ABSTRACT

BUCKNER, BRITTANY JOELLE. Comprehensive Evaluation of the Ballet Pointe Shoe According to Professional Ballet Dancers (Under the direction of Dr. Cynthia Istook).

The purpose of this study was to evaluate the issues and challenges that professional ballerinas face with the current design of the pointe shoe. In their current “out-of-the-box” state, the shoes are unable to be used immediately after purchase. Users must spend time sewing elastic and ribbons, adjusting padding, and roughing up areas of the shoe, for example, to prepare them for use. Literature indicates that the average professional wears one pair of shoes per show, however, the average ballet student can wear one pair for up to 20 hours (Foster, 2016). In addition to durability, other issues include sustainability, consistency, price, fit, symmetry, and time spent preparing the shoes to be worn. Patent research was conducted to direct the development of a pointe shoe survey which was open to professional dancers to validate the stated issues. Ultimately, the goal of this research was to use the information gathered to provide direction to the development of a more consistent, durable, and affordable product. The major findings included verifying the stated issues in the literature review and concluding that brand is not related to factors such as the part of the shoe that dies first and preparation techniques. It is however related to the number of hours that each pair lasts.
Comprehensive Evaluation of the Ballet Pointe Shoe According to Professional Ballet Dancers

by

Brittany Joelle Buckner

A thesis submitted to the Graduate Faculty of North Carolina State University in partial fulfillment of the requirements for the degree of Master of Science

Textiles

Raleigh, North Carolina

2019

APPROVED BY:

_______________________________  ________________________________
Dr. Cynthia Istook  Dr. Trevor Little
Committee Chair

_______________________________  ________________________________
Dr. Yingjiao Xu  Dr. Lori Rothenberg
DEDICATION

To my Heavenly Father.
I would not be where I am without you.
Isaiah 26:3
BIOGRAPHY

Originally from Hickory, NC, Brittany Buckner is the daughter of Phillip and Joelle Buckner. She has one brother, Will and three sisters, Abby, Chloe, and Sophie. Brittany graduated high school in 2011 from Christian Family Academy. In 2015, she graduated magna cum laude with a Bachelor of Science in Apparel Design and Merchandising and a minor in Marketing from Appalachian State University. Following graduation, she moved to New York City to work for a men’s sneaker licensing and manufacturing company. Brittany is pursuing a Master of Science in Textiles, with a focus in Textile Management at North Carolina State University’s Wilson College of Textiles and plans to begin her career in industry upon completion.
ACKNOWLEDGMENTS

I would like to thank my advisor, Dr. Cindy Istook, who has encouraged me every step of the way. She gave me the courage to take on a thesis and has challenged me to put my best foot forward. I thank her for believing in me and for granting opportunities along the way. I would also like to thank my family and peers for supporting my research and providing a listening ear. My mother and grandparents have been especially supportive of the endeavors required for this study.

I would also like to thank the Gordan and Marjorie Osborne Foundation as well as the North Carolina Textile Foundation for affording me the opportunity to continue graduate research in the Wilson College of Textiles at North Carolina State University.
# TABLE OF CONTENTS

LIST OF TABLES .................................................................................................................. viii

LIST OF FIGURES ............................................................................................................... ix

CHAPTER 1: INTRODUCTION ......................................................................................... 1

Rationale ............................................................................................................................. 3

Purpose of Study ................................................................................................................ 3

Significance of Study ........................................................................................................ 4

Definition of Terms .......................................................................................................... 4

Limitations ........................................................................................................................ 5

CHAPTER 2: REVIEW OF LITERATURE ....................................................................... 6

Patent Research ................................................................................................................ 6

History of Ballet and Pointe Shoes .................................................................................. 12

Documented Issues ......................................................................................................... 17

Construction and consistency ......................................................................................... 17

Preparation. ....................................................................................................................... 19

Darning ............................................................................................................................. 19

Modifications. .................................................................................................................. 21

Breaking-in ....................................................................................................................... 22

Durability ........................................................................................................................ 23

Materials. ........................................................................................................................ 24

Fit and symmetry. .............................................................................................................. 26

Price. .................................................................................................................................. 27
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessories</td>
<td>27</td>
</tr>
<tr>
<td>Improvement Attempts</td>
<td>27</td>
</tr>
<tr>
<td>Professional Ballet Industry</td>
<td>30</td>
</tr>
<tr>
<td>CHAPTER 3: METHODOLOGY</td>
<td>32</td>
</tr>
<tr>
<td>Research Objective and Questions</td>
<td>33</td>
</tr>
<tr>
<td>Research Design</td>
<td>33</td>
</tr>
<tr>
<td>Sampling Method and Data Collection</td>
<td>36</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>38</td>
</tr>
<tr>
<td>CHAPTER 4: PRESENTATION OF DATA</td>
<td>39</td>
</tr>
<tr>
<td>Sample Description</td>
<td>39</td>
</tr>
<tr>
<td>Research Question 1</td>
<td>39</td>
</tr>
<tr>
<td>Issues</td>
<td>39</td>
</tr>
<tr>
<td>Research Question 2</td>
<td>44</td>
</tr>
<tr>
<td>Research Question 2a</td>
<td>45</td>
</tr>
<tr>
<td>Research Question 2b</td>
<td>46</td>
</tr>
<tr>
<td>Research Question 3</td>
<td>49</td>
</tr>
<tr>
<td>CHAPTER 5: DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS</td>
<td>54</td>
</tr>
<tr>
<td>RQ 1</td>
<td>55</td>
</tr>
<tr>
<td>RQ 2</td>
<td>57</td>
</tr>
<tr>
<td>RQ 3</td>
<td>58</td>
</tr>
<tr>
<td>Implications</td>
<td>59</td>
</tr>
<tr>
<td>Materials</td>
<td>59</td>
</tr>
</tbody>
</table>
Construction......................................................................................................................... 61
Price gouging.......................................................................................................................... 62
Displaced blame.................................................................................................................... 63
Sports..................................................................................................................................... 63
Anti-comfort............................................................................................................................ 66
Sustainability.......................................................................................................................... 67
Conclusion............................................................................................................................... 69
Recommendations.................................................................................................................. 69
REFERENCES......................................................................................................................... 71
APPENDICES......................................................................................................................... 83
LIST OF TABLES

Table 1: Review of pointe shoe patents ........................................................................................................... 7

Table 2: Methodology chart.............................................................................................................................. 35
LIST OF FIGURES

Figure 1: Pirouette ................................................................................................................. 2
Figure 2: Arabesque ................................................................................................................ 2
Figure 3: Anatomy of a pointe shoe ......................................................................................... 5
Figure 4: Marie Taglioni ........................................................................................................ 13
Figure 5: Taglioni’s pointe shoes ............................................................................................ 13
Figure 6: Salvatore Capezio .................................................................................................. 14
Figure 7: Capezio’s first store ............................................................................................... 14
Figure 8: Anna Pavlova .......................................................................................................... 15
Figure 9: Pavlova’s pointe shoes ........................................................................................... 15
Figure 10: History of ballet and the pointe shoe ................................................................. 17
Figure 11: Turn-shoe ............................................................................................................. 18
Figure 12: Partially complete, post turning ........................................................................... 18
Figure 13: Ribbons, elastic, and sewing kit ............................................................................ 19
Figure 14: Darning process .................................................................................................... 20
Figure 15: Entire platform and side darned .......................................................................... 20
Figure 16: Darned edge using only stitches .......................................................................... 21
Figure 17: Darning edge by sewing elastic to platform ......................................................... 21
Figure 18: Perfectly darned pointe shoe ............................................................................... 21
Figure 19: Cutting shank with tin-snips ................................................................................. 22
Figure 20: Pancaked pointe shoe, left .................................................................................... 22
Figure 21: Student’s shoes, two weeks apart ....................................................................... 24
Figure 44: Deconstructed pointe shoe ............................................................... 59

Figure 45: Dancer’s feet..................................................................................... 63

Figure 46: Trash can full of dead pointe shoes .................................................. 64
CHAPTER 1: INTRODUCTION

Ballet is not only an art form, but also a high intensity sport that is often times forgotten or underestimated in terms of athleticism and technique. Ballerinas, like any other athlete, use clothing and accessories to enhance their performance and improve their technique. Unfortunately, the world of ballet has neglected to technologically advance at the same rate as the nationally more popular sports, such as football and basketball. While these athletes see new advances every year in their athletic attire, ballerinas have been wearing the same basic design in pointe shoes for over 100 years (History Cooperative, 2015). While there is one brand, Gaynor Minden, which has certainly improved a few parts of the shoe, there are great strides and opportunities awaiting to be had.

The pointe shoe is a ballerina’s secret weapon when performing pointe work. It allows them to achieve the weightless, graceful, and delicate dancing associated with ballet. Pointe shoes enable a dancer to put her body weight on the tips of her toes. This is due to the shank pressing against the sole of the dancer’s foot, while the vamp holds the toes in place, and the toe box supports the weight (Weinman, 2013b). Together, they keep the entire foot in place, creating a perfectly straight line from her hip, through her leg, down to her foot. The development of the pointe shoe meant that new advances in technique such as pirouettes (Figure 1) and arabesques (Figure 2) were now possible (Hageli, 2015).
Many companies, instructors, and boutique employees have varying opinions as to when a young ballerina should be able to dance en pointe. According to Gaynor Minden, a dancer needs at least two to four years of training before going en pointe. During this training period, a dancer should be strength training, technique training, practicing self-discipline, and have dedication. In addition, it is recommended that a student be between the ages of 9 and 12, so as not to damage the developing bones in a young dancer’s feet (Weinman, 2013a). Various fitness assessments such as the topple, sauté, and airplane tests can also be conducted to assist in determining pointe-readiness (Hewitt, Mangum, Tyo, & Nicks, 2016).

It is understood that once a ballerina puts on her first pair of pointe shoes, she has accepted the responsibility of all that comes with them. From preparing a new pair, to bandaging her blisters, the real price of pointe shoes is much more than a dollar sign. One will never hear a ballerina complain about the time and effort put into pointe shoes, as many of them could not be happier to be dancing en pointe. Many young ballerinas dream of the day they are fitted for their first pair of pointe shoes, as it opens the door to new technique opportunities and marks the beginning of a possible career as a ballerina (Hewitt et al., 2016). The challenges that ballerinas face with the current developments of pointe shoes include, but

Figure 1: Pirouette. Figure 2: Arabesque.
Note: Figure 1 and 2 from GetDrawings.com, 2018
are not limited to comfort, durability, fit, symmetry, preparation, and price.

**Rationale**

The information presented in this study is an indication of the tremendous strides that have yet to be made in the design and manufacturing of the pointe shoe. There are numerous issues with the current design, preparation, use, and disposal of the shoe. This study reveals the heart of the issues and provides an understanding on what changes need to be made.

The current design of the pointe shoe is not only unsustainable, but non-durable and very costly, as well. Because of this, ballerinas are continually performing in new, non-form fitting shoes at the expense of their time and physical well-being.

**Purpose of Study**

The purpose of this study was to identify the issues and challenges that ballerinas face while wearing pointe shoes. In order to reach the goal described, the following research questions were defined:

1. What do ballerinas perceive to be important issues with pointe shoes?
2. What brand of pointe shoes do professional ballerinas wear?
   a. Is this brand required?
   b. Is this brand the most durable?
3. Is there any relationship between brand of pointe shoes and:
   a. Discomfort
   b. Preparation time
   c. Part of the shoe that dies first
Significance of Study

This study is significant because it gives light to the lack of comfort, high prices, poor construction, inconsistent fit, array of medical concerns, lack of sustainability, and obscure symmetry. This study develops the factors contributing to the overall quality of the pointe shoe. The significance of this study is to contribute to solutions that require less time spent on the ballerina’s part, less money spent on the company’s parts, and less waste generated on the manufacturer’s part.

Definition of Terms

Company: a professional dance organization where dancers are paid employees.

Darning: for the purpose of the study, a sewing technique to increase durability.

Dead: a term referring to a pointe shoe no longer wearable.

Demi-pointe: rising on the ball of one’s foot (Clifton, 2009).

En Pointe: a term referring to an accomplished level of skill in ballet; the act of bearing one’s body weight on the toe box while wearing pointe shoes.

Fitter: a professional trained to fit dancers for pointe shoes.

Over the Box: a term that implies the entire platform of the shoe is on the floor, with the dancers weight evenly dispersed (Yahoo Answers, 2013).

Prima Ballerina: the chief female dancer in a ballet or ballet company (Merriam-Webster, n.d.).

Professional Dancer: for the purpose of this study, any person who is a career ballet dancer.

School: for the purpose of this study, any ballet studio with “Academy” or “School” in their name. These locations usually train dancers for the affiliated professional dance company.

