

A Comparative Analysis of a Mobile Map Device to a Paper Map in Way-Finding Abilities

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ABSTRACT

The study served to determine a better way-finding device for Bennett's Greenhouse; a paper map or a mobile device with a downloadable map application. In an effort to incorporate an emerging technology into this work, RhoHub by Rhomobile was used to attempt to create and build a mobile application. Currently in its beta stage for the public, RhoHub is a hosted development environment for constructing applications for various smart phones. Customers at Bennett's Greenhouse were asked to find a pre-determined item in the store using either said device, complete with a pre- and post-test questionnaire on the experience. After analyzing the results from the experiment it was concluded that the paper map is a faster, more desirable way-finding device for Bennett's current clientele. However, if Bennett's wishes to attract 25-35 year olds they may want to consider having both paper and mobile maps available to their customers.

INTRODUCTION

Bennett's Greenhouse has operated as a family horticultural business in the Greater Lafayette area for over 100 years. Covering 25 acres, the business has a wealth of plants and gardening supplies. However, Bennett's does not have any means of helping customers visually orient themselves in the store and in the greenhouse. Because of the vast size of the store and the fact that they rearrange the layout of their greenhouse and outdoor displays several times a year, customers have a difficult time finding their way around.

In this study, RhoHub by Rhomobile was utilized to create a way-finding application for Bennett's Greenhouse. Not only might this application make it easier for customers to find what they are looking for, but it could also help increase the appeal of Bennett's to a younger demographic (aged 25-35) as opposed to Bennett's current

clientele, as smart phones are currently rising in popularity among young adults with a "spendable" income (Gartner, 2009). The goal of this study is to provide Bennett's with an application that will allow their customers to visually orient themselves within the store.

To determine the effectiveness of this way-finding application, customers of Bennett's were asked to find a pre-determined dot in the store using either the mobile application or a paper map. A dot was used to eliminate any correlation between how often a person visits Bennett's and how well they do on the test. A pre-test was given to assess the customers' demographic profile, and a post-test was given to gather information on the quality and ease of using both devices.

PROBLEM STATEMENT

Bennett's Greenhouse does not have any means of helping customers visually orient themselves in the store or in the greenhouse. Because they rearrange the layout of their greenhouse and outdoor displays several times a year, customers have a difficult time finding their way around.

Furthermore, the current website for Bennett's Greenhouse is plain, contains little information, and does not have a way for the company to communicate with its customers about sales, events, and specials. Because the employees of Bennett's Greenhouse have a limited knowledge of website management, they have to pay an outside company to update the pages for them.

SIGNIFICANCE

Why does Bennett's need a new website?

Bennett's Greenhouse is hoping to target a younger audience than their current clientele. Their current clientele consist of men and women nearing or past retirement age for whom gardening is a hobby. The old website was simple and plain. It was small enough that it could load using dial-up Internet without issues. Because they want to make sure they have a continuing customer base in the years to come, Bennett's Greenhouse would like to attract young couples or singles that are first-time homeowners or are able to do their own landscaping for the first time. In order to appeal to this audience, Bennett's wanted a website that incorporated more color and was more interesting to look at.

There were several points of concern for the old website used for Bennett's Greenhouse. The homepage included a database error, which did not advertise well for the

company. The link to the homepage was broken and created an error. Difficult or broken navigation can cause a customer to leave a website or make an assumption that the company is less than adequate. Another large issue is that the website had no administrative side. Because Bennett's Greenhouse does not employ a technical specialist, there was no one on site that could update and make changes to the website. Bennett's Greenhouse has been paying an outside company to update the site, even if it was as simple as changing the business hours. Not only did this cause an unneeded use of monetary resources by Bennett's but also took up more time than if the changes could be made on site.

Why does Bennett's need a mobile map?

Bennett's Greenhouse changes the layout of their store and greenhouse several times a year. This makes it difficult for customers to keep track of where products have moved. Having a mobile application or website that contained a map of the area would help them find what they needed without having to spend time finding an employee to direct them. With customers able to find what they are looking for with the map, Bennett's would be able to save money spent on hiring extra help to be present in the greenhouse and display areas. Currently, there are no maps available for the purpose of helping customers find their way around.

SOLUTIONS

The website

The team conducted a review of literature pertaining to the demographic Bennett's Greenhouse hopes to target (the 25-35 year age range). Topics such as color theory, page layout, and navigation preferences were researched in order to create a website more attuned to what the members of the

desired demographic look for in a website.

