

GUEST PERCEPTIONS OF WAIT TIMES USING TABLET TECHNOLOGY IN
RESTAURANT ENVIRONMENT

A Thesis presented to the Faculty of the Graduate School
University of Missouri

In Partial Fulfillment of the Requirements for the Degree

Master of Science

By

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MAY 2015

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GUEST PERCEPTIONS OF WAIT TIMES USING TABLET TECHNOLOGY IN
RESTAURANT ENVIRONMENT

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Acknowledgements

This has been a crazy and wild journey for me throughout my graduate career, but I have had so much support by a great group of faculty, students, family, and friends. I would like to begin by thanking my advisors Dr. Leslie G. Jett and Dr. Jim Groves for the guidance, knowledge, and patience they provided me to accomplish this goal. Thank you Dr. Amanda Alexander for always stopping to answer my questions, no matter how busy she was. Thank you Dr. Dae-Young Kim provided me with the guidance and confidence to always continue to expand my knowledge and improve my research; and for that I am very grateful. Thank you Dr. Mark Ellersieck for your valuable insight on statistics.

I must mention the excellent group of graduate students this program has, and want to thank them for being not only great colleagues, but also great friends. It is always amazing when you have such a diverse group of students from different cultures, that would go out of their way each and every time to help one of their fellow colleagues out. I must thank Starsha for answering all my graduate school questions. She always makes sure graduate students get the answers they need.

My family has been very supportive. Thank you, Dad, Mom, my Stepfather Peter, my siblings Logan, Landon, and Heather for all the encouragement you have given me. I must thank my grandparents; along with my family friends Jacqueline, and Harriet for all the support and guidance you have given to me over my academic career.

Lastly I want to thank my girlfriend Adriana for encouraging me to stick with school no matter how tough it got. She is always there to give me the confidence I need to accomplish whatever goal I might have. I am so grateful for everything she has done

and sacrifices she has made so I could pursue my degree. You are the best and I could not have done this without you.

“Every adversity, every failure, every heartache carries with it the seed of an equal or greater benefit.”

-Napoleon Hill

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Chapter 1

Introduction

1.1 Study Background

The restaurant industry has begun its transition of introducing electronic tablet technology (tablets) to improve both service and operations. Tablets can be defined as having larger formats, touchscreen, and improved display resolutions, possibly providing advantages over smartphones and laptops (John, Poh, Lim, & Chan, 2012). According to the National Restaurant Association (NRA), (2014) the restaurant industry enters its fifth consecutive year of real sales growth, and nearly one-fifth of consumers claim innovations in restaurant technology are important when deciding where to dine. The NRA (2014) also states nearly fifty percent of restaurant establishments will devote more capital to customer technology.

Adopting technology is complicated requiring a lot of decision-making affecting both internal and external operational processes (Wang & Qualls, 2007). It is considered both the effects of external and internal factors vary between industries in terms of performance innovation (Vega-Jurado, Gutiérrez-Gracia, Fernández-de-Lucio, & Manjarrés-Henríquez, 2008). There are many researchers who want to understand how technology affects overall business operations. Many factors are considered when deciding if implementing technology into restaurants (Dixon, Kimes, & Verma, 2009). Examples related to implementation of technology factors include cost of investment, possible operational benefits, and guest receptions (Dixon, et al., 2009). A minimum of three clues can be attributed during the multiple layers of the dining experience involving food quality (functional), ambience (mechanic), and service performance (humanic)

(Wall & Berry, 2007). To further elaborate Wall and Berry (2007) stated functional clues provide the restaurants foundation to success, including the “technical quality of service, particularly relating to whether the service was performed competently” (p. 60).

Followed by mechanic clues, providing “nonhuman elements in the service environment.” These elements include operational ambience and design (Wall & Berry, 2007, p. 60). Lastly, clues coinciding with service employee behaviors are humanic, and include “body language, tone of voice, and level of enthusiasm” (Wall & Berry, 2007, p. 60).

Tablet technology can be introduced to improve productivity, lower costs, and enhancing perceptions of service time (Dabholkar & Bagozzi, 2002; see also Kelley, 1994; Sathye, 1999). Also it is important to keep in mind technology that corrupts the service experience may not be beneficial even if it helps lower labor costs (Dixon, Kimes, & Verma, 2009). There for, it is important to always make sure the guest experience has continuous improvement. Continuous improvement is defined as every component of an operation can be improved, always striving for the goal of perfection, even though it is never met (Heizer & Render, pg. 198, 2006).

This study will explore the perceptions of guest waiting time during the first stage of service. According to Sulek and Hensley (2004) guests often have to wait at a full service restaurant, so it is important for wait areas to be physically comfortable due to the affects on both guest satisfaction and repeat business. This is thought to occur because comfort has direct influences on perceived wait time (Sulek & Hensley, 2004). Satisfaction can be defined as the consumers “judgment that a product or service feature, provides a pleasurable consumption related fulfillment” (Oliver, 2010, p. 8). The

implementation of tablets helps us understand the guest perceptions of time using tablets and if any there is any improvements of guest satisfaction while waiting in the restaurant.

Tablet technology, service, and wait times combined provide uniqueness to the study. While more restaurants move towards establishing and adapting technology it is important to find the most effective ways to utilize it. Although the initial wait time is the first stage of service, it provides an operational importance. According to Sulek and Hensley (2004) the initial wait prior to being seated is usually perceived as longer and more discomforting than later wait stages. This may affect guest satisfaction in terms of wait times and service. Any mistake in service can be hard to recover from. Mattila (1999) found service recoveries do not always improve or restore the initial level of guest satisfaction. Therefore it is very important meet guest expectations from beginning to end of the dining experience.

1.2 Problem Statement

How does the implementation of tablets in restaurants during the period of being greeted to waiting to be seated by the host affect their perceptions of waiting time in a casual restaurant?

1.3 Purpose and Objectives of Research

1.3.1 Purpose of Study

The restaurant industry continues to look for innovation and implementation of practices further improving overall guest service and operations. Tablets are being used in both the front and back of house

environments. Purposes of implementing tablets during the guests waiting time is to:

- 1) Explore how these tablets can improve the initial stage of service in casual restaurant may prove beneficial overall service and guest satisfaction.
- 2) Explore how tablets change the perceptions of time during the initial wait stage.
- 3) To explore how tablets make a difference in the initial wait stage, and if they make a significant difference in the overall dining experience to implement in restaurants.
- 4) Measure how tablets make the overall more or less enjoyable, and if the guests' perceptions of time change significantly.

1.3.2 Objectives of Study

The following study objectives are:

- 1) Explore how guests perceive wait time with or without tablets.
- 2) Exploring wait time attitudes
 - a) Explore how dining frequency effects wait time attitude
 - b) Explore effects of demographics on wait time evaluation
- 3) Explore how tablet use impacts wait time management

1.4 Significance of the Study

The implications of this study are beneficial to the hospitality industry. Improving service with tablets should not be limited restaurants and hotels but can help improve

other service industries. Service orientated technology is used to add value to the overall customer experience, technology is not only used in a variety of ways but produced different characteristics to the users when used (Demirkan et al., 2008). The always evolving restaurant industry can use tablets for their continues service and operational improvement. Wait time management is also an important factor to observe. Restaurants are selling the dining experience and not time, it is important for managers to effectively control the length of the dining experience (Noone, Kimes, Mattila, & Wirtz, 2009). Casual dining can use tablets to differentiate their establishment from the competitive nature of the restaurant industry. Although there are previous study's conducted involving both wait times and tablets separately, none have combined the two factors by explore and understanding how guests perceive time while waiting to be seated. This leads to the importance of the first stage of performance and exploring how the overall dining experience is improved with the implementation of tablet technology. Opening the door for future tablet and service study's.

1.5 Outline of Chapters

The following chapters include Literature Review, Methodology, Results, and Discussion. The chapter two-literature review includes previous studies and details on wait times and the use of tablet technology in the restaurant industry. Literature on perceptions of time during service is also included. Chapter three - Methodology explains how the study was conducted. Chapter four includes the results and data analysis found during the study. Chapter five briefly summarizes the study and its findings, also noting implications and suggested future research.

Chapter 2

Literature Review

2.1 Introduction

The literature presented in this chapter examines the use of tablet technology in restaurants in regards to wait times. The research identifies ways tablets technology is being used to make restaurant more efficient. The literature reviewed will provide an understanding of guest wait times, service quality, customer satisfaction, and research theories as they relate to theoretical framework.

More specifically, eight main sections are included in this chapter:

- 1) Using tablet technology in restaurants
- 2) The six stages of restaurant service
- 3) Variety of wait times
- 4) Tablets vs. Traditional Service
- 5) Service Quality
- 6) Factors affecting guest satisfaction during initial wait
- 7) Perceptions of guest wait times
- 8) Peak times and location

The proposed research framework has been developed throughout the literature review. Tablet technology is in the earlier stages of development, but has been incorporated in a variety of ways in restaurants throughout the world. Technology can potentially lead to both an increase in revenue and profit, but does come at a cost (Kimes, 2008). Kimes (2008) also states potential benefits for guests include more convenient

and controlled experience. All while benefiting the operation through reduced processing and service cost, potential revenue and volume growth, and enhanced guest satisfaction.