Shank: stiff insole that supports the arch (Figure 3) (Becker, 2015a).
**Toe Box:** hard encasement that covers the toes.

**Platform:** oval-shaped, flat part, at the tip of the shoe where the dancer bears her weight while en pointe (Saratoga Dance, Etc., n.d.; Weinman, 2013c).

![Figure 3: Anatomy of a pointe shoe.
Note: Taken from The Sock Basket, n.d.](image)

**Limitations**

This research was conducted using a convenience sample across the United States and around the world. There were no data on every professional dancer in the world available. Dancers’ contact information was found via social media. The subjects reported the issues as self-described problems. The researcher relied on email addresses that were obtained on social media and the snowball effect.
CHAPTER 2: REVIEW OF LITERATURE

Based on the purpose of this study, the topics in this literature review include a patent research, historical review of the pointe shoe, documented issues, and improvement attempts. This chapter provides a thorough investigation of the current state of the pointe shoe and the individuals who have pioneered, contributed, and occasionally succeeded in a niche market.

Patent Research

Patent research was conducted using the Derwent Innovations Index and Google Patents to review the manufacturing processes throughout history. This preliminary research provided a foundation of understanding how technological and material advancements contributed to the evolution of the pointe shoe. Table 1 provides a timeline of pointe shoe patents along with the related applicant and components of the pointe shoe that were targeted in each particular instance. It is important to note some of the patent applicants and their relation to the brands that continue to produce pointe shoes today. In 1999, Capezio merged with Ballet Makers-Europe, Ltd., establishing Capezio Ballet Makers, Inc. Today, Michael Terlizzi is the President and CEO of Capezio. Preceding him is four generations of Terlizzi family members following Capezio’s death in 1940 (Grant & Thomson Gale, 2004). Applicant Leo Harris founded Leo’s Dancewear, which was purchased by Bloch in 2012 (Tepper, 2018).

A quick browse reveals that the basic design, shape, and construction of the shoe has experienced little to no improvement since Salvatore Capezio’s seminal patent in 1928. Many manufacturers have patented their individual processes, but the shoe itself remains essentially unchanged. These manufacturing processes are still used today to equip ballerinas with their most important and customized piece of athletic attire.
Table 1.

*Review of Pointe Shoe Patents*

<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Patent Name</th>
<th>Applicant</th>
<th>Focal Point</th>
<th>Picture</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/27/1928</td>
<td>1,693,174</td>
<td>BALLET SLIPPER AND METHOD OF MAKING THE SAME</td>
<td>Salvatore Capezio</td>
<td>entire shoe</td>
<td><img src="image1.png" alt="Image" /></td>
<td>- original pointe shoe</td>
</tr>
<tr>
<td>4/3/1934</td>
<td>1,953,659</td>
<td>BALLET SLIPPER</td>
<td>Michele Savino</td>
<td>toe piece</td>
<td><img src="image2.png" alt="Image" /></td>
<td>- secured toe piece and integral outsole to resist wear and increase life and efficiency</td>
</tr>
<tr>
<td>12/2/1952</td>
<td>2,619,743</td>
<td>FORMED COUNTER CONSTRUCTION FOR BALLET SLIPPERS</td>
<td>Leo Harris</td>
<td>back seam</td>
<td><img src="image3.png" alt="Image" /></td>
<td>- goal: back section be one continuous piece</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- eliminates seam in heel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- eliminates pre-stitching of lining</td>
</tr>
<tr>
<td>Date</td>
<td>Number</td>
<td>Patent Name</td>
<td>Applicant</td>
<td>Focal Point</td>
<td>Picture</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>-------------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 11/1/1983  | 4,412,393| BALLET TOE SHOE AND PROCESS OF MANUFACTURE THEREOF                           | Ballet Makers, Inc. / Terlizzi | shank       | ![Image](image1.png) | - 2 part shank made of leather-like material  
- 2 parts adhered with resin |
| 6/12/1984  | 4,453,996| PROCESS OF MAKING A BALLET TOE SHOE                                         | Ballet Makers, Inc. / Terlizzi | shank       | ![Image](image2.png) | - division of 4,412,393 |
| 2/20/1990  | 4,901,453| BALLET SLIPPER AND METHOD OF MANUFACTURING A BALLET SLIPPER                 | Elizabeth H. Gaynor        | entire shoe | ![Image](image3.png) | - integral shank and toe box made of flexible thermoplastic polymeric material  
- layer of resilient polymeric material lines toe box  
- layer of shock absorbing material covers shank, platform and toe box |
<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Patent Name</th>
<th>Applicant</th>
<th>Focal Point</th>
<th>Picture</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/30/1991</td>
<td>5,035,069</td>
<td>BALLETT SLIPPER AND METHOD OF MANUFACTURING A BALLETT SLIPPER</td>
<td>Elizabeth G. Minden</td>
<td>entire shoe</td>
<td></td>
<td>- same as previous - addition: wicking outer covering fits over shank and toe box</td>
</tr>
<tr>
<td>3/9/1993</td>
<td>5,191,726</td>
<td>ASYMMETRIC BALLET SHOE AND PAIR OF SUCH SHOES</td>
<td>Jean-Marie Vallee</td>
<td>toe box</td>
<td></td>
<td>- asymmetrical shoe - larger above big toe</td>
</tr>
<tr>
<td>7/3/2003</td>
<td>US 2003/0121176 A1</td>
<td>DANCE SHOE</td>
<td>Leo's Dancewear Inc. / Baruck</td>
<td>sole</td>
<td></td>
<td>- split sole provides more flexibility and is lighter</td>
</tr>
</tbody>
</table>
Table 1, continued

<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Patent Name</th>
<th>Applicant</th>
<th>Focal Point</th>
<th>Picture</th>
<th>Description</th>
</tr>
</thead>
</table>
| 3/16/2004  | US 6,705,026 B1         | DANCE SHOE        | Tracey A. M. Arbour        | toe box           | ![Image](image1) | - viscoelastic padding layer  
|            |                         |                   |                            |                   |         | - shields toes from toe box                                                |
| 2/3/2005   | US 2005/0022421 A1      | BALLET POINTE SHOE | Janice S. Bruckner         | toe box and outer cover | ![Image](image2) | - asymmetrical toe box  
|            |                         |                   |                            |                   |         | - removable cover                                                           |
| 5/24/2005  | US 6,895,693 B2         | DANCE SHOE        | Leo's Dancewear Inc. / Baruck | sole              | ![Image](image3) | - split sole provides more flexibility, is lighter, and reduces "break-in" time |


<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Patent Name</th>
<th>Applicant</th>
<th>Focal Point</th>
<th>Description</th>
</tr>
</thead>
</table>
| 7/6/2006| US 2006/0143945 A1| ARTICLE OF MANUFACTURE FOR BALLET SHOES AND SHANKS                | Craig Steven Walker  | shank       | - shank with improved durability  
- made of flexible thermoplastic  
- located between an inner liner and outer sole  
- flexibility and support may be tailored |
| 7/6/2006| US 2006/0145392 A1| SYSTEM AND METHOD FOR HARDENING BALLET SHOES                     | Tanya Durbin         | wear spots of shoe | - apply epoxy resin to broken-down or soft parts of shoe |
| 1/8/2015| US 2015/0007455 A1| TOE WEDGE FOR A BALLET POINTE SHOE                               | Drew Layne, LLC / Suffolk | toe wedge | - toe wedge above the sole and below the upper  
- graduated increasing thickness  
- partially inside the toebox and toward the platform  
- diminishes to a remaining thickness toward the heel |

Note: Author created table from individual patent information
History of Ballet and Pointe Shoes

Over the past 324 years, there have been defining moments (denoted by markers in Figure 10) in the history of ballet that significantly impacted the development of the modern-day pointe shoe. In order to understand the current state of the shoe, it is crucial to understand the history of the pointe shoe and the individuals who disrupted the industry along the way. The evolution of the pointe shoe is quite fascinating and reveals the heart of what is most important. Throughout the history of ballet, tradition has been the perpetual explanation for resisting change, especially regarding any change to the pointe shoe.

The history of ballet dates back to 1669, when the first professional ballet company, Paris Opera Ballet, was established. It was comprised of all male danseurs until 1681, when Mademoiselle de La Fontaine became the first professional female ballet dancer (Oxford Reference, n.d.). At this time, ballerinas wore long gowns and heeled shoes while dancing with as much grace as possible in such attire. The first recorded disruption in the ballet industry was in 1730. Marie Camargo caused quite an upset when she shortened her skirt, to allow for movement, and removed the heels of her shoes, initiating the beginning of toe dancing with flat-soled shoes (TipToe Dancwear, n.d.). For this reason, Camargo could be considered the mother of modern ballet.

Sixty-six years later, in 1796, French dancer and choreographer, Charles Didelot became the first to put ballerinas “en pointe”. Instead of pointe shoes, Didelot used a “flying machine” that attached hidden wires to the dancers’ corsets, allowing them to be hoisted in to the air, giving the illusion that the ballerina was en pointe (History Cooperative, 2015; Kippen, 2013; Parks, n.d.; Schmid, 2016).
Over the years, dancers continued to seek additional support to dance on their toes. Genevieve Gosselin made her debut in 1809 when she joined the Paris Opera Ballet. She is believed to have been one of the first dancers to darn her shoes for added support (Parks, n.d.). The history of pointe shoes themselves, does not take place until the 1820’s when ballet dancers were more like acrobats. In 1823, Amalia Brugnoli was the first of the grotteschi dancers to dance en pointe, although it was more than likely an 18th century exaggerated pantomime (“Amalia Brugnoli,” 2016; Schmid, 2016).

The first ballerina to successfully dance on her toes was a French dancer by the name of Marie Taglioni (Figure 4) (Kippen, 2013), who made it her mission to learn the art of “toe dancing”. At this time, pointe shoes were a soft, satin material with no toe box or platform for support. Over time, she built up enough strength and determination and in 1832, she danced en pointe in La Sylphid, a ballet choreographed by her father (TipToe Dancwear, n.d.). Although she actually danced on a very high demi-pointe, she achieved her goal by wearing shoes that were many sizes too small for her, squeezing her metatarsals in her feet to create added support (Figure 5) (Raftis, n.d.). Because of this, Taglioni is accredited with the weightlessness, gracefulness, and beauty associated with ballet today.

Figure 4: Marie Taglioni. Note: Taken from Sanderson, n.d.
Figure 5: Taglioni’s pointe shoes. Note: Taken from Raftis, n.d.
During this time, Taglioni’s contemporary, Fanny Elssler, was popular in America. The president of the United States, Martin van Buran, was especially a big fan. During one of her visits to Washington D.C., legislatures toasted Essler with champagne at a banquet using one of her shoes. In 1842, Taglioni performed one last time in Russia, where a group of dedicated fans purchased her shoes for 200 Russian Rubles/$3.15 USD, cooked them in a stew, and ate them (Raftis, n.d.; Schmid, 2016).

Around this time, Italian ballet training began to rise in popularity and a shoe cobbler by the name of Salvatore Capezio (Figure 6) arrived on the scene as a theatrical shoe repairman for the Met in New York. He discovered his love of shoemaking when a male opera star commissioned him for an emergency pair of shoes (Fonderia USA, 2012). In 1887, at the age of 17, he opened up shop as “The Theatrical and Historical Shoemaker” (Figure 7) (Capezio.com, n.d.). As his popularity grew, the shop became a meeting place for dancers to discuss their individual shoe needs, making the Italian ballerinas shoes stiffer and more supportive.

Figure 6: Salvatore Capezio. Note: Taken from Fashion Model Directory, n.d.

Figure 7: Capezio's first store. Note: Taken from Capezio.com, n.d.
As the Italian ballerinas shoe advanced, so did their technique, making them a leading sensation in ballet at the time (TipToe Dancwear, n.d.). In 1893, Pierina Legnani executed 32 fouette turns: a turn that is similar to a pirouette during a performance in Russia (“Pierina Legnani,” 2016). Russian ballerinas tried to catch up to the Italians in terms of technique but realized they were unable to, because of the Italian ballerina’s shoes. Russian shoemakers then began using paper, glue, and burlap to make the shoes harder and stronger, as these were the only materials available at the time.

Dancers from around the world continued to visit Capezio for their shoe needs including Russian prima ballerina, Anna Pavlova (Figure 8). Pavlova was known for her rigid feet and in 1901, she added wood to her shoe to strengthen her feet and curve the box (Figure 9). At the time, she was labeled a “cheater” within the industry, as she was taught that her feet must support her, not her shoes (Velardi, 2012; Whitfield, n.d.). Today she is considered one of the greatest ballerinas of all time. By 1910, Pavlova purchased a pair of Capezio’s shoes for herself and her entire dance company, ultimately establishing Capezio’s success (Kippen, 2013).