After developing a design and layout structure, the team tested the website numerous times to ensure that it contained no broken links. It has also been designed to and checked against standards set forth in the American Disabilities Act (ADA). This means that the content of the website is accessible to individuals with disabilities such as blindness. Finally, a simple administrative side was developed so that any textual changes can be done on-site without having to call an external consultant.

In order for Bennett's Greenhouse to know how often their site is being visited, and from where it is being accessed, Google Analytics has been implemented on the new website. Among other things, this tool includes a global map that will visually identify from where people are accessing the website and it will also provide Bennett's Greenhouse with data indicating the amount of time users spend on the site and how frequently users visit. This information can help Bennett's understand where they may want to look into expanding delivery services and how they should improve their site in an effort to keep visitors on the site longer.

In addition to Google Analytics, the site map of the new website has been submitted to Google in order to make it easier to index the site. This will help to increase "searchability" and visibility of Bennett's Greenhouse on the Google search engine. Screenshots for the new website can be seen in Appendix A.

The digital map

The team decided to attempt a prototype for the digital map to see if any validity existed in the topic being researched. Therefore, for the purpose of this research, a small-scale

area was selected to minimize the risk of using valuable resources of time and manpower. Since Bennett's Greenhouse has many areas, just the store was chosen for the prototype of the digital map. The team traced a map drawn by a Bennett's Greenhouse manager into a vector format. This map showed the locations of products within the Bennett's store area. Upon visiting the Bennett's Mobile link on the website, the user is directed to a screen that allows him or her to choose what product for which he or she is searching. Upon clicking this button, the user is redirected to a map with the area in which that product is contained highlighted in color.

Because this is an extension of the website and not a mobile application, the map is available for all phone systems with a browser and access to the Internet. The ease of access and function of the map will hopefully reduce the confusion that occurs when changing the layout at Bennett's Greenhouse. Screenshots of the digital map can be seen in Appendix B.

METHODOLOGY

Participants were recruited using a printed newspaper ad, Facebook message, Bennett's email, and an announcement on the Computer Graphics Technology list serve. Flyers were also placed within Bennett's Greenhouse and announcements were made at two local churches.

Bennett's Greenhouse customers participated in a proctored experiment. Each participant filled out a pre-test that asked them questions such as their age, how often they visited Bennett's, and if they had ever used a mobile application before. Each participant had to find a dot located within the store using both a traditional map and a mobile

device. The customers were timed during the length of time that it took them to find the dedicated dot. After the participant was done testing our device they were asked to fill out a short post-test that asked for their feedback on both way-finding devices as well as which device they preferred.

Independent Variable

The independent variable is the method information is delivered and was accomplished by giving each subject two different deliverables. One was a paper map the other was a cell phone application that showed the product location by highlighting the desired product.

Dependent Variable

The dependent variable in the experiment was time, specifically the time to find each dot from start to finish.

Controlled Variable

The controlled variables are the dot location and start location. Every other variable was kept consistent in order to isolate the independent variable.

Extraneous Variable

Some extraneous variables included other customers blocking travel routes, impaired perception using digital devices, and differences in user expertise with technology.

Null Result

A null result would occur if the customer were able to find the dot in the same amount of time regardless of the device used.

Null Hypothesis

The mean time of finding a location with a paper map is the same mean time as finding the same location with a digital map application.

Stability

The team was able to test fifty-one individuals. By testing over thirty individuals the calculations the assumption can be made that the data will be approximately normal. The team used a matched pair t-test in order to calculate the results. The data was tested at a ninety-five percent confidence interval. This gave us an alpha of .05 and helped us to determine whether or not our results were significant.

Interaction

The only interaction tested was between the type of map and the time taken to complete the task.

Within Subjects Design

A within subjects design was used as the time for an individual person to find the dot using a paper map and the time for that same individual to find the other dot using the digital map would be compared with each other using a matched pairs t-test. One individual's times would not be compared with another individual's times.

Randomize

In order to have valid results, which dot each individual found first had to be randomized. This was done by generating a random list of ones and twos in Excel. If the next available number on the list was a one, then the individual would first find the red dot and then the blue dot. If the next available number on the list was a two then the user would find the blue dot first and then the red dot.