2.2 Using tablet technology in restaurants

2.2.1 Incorporating tablets

Tablet technology is being implemented in many different restaurant segments, offering a whole host of functionalities. Many large, corporate, casual chains such as Applebee's and Chili's have begun utilizing the variety of tablets. Chili's tested different brands and styles of tablets during a five-month pilot test. Based on their requirements and guests' preferences they adopted the Ziosk tablet corporate wide (Ruggless, 2013). Ruggless (2013) states Ziosks are tabletop tablets that can take orders, accept payments and allow guests to buy a series of 99-cent games. The pilot test saw a 20 percent increase in dessert sales along with increased coffee sales (Ruggless, 2013). Buchanan (2011) reminds us how important technology is in the Food and Beverage (F&B) industry; it can lead to more efficient operations, improved consistency of products, and enhanced guest services. Buchanan also documents the progress of guest technologies; siting restaurants first used ipads as wine menus and eventually incorporated them as dinner menus.

2.2.2 Categories of restaurant technology

In a study conducted to identify what technology holds the highest value to customers, researchers used guest preferences to develop five classifications of restaurant technology.

These categories include (Dixon et al., 2009):

- 1) Queue management (handheld ordering, pagers)
- 2) Internet based (online ordering/reservations)
- 3) Menus
- 4) Kiosks
- 5) Payment during the

Service Innovation Category	Technology	Definition
Queue management	<ul style="list-style-type: none"> • Pagers for table management • Handheld order taking while waiting in line 	<ul style="list-style-type: none"> • Alerts customers when their table is ready • Order taken while customers are in line and transmitted to the kitchen
Internet-based	<ul style="list-style-type: none"> • Online Reservations • Internet-based ordering 	<ul style="list-style-type: none"> • Make reservations online • Order online for pickup or delivery
Menu-based	<ul style="list-style-type: none"> • Virtual menus available tableside with nutritional Information • Virtual menus online with nutritional information 	<ul style="list-style-type: none"> • Electronic menus that have nutritional information of the restaurant's menu • Online menu with nutritional information tableside
Kiosk	<ul style="list-style-type: none"> • Kiosk-based payment • Kiosk-based food ordering 	<ul style="list-style-type: none"> • Payment using touch screen terminal • Order taken on a touch screen terminal
Payment	<ul style="list-style-type: none"> • Payment via SMS or text message • Payment via 'smart' card (RFID-enabled) • Payment via cell phone using NFC technology 	<ul style="list-style-type: none"> • Payment made using a cell phone • Payment made with a RFID enabled credit card • Payment made with a neat fields communication (NFC) cell phone

Figure 1: Five classifications of restaurant technology (Dixon, Kimes, & Verma, 2009)

2.3 The six stages of restaurant service

It is important to explore the expectations of guest's wait times during service.

Although, Walsh (2000) found guests had trouble remembering specific encounters during service, noticing only when service was good and when it was bad. The restaurant industry still must strive to ensure expectations of their guest are met and services failures are avoided.



Q: Waiting Time

Greet (Q1): wait to be greeted

Seat (Q2): wait to be seated

Order (Q3): wait for order to be taken

Serve (Q4): wait for items to be served

Check (Q5): wait for the check

Pay (Q6): wait for account to be processed

Figure 2: Multi-Stages of service in restaurants (Hwang and Lambert, 2006)

A 2006 study conducted by Hwang and Lambert explored six multi-stages of service in a Restaurant. The stages identified six points where guest wait during dining experience. These waiting points included, greet, seat, order received, items served, receiving of check, and payment transaction (Hwang and Lambert, 2006). Projected use of tablets could be a beneficial part of each of these six stages, effectively changing the overall dining experience. When incorporated from arrival to payment not only may the restaurant be more efficient, but it could potentially improve the guest perception of their wait.

2.4 Different types of wait times

2.4.1 Wait Times

As referenced above, there are many different waiting periods during the stages of service in restaurants. Additionally, research identifies several theories on types of wait processes within the restaurant. One study incorporates wait periods called pre-process, in process, and post-process (Dubé-Rioux, Schmitt, & Leclerc, 1988). Another study proposes six main wait components. Kimes (2008) proposed pre-arrival; period from guest's decision to go to restaurant until they arrive. Post-arrival; point of arrival until seated, Pre-process; guest is seated until food arrives, In-process; point where guest receives food up until request of payment; Post-process; request payment up until guest leaves; and lastly table turnover; point where guest leaves and table is reused. Trying to provide the guests the best dining experience, managers have looked not only at managing the wait times, but also the perception of wait times. If actual wait cannot be controlled then managers must gain knowledge of what their guests perceive during their wait (Taylor, 1994). Each stage affects the overall dining experience. Managers must understand the importance of these wait times to continually improve their operation and retain guests' loyalty.

2.4.2 Importance of Stage One – The Initial Wait

As a hospitality professional, it is important to manage all stages of service experience for your guest. However, one of the most significant times to manage is before the guest is even seated at the table. Although the guest experience can begin before the guest ever steps inside the operation (i.e. reservations, website) the pre-process wait is where the experience truly begins. If the pre-process wait results in negative

effects on the guest the more difficult it will be to recover during the rest of the experience.

Guests expect fairness when it comes to gaining back trust and loyalty during service recovery (Nikbin, Ismail, Marimuthu, & Jalalkamali, 2010). One study suggests the pre-process delay may be more objectionable for the guest than the in-process delay. Results presented participants became more disgruntled with the delay before their meals were ordered (Dubé-Rioux, Schmitt, & Leclerc, 1988). Taylor (1994) provided another way to categorized pre-process waits but dividing them into three general categories; preschedule waits, post schedule waits, and queue waits. An example adapted from Taylor (1994) guest showing up 30 minutes prior to their 7:00 p.m. reservation would constitute a pre-scheduled wait. If the guest isn't sat until 7:20 p.m. they will experience a post-schedule wait of 20 minutes. The queue wait concept is employed when there are no set reservations times and guests are served on a "first-come-first-served basis." In all three categories the F&B professionals must learn to help manage the guest expectations.

2.4.3 High and low cost waits

Most delays can be divided into low cost wait or high cost waits, both can affect the guest negatively. An example of high-cost wait may be a flight delay, where waiting in a quick serve restaurant pertains to low cost wait (Bae and Kim, 2011).

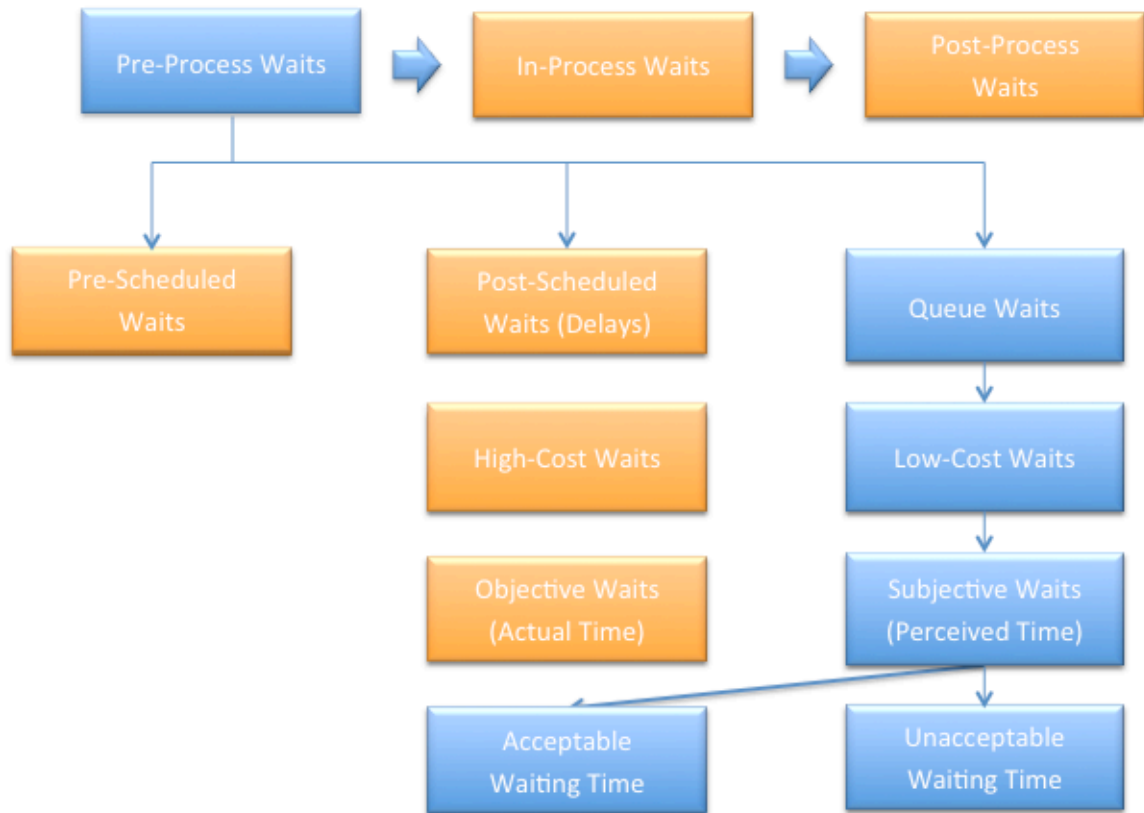


Figure 3: Types of wait times (Bae & Kim, 2011)

These costs may include financial, opportunity, social, and emotional costs altering the guest view on the operation during their wait (Houston, Bettencourt, & Wagner, 1998). When financial, emotional, or opportunity costs affect the guest, high cost wait factors are established. While low cost waits may aggravate the guest they do not have the components referenced during high cost waits (Cameron, Baker, Peterson, & Braunsberger, 2003). Researchers have long surmised the majority of waiting during service delays are high cost, but little analysis has focused on the measurement of the guest perceptions of these costs (Cameron et al., 2003). According to Cameron et al., (2003) low cost waits are anticipated to be what most consumers experience throughout their day. The study explored low cost waits in casual restaurant setting attempting to

shorten wait time perceptions with music (Cameron et al., 2003). Also stated is consumer costs do not always pertain to the wait time but the individual's situation. Explored also was low cost waits in casual restaurant setting attempting to shorten wait time perceptions with music (Cameron et al., 2003).

