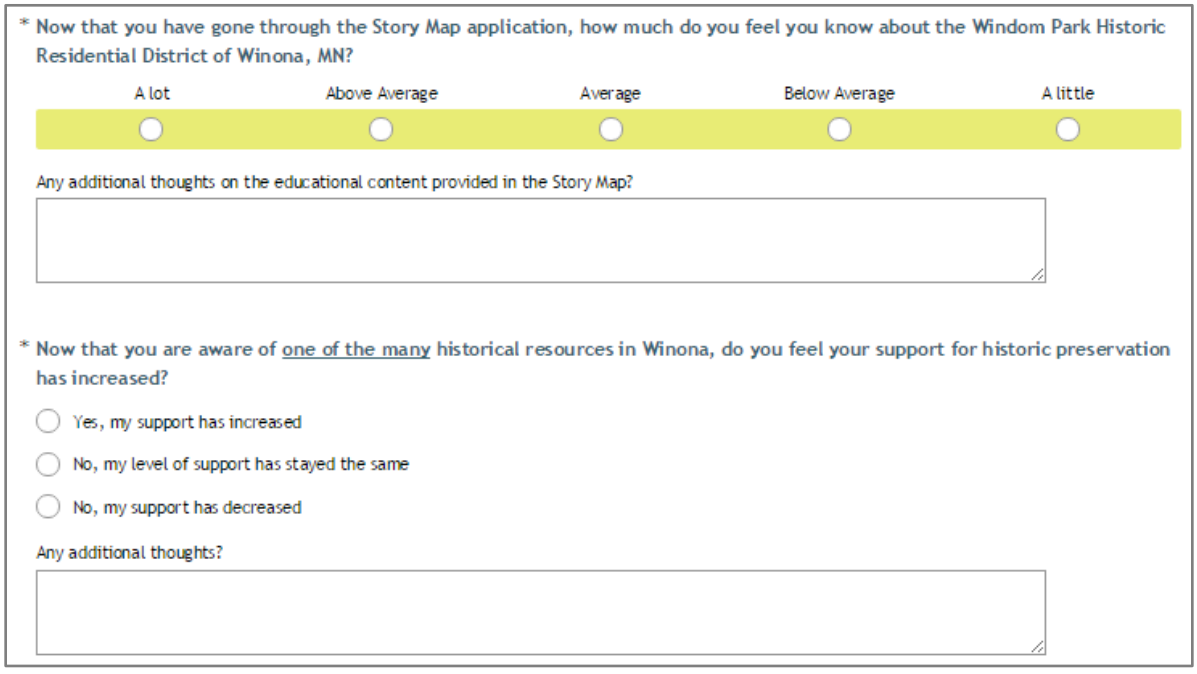
The Likert scale below was used for the "Function" measure.



The Likert scale below was used for the "Design" measure.



The first question listed in the screenshot below was the second part to the "Education" measure.



* Where do you consider your hometown to be? *(select the state in the drop-down menu, and type in the city or town)*

City/Town

* How many years (consecutive and non-consecutive) have you lived and/or worked in Winona, MN?

- 0< >5
- 5< >10
- 10< >20
- 20< >40
- 40+

* What is your highest level of education?

- 12th grade or less (no diploma)
- High School Diploma/GED
- Some college, no degree
- Associate's or technicalDegree
- Bachelor's Degree
- Master's Degree
- PhD

* In which category is your age?

- 17 years and younger
- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 to 74
- 74 years and older

END OF SURVEY

Appendix B. The education impact value (rank difference between pre-application survey and post-application survey) for each Story Map Journal[SM] participant was tallied and is displayed in the matrix below. The majority of values fell in the upper-right corner of the matrix, implying a positive impact or that education was provided through the Story Map Journal[SM] on the Windom Park Historic Residential District.

Story Map Journal[SM] Education Impact Values		Post-application Survey responses					
		A little	Below Average	Average	Above Average	A lot	**Total**
Pre-Application Survey responses	Not Aware	4	0	6	28	11	49
	A little	0	0	0	0	1	1
	Below Average	0	0	1	6	2	9
	Average	0	0	0	6	4	10
	Above Average	0	0	0	2	9	11
	A Lot	0	0	0	1	4	5
	Total	0	0	7	43	31	**85**

Appendix C. The education impact value (rank difference between pre-application survey and post-application survey) for each Story Map Series[SM] participant was tallied and is displayed in the matrix below. The majority of values fell in the upper-right corner of the matrix, implying a positive impact or that education was provided through the Story Map Series[SM] on the Windom Park Historic Residential District.

Story Map Series[SM] Education Impact Values		Post-application Survey responses					
		A little	Below Average	Average	Above Average	A lot	**Total**
Pre-Application Survey responses	Not Aware	0	1	3	10	3	17
	A little	0	0	0	1	0	1
	Below Average	0	0	0	0	0	0
	Average	0	1	0	1	2	4
	Above Average	0	0	1	1	2	4
	A Lot	0	0	0	0	2	2
	Total	0	2	4	13	9	**28**