Hawthorne Effect

The Hawthorne effect could have influenced our experiment. Since the individuals knew that they were being tested they might have tried to not become as distracted in the store and pay closer attention to just trying to find the dot in order to achieve a faster time.

Experimenter Effect

The experimenter effect could influence our results. Since the individuals knew that they were being timed and watched they could have become flustered and therefore had more difficulty with the way-finding device.

RESEARCH QUESTION

Is a digital map on a mobile device a faster, more desirable way-finding solution in Bennett's Greenhouse than a traditional paper map?

HYPOTHESIS

The use of color and having the mobile device highlight the area in which the selected product is located will make the mobile map a more desirable way-finding device. The mobile application will be a faster, more efficient method for finding products within the store and eventually the entire greenhouse.

RESULTS

Analyzing Results using a T-Test

In order to properly analyze the results from the experiment a matched pairs t-test was used. A matched pairs test compares two treatments and subjects that are matched in pairs. The matched pairs t-test was chosen because the experiment was a within subjects design. By using the matched pairs t-test individuals were compared against themselves rather than against the entire group.

After compiling the results and conducting the t-test a p-value of .026 was recorded. This p-value is less than our alpha of .05,

which makes any results statistically significant. The mean time to find the dot using the mobile map was 68.86 seconds while the mean time for those using the paper map was 49.61 seconds. The difference between the two means was 19.225 seconds. Since the paper map mean was smaller that indicates that the paper map was 19.225 seconds faster to use than the mobile map. A print out of the data from the matched pairs t-test can be seen below.

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Paper	49.61	51	44.748	6.266
Mobile	68.86	51	48.234	6.754

	N	Correlation	Sig.
Pair 1 Paper & Mobile	51	.169	.237

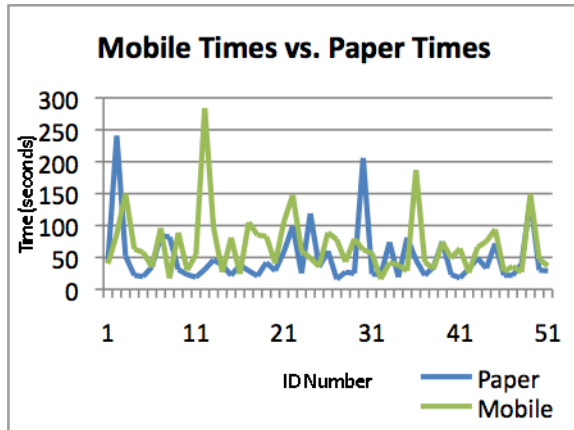
		Paired Differences				
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
					Lower	Upper
Pair 1	Paper - Mobile	-19.255	60.006	8.403	-36.132	-2.378

		Paired Differences		
		t	df	Sig. (2-tailed)
Pair 1	Paper - Mobile	-2.292	50	.026

The data can also be seen in Appendix C

Since the data collected is statistically significance it is correct to say that for Bennett's current clientele the paper map is the faster, more desirable way-finding device. This conclusion is supported by the p-value of .026 and the difference in means. This conclusion means that the original hypothesis, that the mobile map would be a faster, more desirable way-finding device, has to be rejected.

The graph below visually illustrates the time it took for participants to complete the task using both the mobile device and the paper map. The blue line represents the paper times and the green line represents the mobile times. The blue line is generally below the green line confirming that the paper device was the preferred device. The graph below displays the participant identification number on the x-axis and the time in seconds on the y-axis.



The graph can also be seen in Appendix C

Analyzing the Correlation in our Results

During the experiment individuals were also asked how often they frequented Bennett's Greenhouse each month. This data was collected in order to determine if there was any correlation between the amount of time individuals frequented Bennett's Greenhouse and how well they did in our experiment. More specifically we wanted to measure the strength between the two variables, the frequency of visits and the time taken to complete the experiment.