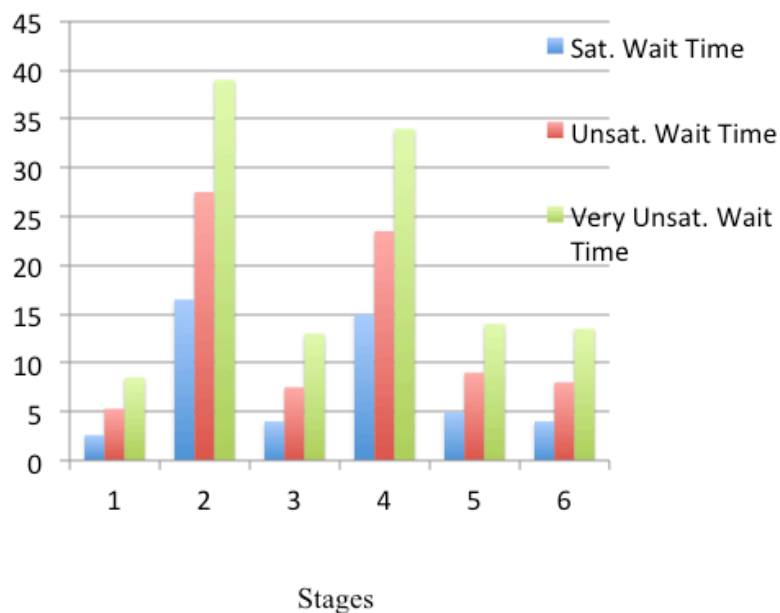
2.4.4 Acceptable and unacceptable waiting time

Several research projects have explored acceptable wait times including Pruyn and Smidts (1998), Hwang and Lambert (2005), and Bae and Kim (2011). Each study varies in context and theories explored. Pruyn and Smidts (1998) investigated two elements of acceptable wait times such as ambience of waiting area and the existence of a TV. As shown above in Figure 2, Hwang and Lambert (2005) researched the six multi-stages in restaurant service. Bae and Kim (2011) expanded on the idea of acceptable wait times by researching guest perceptions of wait times upon entering the restaurant. Pruyn and Smidts (1998) defined acceptable wait time as “the maximum number of minutes tolerated in a specific waiting situation” (p. 323).

Each of these studies explores acceptable wait times differently yet none of them have addressed using physical distractors, such as technology to mitigate the perception of wait times. Bae and Kim (2011) study explains unsatisfactory wait before being seated is “33.30 minutes (5.28+28.02) and a mean value of very unsatisfactory for seating is 47.91 minutes (8.52+39.39) (Literature Review, para. 5)” Bae and Kim (2011) also describe objective wait and subjective waits. Objective waits involves real time and is monitored by the clock, while subjective pertains to how much time the guest believes they are waiting. This can be seen above in Figure 2.

Hwang and Lambert (2008) found subjects who waited 2.6 minutes at the greeting stage were still please with their wait and found it acceptable. They also found subject's felt waiting over 5.3 minutes was unsatisfactory, but when considering the wait did not exceed 8.5 minutes there was not any influence. Figure 3 is presented below providing Hwang, & Lamberts (2008) findings of wait times. This graph provides a good visual example of subject's satisfactory wait time, unsatisfactory wait time, and very unsatisfactory wait time through out the six stages of service (Hwang, & Lamberts (2008). The importance of this graph is simply providing an example of how guests wait.

Figure 4: Acceptance of Waiting Times in a Six-Stage Service-Delivery Process (Hwang, & Lambert, 2008)



2.5 Advantages and disadvantages of adopting tablet technology

Although little research has been completed comparing tablet infused service to traditional service, different restaurants have brought tablets into their operations in a variety of ways. According to Cline & Wenger (2001) there are many variables that keep an operation from implementing new technology including “proprietary technology solutions, lack of technology standards, limited internal technology skills, and unclear return on investment analysis” (Industry E-Profile, para. 13)

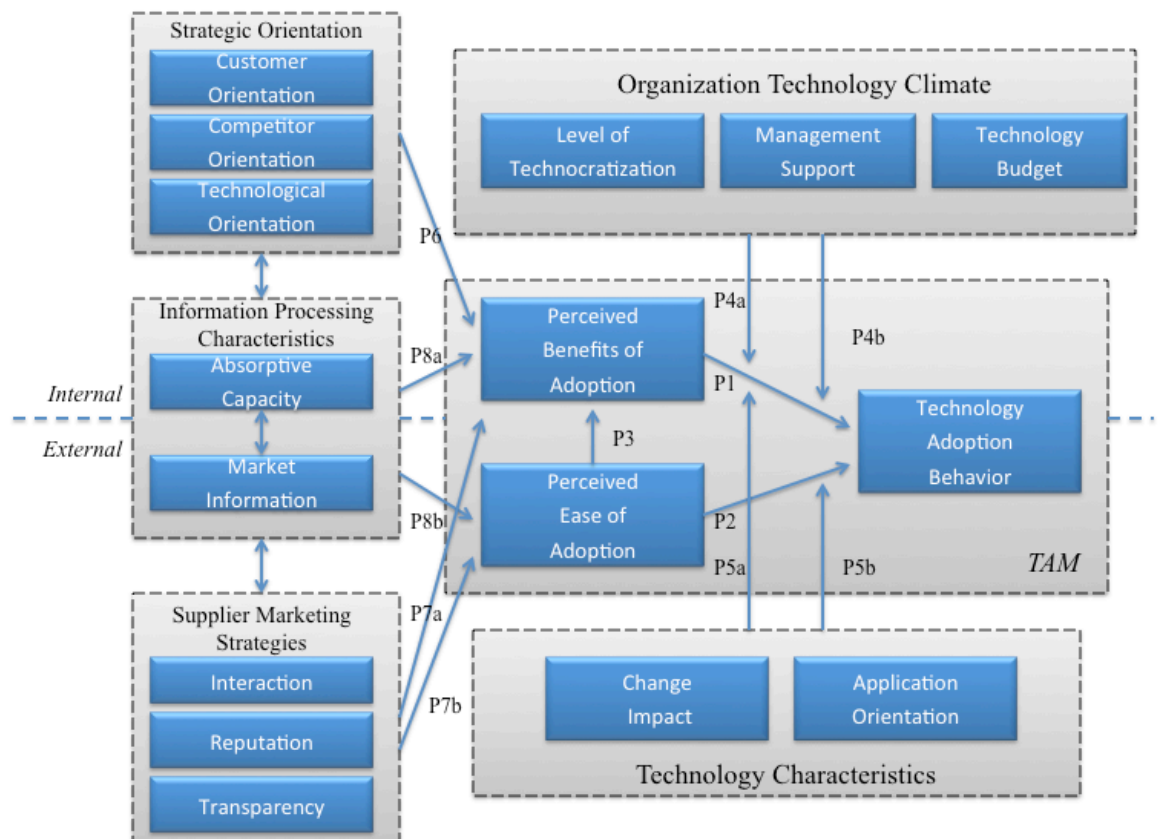


Figure 5: Proposed model of technology adoption in hospitality organizations (Wang & Qualls, 2007)

Tablet technology is implemented throughout multiple restaurant sectors, but they are not always the high-end, mainstream, commercial tablets. Brustein (2013) states

Chili's and Applebee's are purchasing industry specific tablets geared toward to improving service and operations. These tablets are said to be less-expensive, have removable batteries, and are less likely to be stolen than an ipad.