Figure 8: Anna Pavlova.
Note: Photo by Media Storehouse, n.d.

Figure 9: Pavlova's pointe shoes.
Note: Taken from Whitfield, 2018
With Capezio’s success, came competitors who sought to create pointe shoes of their own. Freed of London trailed behind 19 years later, establishing themselves in 1929, and remain one of the top choices of professional ballet companies (Kramer, 2012) due to the wide array of customizations available to each professional dancer (Freed of London, n.d.-b). Australian pointe shoe company, Bloch, was established in 1931, by Russian, Jacob Bloch, who began manufacturing during the Great Depression (TipToe Dancwear, n.d.). In the 1940’s, the first attempt at improving the pointe shoe arises. During WWII, Japanese shoe manufacturers attempted to use balsa wood to create a stiffer toe box instead of the traditional materials of paper, fabric, and glue, as these were needed for the war effort. Unfortunately, this experiment failed during testing, as the wood crumbled beneath the dancers' feet. However, this experiment is the reason many believe the pointe shoe toe box is made of wood, even to this day (Ludden, 2014; Schmid, 2016).

Fast forward 50 years to 1989 and Grishko, a Russian pointe shoe manufacturer, was established and the product continues to be sold in 70 countries today (TipToe Dancwear, n.d.). One year later in 1990, former dancer, Eliza Gaynor Minden patented her first pointe shoe (US4901453 A, 1990), from which the brand, Gaynor Minden, began. In 1993, she opened her store with what is now considered the most technologically advanced pointe shoe available on the market today (Word, 2013).
Documented Issues

One of the most thorough pointe shoe blogs, pointeshoebrands.com lists 90 pointe shoe brands on the home page of their site, however, with the addition of brands that do not have a website, or are still in the conceptual phase of production, there are currently over 100 different pointe shoe brands, worldwide (“Pointe shoe brands,” n.d.). The documented issues apply to the majority of pointe shoe brands, including most of the high-profile manufacturers such as Capezio, Freed of London, Grishko, Bloch, and Gaynor Minden, to name a few. When researching the basics of pointe shoes, one of the most commonly asked questions is “How are they made?” (Pittsburgh Ballet Theatre, n.d.).

Construction and consistency. In the 19th century, most shoes were constructed inside-out, before being turned right side out, so that the seams were hidden. This type of shoe consisted of only two pattern pieces and encouraged the wearer to walk on the balls of their feet, instead of the heels (Jones, n.d.; Parks, n.d.) To this day, each pointe shoe continues to be hand-made (Rose, n.d.) from the inside out (Figure 11) The correct term for this type of
construction is called “turn-shoes” (Bentley, 1984; Jones, n.d.). While this may add value and uniqueness, when ordering fifty pair at a time, sizes are not always consistent and lead times can be lengthy.

![Figure 11: Turn-shoe.](image1)
![Figure 12: Partially complete, post turning.](image2)

Note: Figure 11 and 12 taken from Hutter, 2017

Each batch of shoes takes many weeks to complete due to the initial construction, turning, and the amount of paste that is used. The layers in the toe box are glued together with a paste mixture and baked in an oven overnight. Once the shoe is complete, it takes another few weeks to completely dry and harden (Kramer, 2012). Many professionals will receive a box of brand new, made to order shoes, but may only be able to wear half of the shipment, due to inconsistency issues (Becker, 2015a). In any case, most dancers choose to wear the “bad” ones, since they are continually in need of new shoes. Some dancers also sort a new batch by designating which shoes are to be used for rehearsals and which ones will be used on stage (Bentley, 1984). A professional dancer from the Miami City Ballet stated, “Since all Freed [of London] Classics are handmade, there are definitely going to be variations. Usually you can tell before you put them on if they are going to be good or bad shoes, but most of the time you can make a shoe work for you even if it’s a little weird!” (Becker, 2015a, http://balletfocus.com/pointe-shoes-part/). Although this remains a common issue, pointe shoe brands continue to construct each shoe by hand, using the turning method.
**Preparation.** Pointe shoes do not come ready-to-wear (Saratoga Dance, Etc., n.d.). Ballerinas must sew on ribbons and elastic to every... single... pair... (Figure 13). Without these two basic additions, the pointe shoes themselves are worthless. It is recommended to use a slip stitch or whip stitch when attaching the ribbons and elastic (Inspirations Dancewear, n.d.; Weinman, 2013d). After this is done, the preparation process continues based on the dancer’s chosen set of rituals and primarily consists of making modifications to the shoe itself. For some, this includes darning and/or modifying parts of the shoe. For those who skip darning or choose to leave their shoes in mostly original condition, the last step is to break in the newly prepared pointe shoes. Breaking in the shoes is not exactly mandatory, but it is quite necessary to achieve somewhat form-fitting shoes. Those who choose to skip this step, will more than likely begin to do so after suffering the consequences of non-broken in shoes.

![Figure 13: Ribbons, Elastic, and Sewing Kit](image)

*Note: Taken from Johanna, 2012*

**Darning.** As previously mentioned, one option for continuing preparation is darning. Although durability is the primary reason for darning pointe shoes, dancers also invest time in
darning to create a quieter box, reduce slipping, create friction while executing turns, and create a wider platform to dance on, making it slightly easier to balance (King, 2017). This technique can be achieved in a many different ways, depending on preference and the amount of time a dancer wants to invest in adding an additional layer of protection to her shoe. Darning is a technique that requires embroidery thread, crochet thread, or yarn and a rather large needle, such as a leather needle. This can be applied before or after the shoes have been worn to slightly extend the life the shoe (Marjorie, 2014). One may choose to darn the entire platform, parts of the shoe that tend to wear out quicker, or simply the edge of the platform.

Darning the entire platform is achieved by sewing around the edges first and then weaving additional yarn to create an added layer of material on the shoe (Figures 14 and 15). Darning the edges can be achieved in a few different ways. The first option is to sew knots or large stitches around the platform (Figure 16). The second option is to wrap additional material around the edge of the platform such as elastic or thread and tightly stitch them in to place (Figure 17) (Swartz, 2013).

Figure 14: Darning process.  
Figure 15: Entire platform and side darned.  
Note: Figures 14 and 15 taken from Marjorie, 2014
Regardless of the selected darning technique, it is necessary to sew directly into the toe box itself to ensure the stitches stay (Marjorie, 2014). Dancers who choose to darn only on the edges, must be careful of the types of stitches used and evenness around the edge. If the stitches are uneven, it can cause the dancer to become off balance while dancing. One way to ensure the edges are perfectly darned, is by standing the shoe up on the platform (Figure 18). It should be able to stand on its own, if darned properly (King, 2017).

**Modifications.** The remaining preparation techniques are the most destructive and may
require purchasing additional tools or supplies. Such techniques include slashing the satin on the platform or removing it completely to prevent slipping, cutting or trimming the shank (Figure 19) with a box cutter or construction strength tin-snips (Swartz, 2013) after removing the nail that keeps the glued layers of the shank in place (Boday, 2002); and/or hardening parts of the shoe with jet-glue, super glue, or shellac, and scoring the outer sole to create friction (Bedinghaus, 2017a.; Orio, 2005; Saratoga Dance, Etc., n.d.). Some character roles may require dancers to “pancake” their shoes (Figure 20). The goal of pancaking can be to eliminate the shine of the satin for aesthetic purposes or alternate the color of the shoe to match the dancer’s skin tone. This process is accomplished by applying calamine lotion or cosmetic foundation with a sponge or cosmetic wedge (Robertson, 2018; Simpkins, 2015).

![Figure 19: Cutting shank with tin-snips. Note: Taken from Swartz, 2013](image1)

![Figure 20: Pancaked pointe shoe, left. Note: Taken from Simpkins, 2015](image2)

**Breaking-in.** Once the dancer has practically reconstructed the shoes, the breaking in process is also based on personal preference to ensure a better fit. A dancer may choose to break in her shoes by softening areas of the shoe with water or rubbing alcohol, stepping on the toe box to reduce sound and stiffness, bending or breaking the shank to increase support.
(Bedinghaus, 2017a). In addition to personal preference, it is recommended to view the manufacturers suggestions for breaking in, as not all pointe shoes are made equally (Orio, 2005). This lengthy process of transforming each new pair of pointe shoes is to make the shoes wearable, provide improved comfort and increase the life of the shoe. While a dancer may choose her set of preparation tactics, instructors have the power to inhibit the use of any said tactics. Some instructors may prohibit darning, pancaking, and no gel toe pads, to name a few.

**Durability.** It is well known in the ballet industry that the maximum life expectancy of one pair of pointe shoes is approximately 20 hours (Foster, 2016). This number varies with each brand; according the Russian Pointe, their shoes are expected to last 12 to 15 hours (Russian Pointe, n.d.) A professional ballerina wears an average of one pair per day (approximately 8 hours) and can easily wear two to three pair per performance, depending on the role she is dancing and how much pointe work is involved (Kaufman, 2017; Pittsburgh Ballet Theatre, n.d.). In an interview with The Telegraph, Royal Ballet dancer, Marianela Núñez said, “During the day I can get through two pairs of shoes in rehearsals; If I’m dancing in a three-hour ballet, I use one pair per act, so three pairs can go in one night” (Pithers, 2015, https://www.telegraph.co.uk/culture/theatre/dance/11327851/Marianela-Nunez-The-biggest-myth-about-dancers-is-that-we-dont-eat.-Im-always-eating.html), totaling five pair in one day. It is not unusual for a professional dancer to wear 100 pair of pointe shoes in one season (History Cooperative, 2015; Pittsburgh Ballet Theatre, n.d.), however, an experienced ballet student can wear one pair anywhere from one week to three months (Figure 21) (Bedinghaus, 2017b).
This lack of durability is largely due to the fact that the shoe disintegrates with moisture. Whether it be from the humidity levels in the dance studio or perspiration from the foot, moisture is the primary agent for causing dead pointe shoes (Bedinghaus, 2017b; McGuire, 2017). Extensive measures are taken to minimize the amount of moisture. The optimal choice for reducing moisture is alternating between two or more pair to allow each pair to fully dry between usage, as affirmed by principal dancer of Pittsburgh Ballet Theatre, Alexandra Kochis, who continually rotates between 12 and 14 pair at all times (Swartz, 2013). Many suggest allowing at least 24 hours before being worn again after removing any additional padding or accessories (McGuire, 2017; Russian Pointe, n.d.). Other measures taken include hanging the shoes in open air and stuffing the shoes with newspaper, paper towels, or other materials to absorb moisture (Foster, 2016). It is also recommended that students place the shoes in a mesh bag during transportation to allow additional air flow (Russian Pointe, 2014).

**Materials.** Traditional pointe shoes are made of assorted combinations of satin, burlap, canvas, suede, leather, cardstock, and paper (Becker, 2015a; Cunningham, DiStefano, Kirjakin, Levine, & Schon, 1998) (Figure 22). The primary adhesive used during manufacturing is a papier-
mâché like paste called nitrocellulose. This compound, also known as guncotton, was first discovered in the 1830’s (Thomason, 2016). Nitrocellulose can take on many different forms, however, the type found in pointe shoes is non-explosive, low-nitrate compound, with a similar fibrous texture to cotton (Fernandez de la Ossa, Torre, & García-Ruiz, 2012). When mixed with ingredients such as sugar, flour, starch, sand, and water, a very hard, almost cement-like paste is formed. Many manufactures have their own “secret” paste recipe (Victoria, 2017).

![Figure 22: Traditional materials.](image)
*Note: Taken from Kumar, 2013*

Although moisture is the main cause of rapid break-down, there is also the occasional factor that must be considered: bugs. Weevils and grain beetles feed on grain products and therefore are attracted to the flour in the adhesive paste. To prevent these bugs from damaging new pointe shoes, they are stored in plastic bags (Fuhrer, 2018). Existing bugs can be killed by freezing the shoes overnight, yet the possibility of larva remains. The only way to eliminate the issue for certain is to discard the shoes (McKeever, 2014).

Gaynor Minden shoes are not plagued by many of these issues since their thermoplastic shank and toe box are one continuous piece between small strips of Poron® polyurethane foam (Brewer, 2001; McKeever, 2012; Weinman, 2013a). In Figure 23, the pink layer denotes the thermoplastic shank-toe box combination. This use of plastics and foam eliminates the need
for a paste mixture, however, even with these advancements, the materials continue to be non-breathable and the remainder of the shoe continues to be made of the previously stated, traditional materials. While they may last longer than other brands, these small improvements contribute to the high price of $120 per pair compared to the average cost of $60 to $80 per pair (Cupp, 2016).