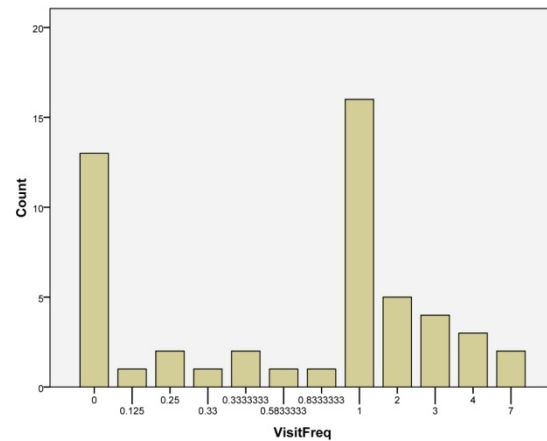
In order to calculate this data a Pearson's Correlation was used. The correlation between the paper map and how often the individual frequented Bennett's Greenhouse was .175 and the correlation between the mobile device and how of the individual frequented Bennett's Greenhouse was .198. This indicates a weak relationship between the frequency of visits and the time taken to complete the experiment. Specifically this means that how often an individual frequented Bennett's Greenhouse had little or no effect on how the individual performed in the experiment. A summary of the correlation data can be seen below.

Correlations

		Paper	Mobile	VisitFreq
Paper	Pearson Correlation	1.000	.169	.175
	Sig. (2-tailed)		.237	.220
	N	51	51	51
Mobile	Pearson Correlation	.169	1.000	.198
	Sig. (2-tailed)	.237		.164
	N	51	51	51
VisitFreq	Pearson Correlation	.175	.198	1.000
	Sig. (2-tailed)	.220	.164	
	N	51	51	51

This data can also be seen in Appendix C.

After analyzing our results it was concluded that there was little or no correlation as to how often individuals frequented Bennett's Greenhouse. This indicates that the data for the amount of visits was not skewed in any direction. However, it is reasonable to conclude, from the data collected, that most individuals visit Bennett's Greenhouse at least once a month. A visual representation of how often visits occur can be seen below.



This data can also be seen in Appendix C.

As seen in the graph above the highest bar is the bar for one visit a month. This visually demonstrates that most of the individuals participating in our experiment frequent Bennett's Greenhouse once a month.

Application of Demographics

The age of participants who took part in the study averaged around 51 years old. This parallels Bennett's current average age of their clientele, which was derived from past customer surveys and observational data. Unfortunately, the mobile application was developed to target 25 to 35 year old adults. The effect of the older demographic was apparent. Most of the participants had not used a mobile application before and had trouble learning to use the touch screen input device. Another issue was that older participants had trouble seeing the screen, some even claiming "I left my reading glasses at home." This issue has potential effects on the results in favor of the paper map. Even though the study missed a thorough evaluation of the target audience, the results from the older audience give insight to how current clientele might react to the mobile application.

Paper Map vs. Mobile Application

As denoted by the results, the paper map was a faster way finding method. The significant results show that the current older clientele would be better off with a paper map. With the paper map having no learning curve and the prevalence of smart phones in respect to the older demographic being lower, this contributes to the reasoning that Bennett's greenhouse would be better off using a paper map for their current clientele.

However, since the goal of Bennett's Greenhouse is to draw a younger demographic, there is not enough evidence to suggest that a paper map is more useful for Bennett's target audience. In fact a potential future research question then becomes: Is a digital map on a mobile device a faster, more desirable way-finding solution in Bennett's Greenhouse than a traditional paper map for customers of aged

25 to 35? There is evidence that could support a mobile application for a younger demographic. Evidence that younger users generally have more experience with digital devices like smart phones (PEW, 2008). Also, younger demographics are more receptive to learning new technologies (PEW, 2006).

Observations from the Participants

When the participants were questioned about their preference for way finding methods, 20 said they preferred the mobile application while 31 said they preferred the paper map. The mean age of each group was 48.2 to 51.22 respectively. Two participants were undecided.

Most rationalized their preferences for the mobile device with statements like: "I feel so empowered with it", "I definitely enjoyed the mobile device more, simply because of the highlighting feature", and "mobile because it should be so much more convenient to use regularly." Most of the positive comments about the mobile application focused on convenience and the new technology. Many participants liked that the item they were searching for was highlighted.

Most of the negative responses pertaining to the mobile application were related to usability. This might be attributed to the observation that 62.2% of the respondents had never used a mobile application before. Many respondents stated that: "(I) Was not used to using this but it does look easy"

Many respondents had trouble navigating with the mobile device because the map would rotate according to the orientation of the iPhone. This allowed an interesting observation to be made. A number of participants had to rotate the paper map to orient themselves and it appeared as if the

participants did not have enough spatial ability to rotate the map in their mind. Participants also had trouble orienting themselves because they could not zoom and see the entire map on the mobile device.