Historically, service in casual restaurants has always been geared around the social interaction among humans. New service concepts could potentially be created with technology, there may be negative effects as well (Bitner, 2001). Although technology is meant to help improve service, some employees may be reluctant to accept changes with fear of being replaced (Bitner, 2001). Although some claim tablets may make the server obsolete, some restaurants implementation strategies state otherwise. Mulinder (2013) gives examples on how servers will always be needed throughout the dining experience. He claims that guests have the need to being acknowledged and taken care of during service. Although the tablets are incorporated to improve the efficiency of service, it may still be easier to tell a server. Two examples of when servers may be able complete are process or function sooner are in reference to taking payments for large groups and checking IDs when ordering alcoholic beverages (Mulinder, 2013).

In terms of acceptance and use by consumers, little is none about who will actually embrace the introduction of technology and who will desire to maintain traditional service. There is no debate the U.S. restaurant industry elderly population has grown over the last decade. F & B operations and service entities must understand and take special care of older guests, especially since research shows they have discretionary income to spend and frequent restaurants (Fu & Parks, 2001). More Research still needs to be conducted on how elderly will view tablet technology during service. Dixon et al (2009) found elderly participants were less likely to have used technology in the

restaurant environment than younger subjects. Positive tendencies of tablets are helping managers communicate with guests, helping to increase loyalty, documenting staff member who provided great service, inventory management, training employees, improving communication among staff, and improving guest services (Gayeski & Petrillose, 2005). Adopting new technologies can be a tough process for an organization. Organizations too often view technology in its simplest form, missing the multiple dimensions technology brings to the operation. The benefits often include increased productivity, cost savings, efficiency, market share, and guest services (Wang & Qualls, 2007).

2.6 Measuring guest satisfaction during wait stages

According to Dixon et al (2009) technology has changed how customers utilize and perceive services. Their technology based service examples are self-service checkout, ATMs, airport kiosks, and paying for fuel at the pump. Tablets can play an important role in guest satisfaction. Davis and Vollmann (1990) research goal was to establish a model that coincided with both wait times and guest satisfaction. Analyzing guest satisfaction attributes and elements provides important information of how managers should react in regards of increasing the probability for guest returning to establishment (Dube, Renaghan, & Miller, 1994). According to Kokkinou and Cranage (2013) performance may be measured through service levels and can be better linked with satisfaction, leading to superiority over wait times. There is a particular disadvantage though; performance measures of service levels are lacking information of the guests have waited past “pre-specified” wait time, meaning “average wait-times and

service levels” need to be used at the same time to provide a more accurate example of measuring performance (Kokkinou and Cranage, 2013, p. 437). There is potential to improve guest satisfaction using tablet technology during wait periods.

2.7 Factors affecting guest satisfaction

Davis and Vollmann (1990) explored wait times that related to guest satisfaction. Applying regression analysis waiting time was found to be directly related to satisfaction meaning longer waits leads to guests being unhappy with service. The model developed for this study involved a number of factors related to guest satisfaction and wait times. These factors for guests included prior experiences, number of other guests at establishment, criticality of time, and numerous other distractions. Factors explained are prior experiences involved what the guest will perceive their wait to be affecting guest satisfaction. When guests walk into a restaurant and it is busy they expect to wait longer. Criticality of time is an important factor to guests, for example if they only have a 30-minute lunch break. The final factor is other distractions that may be intentional or unintentional including gaming machines and full service bar (Davis & Vollmann, 1990). Liang and Zhang (2012) believe interaction between guests and the restaurant industry can be facilitated by the creation of technology resources. When a guest has a positive interaction they may develop an increase in satisfaction and loyalty (Liang & Zhang (2012). Guests who are frequent diners at a particular establishment will have greater loyalty and satisfaction compared to less frequent diners due to the frequent diners positive service interactions (Liang & Zhang, 2012). The importance of frequent

restaurant diners may provide valuable differences compared to less frequent diners when researching technology and wait times in terms of guest satisfaction.

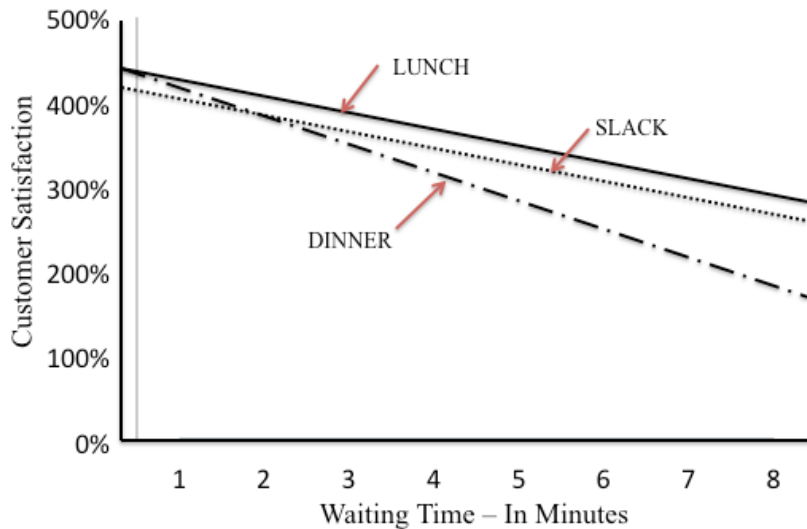


Figure 6: Waiting time (Davis & Vollmann, 1990)

2.8 Peak and Nonpeak times

Waiting brings up two service issues; how long guests actually wait and how long they perceive they are waiting (Dickerson, 2005). These two issues may be tough to manage but it is important to manage capacity during both peak and non-peak times. Although peak and nonpeak times are not researched in this study, it is important to consider when using technology. For example to manage wait times during peak and nonpeak times involves adjusting staff to meet operational efficiencies and utilizing capacity (Dickerson, 2005). According to Dickerson (2005) a design day is set as the expected peak period and presumes the establishment is operating a maximum efficiency, therefore no addition staffing can be added. Wait times will not exist or be shorter on design days where capacity is below what is expected, resulting in higher guest

satisfaction. Adversely, on days with higher demand satisfaction among guests will tend to be lower as wait times will be longer (Dickerson, 2005).

2.9 Perceptions of guest wait times

2.9.1 Psychology of wait times

Perception is explained as, “customers perceptions of actual performance, implying that perception and objective actual performance are not one and the same” (Davis et al., 1998, p. 3). When someone recalls their experience at a service facility, waiting in line is indeed a notional perception service quality is affected (Maister, 1984). Maister (1984) displays the formula “ $S = P - E$ ” where “S = satisfaction, P = perception, and E = Expectation” (p. 2). The article explains this formula as what a guests expects and perceives their experience to reach a certain level of satisfaction. It is important to note there are many ways people view waiting in lines. Maister (1984) article breaks down the psychology humans go through while waiting in line. The main theme is customers are eager to start the service process. For example handing out menus or selling drinks from the bar give the idea that service has began (Maister, 1984). This is a good example of how tablets could effectively help get the experience started. Borges, Herter, & Chebat, (2015) study suggest that when consumers are waiting in line while watching TV they perceive a shorter wait time. Maister (1984) noted other psychological factors such as anxiety make the wait feel long, uncertain waits are longer than known, unexplained awaits are longer than explained, unfair waits are longer than equitable waits, and the more valuable service is to guest the longer they will wait.

A study that evaluated guest wait experience listed six psychological factors of waiting. These factors are perceived wasted time, perceived control, perceived boredom, perceived neglect, perceived crowding, and delay of gratification (McGuire, Kimes, Lynn, Pullman, & Lloyd, 2010). These factors are presented below in figure 6.