![Image: Gaynor Minden materials](image)

**Figure 23: Gaynor Minden materials.**
*Note: Taken from Weinman, 2013c*

**Fit and symmetry.** When a dancer enters the world of ballet, particularly when she advances to pointe, she has accepted that discomfort and pain is inevitable, however, if the pointe shoe does not fit properly, it can lead to various issues such as blisters, corns, and even toenail removal. The lack of appropriate fit contributes to this pain. Unlike most shoes on the market, pointe shoes do not have a left and right. There is no differentiation between the two shoes (ballet-feetfirst.com, n.d.; Weinman, 2013a). This type of symmetry is unique to the pointe shoe, as no other athletic shoe is created this way. The shoes are expected to conform to the ballerina’s feet while dancing, however, since they are identical, dancers must label the left and right foot, so as not to wear the previously broken in shoe on the wrong foot. This process is repeated for each new pair, making it impossible for any two pair to be exactly identical (Becker, 2015b; Pittsburgh Ballet Theatre, n.d.). The proper fit also affects the dancer’s
ability to get over the box. If a dancer is wearing a poorly fitted shoe, she may not be able to successfully stand completely en pointe with the entire platform touching the floor (Morgan, 2018).

**Price.** The average cost of pointe shoes is $75 to $125 USD per pair (Rose, n.d.). For professional dance companies buying in bulk, such as New York City Ballet, their cost is $67.50 per pair, totaling $500,000 per year spent on pointe shoes alone (Becker, 2015a; Summer, 2012). The cost hinders many young dancers from pursuing their dreams (Abrams, 2015). Prices have increased over the years. In 1984, one pair of Freed of London’s stock shoes were $29 USD and for special alterations a fee of $5 was charged (Bentley, 1984). Over the years, the cost of pointe shoes and manual labor has skyrocketed and many manufacturers have gone out of business, as a result. Brands such as Woessner, Schachtner, and Salvio have been forced to close their doors due to price increases (“Salvio’s pointe shoes-a fond farewell,” 2016).

**Accessories.** In many cases, additional accessories are needed to achieve a better fit. After purchasing the pointe shoes, ribbons and elastic, which are required to wear the shoes, must also be purchased. Purchasing additional add-ons is a personal choice. Some dancers may choose to not utilize any, while others may opt to use an array of accessories available. There are many pointe shoe accessories available on the market today, but the most commonly used ones are toe pads, toe spacers, lamb’s wool, gel squares, corn cushions, gel toe caps, toe tape, bunion guards, and suede tips, all of which, come at a price (Boday, 2002).

**Improvement Attempts**

Several attempts to reinvent the pointe shoe, or parts of the shoe, and advance the materials have been made in the 21st century by various individuals, some unrelated to dance.
While there is certainly something to be learned from each of these, it is apparent that the inventor in most of these cases did not take into consideration the most important aspect in ballet: tradition. In addition, the majority of the attempts were not based on scientific research, but rather an entrepreneurial spirit.

In 2008, Michael Thoraval, director of English manufacturing company, Capulet, partnered with DuPont to develop a shoe that offered greater comfort along with noise and impact absorption (Figure 24) (Brett, 2008). The primary material was a type of foam called D30 that was incorporated inside the toe box. Unfortunately, it was compared to Gaynor Minden’s use of Poron® which has even greater comfort properties (Feel Like Dancing, 2016; Marisa, 2009). The pointe shoe was not a success.

One year later, in 2009, Dr. Matthew Wyon, professor of Dance Science at University of Wolverhampton invented the Flyte Pointe Shoe (Figure 25). The features of this shoe included clip on ribbons, differing shanks for each foot, removable satin for easy replacement, polymer in the toe box to reduce sound, and slip-resistant microfiber on the platform. In 2010, this product was on the market in three locations: two stores in England, and one in Dubai, where the shoe was manufactured (Marisa, 2010; Schanfein, 2012). They are currently nowhere to be found when searching for purchasing locations or product website.
Invented by Kelly Schmutte in 2012, the PerfectFit Insert (Figure 26) is a moldable insert that replaces a toepad. The insert consists of a fabric cover, a blend of silicone rubber putty, and provides the option to incorporate toe spacers (purchased separately). The purpose of the moldable material is to provide a custom casting around the toes (Martin, 2018). It is currently available on their website for $42 USD plus shipping.

One year later, in 2013, Dr. Gordan Waddington (Professor of Physiotherapy at the University of Canberra) and his assistant, Jeremy Witchalls, developed a textured PVC insole. The PVC has a lined pattern in order to lock into the skin. It was created in hopes that it would prevent slipping. As of 2013, the insole is currently undergoing testing and not available on
shelves yet (Clarke, 2013).

The most recent concept came in 2018. Hadar Neeman Weinstein, an industrial design student at Bezalel Academy of Art and Design, has developed a conceptual pointe shoe, the P-roulette 3D printed pointe shoe (Figure 27) (Weinstein, 2018a). The idea is that the shoe would be created using an elastomeric polymer extruded through a 3D printer. During the printing process, an elastic, satin-like fabric is sandwiched between printing layers, eliminating the need for paste, glue, and multiple layers of varying materials. The dancer uses a mobile app to scan her foot where the details can be edited on a computer (de Klee, 2018). The goal of the shoe is to provide shock absorption, ventilation and longevity (Weinstein, 2018a).

Unfortunately, this was only a conceptual model for Weinstein’s final project in industrial design. There was never a prototype developed and she has no plans to commercialize the product (Weinstein, 2018b).

Figure 27: P-roulette pointe shoe.
Note: Taken from (Neeman, 2018)

Professional Ballet Industry

Professional ballet companies can be found in most major cities in the United States and around the world. The majority are located in large cities such as New York City, Moscow, and Berlin. However, some smaller cities also have their own professional ballet company as well.
such as Raleigh, NC and Salt Lake City, UT. Professional ballet companies are primarily 501(c)(3), non-profit organizations so they must rely on financial support from donors. These donors vary from company to company but overall they are usually large corporations, local government, local businesses, foundations, and individuals. The more prominent ballet companies, such as Paris Opera Ballet, have high-profile sponsors including Ernst and Young, Rolex, Chanel, and Mastercard, just to name a few (Opera de Paris, 2017).

The cost of pointe shoes makes up such a large portion of the budget that many companies have a pointe shoe fund where donors can direct their donations specifically toward purchasing pointe shoes. In addition to the cost, the number of pointe shoes that companies go through on a daily basis requires a shoe manager on staff. There is at least one person whose full time job is managing the pointe shoe inventory and overseeing each ballerina’s custom pointe shoe specifications. Depending on the company, they will place monthly orders comprised of around 50 pairs per dancer.

Although it is a niche market, the size of the ballet industry is much larger than many may realize. Within the United States alone, there are approximately 132 professional ballet companies (Appendix A). Within each company, there is an average of 24 dancers including males and females. Of the 132 companies identified, 121 had the company members listed on their public website. The total number of dancers fluctuates dramatically depending on the size of the company. For example, American Ballet Theatre has 96 dancers in their company, whereas Pittsburgh Ballet Theatre has 30, and Missouri Contemporary Ballet only has 9 company members. The total number of professional ballet dancers that the researcher identified in the United States, excluding the ones that did not have their information listed, is
3,119. Male dancers should be excluded in this count, since females are the only ones who wear pointe shoes. The total number of female professional ballerinas in the United States is 2,054. Ballet companies around the world are comprised of far more dancers than those in the States. Two of the most well-known companies, Paris Opera Ballet and Bolshoi Ballet, consist of 158 and 229 company members, respectively (Bolshoi Ballet, n.d.).

The number of professional football and basketball players pales in comparison to the number of professional ballerinas. To put this in perspective, there are 32 NFL teams in the United States with each team being allowed up to 58 players (53 on the roster plus 5 additional players for practice). This is a total of 1,696 total players in the entire league (InfoPlease Editors, n.d.). Within basketball, there are a total of 30 NBA teams, with each team having a maximum of 15 players, totaling 450 professional basketball players in the United States (NBA Media Ventures, 2018).

CHAPTER 3: METHODOLOGY

The purpose of this study was to identify the issues and challenges that ballerinas face with pointe shoes. Patent research has shown that the design and development of the shoe has had little to no advancement in the past 100 years. This information gave insight to the materials and construction processes still used today, however no research has been executed on the specific issues created by the current state of the shoe. The results of this study will provide information regarding the issues and challenges that affect ballet dancers when wearing the shoes, give insight into the current construction and manufacturing process of the shoe, and provide valuable information to students, parents, instructors, dance boutiques, professional dancers, and manufacturers. This study will provide important information as to
what aspects can be enhanced to create a better pointe shoe.

**Research Objective and Questions**

In order to better understand the issues and challenges that professional dancers face with pointe shoes, the following research questions were developed to guide the development of an electronic survey:

1. What do ballerinas perceive to be important issues with pointe shoes?
2. What brand of pointe shoes do professional ballerinas wear?
   a. Is this brand required?
   b. Is this brand the most durable?
3. Is there any relationship between brand of pointe shoes and:
   a. Discomfort
   b. Preparation time
   c. Part of the shoe that dies first

**Research Design**

This study was designed to provide insight toward future research and contribute to a much larger issue of redesigning the shoe based on the issues identified. Survey questions were developed based on literature review and personal contacts with dancers. Once the questions were established, an online survey was created using Qualtrics™ software to gather user data. Table 2 outlines the relationship that each survey question has to the research questions. The survey was vetted by a small group of dancers and changes were incorporated for clarity and precision. The complete list of survey questions can be seen in Appendix C. Institutional Review Board approval was received before the study began.
The study was conducted by emailing professional dancers an explanation of the research along with a link to the survey which collected data regarding their personal experience, individual preparation routine, and the brand of pointe shoes they were currently wearing (Appendix C). Personal demographics were not incorporated in the survey to maintain anonymity. The researcher hoped to receive 50 responses. This number was based off the assumption that professionals would be difficult to contact or may not have time to respond. The survey data was statistically analyzed using JMP Pro by SAS.
### Methodology Chart

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Survey Questions</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What do ballerinas perceive to be important issues with the pointe shoe?</td>
<td>In what ways do you increase the life of your pointe shoes?</td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td>In what ways do you prepare your new pointe shoes so they are ready to wear?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approximately, how long do you spend preparing a new pair of pointe shoes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What areas of your foot do you experience discomfort while wearing pointe shoes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If you could change one aspect of the pointe shoe what would it be?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Which of the following do you experience as a result of wearing pointe shoes?</td>
<td></td>
</tr>
<tr>
<td>2. What brand of pointe shoes do professional ballerinas wear?</td>
<td>What brand of pointe shoe do you currently wear?</td>
<td>Frequency</td>
</tr>
<tr>
<td>2a. Is this brand required?</td>
<td>Are you required to wear this brand?</td>
<td>Frequency</td>
</tr>
<tr>
<td>2b. Is this brand the most durable?</td>
<td>On average, how many hours does one pair of pointe shoes last you?</td>
<td>Chi Square &amp; Frequency</td>
</tr>
<tr>
<td>3. Is there any relationship between brand of pointe shoe and:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Discomfort</td>
<td>What areas of your foot do you experience discomfort while wearing pointe shoes?</td>
<td>Frequency</td>
</tr>
<tr>
<td>3b. Preparation time</td>
<td>Approximately, how long do you spend preparing a new pair of pointe shoes?</td>
<td>Chi Square &amp; Frequency</td>
</tr>
<tr>
<td>3c. Part of the shoe that dies first</td>
<td>What part of your pointe shoe dies first?</td>
<td>Chi Square &amp; Frequency</td>
</tr>
</tbody>
</table>
**Sampling Method and Data Collection**

The objective of this study was to identify the array of issues and challenges that are associated with professional ballerinas’ use of the pointe shoe. This study was conducted using a convenience sample of participants within the ballet industry. Subjects included professional dancers from numerous ballet companies all over the United States as well as professional dancers in other countries. This variation in subjects provided insight from users around the world, giving a global perspective of the issues.