Relevance to Bennett's Greenhouse

This study gives sufficient evidence that Bennett's Greenhouse should incorporate a paper map over a mobile application to orient their customers. However, 22 respondents did prefer the mobile application regardless of their time results. For this reason Bennett's could provide both the digital and paper map. Several participants at Bennett's Greenhouse actually had iPhones with them. Participants who preferred the paper map were still receptive to the digital map in most cases.

THE FUTURE

Development of the Mobile Application

With added features, there could be potential bonuses using the digital map that surpass the negative impacts of slower usability. For instance, a zoom could be added to display the entire map inside the iPhone view screen. A product details page could be added to the mobile application. And lastly, an administrative component could be implemented with the digital map so that employees could update product locations. When you consider that products rotate seasonally in a greenhouse, the paper map becomes less attractive.

Development of the Website

While the website is fully functional for Bennett's needs, their opportunity for adding new features to the existing web page. Bennett's Greenhouse is very interested in adding a shopping cart to their new website. Their current online sale solution is outsourced to flower arrangement

companies such as FTD and Teleflora, which do not allow Bennett's to sell their own varieties of arrangements. Furthermore, a more robust administrative control panel could be implemented to the website to allow Bennett's to add new sections to the website as needed.

Future Studies

As stated before, further study that targets the 25- to 35-year-old age group might enhance any decision relative to the digital map. Another interesting study would be to measure spatial abilities while using a map. Lastly, with ample time allotted, it would be interesting to see how well subjects navigate after several exposures to the map application. This would help study the effects of how new users develop their experience with smart phone devices and touch screen inputs.

CONCLUSIONS

The digital map

Bennett's first problem of not having a means for customers to visually orient themselves in the store was solved by creating a digital map. The map was first created as a prototype using just HTML and JavaScript. The map currently only focuses on the store of Bennett's Greenhouse.

The map could be expanded in the future. Currently the map cannot be updated by Bennett's Greenhouse employees. The map also does not contain an administrative back end. With an administrative side Bennett's employees and administrators would be able to update the map when products are moved. The map could also be expanded to cover then entirety of Bennett's Greenhouse instead of focusing on just the store.

The Website

The second portion of the problem statement was solved by designing and creating a new website for Bennett's Greenhouse. The new website was created with PHP using an XML database. In order to create the website the targeted demographic was researched and the layout, colors, and links were designed to fit the targeted demographic. The website was also checked against ADA standards and can be read with screen readers.

Google Analytics was also implemented on the site so that Bennett's employees can track who is viewing the site and from where. They can also view how long users are staying on the site and which pages they view. The site map for the new site was also submitted to Google. This helps Google index the site faster so that the Bennett's website will appear more frequently in Google searches.

The Research Question

The question researched was: "Is a digital map on a mobile device a faster, more desirable way-finding solution in Bennett's Greenhouse than a traditional paper map?"

This was done by conducting a test at Bennett's Greenhouse. Participants were asked to complete a pre-test then to find a predetermined location inside the store (a red or blue dot) while using both a digital map and a paper map. The times were recorded and the participants were asked to complete a post-test that collected the participants' preference and suggestions for each device.

The Results

The results were collected and a matched pairs t-test was conducted. A matched pairs

t-test was chosen because individuals would just be compared to themselves and not to each other. There were 51 participants and a p-value of 0.026 was calculated. Since there were over thirty participants the results were calculated based on the normal approximation. Also, with a p-value of less than 0.05 our results can be considered statistically significant.

The paper map was a faster way finding source. The results show that the current older clientele would be better off with a paper map. With the paper map there was no learning curve for the older demographic and the prevalence of smart phones in respect to the older demographic is lower, contributing to the reasoning that Bennett's greenhouse would be better off using a paper map for the current clientele. However with the rising interest and use of smart phones Bennett's might want to consider exploring the concept of a digital map. For this reason Bennett's could provide both the digital and paper map.

The Future

Both the digital map and the website could be expanded. The digital map could be expanded to include the entire greenhouse complex. An administrative side could also be developed so that employees could update the locations of products in real time.

The website could be expanded to include an online shopping system. This would decrease Bennett's reliability on floral sites such as FTD and Teleflora. The website could also have a more comprehensive administrative side. This administrative side could include the ability to update pictures as well as add new pages for the website.

Appendix A: New Website Screenshots

Below is the new home page for Bennett's Greenhouse.