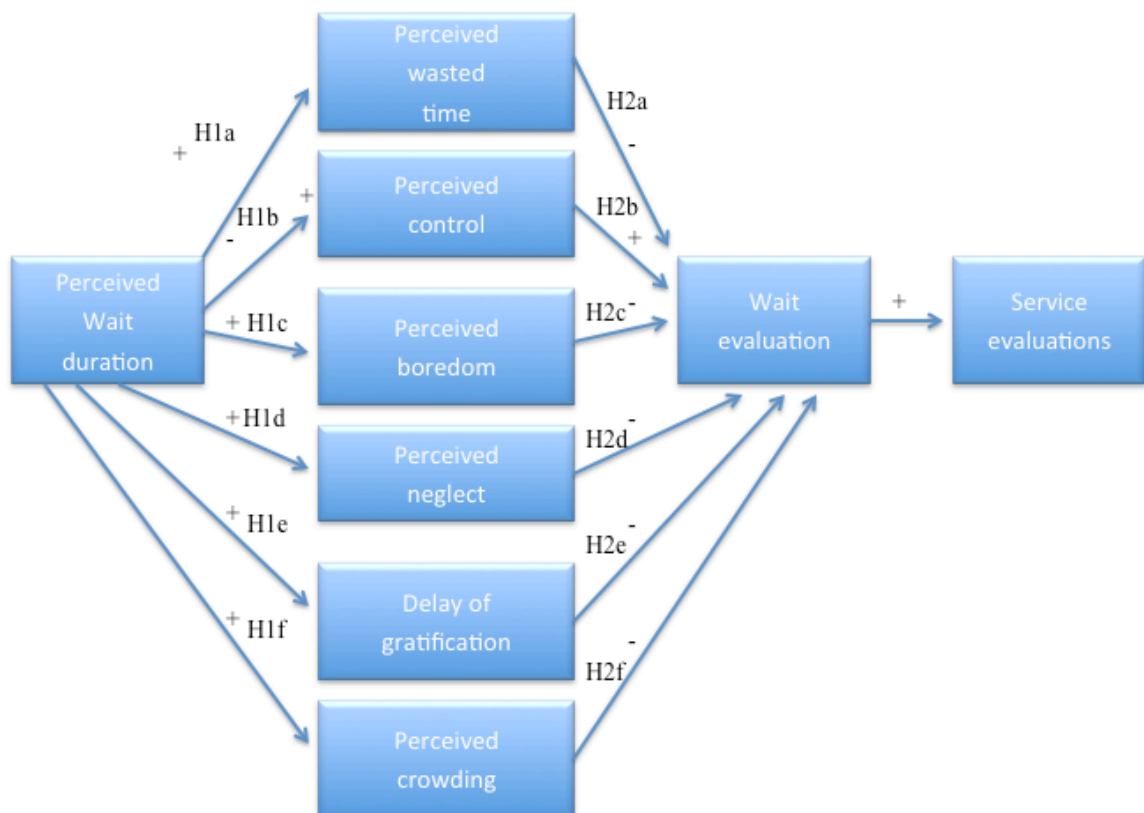


Figure 7: Psychological Factors of waiting (McGuire, Kimes, Lynn, Pullman, & Lloyd, 2010)

2.9.2 Objectives

Based on all prior research the following will serve as our research objectives for this project:

- 1) Explore how guests perceive wait time with or without tablets.
- 2) Exploring wait time attitudes

- a) Explore how dining frequency effects wait time attitude
 - b) Explore effects of demographics on wait time evaluation
- 3) Explore how tablet use impacts wait time management

2.10 Research Framework

The framework for this study involves exploring different types of wait times. Developed from the literature, the study will consist of low cost wait in restaurant setting. The explored wait times are pre-process waits during the initial stage of waiting and how technology affects it; the waits are subjective, focusing on perceptions of perceived waits as acceptable and unacceptable. The variable being explored is pre-process waits and the impact technology has on the perception and satisfaction with and without the use of tablets.

2.11 Summary

The chapter reviewed existing literature relating to the different types of wait times and how people perceive time. The literature presented psychology of waits, traditional service theories, and the role of tablet technologies in restaurants. It also presents how tablet can be effectively used in the hospitality industry. The framework is clearly derived and developed from the existing literature and previous experiments.

Chapter 3

Methodology

3.1 Introduction

Chapter three will discuss the methodology performed in this study. Section 3.2 will provide the purpose of the study. Presented in section 3.3 is the research design. Section 3.4 addresses population and sampling procedures. Discussed in section 3.5 is the review process by the Campus Institutional Review Board, followed by instrumentation is 3.6, discussing validity and measurement. Section 3.7 provides data collection procedures, followed by section 3.8 presenting data analysis. The final section presents statistical procedures used for data analysis.

3.2 Purpose of the Study

Purposes of this study:

- 1) Explore how the guest experience will change while using tablet technology during initial lunch wait time(s) in casual restaurant setting.
- 2) Analyzing potential factors to improve guest experience with the use of tablet technology.
- 3) Exploring how wait perceptions changes while using tablet technology.

3.3 Research Design

This study was conducted by using experimental research design. Experimental research “ seeks to determine if a specific treatment influences an outcome in a study” (Creswell, 2009, p. 229). Explored in a controlled restaurant setting analyzing guest

perceptions of wait time when using tablet technology. According to Creswell (2009) experimental design “tests the impact of a treatment or an intervention on an outcome, controlling for all factors that might influence that outcome” (p. 229) Experimental design meets the need for answering the study’s objectives. This particular design was chosen to provide results in an actual restaurant setting. A questionnaire was also provided once the experiment was completed. Figure 8 below provides the conceptual framework for the study.

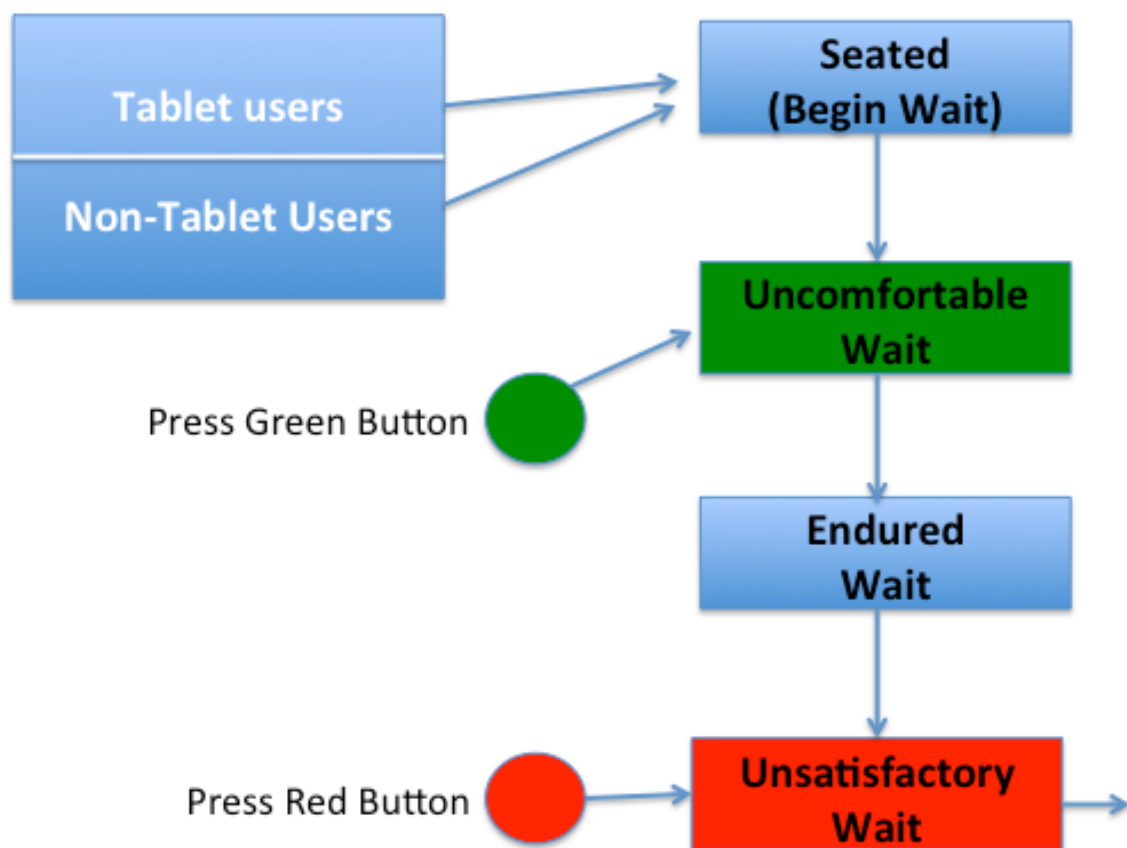


Figure 8. Conceptual Framework

3.4 Population and Sampling Procedures

3.4.1 Population

The intended target population for this study was people in the Midwest at a major land grant University. The population pertained to people who have dined in casual restaurants. Due to the large number of individuals who have experienced wait-time in restaurants the population cannot be measured.

3.4.2 Sample Frame

An email was distributed through the university's system requesting subjects to reserve their time slot through an online reservation system provided by Rezbook. The sample frame consisted of university students, faculty, and staff.

3.4.3 Sample

Due to time, availability of facilities, and vast number of restaurant diners the subjects were selected via the convenience sample method. A student operated café within the university open during lunch, provided the setting for the study. Permission to collect data was obtained from the manager of the Café.

The study consisted of 100 subjects over two days, Monday December 8th 2014, and Tuesday, December 9th, 2014. The reservation system organized the sample by having seven reservations per every 15 minutes over a two-hour lunch period from 11:00 a.m. to 1:00 p.m. equaling 56 reservations per day. All reservations were filled prior to the start of the study on both days. On Monday, December 8th there were eight cancelled reservations, and on Tuesday, December 9th there were four cancelled reservations.

3.4.4 Sampling error

To reduce sampling error only seven slots were open for reservations per every 15 minutes. This limited any bias or bullying affects possibly occurring through the experiment. Sampling error was reduced because the subjects could finish at anytime without the influence of others. The subjects were split up, and asked to keep talking to a minimal.

3.4.5 Selection error and Frame error

Sample error and frame error were limited by using the university's updated email directory. Online reservations were monitored to make sure all subjects participated only once in the study reducing error.

3.5 Institutional Review Board

Any research that involving human subjects is required by Federal law and the University of Missouri to be submitted to Institutional Review Board (IRB) for approval. The study may not proceed until it is reviewed and approved by the board. This study assured confidentiality and was submitted and approved by the University of Missouri's Institutional Review Board allowing the study to commence. This study was approved December 5th, 2014 with the IRB #1214095.