Subjects were contacted via email with information about the research and provided a link to the survey. A total of 200 professionals were emailed with the hopes of receiving a minimum of 50 responses. Prior to emailing, contact information was discovered on the social media site, Instagram, specifically on various ballet accounts, such as balletzaida and dreamdancerballet, formerly known as dreamdancer840 (Figure 28). These particular accounts are dedicated to featuring high quality ballet photography and are comprised of primarily professional ballerinas with the occasional advanced ballet student featured. Many hours were spent scrolling through over 8,000 posts, identifying which dancers were professional (Figure 29), pinpointing the professionals that publicly displayed their email addresses on Instagram (Figure 30), and finally contacting said professionals. Subjects were emailed only once and were encouraged to pass it along to those in their ballet network. There were no reminder emails sent. The researcher relied on one time requests and the snowball effect.
Figure 28: dreamdancer840's Instagram account.
Note: Author’s Screenshot

Figure 29: Instagram post featuring professional dancer, Kristy Lee Denovan. Note: Author’s Screenshot

Figure 30: Kristy Lee Denovan’s Instagram account.
Note: Author’s Screenshot
Data Analysis

The goal of this study was to receive 50 complete responses over a six month period. The survey was open from February 2018 to July 2018. A total of 143 responses were received. If a response was less than 30% complete, it was deemed incomplete and eliminated. No responses were less than 30% complete. This study primarily relied on quantitative data, with two qualitative, optional opinion questions at the end of the survey. The quantitative data was exported in to a .csv document in Microsoft Excel and statistically analyzed using JMP Pro 14 by SAS. The qualitative data was analyzed using a common word association software called NVivo which displayed repetitive words and phrases.
Sample Description

The respondents were comprised of all female professional dancers from all over the world. A total of 200 dancers were emailed and 143 responded to the survey, providing an 72% response rate. No demographic information was collected related to age, dance company, residence, or ethnicity to assure anonymity.

Research Question 1

To answer the question “What do professional ballerinas perceive to be important issues with pointe shoes?”, a frequency analysis was run to identify which issues were most prevalent. Factors that were explored included: durability, preparation techniques, preparation time, discomfort, brand, and additional accessories.

Issues. Five survey questions were developed to answer RQ 1. The first survey question was: In what ways do you increase the life of your pointe shoes? Respondents were given six options, along with an ‘other’ option as well as ‘I do not use any techniques’ (see Appendix C). They were able to select as many as applied. Out of the 138 respondents to this question, 104 (75%) said they rotate between two or more pair to make their shoes last longer. The second most popular choice (87 responses or 63%) was the application of super glue to the shank or other parts. The third most popular choice (85 responses or 62%) was to hang the shoes in open air or a mesh bag to dry. Figure 31 shows the breakdown of all responses.
Figure 31: Techniques used to extend the life of the shoe.

The second issue respondents were asked to address was “In what ways do you prepare your new pair of pointe shoes so they are ready to wear?” Thirteen options were provided and respondents could select as many options as applied. The top three selections were to: sew on elastic (137 respondents or 99%), sew on ribbon (128 responses or 93%), and bend or break the shank (97 responses or 70%). Figure 32 provides a breakdown of the overall responses. It is important to note that there were many responses in the ‘other’ category, which demonstrated that dancers go to great lengths, in many unexpected ways, to prepare their shoes to make them more comfortable, increase their life, or aid performance.
The third issue subjects were asked to address was “Approximately how long do you spend preparing each new pair of pointe shoes?” As shown in Figure 33, the largest number of dancers (34%) reported spending 45 minutes to 1 hour preparing each pair of new pointe shoes. Only 5% of the respondents spend less than 15 minutes in this process.
The fourth issue respondents were asked to address was “*In what areas of your foot do you experience the most discomfort?*” Respondents were asked to select from six parts of the foot (toenails, big toe, pinky toe, heel, ankle, and arch) and choose all the options that applied. An ‘other’ option was also available. The ‘other’ option received 26 responses, which included bunions and metatarsals and have been pulled out in Figure 34. The majority of respondent (66 out of 112 respondents or 59%) reported that toenails were a major area of discomfort. The second most prominent area of discomfort (50 respondents or 45%) reported was the big toe, also known as the hallux. The third primary area of discomfort (29 respondents or 26%) Figure 34 shows the breakdown of foot discomfort.
The fifth issue respondents were asked to address was “If you could change one aspect of the pointe shoe what would it be?” Six options for response were provided, however, the question was not mandatory. There were 129 responses to this question, with the most, 30%, reporting that they would change the durability of the pointe shoe. The second most reported answer was price with 28% or 36 respondents reporting that they would change the price of the pointe shoe. Figure 35 shows the responses for the six options.

Figure 34: Areas of the foot where the most discomfort is felt.
Figure 35: Areas where change in the shoe was desired.

**Research Question 2**

To answer the question “What brand of pointe shoes do professional ballerinas wear?”, data was analyzed to determine the most commonly used brand of pointe shoe among the 135 respondents. The top three brands were Freed of London (32%), Gaynor Minden (19%), and Bloch (12%). A total of 14 brands were available, as well as an optional ‘other’ section, for those that might wear lesser known brands. See Figure 36 for the distribution of all brands.
Research Question 2a

The second question, to accompany RQ 2 and assist in identifying the brands was “Is this brand required?” Of the 130 responses to this question, 120 respondents (92%) reported that they were not required to wear the brand (Figure 37), while 10 reported that they were required to wear the brand (Figure 38).
Research Question 2b

The third part of RQ 2 was “Is this brand the most durable?” To answer this question, the following survey question was asked: “How many hours does one pair of pointe shoes last you?” Out of 140 responses, most (43%) reported that one pair lasting 12.5 hours or more.

Figure 39 reports the general hours of use for a pair of pointe shoes.
Figure 39: Brand durability – all brands.

Figure 40 shows the general “hours of use” by brand. Those that reported wearing Freed of London reported the durability ranging across the board. Professionals that reported wearing Gaynor Minden reported their shoes as lasting the longest. The relationship between hours per pair and brand is statistically significant (chi square equals 87.311, df=44, p value=0.0001). Due to the size of the matrix, no post-hoc tests were conducted. Instead, bar charts were used to examine the frequencies.
Figure 40: Brand durability – breakdown by brand.

Note: Brand abbreviations: Freed of London (Freed), Russian Pointe (RP), and Gaynor Minden (GM). Freed, n= 43, GM, n=24, Bloch, n= 16, Grishko, n=15, Suffolk, n=12, RP, n=7, Capezio, n=3, Sansha, n=2, Merlet, n=2, Other Brands, n=16.
Research Question 3

To answer the question “Is there any relationship between brand and discomfort, preparation time, and the part of the shoe that dies first?” frequency and chi square analysis was run to determine the relation to brand (Figure 41). For the first question “Is there any relationship between brand and discomfort?” respondents were able to select as many locations that applied, as well as enter other areas of discomfort that may have not been listed. Other pain locations included between the toes, metatarsals, and “it depends”. Other brands included Sansha, Chacott, Eva Martin, Merlet, Prima Soft, Repetto, and “multiple brands”. Figure 41 shows the results from the 112 responses to this question.

As reported earlier (Figure 34), the top three areas of discomfort were toenails, big toe, and pinky toe. Users from every brand reported toenails being an area as discomfort. The second primary area of discomfort was the big toe. The third primary area of discomfort was the pinky toe.
Figure 41: Brand by type of discomfort.

Note: Freed, n=23, GM, n=13, Bloch, n=8, Suffolk, n=7, Grishko, n=6, RP, n=4, Capezio, n=3, Other Brands, n=5
As reported previously in Figure 33, the majority (34%) of respondents reported spending 45 minutes to 1 hour preparing each new pair of pointe shoes. To answer the question: *Is there any relationship between brand and preparation time?*, a chi square analysis was run to determine which brand required the most preparation time (Figure 42). The relationship between preparation time and brand is not statistically significant (chi square equals 47.096, df=44, p value=0.3470). Bar charts were used to examine the frequencies. Figure 42 shows the breakdown of all responses by brand.

![Figure 42: Brand by preparation time.](image)

Note: Freed, n= 43, GM, n=25, Bloch, n= 16, Grishko, n=15, Suffolk, n=12, RP, n=8, Capezio, n=3, Sansha, n=2, Merlet, n=2, Other Brands, n=8.
To answer the question “Is there any relationship between brand and the area of the shoe that dies first?”, a chi square analysis was run to explore a possible correlation. Overall, the majority of respondents, 38% of 135 respondents, reported that the toe box in general was the area of their shoe that died first. The shank was the second most recorded area that users reported dying first, with 31%. The third primary area that users reported dying first was the platform. The relationship between the part of the shoe that dies first and brand is not statistically significant (chi square equals 67.481, df=88, p value=0.9490). Bar charts were used to examine the frequencies.
Figure 43: Brand by part of the shoe that dies first.
Note: Freed, n=43, GM, n=25, Bloch, n=16, Grishko, n=15, Suffolk, n=12, RP, n=8, Capezio, n=3, Sansha, n=2, Other Brands, n=11.
CHAPTER 5: DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to identify the issues and challenges that professional ballerinas face every day while wearing pointe shoes. Over the past 100 years, very little has been done to improve the design and function of the shoe. A review of literature provided an understanding of the materials and construction processes still used today. Until now, the current condition of the shoe has remained undisputed and no academic research has been conducted to identify the extensive issues due to the outdated fabrication of the pointe shoe. The results of this study will provide information as to what aspects can be enhanced to create a pointe shoe that not only addresses the issues identified, but encourages future research and developers to contribute to the making of a better athlete.

Modern day advances in pointe work and technique are the result of dancers that disrupted the idea of dancing en pointe with not only their talent, but their shoes as well. First, Marie Camargo in 1730, by introducing toe dancing and causing an upset by shortening her skirt and removing her heels. Next was Anna Pavlova in 1901, when she added wooden reinforcement to her shoes. The most recent disruption is Gaynor Minden with their thermoplastic shank and toe box.

The issues that were identified and detailed in the literature review were construction and consistency, preparation, deconstruction and breaking in, durability, materials, fit and symmetry, and price. Many attempts have been made to adjust parts, patterns, or processes, but no attempts have been made by academia to provide individual solutions to each issue in order to contribute to a new and improved pointe shoe.
In order to contribute to the improvement of the pointe shoe and provide future researchers with information and suggestions, a survey was sent out to 200 professional ballerinas to gain insight on the previously stated issues. The responses were recorded in Qualtrics and analyzed using JMP software to answer the following the research questions:

1. What do ballerinas perceive to be important issues with pointe shoes?

2. What brand of pointe shoes do professional ballerinas wear?
   a. Is this brand required?
   b. Is this brand the most durable?

3. Is there any relationship between brand of pointe shoes and:
   a. Discomfort
   b. Preparation time
   c. Part of the shoe that dies first

**RQ 1**

*What do ballerinas perceive to be important issues with the pointe shoe?* According to the findings, the top issues that ballerinas perceive to be important issues are durability and price. Even though there is a significant amount of time spent preparing the shoe and various attempts to increase the life of the shoe, durability remains the top concern. Surprisingly, comfort was not an area that respondents would want to see a change in, although there is a slew of painful effects from wearing them.

It is logical that durability would be the primary concern, due to the constant preparation and breaking-in process that occurs on a daily basis for professional dancers. One user commented “I have super bendy feet and go through shoes really quickly...The problem is
most shoes don’t last long enough for me”. Additionally, durability is the reason that many dancers remain conscious about the state of their shoe while on stage. It is quite common for a dancer to change into new pointe shoes during a performance. No athlete should have to worry about their equipment failing halfway through a performance. They should be solely focused on their technique and routine with full confidence in their shoes.

The preparation techniques and attempts to make the shoes last longer seem in vain. Although the majority of respondents reported alternating between two or more pairs of shoes to extend the life of their shoes, it is not actually a life extension technique. If a dancer is wearing one pair of shoes for 9 hours and decides to add another pair to the rotation, she will need two new pair in 18 hours. Each shoe has lasted for 9 hours. Instead of preparing and wearing one pair at a time, she has simply extended it to two. This could be extended even further by rotating between 50 pair at a time. All in all, alternating does not seem to be a logical way to extend the shoe’s life. The extent to which dancers go to prepare their shoes and apply techniques to extend the life, do not change the fact that they still disintegrate at an astonishing rate. Instead of spending time preparing and breaking in shoes constantly, dancers could be spending their time elsewhere or simply relaxing.

Other concerns that were not addressed in the survey came from the comments. The majority of the additional comments that were received were related to consistency. The researcher did not include this in the survey question “If you could change one aspect of the pointe shoe what would it be?” Comments that addressed consistency such as the following were received:
• “Regarding what I would change — I like that my shoes are handmade however, I would also like more consistency”.
• “Honestly, machine made is my preference for consistency purposes”.
• “The only thing I wish as a professional is that point shoes could come always consistent”.
• “I would love to see more consistency in the production of pointe shoes”.
• “I have handmade pointe shoes...but it also makes them inconsistent and that is very disturbing”.
• “I would change that the shoe is made consistently the same”.