BENNETT'S
Everything from the ground up...

- Home
- Calendar
- Departments
- About Bennett's
- Helping Hands
- Newsletter
- Bennett's Mobile
- Contact Us

Welcome to Bennett's Online!

Bennett's has operated as a family horticultural business in the Greater Lafayette Area for over 100 years. The company was founded between 1870 and 1880 by William Bennett and his son shortly after arriving in the Lafayette area from Ohio. Over the last century, the privately owned company has been led by members of the Bennett family and is currently operated by the sixth Bennett's generation: Richard Bennett, Barbara Bennett Ruff and Kathy Bennett Chinn. Bennett's respects and values its past history and looks forward to the challenges and opportunities that will guide it into its second century. Bennett's is a complete horticultural center offering growing, consulting, designing and installation of all its products. A key strength of Bennett's is the education and training it gives all employees to serve both its retail and wholesale customers. In addition, Bennett's conducts seminars for its customers on an annual basis to provide them with the latest in products and information.

Want to save money?

Join Bennett's [Frequent Buyer Program](#) and save \$50 for every 12 punches on your card.

Want to order flowers?

 Go to the [FTD](#) site and order from Bennett's.

 Go to the [Teleflora](#) site and order from Bennett's.

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Designed by: En Garde
Administrator? [Log in here](#)

Home | About | Contact | Departments | Calander | Helping Hands | Newsletter | Bennett's Mobile
3651 McCarty Lane - Lafayette, IN 47905 - (765) 447-7636

Below is a screenshot of the About Bennett's page for the new website.

BENNETT'S
Everything from the ground up...

- Home
- Calendar
- Departments
- About Bennett's
- Helping Hands
- Newsletter
- Bennett's Mobile
- Contact Us

Bennett's Greenhouse, Inc.

3651 McCarty Lane
Lafayette, IN 47905
(765) 447-7636

Store Hours

As of April 13, 2009

Mon.-Fri.: 8am- 6pm
Saturday: 8am-6pm
Sunday: 10am-5pm

A Little Bit About Bennett's Greenhouse

Bennett's has operated as a family horticultural business in the Greater Lafayette Area for over 100 years. The company was founded between 1870 and 1880 by William Bennett and his son shortly after arriving in the Lafayette area from Ohio. Over the last century, the privately owned company has been led by members of the Bennett family and is currently operated by the sixth Bennett's generation: Richard Bennett, Barbara Bennett Ruff and Kathy Bennett Chinn. Bennett's respects and values its past history and looks forward to the challenges and opportunities that will guide it into its second century. Bennett's is a complete horticultural center offering growing, consulting, designing and installation of all its products. A key strength of Bennett's is the education and training it gives all employees to serve both its retail and wholesale customers. In addition, Bennett's conducts seminars for its customers on an annual basis to provide them with the latest in products and information.

Located within minutes of the Purdue University campus, it is a major influence to the landscape and gardening enthusiast in northwest Indiana based on the latest in agricultural research. If you are looking for a wide selection of perennials, annuals, roses, chrysanthemums, vegetable garden plants, herbs, houseplants, poinsettias or Easter lilies, Bennett's Greenhouse Inc. is the best solution to your needs. If you cannot complete your project yourself or if you do not have the time, let Bennett's full service design and build landscape division assist you with your goals.

An active facility on 25 acres at the corner of McCarty and Creasy Lanes, Bennett's can provide you with quality and selection in its large retail nursery, unparalleled garden center or in its full service greenhouse and floral areas. In addition, Bennett's has numerous resources called "Helping Hand Hints" that can be obtained during your visit. Make plans to visit sometime soon, either by yourself or as a group with a guided tour. Bennett's the place to find a helping hand.

Want to become a part of Bennett's Greenhouse?

Download the [employment form](#) and return it anytime to Bennett's Greenhouse.

Maps to Bennett's Greenhouse

[Click here](#) to find Bennett's Greenhouse on Google Maps.

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Designed by: En Gonic
Administrator: Log in here

Home | About | Contact | Departments | Calander | Helping Hands | Newsletter | Bennett's Mobile
3651 McCarty Lane - Lafayette, IN 47905 - (765) 447-7636

Below is a screenshot of the new calendar developed to inform users about upcoming events at Bennett's Greenhouse.

BENNETT'S
Everything from the ground up...