3.6 Instrumentation

3.6.1 Procedures

As stated previously all subjects were recruited through the university email system. The participants were then required to make an online reservation through open table formally known as Rezbook. Open table is a company that is operated through an app that helps simplify and manage reservations (opentable.com, 2015). Open table was available through the Hospitality Management program, and was a readily available tool to make reservations. Seven ipads were implemented equipped with buzzer and directions. The Experiment was categorized into three sections. The first group of seven waited in section one for instructions, section two was the wait area itself where the experiment was conducted, and sections three was where the questionnaire was conducted and submitted.

Section one is a conference room connected to the café; this was where each sample group of 15-minute slot of seven reservations waited for the study to begin or the previous study to finish. Before the group proceeded to the host stand inside of the restaurant the subjects were read the directions of the experiment and informed their identities would be concealed. This was done by an online randomization system. The subjects were asked to put anything providing time (i.e. phone, watch) inside a yellow envelope marked with their name. This was done so the subjects did not know what time it was, limiting bias. The envelopes were collected from the subjects by an assistant, and put in a bin marked with the reservation time. The subjects would receive their items back at the conclusion of the study.

Section two was the waiting area of the restaurant. A host stand was implemented along with seven chairs spaced strategically in the waiting area. Chairs were spaced apart and not facing each other to reduce talking and bias. When the subjects came from section one they would then precede to the host who would assign each person a tablet. The control group did not receive a tablet for wait time. This was done by randomization. The subjects who received tablets would then choose if they wanted to use Internet or play a game during their wait. There were buzzers attached to the ipads. The control group who did not receive ipads still was given a buzzer. When the subjects finished their wait an assistant would come to escort them to a numbered table in section three.

Section three of the study consisted of seven tables in the restaurant opposite of the waiting area. After completing the experimental part of the study, the subjects filled out a questionnaire and were given a consent form. Once the questionnaire was completed and turned in the subjects were returned their belongings and received a free lunch for their participation.

3.6.2 Measurement

Wait time perceptions were measured in two different stages. The first stage was the experiment that included buzzers and during the second stage subjects received a questionnaire. Times were recorded separately for each subject. The time was recorded as the subject was sat. Once sat the subject's time would also be recorded when they pressed the green button on the buzzer signifying they are uncomfortable in their wait.

When the subject felt their wait had become unacceptable they were directed to press the button on the buzzer.

The questionnaire was measured on a 7-point Likert scale. One meaning *strongly disagree* and 7 meaning *strongly agree*. The 1 to 7 scale was presented as indicating how much you agree or disagree with the statement that in your opinion describes the experiment in which you partook.

3.6.3 Manipulation

To prove the experiment was realistic the subjects were asked a variety of questions. These questions were: was the experiment realistic, was it easy to understand procedures of experiment, and was the subject influenced by others during the experiment. The questions were based on a 7-point Likert scale, one is *strongly disagrees*, and seven *strongly agree*. The table below provides an example of experiment realism with a mean of 4.82, procedures were easily understood with a mean of 5.52, and influence was limited with a mean of 3.85.

Table 1

Manipulation

Source	Mean	<i>SD</i>
The experiment was realistic	4.82	1.445
Easy to understand experiment procedures	5.52	1.337
I was influenced by others during experiment	3.85	1.749

3.6.4 Validity

An expert panel of five scholars was used to establish validity. These experts help evaluate analyze framework of the experiment and questions on the questionnaire. These experts provided insight by having both industry and research expertise. The scholars helped make sure the experiment was feasible and organized correctly, along with evaluating questions on the questionnaire. Corrects were made from experts feedback on both the experiment and the questionnaire.

3.7 Data Collection

Data was collected with the following methods. An email was sent to University students, faculty, and staff. Participants made a reservation in one of the seven openings online. At the beginning of study, times were recorded by the host when subject was sat. Two assistants recorded the times to limit bias and increase accuracy when guests buzzed in as uncomfortable (green button), and when the wait was unacceptable (red button). Upon completion of experiment the participants were required to complete a questionnaire. 100 subjects participated in the experiment and questionnaire out of the 112 available reservations over a two-day period. The study was conducted Monday December 8th, and Tuesday December 9th in 2014 from 11:00 a.m. to 1:00 p.m. offering seven reservations per every 15 minutes.

3.8 Data Analysis

Data was analogized through time sheets and questionnaire. Perceptions of time using tablets and demographics were asked in questionnaire. The following analysis was

conducted by using independent sample t-test to find any significance along with findings of both mean and standard deviation. All independent variables were compared with five dependent variables of actual wait time, uncomfortable feeling, endured wait, wait area enjoyment, and influence from others. The independent variables are tablet and non-tablet users, gender, and ethnicity. Analysis comparing the previously stated dependent variables is frequency of diners who eat out more often, and diners who eat out less. Data analysis also includes two separate tests of one-way anova comparing income and generations to the previously stated dependent variables. Lastly the data analysis will provide an independent sample t-test comparing tablet impact on wait time management.

3.9 Summary

Methodology used to conduct this study was presented in this chapter. The second section of this chapter discussed the purpose of this study. The research design was reviewed in the third section. The fourth section reviewed sampling and procedures, including sample error, and sample frame. Section five presented the review process of required for approval by the Campus Institutional Review Board, followed by instrumentation in section six. This section also included measurement, manipulation, and validity. The remaining two sections reviewed data collections procedures in section seven, and data analysis procedures in section eight.

Chapter 4

Results

4.1 Introduction

This chapter's purpose is to provide statistical data analysis found in this study. Section two will review the study's objectives. Demographics and descriptive statistics are provided in section three. This section provides a breakdown of tablet and non-tablet users each providing the subjects perception of time, actual wait and effect on guest satisfaction.

4.2 Review of Study Objectives

The following study objectives are:

- 1) Objective – Identify how guests perceive wait time when analyzed in a restaurant with or without tablets.
- 2) Objective – Exploring wait time attitudes with demographics
 - a) Explore how dining frequency effects wait time attitude
 - b) Explore effects of demographics on wait time evaluation, tables 5-8
- 3) Objective – Explore how tablet use impacts wait time management

4.3 Descriptive Statistics

4.3.1 Demographics of tablet users and non-tablet users

According to table 2, 44.0% (n=28) of tablet users were male and 56.0% (n=35) were female. Non-tablet users responded at 43.0% (n=16) male and 57.0% (n=21) female. Ethnicity was categorized into two groups due to small sample size. There were 78.0% (n=49) *Caucasian* and 21.0% (n=13) *Other* respondents who received tablets,

following 73.0% (n=27) *Caucasian* and 27.0% (n=10) *Other* non-tablet users. One subject did not respond.

Generations were categorized into three groups. 14.3% (n=9) of respondents with tablets who were born between *1946 and 1964*. Respondents without tablets born between *1946 and 1964* were 10.8 percent (n=4). 11.1% (n=7) of tablet users were born between *1965 and 1980*, following 5.4% (n=2) of non-tablet users. Tablet users born between *1981 and 2000* responded at 68.3% (n=43), following 75.7% (n=28) of non-tablet users. There were seven non-responses.

Higher education was categorized into the five groups. High School/GED, tablet users 4.8% (n=3), following non-tablet users 8.1% (n=3). Some college, tablet users 28.6% (n=18), following 24.3% (n=9) of non-tablet users. Undergraduate degree consisted of 30.2% (n=19) tablet users, along with 29.7% (n=11) of non-tablet users. Respondents with advanced degrees were 34.9% (n=22) of tablet users, following 32.4% (n=12) of non-tablet users. The final group was labeled as *other* and had tablet users of 1.6% (n=1), following non-tablet users of 5.4% (n=3).

Income was the final demographic surveyed. It is broken down into three different levels of income. Less than \$39,999 per year of tablet users was 68.3% (n=43), along with 83.8% (n=31) of non-tablet users. Income range of \$40,000-\$80,000 of tablet users was 23.8% (n=15), following 13.5% (n=5) of non-tablet users. The final income category of \$80,000 and greater resulted in an outcome of 7.9% (n=5) respondents with tablets, following 2.7% (n=6) of non-tablet users.