RQ 2

What brand of pointe shoes do professional ballerinas wear? According to the findings, the top three brands worn by professional dancers are Freed of London, Gaynor Minden, and Bloch. The fact that Freed of London is the most worn brand was not surprising, a many ballet companies consider themselves “Freed Companies” meaning that their dancers only wear Freed shoes, including the local ballet company, Carolina Ballet. Kerri Martinsen, the shoe manager there, stated that she aims to transition incoming professionals in to Freed shoes as soon as possible, upon joining the company. Exceptions are made for those who are not able to find the perfect fit (Martinsen, 2018). The reason that Freed of London is the brand of choice for professional companies is because of the wide array of customization options that the dancers are given. The 11 areas of customization include: fabric color, maker, length, width, block, platform, vamp, side, heel, insoles, and drawstring (Freed of London, n.d.-a). They also form to the dancers’ feet faster but have the shortest life span and take the longest to get
ready. This does not make any sense. Even with all the customization options available, they still require additional work to be worn. Outsiders looking in would expect that a custom experience eliminates work on the dancers’ part.

The majority of professionals, however, reported that they were not required by the company to wear this brand. It is the researcher’s opinion that while they may not be required, they may be highly encouraged to wear Freed's. The majority of Freed users reported their shoes lasting an average of 7.5 to 9 hours. This is understandable and was expected, due to the amount of time that professionals spend wearing pointe shoes on a daily basis.

The researcher found it surprising that Gaynor Minden was in the top three brands due to the stigma associated with the shoes (Swanson, 2018). It is encouraging, however, to see the industry beginning to accept a newer, less traditional brand. It would be interesting to know if the professionals that wear them are in the United States or are international. No personal information was collected from the respondents, so brand acceptance by location could not be identified. The researcher also found it interesting that Capezio did not appear as one of the top three brands, or even the top five. Instead, they ranked at number seven. This was unexpected since Capezio was an original pioneer of the pointe shoe.

**RQ 3**

*Is there a relationship between brand and discomfort, preparation time, and the part of the shoe that dies first?* The top three areas of discomfort that were reported were toenails, big toe, and pinky toe. Users from all brands reported toenails and the big toe being the primary areas of discomfort. Instead, the shoe overall is the reason for this discomfort. This shows that even though a particular brand may last longer, the issue of comfort still remains unaddressed.
The majority of users of all brands reported spending between 30 minutes to 1 hour preparing each new pair of shoes. One Freed user reported that “Even though preparing my pointe shoes takes around 2 hours, I am very satisfied with the brand, maker, and type of pointe shoes I am wearing”. The one brand that stood out was Russian Pointe. Users of this brand reported spending the most time preparing each new pair. It is unclear what the cause of this may be and what makes Russian Pointe users unique in this area.

According to the findings, there is not a relationship between brand and the part of the shoe that dies first. The top three areas that were reported were the toe box in general, shank, and platform. The toe box and shank were not necessarily related to one brand specifically, but rather an overall pointe shoe issue that users experience no matter what brand is worn. The platform, however, was significantly more reported by Freed users than any other brand. Freed shoes are designed to form to the dancers foot quickly, which really means that they break down more quickly than other brands. In order for the shoe to form and mold, heat and moisture must be present, the two factors that also contribute to the disintegration of the shoe.

**Implications**

The fact that 143 (72%) of the 200 professional dancers contacted, responded to the survey is evidence that the current condition of the pointe shoe is worth being addressed. The following topics are areas of concern due to the implications for multiple parties including professional ballerinas, professional ballet companies, manufacturers, and the planet.

**Materials.** The current materials are not ideal for the conditions in which the shoes are required to perform. The lack of breathability, wicking capabilities, shock absorption, and slip
resistance is simply disheartening. Upon deconstructing a pointe shoe and observing the multitude of parts involved, it was very clear as to why and how the shoe disintegrates so quickly. The shoe in question was a Capezio pointe shoe. There were a total of 8 lines of stitching throughout the entire shoe, 34 pieces, 21 pattern pieces, 3 metal nails and more glue and paste then could be accounted for (Figure 44).

![Figure 44: Deconstructed pointe shoe.](image)

Note: Author’s image

The paste used in this particular shoe contained a gritty substance such as sand or a related granular material. Many manufacturers use a paste that contains flour which attracts grain beetles and weevils (Fuhrer, 2018). Is it simply appalling that manufacturers would not do everything in their power to eliminate this problem as soon as it occurs. Even worse, the industry overlooks it instead of insisting on a resolution that holds the manufacturers accountable for their lack of preventative actions. There is no other sport in which this would be remotely acceptable in. In fact, it would more than likely result in millions of dollars spent in compensating the athletes due to harming their bodies’ foundation and possibly ruining their
career in the sport. There is a significant opportunity in the materials department for major improvements that could certainly be achieved.

**New materials.** “Your feet should be able to hold you up, not the shoe”. The argument that pointe shoes should continue to be constructed with outdated materials, because it requires the dancer to build strength and muscle and that a shoe with newer (although still not advanced) materials inhibits this development, is the same argument that was used hundreds of years ago. The reality is, is that our feet are not designed to hold our entire body weight on the tips of our toes. In Walter Terry’s 1962 book, *On Pointe*, he explains, “For those who complain that the toe shoe is artificial, Balanchine has an answer. He agrees but he approves. ‘Ballet is artificial,’ he says. ‘It is like poetry, it is invented. It is the unreal versus the real. Where words fail, poetry can succeed and the same is true of ballet: something you cannot explain can be expressed on pointe” (Laemmli, 2015, pg. 18). Just because a dancer uses a slightly improved shoe, does not make her any less of a dancer. Without any developments throughout history, dancing en pointe would still be impossible.

**Construction.** Handmade construction will not last forever with the depletion of this craft/skill. The older generation of workers is slowly dying. According to Jacob Russell, a writer for the Wall Street Journal, who interviewed Freed of London cobblers, “Newer cobblers also produce less. Mr. Turner, who is 55, turns out about 40 pairs of shoes a day, starting at 7 a.m. and working through most of his 30-minute lunch break. His less experienced colleagues average 25 or 30, Mr. Brooks says. Employees are paid by the shoe, and Mr. Turner says he takes in more than $950 a week” (Russell, 2006, https://www.wsj.com/articles/SB116682961525958107).
As a reminder, these cobblers are constructing turn shoes, as mentioned in the literature review. Why does no one dispute this outdated, 19th century construction method when we have such advanced manufacturing methods in place, in almost every other industry today? The inconsistencies, due to being handmade, make it impossible for any two pair to be alike. This is a disservice that the pointe shoe industry is doing for all ballerinas but will remain an issue as long as they are constructed by fallible human beings.

Ballerinas should not have to simply “deal” with the issues caused by handmade construction. They, like any other athlete, deserve a quality, well-made, consistent shoe that is reliable. The amount of time put in to making one pair of pointe shoes does not justify the amount of time it takes to destroy them. A pair of shoes should last longer than it takes to make them. Because of this imbalance, manufacturers are constantly dealing with back orders and are unable to keep up with “demand”. One user confirmed this in the additional comments, stating “Freed shoes take too long to arrive. I am out of shoes and will not get [more] until April”.

**Price gouging.** The researcher strongly believes that pointe shoe manufacturers have found a way to take advantage of a niche market that relies 100% on their product. Without pointe shoes, dancers are unable to perform, shows would be canceled and professional dance companies would lose business. The cost of one pair of pointe shoes is outrageous for what is being provided. A simple Google search for ‘soccer cleats’ reveals that one can purchase a pair for anywhere from $40 to $200 depending on personal preference of style, brand, etc. Most would expect this shoe to last at the minimum of one soccer season, if not longer. Why shouldn’t dancers expect the same from their shoes? The amount of money that each shoe
costs, which is around $67 per pair wholesale is not relative to the amount of time it takes for them to disintegrate. Pointe shoe companies will never have a ballerina’s best interests at heart, unless they have a financial reason to do so. Football, soccer, and basketball shoes all improve because the athletes and coaches demand a level of performance from the brands. Ballerinas are not making any demands and the professional companies are not making any demands on behalf of the dancers. Because dancers are trained to be silent, the dance companies should stand up for the ballerinas and hold the manufacturers accountable for the lack of a suitable product. If manufacturers truly were focused on what the dancer needs and how they can address those needs, there would be research and development teams prototyping new pointe shoes every week to find the best materials to protect the dancers’ feet and possibly even improve their technique.

**Displaced blame.** The difficulties that a ballerina may face with her pointe shoes are her job to resolve. Whether it is comfort, durability, breaking in, or avoiding bugs, the problems experienced by the dancer, become her job to fix. Since the industry is not fixing the issues, it appears as if the industry has placed the blame on factors such as poor training, lack of strength, ill-fitting shoes, and the dancer not preparing her shoes properly. Instead of looking to the manufacturer for improvements, money and time is spent on the dancers’ and dance companies’ part to adjust the pointe shoes to her individual needs.

**Sports.** In the sports world, athletic equipment manufacturers often make use of new research and advances in technology and physiology to improve the effectiveness of their products and safeguard the health of the athlete. One example of this is the development of the running shoe, which, in only a few decades has progressed from a simple sneaker to a
sophisticated, aerodynamic, foot-protecting, performance necessity (Clifton, 2009).

Every other sport remains in continual search of improvements to materials and athletic gear so that the athletes can perform at their maximum capacity without bodily harm. Football players are not condemned for wearing padding, a helmet, and cleats. Could they be expected to tackle one another without injury otherwise? Of course not. They use the equipment to enhance their ability on the field without fear of injury. Even in golf, gloves are encouraged to prevent the slightest injuries of blisters and golf shoes with small cleats are used to prevent slipping in the grass.

The definition of a sport, according to Oxford Dictionary is "an activity involving physical exertion and skill in which an individual or a team competes against another or others for entertainment" (Oxford Dictionaries, n.d.). Many may argue that ballet is not a sport, however, the definition of a sport may need to be reconsidered. The fact that throwing darts is considered a sport, which requires very little physical exertion, is a reflection that the definition of a sport is really anything that concludes with a “winner”. The only difference between ballet and other sports is that there is no competition involved, other than auditioning for a part. If a sport requires competition or a rival to compete with to determine who is the best, then no, ballet is not a sport. But if a sport is defined as an activity where the participants must be well trained, physically in shape, and self-disciplined, ballet is absolutely a sport. In fact, ballet requires more commitment to continual skill training, maintaining bodily muscle, and the overall sport itself, than most other physical activities. Ballet is extremely demanding not only of one’s time but also in that one cannot simply decide to put on a pair of pointe shoes at the age of 15 and expect to be a ballerina in a year. Young girls begin training for pointe as young as
9-years-old. A young boy, however, may decide at the age of 12 that he wants to play football, and in a year, depending on the child, he may become the best player on his team. The physical demands of ballet are not only in the feet, but the entire body. Additionally, professional dancers are in class or rehearsals five or six days of the week and may dance in two or three shows each night during show seasons.

Most sports require that young children entering a sport, such as football, begin with all types of protective gear to protect their fragile bodies. Ballet, on the other hand, expects a young girl to deal with the pain and discomfort. She is expected to simply adjust and “grow thick skin”, so to speak. Because of this expectation, professional dancers most definitely have a higher pain tolerance than other professional athletes, due to the daily wear and tear on their body and feet without any protection. Overall, any activity that requires extreme physical exertion should be considered a ‘sport’ since it is requiring the human body to exert more precision and energy than it may have been designed for.