- Home
- Calendar
- Departments
- About Bennett's
- Helping Hands
- Newsletter
- Bennett's Mobile
- Contact Us

Bennett's Greenhouse, Inc.
3651 McCarty Lane
Lafayette, IN 47905
(765) 447-7636

Store Hours
As of April 13, 2009
Mon.-Fri.: 8am- 6pm
Saturday: 8am-6pm
Sunday: 10am-5pm

Bennett's Calendar
December 2009
[Sale](#) / [Gardening Tip](#) / [Bennetts Event](#) / [Holiday](#)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25 Christmas	26
27	28	29	30	31		

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Designed by: En Guide
Administrator / [Log in here.](#)

Home About Contact Departments Calander Helping Hands Newsletter Bennett's Mobile
3651 McCarty Lane - Lafayette, IN 47905 - (765) 447-7636

Appendix B: Digital Map Screenshots

Below is the page on the website where users can access the digital map.



The screenshot shows the Bennett's website interface. The header features the logo "BENNETT'S" with the tagline "Everything from the ground up..." and a decorative floral graphic. A navigation menu on the left lists: Home, Calendar, Departments, About Bennett's, Helping Hands, Newsletter, Bennett's Mobile, and Contact Us. The main content area is titled "Bennett's Has Gone Mobile!" and contains the following text: "The link below will provide you with a digital map of the store inside Bennett's Greenhouse. The link is able to be accessed on a mobile device (such as an iPhone). Feel free to check it out and use it when you are in the store!" Below this text is a link labeled "Digital Map".

Bennett's
Greenhouse, Inc.

3651 McCarty Lane
Lafayette, IN 47905
(765) 447-7636

Store Hours

As of April 13, 2009

Mon.-Fri.: 8am-6pm
Saturday: 8am-6pm
Sunday: 10am-5pm

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Designed by: En Garde
Administrator? [Log in here](#)

[Home](#) | [About](#) | [Contact](#) | [Departments](#) | [Calendar](#) | [Helping Hands](#) | [Newsletter](#) | [Bennett's Mobile](#)
3651 McCarty Lane - Lafayette, IN 47905 - (765) 447-7636

Below is how the digital map will appear on an iPhone.



Appendix C: Statistical Data

Below are the matched pairs t-test results.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Paper	49.61	51	44.748	6.266
	Mobile	68.86	51	48.234	6.754