Table 2

Demographics of Tablet Users and Non-tablet Users

	Tablet		Non-Tablet			
Characteristic	n	%	n	%	Total n	Total %
Gender						
Male	28	44.0	16	43.0	44	44.0
Female	35	56.0	21	57.0	56	56.0
Total	63	100.0	37	100.0	100	100
Ethnicity						
Caucasian	49	78	27	73.0	76	76
Other	13	21.0	10	27.0	23	23.0
Total	62	99.0*	37	100.0	99	99.0*
Year Born						
1946-1964	9	14.3	4	10.8	13	13
1965-1980	7	11.1	2	5.4	9	9
1981-2000	43	68.3	28	75.7	71	71
Total	59	93.7*	34	91.9*	93	93.0*
Highest Education						
High School/GED	3	4.8	3	8.1	6	6.0
Some College	18	28.6	9	24.3	27	27.0
Undergraduate Degree	19	30.2	11	29.7	30	30.0
Advanced Degree	22	34.9	12	32.4	34	34.0
Other	1	1.6	2	5.4	3	3.0
Total	63	100.0	37	100.0	100	100.0
Income						
Less than \$39,999	43	68.3	31	83.8	74	74.0
\$40,000-\$80,000	15	23.8	5	13.5	20	20.0
\$80,000 or greater	5	7.9	1	2.7	6	6.0
Total	63	100.0	37	100.0	100	100.0

*Indicates a Non-Response

4.3.2 Guest perceptions of time with and without tablets

Table 3 represents an independent sample t-test of tablet and non-tablet users. It compares tablet and non-tablet users actual wait time, point in time they felt uncomfortable, endured time, their enjoyment, and how subjects were influenced by each other. Tablet users during the actual wait time stage have the highest mean value at 15.02, with a standard deviation (SD) of 5.097. Non-tablet users during actual wait time had a mean of 12.19 and a standard deviation (SD) of 5.364. The observed statistical test (t) is 2.626, followed by the significance value (p) of .010. Uncomfortable wait time while using tablets have a mean value of 9.22. Following uncomfortable wait time without tablets at a mean value of 5.54. The mean value during endured wait time is 5.73 with tablets, and 6.51 without. Tablet users had standard deviation (SD) of 3.038, and non-tablet is 3.461. The observed statistical test value (t) is -1.182, along with the significance value (p) of 0.240. Influence from others who used tablets had a mean value of 3.89, and 3.78 for non-tablet users. Wait area enjoyment was the lowest mean value at 3.63 with tablets and 3.27 without. Standard deviation (SD) with uncomfortable time and tablets was 4.386, along with 3.132 for non-tablet. Enjoyment with tablets had a standard deviation (SD) of .789, and .769 without. Standard deviation (SD) of influence by others was 1.752 with tablets and 1.766 without. The observed value of the test statistic (t) for uncomfortable time is 4.874, following enjoyment at 2.252, and influence of 0.289. The significance (p) of uncomfortable wait time was .000, enjoyment 0.027, and influence of 0.773.

Table 3

Differences according to guests with tablets and without

n = With tablets: 63, Without tablets: 37			
Source	Mean \pm SD	<i>t</i>	<i>p</i>
Actual wait time	With tablet: 15.02 \pm 5.097	2.626 *	.010
	Without tablet: 12.19 \pm 5.364		
Uncomfortable feeling	With tablet: 9.22 \pm 4.386	4.874***	.000
	Without tablet: 5.54 \pm 3.132		
Endured wait time	With tablet: 5.73 \pm 3.038	-1.182	.240
	Without tablet: 6.51 \pm 3.461		
Wait area enjoyment	With tablet: 3.63 \pm .789	2.252*	.0
	Without tablet: 3.27 \pm .769		
Influenced by others	With tablet: 3.89 \pm 1.752	0.289	.773
	Without tablet: 3.78 \pm 1.766		

p* < .05, **p* < 0.001

The results in table 4 were found by subtracting perceived wait time from actual wait time. An independent sample t-test was then conducted resulting in a mean of -.4127 for tablet users and -.6486 without. The standard deviation (SD) for tablet users was 6.689 and 5.422 for non-tablet users. The observed value of the test statistic (*t*) is 0.192, followed by the significance (*p*) of .848.

Table 4

Differences according to guest wait time perceptions with tablets and without

n = With tablets: 63, Without tablets: 37			
Source	Mean \pm SD	<i>t</i>	<i>p</i>
Perceived wait time	With tablet: -.4127 \pm 6.689	0.192	.848
	Without tablet: -.6486 \pm 5.422		

4.3.3 Explore how dining frequency affects wait time attitude

Table 5 reviews a frequency test of two groups, conducted by analyzing which subjects dine at restaurants more frequently, and less frequently. There was a frequency of 56 less frequent diners, and 44 subjects who ate at restaurant establishments more often. The group mean is 0.44.

Table 5

Frequency of less frequent dine-out and more frequent dine-out group

Group	Frequency	Percent	Cumulative Percent
Less frequent dine-out group	56	56.0	56.0
More frequent dine-out group	44	44.0	100.0
Total	100	100.0	
Group mean= 0.44			

The data displayed in table 6 was conducted by using an independent t-test. Subjects who dined more frequently, and less frequently were compared with actual time, uncomfortable time, endured time, wait area enjoyment, and influence from others. The highest mean levels were less frequent diners during actual time at 15.13, and more frequent diners had a mean of 7.14. Standard deviation (SD) for frequent diners is 5.333, while less frequent diners are 5.117. The observed value of the test statistic (t) was 2.500 with the significance value (p) providing .014. Uncomfortable feeling mean resulted in 8.43, with a standard deviation (SD) of 4.512 for less frequent diners. More frequent diners had a mean of 7.14 with a standard deviation (SD) of 4.038 when feeling uncomfortable. The observed statistical test (t) is 1.488, followed with the significance

value (p) of 0.140. The subject's endured time mean resulted in 6.55, with a standard deviation (SD) of 3.531 for less frequent diners. More frequent diners had a mean of 5.34 with a standard deviation (SD) of 2.623 during endured wait. The observed statistical test (t) is 1.970, followed with the significance value (p) of .052. When compared to wait area enjoyment the lowest mean value is 3.43 for frequent diners, while less frequent diners are 3.55. The standard deviation (SD) is .759 for frequent diners, and .829 for less frequent. The observed value of the test statistic (t) is .756 with the significance value (p) of .451. Influence of subjects had a mean of 3.73 for frequent diners, and 3.95 for less frequent. Standard deviation (SD) for frequent diners is 1.515, and 1.920 for less frequent. Observed value (t) is .620, followed by the significance value (p) of .537.

Table 6

Differences according to less dine-out group and more dine-out group

n = Less frequent dine-out: 56, More frequent dine out: 44			
Source	Mean \pm SD	<i>t</i>	<i>p</i>
Actual wait time	Less dine-out: 15.13 \pm 5.117 More dine-out: 12.50 \pm 5.333	2.500*	.014
Uncomfortable feeling	Less dine-out: 8.43 \pm 4.512 More dine-out: 7.14 \pm 4.038	1.488	.140
Endured wait time	Less dine-out: 6.55 \pm 3.531 More dine-out: 5.34 \pm 2.623	1.970	.052
Wait area enjoyment	Less dine-out: 3.55 \pm .829 More dine-out: 3.43 \pm .759	0.756	.451
Influenced by others	Less dine-out: 3.95 \pm 1.920 More dine-out: 3.73 \pm 1.515	0.620	.537

**p* < .05,

4.3.4 Explore effects of demographics for wait time evaluation

Due to smaller sample size ethnicity was categorized into two groups. Group one is Caucasian and group two is *other*. Table 7 displays differences in ethnicity when compared to actual wait time, uncomfortable time, endured time, wait area enjoyment, and influence by others. Actual time had the highest mean value. The mean value of group 2 (*other*) is 15.57, with a standard deviation (SD) of 5.759. Mean value of actual time for group one (Caucasian) is 13.55 with a standard deviation (SD) of 5.173. The observed statistical test (*t*) is -1.592, along with a significance value (*p*) of .115. The mean value for group two (*other*) is 8.48 when compared to uncomfortable time; Group one (Caucasian) has a mean of 7.74. Standard deviation (SD) for group two is 4.571, and

4.272 for group one. The observed statistical value (t) is -0.718, along with the significance value (p) of 0.475. When endured time is compared to ethnicity the mean value of group 2 (other) is 7.09, with a standard deviation (SD) of 3.716. Mean value of endured time for group one (Caucasian) is 5.71 with a standard deviation (SD) of 3.010. The observed statistical test (t) is -1.816, along with a significance value (p) of .072. The mean value of wait area enjoyment for group one *Caucasian* is 3.49, while *other* is 3.57. The standard deviation (SD) for enjoyment by group one “Caucasian” is 0.808, while group two *other* is .788. The observed statistical value (t) is -0.410, along with a significance value (p) of 0.683. Lastly when ethnicity was compared to influence, *Caucasian* had a mean value of 3.95 and a standard deviation (SD) of 1.758. Group two *other* had a mean value of 3.48 and a standard deviation (SD) of 1.729. The observed statistical test (t) is 1.126, followed by a significance value (p) of 0.263.