In American society, it is very common for sports that are primarily female based, such as cheerleading, gymnastics and all types of dance, to be neglected in terms of respect and corporate investments. Is it possible that these activities are ignored because they are primarily made up of female participants? It is not farfetched to believe so. As a predominantly male-run society, female interests have been pushed by the wayside and deemed to have lesser value than those activities that men are interested in. In more recent times, however, women’s interests are becoming more important and valued by all parties. Women are much more respected in the work place and are being encouraged now more than ever to take leaps of faith in whatever they may be passionate about.
**Anti-comfort.** Unfortunately, the area of comfort is not something that dancers speak up about. The fact that ballerinas simply “deal” with an array of issues while wearing pointe shoes (Figure 45), is the result of their training. From a young age, dancers are taught not to speak, only train. Ballet classes are very strict and dancers must abide by a rigid code of conduct in the classroom. Some behavioral expectations are no talking, no yawning, no leaning on the barre, and no leaving the classroom to use the bathroom or get water, just to name a few (Kansas City Ballet, 2015). Ballerinas are expected to arrive at class prepared to focus on ballet only. Eliza Minden, founder of Gaynor Minden, expounds on this topic, “Dancers are so disciplined; they are trained not only not to complain, but not to speak. So the last thing that they’re going to do is to complain about their toes. Also, the pointe shoe has become almost mythologized into a symbol and this rite of passage: yes it’s going to hurt; but you’re an artist and you have to suffer” (Clifton, 2009, pg. 28). Young ballerinas dream of the day they get their first pair of pointe shoes and whatever they must endure to reach this goal, they will. Ballerinas have not always accepted the state of the pointe shoe and the issues that come with it. In 1980, dancers threatened to go on strike for better pointe shoes (Fischer, 2011). If there was outrage from the dancers and dance companies, the industry would have no choice but to listen. No matter what data is presented in this research, ballerinas are so brainwashed to believe that this is their rite of passage and simply ‘part of the process’ that the issue of comfort may never be resolved.
**Sustainability.** The average professional dancer disposes of one to five pair of pointe shoes per day, with principal dancers wearing two to three pair per performance (Queensland Ballet, n.d.). Figure 46 shows a trash can full of dead pointe shoes after one of San Francisco Ballet’s shows. As Freed’s chief fitter, Michele Attfield, pointed out, “For a ballet such as David Bintley’s *Arthur*, each Guinevere needs eight differently colored pairs of shoes. Even in *Swan Lake*, a ballerina will need light and shiny in the ‘white’ acts, firm and matte for the bravura ‘black’ act, with a super-hard extra shoe to put on for the climactic 32 fouettes” (Brown, 2003, https://www.telegraph.co.uk/culture/theatre/dance/3590908/Arch-rivals.html). Consequently, ballerinas are not the only ones affected by the current condition of the shoe. The contributions that each company makes to landfills is unbelievable. The New York City Ballet goes through 8,600 pair per year for 47 dancers, while the Royal Ballet goes through 12,000 pair a year.
(Becker, 2015a). There are approximately 130 professional ballet companies in the United States alone, none of which compare to the size of international ballet companies such as the Paris Opera Ballet, the Royal Ballet, and the Bolshoi Ballet, which consists of 124 ballerinas. One can only imagine the number of pointe shoes Bolshoi goes through in one day. Some professional dance companies do take measures to reuse the shoes by selling used ones after a performance with the dancers’ signatures, however this does not apply to all companies and does not include the shoes that are discarded after rehearsals. It would be interesting to find out how many pounds of pointe shoes are disposed of each day.

Figure 46: Trash can full of dead pointe shoes.
Note: Taken from (San Francisco Ballet, 2016)
Conclusion

The survey findings were in accordance with the information uncovered in the literature review and demonstrate that there is significant opportunity for improvement in the manufacturing and development of the ballet pointe shoe. The literature review did in fact support the findings of the study and the results were mostly as expected. The survey was intended to validate the issues uncovered in the literature review and those known previously by the researcher and it surpassed the expectations.

The ballet pointe shoe is the most important piece of attire that a professional ballerina possesses. Unfortunately, there has been little to no effort put in to improving it. In the United States, there are multiple companies and industries built on improving the performance of the athlete and enhancing their equipment to allow them to be the best. Sadly, little has been invested to help protect and improve the performance of the dance athlete.

Recommendations

The purpose of this research was to better understand the variety of challenges that come with pointe shoes by conducting a survey for those wearing pointe shoes on a daily basis. One day, I hope to see a world of ballerinas with healthy feet and comfortable pointe shoes, thanks to committed research and development teams. With the use of modern day materials, computer-aided design, computer-aided manufacturing, and automated sewing, I am more than confident that this is possible and hope to one day see its fruition. The opportunities for future research on this topic are vast. Research should be conducted to identify the comfort and durability properties that would need to be addressed, such as surface friction, moisture absorbency, air permeability, abrasion resistance, etc. Additional research should also be done
to suggest appropriate materials to accommodate said properties. It would also be interesting to find out how many pounds of pointe shoes are disposed of each day and how much money ballet companies could save if dancers were able to wear one pair of pointe shoes for a longer period of time.
REFERENCES


from http://www.nbcsn.com/id/2463001/ns/technology_and_science-innovation/t/modern-twist-ancient-shoe/


https://www.telegraph.co.uk/culture/theatre/dance/3590908/Arch-rivals.html


Clifton, G. (2009). The coefficient of friction of the pointe shoe and implications for current 
manufacturing processes, 40.

comparative mechanical analysis of the pointe shoe toe box. The American Journal of 


Parks, G. (n.d.). Who was the first ballerina to dance on pointe? Retrieved October 12, 2018, from https://www.mtholyoke.edu/courses/cflachs/limited/pointe.htm


APPENDICES
Appendix A: Professional ballet companies in the United States .......................................................... 85
Appendix B: Email distributed to subjects .................................................................................................. 89
Appendix C: Survey for professional dancers ............................................................................................ 90
Figure 4: Marie Taglioni .............................................................................................................................. 13
Figure 5: Taglioni’s pointe shoes ................................................................................................................. 13
Figure 6: Salvatore Capezio .................................................................................................................... 14
Figure 7: Capezio’s first store ..................................................................................................................... 14
### Appendix A

**Professional ballet companies in the United States**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>City</th>
<th>State</th>
<th>Female Dancers</th>
<th>Male Dancers</th>
<th>Total Dancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;A Ballet</td>
<td>Chicago</td>
<td>IL</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Alabama Ballet</td>
<td>Birmingham</td>
<td>AL</td>
<td>26</td>
<td>11</td>
<td>37</td>
</tr>
<tr>
<td>Alameda Civic Ballet</td>
<td>Alameda</td>
<td>CA</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Alexandra Ballet</td>
<td>St. Louis</td>
<td>MO</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Alonzo King LINES Ballet</td>
<td>San Francisco</td>
<td>CA</td>
<td>5</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>American Ballet Theatre</td>
<td>New York</td>
<td>NY</td>
<td>54</td>
<td>40</td>
<td>94</td>
</tr>
<tr>
<td>American Repertory Ballet</td>
<td>New Brunswick</td>
<td>NJ</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Anaheim Ballet</td>
<td>Anaheim</td>
<td>CA</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Asheville Ballet</td>
<td>Asheville</td>
<td>NC</td>
<td>8</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Aspen Santa Fe Ballet</td>
<td>Aspen / Santa Fe</td>
<td>CO/NM</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Atlanta Ballet</td>
<td>Atlanta</td>
<td>GA</td>
<td>17</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>Avant Chamber Ballet</td>
<td>Dallas</td>
<td>TX</td>
<td>16</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>Ballet 5:8</td>
<td>Chicago</td>
<td>IL</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Ballet Arizona</td>
<td>Phoenix</td>
<td>AZ</td>
<td>16</td>
<td>13</td>
<td>29</td>
</tr>
<tr>
<td>Ballet Arkansas</td>
<td>Little Rock</td>
<td>AK</td>
<td>9</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Ballet Austin</td>
<td>Austin</td>
<td>TX</td>
<td>22</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>Ballet des Amériques</td>
<td>Port Chester</td>
<td>NY</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Ballet Des Moines</td>
<td>Des Moines</td>
<td>IA</td>
<td>17</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Ballet Deviare</td>
<td>New York</td>
<td>NY</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Ballet Etudes</td>
<td>Hialeah / Miami Beach</td>
<td>FL</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Ballet Fantastique</td>
<td>Eugene</td>
<td>OR</td>
<td>10</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Ballet Hispanico</td>
<td>New York</td>
<td>NY</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Ballet Idaho</td>
<td>Boise</td>
<td>ID</td>
<td>14</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Ballet Magnificat!</td>
<td></td>
<td>MS</td>
<td>25</td>
<td>3</td>
<td>28</td>
</tr>
<tr>
<td>Ballet Memphis</td>
<td>Memphis</td>
<td>TN</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Ballet Minnesota</td>
<td>Saint Paul</td>
<td>MN</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Ballet Nebraska</td>
<td>Omaha</td>
<td>NE</td>
<td>19</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>Ballet Palm Beach</td>
<td>Palm Beach Gardens</td>
<td>FL</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Ballet Pensacola</td>
<td>Pensacola</td>
<td>FL</td>
<td>8</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Ballet Quad Cities</td>
<td>Rock Island / Quad Cities</td>
<td>IL</td>
<td>10</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Ballet San Antonio</td>
<td>San Antonio</td>
<td>TX</td>
<td>20</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>Ballet Theatre of Maryland</td>
<td>Annapolis</td>
<td>MD</td>
<td>25</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>Ballet West</td>
<td>Salt Lake City</td>
<td>UT</td>
<td>29</td>
<td>25</td>
<td>54</td>
</tr>
<tr>
<td>Ballet Wichita</td>
<td>Wichita</td>
<td>KS</td>
<td>17</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>BalletMet</td>
<td>Columbus</td>
<td>OH</td>
<td>17</td>
<td>16</td>
<td>33</td>
</tr>
<tr>
<td>Company Name</td>
<td>City</td>
<td>State</td>
<td>Female Dancers</td>
<td>Male Dancers</td>
<td>Total Dancers</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------</td>
<td>-------</td>
<td>----------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Ballets with a Twist</td>
<td>New York City</td>
<td>NY</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Bay Area Houston Ballet and Theatre</td>
<td>Houston / Bay Area</td>
<td>TX</td>
<td>32</td>
<td>6</td>
<td>38</td>
</tr>
<tr>
<td>Bay Pointe Ballet</td>
<td>South San Francisco</td>
<td>CA</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Boston Ballet</td>
<td>Boston</td>
<td>MA</td>
<td>33</td>
<td>33</td>
<td>66</td>
</tr>
<tr>
<td>Brandon Ballet</td>
<td>Brandon</td>
<td>FL</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Brighton Ballet Theater</td>
<td>Brooklyn</td>
<td>NY</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>California Ballet Company</td>
<td>San Diego</td>
<td>CA</td>
<td>23</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Carolina Ballet</td>
<td>Raleigh</td>
<td>NC</td>
<td>23</td>
<td>16</td>
<td>39</td>
</tr>
<tr>
<td>Central Illinois Ballet</td>
<td>Peoria</td>
<td>IL</td>
<td>46</td>
<td>8</td>
<td>54</td>
</tr>
<tr>
<td>Central West Ballet</td>
<td>Modesto</td>
<td>CA</td>
<td>24</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Charleston Ballet</td>
<td>Charleston</td>
<td>WV</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Charlotte Ballet</td>
<td>Charlotte</td>
<td>NC</td>
<td>13</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>Chattanooga Ballet</td>
<td>Chattanooga</td>
<td>TN</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Chicago Ballet</td>
<td>Chicago</td>
<td>IL</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Chicago Festival Ballet</td>
<td>Chicago</td>
<td>IL</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Cincinnati Ballet</td>
<td>Cincinnati</td>
<td>OH</td>
<td>13</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>City Ballet of San Diego</td>
<td>San Diego</td>
<td>CA</td>
<td>37</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>Cleveland Ballet</td>
<td>Cleveland</td>
<td>OH</td>
<td>14</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Colorado Ballet</td>
<td>Denver</td>
<td>CO</td>
<td>17</td>
<td>14</td>
<td>31</td>
</tr>
<tr>
<td>Company C Contemporary Ballet</td>
<td>Walnut Creek</td>
<td>CA</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Complexions Contemporary Ballet</td>
<td>New York</td>
<td>NY</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Concert Ballet of Virginia</td>
<td>Richmond</td>
<td>VA</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Dance Theatre of Harlem</td>
<td>New York City</td>
<td>NY</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Dayton Ballet</td>
<td>Dayton</td>
<td>OH</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Diablo Ballet</td>
<td>Walnut Creek</td>
<td>CA</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>El Paso Ballet Theatre</td>
<td>El Paso</td>
<td>TX</td>
<td>14</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Eugene Ballet</td>
<td>Eugene</td>
<td>OR</td>
<td>13</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Festival Ballet Providence</td>
<td>Providence</td>
<td>RI</td>
<td>17</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>Festival Ballet Theatre</td>
<td>Fountain Valley</td>
<td>CA</td>
<td>9</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Florida Ballet</td>
<td>Jacksonville</td>
<td>FL</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Fort Wayne Ballet</td>
<td>Fort Wayne</td>
<td>IN</td>
<td>21</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>Grand Rapids Ballet</td>
<td>Grand Rapids</td>
<td>MI</td>
<td>24</td>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>Houston Ballet</td>
<td>Houston</td>
<td>TX</td>
<td>32</td>
<td>26</td>
<td>58</td>
</tr>
<tr>
<td>Huntsville Ballet Company</td>
<td>Huntsville</td>
<td>AL</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Island Moving Co.</td>
<td>Newport</td>
<td>RI</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>James Sewell Ballet</td>
<td>Minneapolis</td>
<td>MN</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Joffrey Ballet</td>
<td>Chicago</td>
<td>IL</td>
<td>20</td>
<td>23</td>
<td>43</td>
</tr>
</tbody>
</table>
## Appendix A