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Paper & Mobile	51	.169	.237

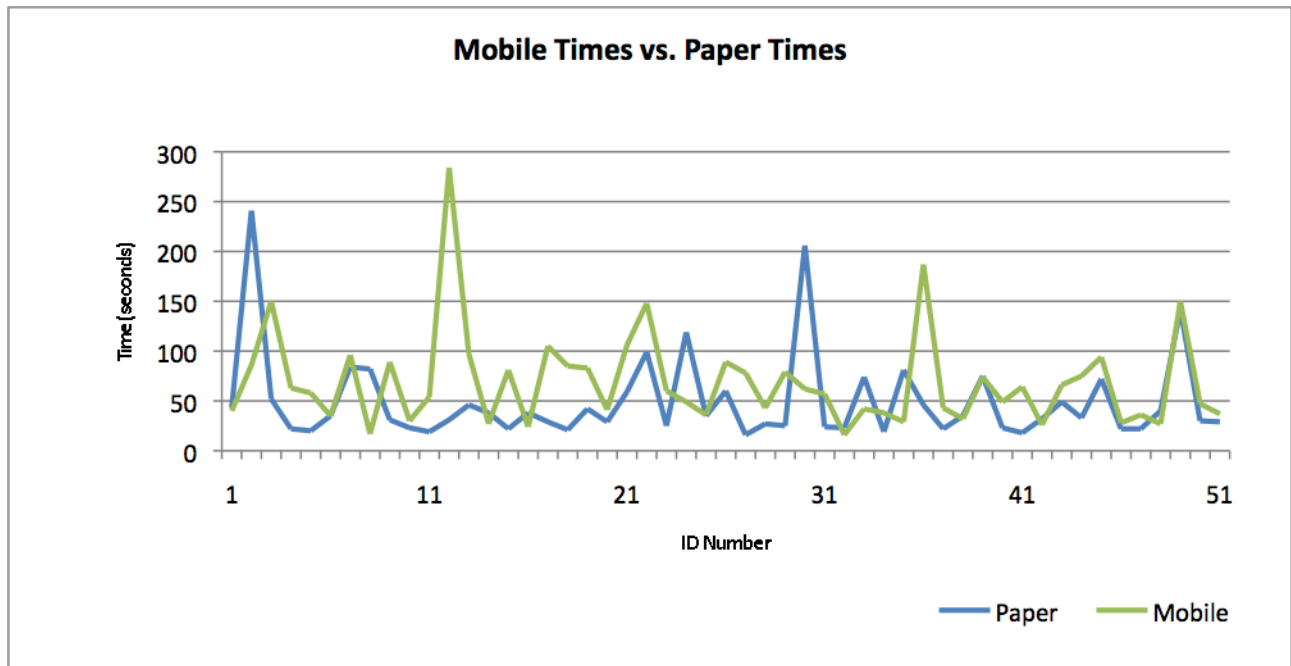
Paired Samples Test

		Paired Differences				
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
					Lower	Upper
Pair 1	Paper - Mobile	-19.255	60.006	8.403	-36.132	-2.378

Paired Samples Test

		Paired Differences		
		t	df	Sig. (2-tailed)
Pair 1	Paper - Mobile	-2.292	50	.026

Below is a graphics representation of the times recorded.

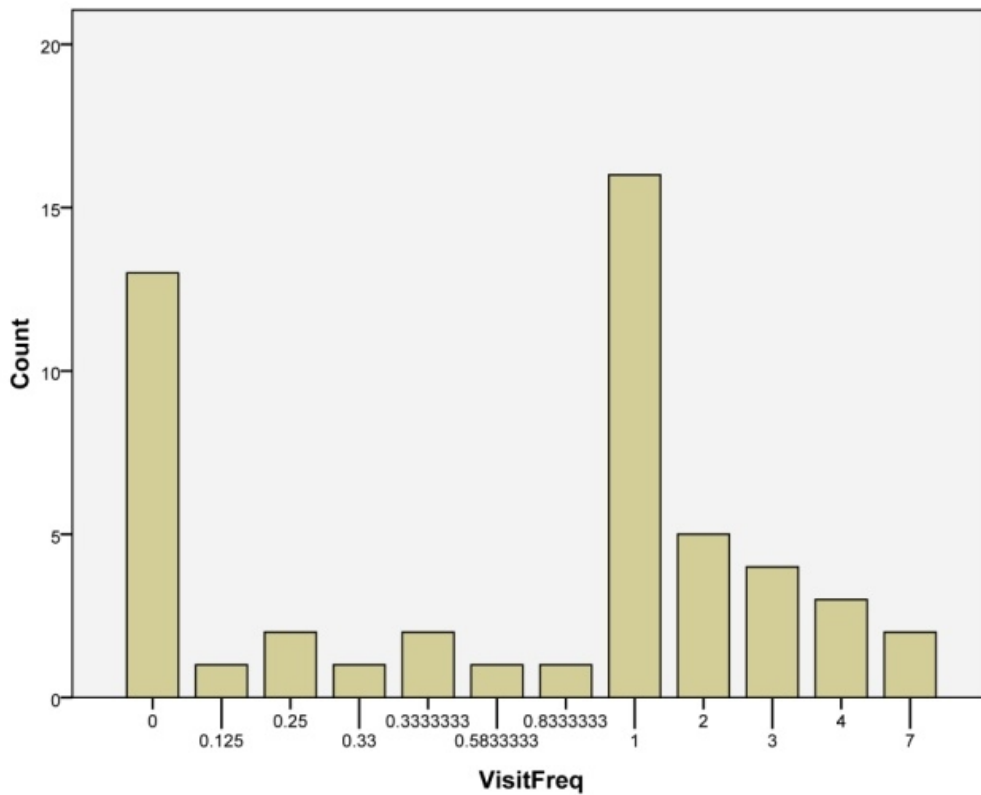


The correlation data can be seen below.

Correlations

		Paper	Mobile	VisitFreq
Paper	Pearson Correlation	1.000	.169	.175
	Sig. (2-tailed)		.237	.220
	N	51	51	51
Mobile	Pearson Correlation	.169	1.000	.198
	Sig. (2-tailed)	.237		.164
	N	51	51	51
VisitFreq	Pearson Correlation	.175	.198	1.000
	Sig. (2-tailed)	.220	.164	
	N	51	51	51

The visit frequency graph can be seen below.



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