<table>
<thead>
<tr>
<th>Company Name</th>
<th>City</th>
<th>State</th>
<th>Female Dancers</th>
<th>Male Dancers</th>
<th>Total Dancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kansas City Ballet</td>
<td>Kansas City</td>
<td>MO</td>
<td>18</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Kentucky Ballet Theatre</td>
<td>Lexington</td>
<td>KY</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Lake Charles Civic Ballet</td>
<td>Lake Charles</td>
<td>LA</td>
<td>30</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>Lexington Ballet</td>
<td>Lexington</td>
<td>KY</td>
<td>18</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Los Angeles Ballet</td>
<td>Los Angeles</td>
<td>CA</td>
<td>19</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>Louisville Ballet</td>
<td>Louisville</td>
<td>KY</td>
<td>27</td>
<td>13</td>
<td>40</td>
</tr>
<tr>
<td>Madison Ballet</td>
<td>Madison</td>
<td>WI</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Maine State Ballet</td>
<td>Falmouth</td>
<td>ME</td>
<td>19</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>Mark Morris Group</td>
<td>Brooklyn</td>
<td>NY</td>
<td>7</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>Menlowe Ballet</td>
<td>Menlo Park</td>
<td>CA</td>
<td>19</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>Miami City Ballet</td>
<td>Miami</td>
<td>FL</td>
<td>30</td>
<td>21</td>
<td>51</td>
</tr>
<tr>
<td>Milwaukee Ballet</td>
<td>Milwaukee</td>
<td>WI</td>
<td>25</td>
<td>19</td>
<td>44</td>
</tr>
<tr>
<td>Minnesota Ballet</td>
<td>Duluth</td>
<td>MN</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Missouri Contemporary Ballet</td>
<td>Columbia</td>
<td>MO</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Mobile Ballet</td>
<td>Mobile</td>
<td>AL</td>
<td>30</td>
<td>?</td>
<td>30</td>
</tr>
<tr>
<td>Montgomery Ballet</td>
<td>Montgomery</td>
<td>AL</td>
<td>9</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>MorDance</td>
<td>New York</td>
<td>NY</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Moscow Ballet</td>
<td>Pittsfield</td>
<td>MA</td>
<td>10</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Mystic Ballet</td>
<td>Mystic</td>
<td>CT</td>
<td>8</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Nashville Ballet</td>
<td>Nashville</td>
<td>TN</td>
<td>13</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>National Ballet Theater of Puerto Rico</td>
<td>Guaynabo</td>
<td>PR</td>
<td>6</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Neglia Ballet</td>
<td>Buffalo</td>
<td>NY</td>
<td>?</td>
<td>?</td>
<td>0</td>
</tr>
<tr>
<td>Nevada Ballet Theatre</td>
<td>Las Vegas</td>
<td>NV</td>
<td>26</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>New Chamber Ballet</td>
<td>New York</td>
<td>NY</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>New Jersey Ballet Company</td>
<td>Livingston</td>
<td>NJ</td>
<td>12</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>New Orleans Ballet</td>
<td>New Orleans</td>
<td>LA</td>
<td>8</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>New York Baroque Dance Company</td>
<td>New York</td>
<td>NY</td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>New York City Ballet</td>
<td>New York</td>
<td>NY</td>
<td>47</td>
<td>38</td>
<td>85</td>
</tr>
<tr>
<td>New York Theatre Ballet</td>
<td>New York</td>
<td>NY</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Oakland Ballet</td>
<td>Oakland</td>
<td>CA</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Oklahoma City Ballet</td>
<td>Oklahoma City</td>
<td>OK</td>
<td>57</td>
<td>18</td>
<td>75</td>
</tr>
<tr>
<td>Oregon Ballet Theatre</td>
<td>Portland</td>
<td>OR</td>
<td>15</td>
<td>12</td>
<td>27</td>
</tr>
<tr>
<td>Orlando Ballet</td>
<td>Orlando</td>
<td>FL</td>
<td>24</td>
<td>11</td>
<td>35</td>
</tr>
<tr>
<td>Pacific Northwest Ballet</td>
<td>Seattle</td>
<td>WA</td>
<td>27</td>
<td>22</td>
<td>49</td>
</tr>
<tr>
<td>Paradosi Ballet Company</td>
<td>Tacoma</td>
<td>WA</td>
<td>22</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Pennsylvania Ballet</td>
<td>Philadelphia</td>
<td>PA</td>
<td>28</td>
<td>24</td>
<td>52</td>
</tr>
<tr>
<td>Phoenix Ballet</td>
<td>Phoenix</td>
<td>AZ</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>
Appendix A

<table>
<thead>
<tr>
<th>Company Name</th>
<th>City</th>
<th>State</th>
<th>Female Dancers</th>
<th>Male Dancers</th>
<th>Total Dancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pittsburgh Ballet Theatre</td>
<td>Pittsburgh</td>
<td>PA</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Portland Ballet</td>
<td>Portland</td>
<td>ME</td>
<td>9</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Richmond Ballet</td>
<td>Richmond</td>
<td>VA</td>
<td>56</td>
<td>17</td>
<td>73</td>
</tr>
<tr>
<td>Roanoke City Ballet</td>
<td>Roanoke</td>
<td>VA</td>
<td>14</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Rochester City Ballet</td>
<td>Rochester</td>
<td>NY</td>
<td>14</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Sacramento Ballet</td>
<td>Sacramento</td>
<td>CA</td>
<td>17</td>
<td>11</td>
<td>28</td>
</tr>
<tr>
<td>San Diego Ballet</td>
<td>San Diego</td>
<td>CA</td>
<td>14</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>San Francisco Ballet</td>
<td>San Francisco</td>
<td>CA</td>
<td>46</td>
<td>36</td>
<td>82</td>
</tr>
<tr>
<td>Sarasota Ballet</td>
<td>Sarasota</td>
<td>FL</td>
<td>29</td>
<td>23</td>
<td>52</td>
</tr>
<tr>
<td>Savannah Ballet Theatre</td>
<td>Savannah</td>
<td>GA</td>
<td>22</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Shreveport Metropolitan Ballet</td>
<td>Shreveport</td>
<td>LA</td>
<td>42</td>
<td>2</td>
<td>44</td>
</tr>
<tr>
<td>Smuin Ballet</td>
<td>San Francisco</td>
<td>CA</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>St. Louis Ballet</td>
<td>St. Louis</td>
<td>MO</td>
<td>16</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Suzanne Farrell Ballet</td>
<td>Washington</td>
<td>D.C.</td>
<td>12</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Tallahassee Ballet</td>
<td>Tallahassee</td>
<td>FL</td>
<td>38</td>
<td>3</td>
<td>41</td>
</tr>
<tr>
<td>Texas Ballet Theater</td>
<td>Fort Worth</td>
<td>TX</td>
<td>24</td>
<td>17</td>
<td>41</td>
</tr>
<tr>
<td>The Portland Ballet</td>
<td>Portland</td>
<td>OR</td>
<td>23</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Toledo Ballet</td>
<td>Toledo</td>
<td>OH</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Tulsa Ballet</td>
<td>Tulsa</td>
<td>OK</td>
<td>25</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Washington Ballet</td>
<td>Washington</td>
<td>D.C.</td>
<td>17</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>Wonderbound</td>
<td>Denver</td>
<td>CO</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>2054</strong></td>
<td><strong>1065</strong></td>
<td><strong>3119</strong></td>
</tr>
</tbody>
</table>

Note: Author created table from information taken from (Best of the Web, n.d.)
Appendix B

Email distributed to subjects

Hello (NAME)!

My name is Brittany and I am pursuing a Master’s of Science in Textiles at North Carolina State University. I have chosen my area of research to be the evaluation of the pointe shoe. As part of my research, I am conducting a survey to better understand the overall use and challenges associated with pointe shoes such as fit, comfort, durability, and price.

I am writing to you to request your participation in the survey, as you are a valued part of the pointe shoe industry. If you would like to participate, please follow the link below. The survey will take between 5 and 10 minutes. This is completely anonymous and no personal identifiers will be asked.

**Pointe Shoe Survey**

I hope you will take part in this survey and share your experience with pointe shoes. Please feel free to forward this to any parents, teachers, professionals, or dance boutique owners within your ballet network.

Thank you in advance for your time!

Brittany Buckner

If you have any questions concerning your rights as a participant, you may contact Campus Institutional Review Board at (919) 515-7315 or at ncsuirbofice@nrcsu.edu. If you have any questions regarding the research itself, you may contact Brittany at bbuckner@nrcsu.edu.

---

College of Textiles
Textile & Apparel Technology & Management

1020 Main Campus Dr.
P. 919-515-6040

NC STATE UNIVERSITY
Raleigh, NC 27606
Appendix C

Survey for professional dancers

Participation in this survey is strictly voluntary and you may refuse to participate or discontinue participation at any time. The survey should take between 5 and 10 minutes to complete. All data is kept and analyzed anonymously without any personal identifiers.

Continuing with the survey is an indication of your willingness to participate and that you are at least 18 years old.

I am at least 18 years of age and would like to continue to the survey.

OR

I am under 18 years of age and have a parent's permission to continue to the survey.

- Yes
- No

In what ways do you prepare your new pointe shoes so they are ready to wear? Select all that apply.

- Apply rosin
- Bend/break shank
- Cut shank
- Cut fabric off platform
- Darn the platform
- Pancake/matte outer fabric
- Sew on ribbon
- Sew on elastic
- Soften toe box with liquid (such as water)
- Soften toe box with force (such as banging)
- Slice outsole
- Trim outsole edges
- Trim drawstring
- Other __________________

Approximately, how long do you spend preparing a new pair of pointe shoes?

- less than 15 minutes
- 15 to 30 minutes
- 30 to 45 minutes
- 45 minutes to 1 hour
- more than 1 hour

What part of your pointe shoe dies first?

- Heel seam
- Insole
- Outsole
- Platform
- Shank
- Toe box in general
- Vamp
- Wings
- Other ___________
Appendix C

In what ways do you increase the life of your pointe shoes? Select all that apply.

- Alternate: rotate between two or more pairs
- Coat: apply shellac or other type of resin
- Darn: stitch the platform
- Dry: hang in open air or mesh bag
- Glue: apply super glue to shank or other parts
- Stuff: fill toe box with paper to absorb moisture
- Other __________

What do you do with your dead pointe shoes?

- Keep them.
- Donate them.
- Trash them.
- Other __________

Which areas of your foot do you experience discomfort while wearing pointe shoes? Select all that apply. If no discomfort is experienced, please continue to the next question.

- Arch
- Ankle
- Big toe
- Pinky toe
- Toenail(s)
- Heel
- Other __________

Please rank your previous answers with 1 being the most discomfort experienced. Click and drag each answer to rank it.

_____ Arch
_____ Ankle
_____ Big toe
_____ Pinky toe
_____ Toenail(s)
_____ Heel
_____ Other

Which of the following do you experience as a result of wearing pointe shoes? Select all that apply. If none of the following are experienced, please continue to the next question.

- Blisters
- Chafing (raw)
- Inflammation (redness) Swelling (enlarges)
- Bunions (bone sticking out on big toe)
- Other ______________
Appendix C

What additional accessories do you use while wearing pointe shoes?
- Toe pads
- Toe tape
- Moleskin
- Lamb's wool
- I do not use any additional accessories
- Toe spacers
- Corn/callus cushions
- Gel skin squares
- Other ________________

What brand of pointe shoe do you currently wear?
- Bloch
- Capezio
- Chacott
- Freed of London
- Gaynor Minden
- Grishko
- Leo
- Mirella
- Russian Pointe
- Sansha
- So Danca
- Suffolk
- Sylvia
- Wear Moi
- Other ____________

How many years of experience do you have wearing pointe shoes?
- less than 5 years
- 5 to 7 years
- 7 to 10 years
- more than 10 years

On average, how many hours per day do you wear pointe shoes?
- 5 hours or less
- 5.5 to 7 hours
- 7.5 to 9 hours
- 9.5 to 12 hours
- 12.5 hours or more

On average, how many hours does one pair of pointe shoes last you?
- 5 hours or less
- 5.5 to 7 hours
- 7.5 to 9 hours
- 9.5 to 12 hours
- 12.5 hours or more

92
Appendix C

What Freed maker do you currently wear?

- A
- B
- D
- L
- N
- O
- Q
- T
- V
- Y
- Z
- Anchor
- Triangle
- Bell
- Butterfly
- Castle
- Club
- Cross in circle
- Crown
- Fish
- Heart
- Maltese cross
- Neptune
- Star
- Wine glass

Are you required to wear this brand?

- Yes
- No

In your opinion, how important is it that pointe shoes continue to be hand-made?

- Very important
- Moderately important
- Slightly important
- Not important
- No opinion

If you could change one aspect of the pointe shoe, what would it be?

- Comfort: no accessories needed
- Durability: lasts longer than 20 hours
- Ready to wear: ribbons and elastic pre-attached
- Price: less than $75
- Symmetry: left and right foot differentiation
- I would not change anything

If you have any additional comments, please tell us below:

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________