Table 7

Differences according to Ethnicity

n =Caucasian: 76, Other: 23			
Source	Mean \pm SD	<i>t</i>	<i>p</i>
Actual wait time	Caucasian: 13.55 \pm 5.173 Other: 15.57 \pm 5.759	-1.592	.115
Uncomfortable feeling	Caucasian: 7.74 \pm 4.272 Other: 8.48 \pm 4.571	-0.718	.475
Endured wait time	Caucasian: 5.71 \pm 3.010 Other: 7.09 \pm 3.716	-1.816	.072
Wait area enjoyment	Caucasian: 3.49 \pm 0.808 Other: 3.57 \pm 0.788	-0.410	.683
Influenced by others	Caucasian: 3.95 \pm 1.758 Other: 3.48 \pm 1.729	1.126	.263

Displayed in table 8 is a t-test comparing gender with actual time, uncomfortable time, endured time, waiting area enjoyment, and influence by others. Actual time mean value of males is 13.43, with a standard deviation (SD) of 5.013. Mean value of actual time for females is 14.39 with a standard deviation (SD) of 5.067. The observed statistical test (*t*) is -0.891, along with a significance value (*p*) of .375. The mean value for males when uncomfortable time is 7.59, and female is 8.07. Standard deviation (SD) of uncomfortable time is 4.422 for male, and 4.297 for females. Endured wait time mean value of males is 5.84, with a standard deviation (SD) of 2.964. Mean value of endured time for females is 6.16 with a standard deviation (SD) of 3.405. The observed statistical test (*t*) is -0.493, along with a significance value (*p*) of .623. When gender was compared to wait area enjoyment the mean is the same for both males and females at 3.50. The

standard deviation (SD) for males is .762, and .831 for females. The observed statistical value (t) is 0.000, and has a significance value (p) of 1. Males mean value when influenced by others is 3.68 with a standard deviation (SD) of 1.827. Females mean value when influenced by others is 3.98 with a standard deviation (SD) of 1.689. The observed statistical test value (t) of gender compared to influence by others is -0.851, and has a significance value (p) of 0.397.

Table 8

Differences according to Gender

n = Male: 44, Female: 56			
Source	Mean \pm SD	t	p
Actual wait time	Male: 13.43 \pm 5.013 Female: 14.39 \pm 5.067	-0.891	.375
Uncomfortable feeling	Male: 7.59 \pm 4.422 Female: 8.07 \pm 4.297	-0.548	.585
Endured wait time	Male: 5.84 \pm 2.964 Female: 6.16 \pm 3.405	-0.493	.623
Wait area enjoyment	Male: 3.50 \pm 0.762 Female: 3.50 \pm .8310	0.000	1.000
Influenced by others	Male: 3.68 \pm 1.827 Female: 3.98 \pm 1.689	-0.851	.397

Table 9 displays an Anova test of generation comparing, actual wait time, uncomfortable time, endured wait, wait area enjoyment, and influence by other subjects. Actual wait compared to generation has a sum of squares of 76.547, degree of freedom

(*df*) of 2, mean square of 38.274, and F statistic of 1.288. When generation was tested with uncomfortable waiting time, the sum of squares is 9.929, degree of freedom (*df*) is 2, a mean square is 4.965, followed by the F statistic of 0.251. The subject's endured wait compared to generation has a sum of squares of 30.580, degree of freedom (*df*) of 2, mean square of 15.290, and F statistic of 1.468. Wait area enjoyment tested with generation had a sum of squares of 0.710 and degree of freedom (*df*) of 2, mean square of 0.355, and an F statistic of 0.546. Generations influenced by others had a sum of squares of 5.428, degree of freedom (*df*) of 2, mean square of 2.714, and F Statistic of 0.861.

Table 9

Differences according to generation

Dependent Variable	Source	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>
Actual wait time	Generations	76.547	2	38.274	1.288
Uncomfortable feeling	Generations	9.929	2	4.965	.251
Endured wait time	Generations	30.580	2	15.290	1.468
Wait area enjoyment	Generations	0.710	2	0.355	.546
Influenced by others	Generations	5.428	2	2.714	.861

Table 10 reviewed an Anova test of income compared actual wait time, uncomfortable feeling, and endured wait time income. This followed by wait area enjoyment, and influence from others. Comparison of actual wait time to income resulted in a sum of squares of 31.405, degree of freedom (*df*) 2, a mean square of 15.703, and an F statistic of .544. When income was compared to uncomfortable time the sum of

squares is 13.152, with a degree of freedom (*df*) of 2, mean square of 6.576, and an F statistic of .709. Comparison of endured wait time to income resulted in a sum of squares of 14.555, degree of freedom (*df*) 2, a mean square of 7.278, and an F statistic of .704. Wait area enjoyment analyzed with generation had a sum of square of .064, degree of freedom (*df*) of 2, mean square of .032, and F statistic of 0.049. Generations influenced by influence of others had sum of squares of 3.422, degree of freedom (*df*) of 2, mean square of 1.711, and F statistic of .554.

Table 10

Differences according to income

Dependent Variable	Source	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>
Actual wait time	Income	31.405	2	15.703	.544
Uncomfortable feeling	Income	13.152	2	6.576	.709
Endured wait time	Income	14.555	2	7.278	.704
Wait area enjoyment	Income	0.064	2	0.032	.049
Influenced by others	Income	3.422	2	1.711	.554

4.3.6 Explore how table use impacted wait time management

Data displayed in table 11 explores how tablets impacted wait time management. An independent t-test was conducted comparing subjects with and without tablets and how the tablets impacted wait time. The highest mean value for managing wait was 3.14 without tablets with a standard deviation (SD) of 1.273. Managing wait without tablets

had a mean of 2.81 and standard deviation (SD) of 1.075. The observed statistical test (t) is -1.365, followed by the significance value (p) of 0.196.

Table 11

Differences according to impact of tablets when managing wait

n = With tablets: 63, Without tablets: 37			
Source	Mean \pm SD	t	p
Managing wait	With tablet: 2.81 \pm 1.075	-1.365	.196
	Without tablet: 3.14 \pm 1.273		

4.4 Summary

This chapter provides the statistical data analysis found in this study. The chapters reviewed are as follows. The study's objectives are reviewed in section two. Demographics and descriptive statistics of study, along with a breakdown of tablet and non-tablet users providing perceptions of time, actual wait and effects on guest satisfaction are reviewed in sections three. Chapter five will provide the study's outcomes, limitations, and future suggested studies.

Chapter 5

Discussion

5.1 Introduction

This chapter provides the conclusion, implications, limitations, and suggestions for future research. The findings are categorized in the conclusion following the objectives included in the study referring to, guest perceptions of wait-times with and without tablets, wait-time attitudes, and how tablet use impacts wait-time management. Developed from the discussion of the results are implications from both the restaurant industry and academia. Lastly the implications are explained, along with potential future studies.

5.2 Conclusion

The purpose of the study was to find how tablets affect perceptions of wait times, attitudes of dining frequency, and how tablet use impacts wait time management. The results indicate, a significance of wait time between tablet and non-tablet users when analyzed with actual wait time, uncomfortable feeling, and wait area enjoyment. When users had tablets they waited longer than those without. Restaurants should keep this in mind when deciding when and where to incorporate tablet technology. Even though there was no significance between wait-time perceptions and actual time the information is still beneficial to the restaurant industry. For example there may be better areas to invest in tablet technology at some other stage of service and not the pre-process stage. The significance of tablet users waiting longer than non-tablet can also be useful in the terms that the guest were distracted longer during their wait. With the research provided in the literature review, service is often proposed to begin during the initial wait stage.

So there are potential advantages of using tablets during the pre-process stage. For example Non-tablet users became uncomfortable more quickly than subjects with tablets. Tablet users also enjoyed the wait area better when using a tablet versus not using one. Casual restaurants want their guests to be comfortable during the wait periods; this study proved tablets helped improved the guest enjoyment of the wait area. If a restaurant has poor satisfaction in their wait area implementing tablets could help improve the guest's enjoyment. The differences of endured wait time, and influence by others is too small providing no significance.

The research provided shows subjects who ate out less had a mean of 15.13 when compared to actual wait time. Actual wait time for frequent diners provided a lower mean of 12.50 providing significance. Subjects who ate out less often waited longer than frequent restaurant diners. These results provided more patience for less frequent diners who maybe only going out to enjoy their selves every once in awhile leading to more patience than diners who eat out frequently. There was no significant differences in uncomfortable feeling, endured wait, wait area enjoyment, and influence by others. Actual wait time was the only significant difference frequent and less frequent restaurant diners had in common.

Research comparing the demographics to actual wait time, uncomfortable feeling, endured wait, wait area enjoyment and influence by others. The demographics tested were ethnicity, gender, generation, and income. Ethnicity and gender results were found by completing an independent sample t-test. Generation and Income were both categorized into three groups and tested separately using a one-way Anova. The purpose of this analysis was to explore demographical differences. The research proved no

significance differences in ethnicity and gender, as it relates to actual wait, uncomfortable wait, and endured wait. This study proved generations did not have any differences. Keep in mind the generation's sample may have been too small, but there were still no differences. If restaurants are unsure of adopting tablet technology because of generation differences the results show no differences. The data indicates no demographical significance exists between income and wait area enjoyment. Restaurants do not have to worry about different incomes when adopting tablet technology; income did not have significance.

The data was analyzed by conducting an independent sample t-test between users with and without tablets in regards to wait management. The purpose was to analyze how tablets had an impact on managing wait time. When managing wait, the tablets had minimal impact. Subjects with tablets had a mean of 2.81, followed by non-tablet user with a mean of 3.14 for wait management. This shows the tablet did have a slight impact over user without a tablet when managing wait but not enough to result in statistical significance.

5.3 Implications

The data supports tablet users will wait longer, and do not feel uncomfortable as quickly as non-tablet users. It can also be determined tablets increase wait area enjoyment. Although there are no significant differences in endured wait and influence by others the tablet was still effective during the wait. The second objective compares diners depending on how often they ate at restaurants. There was a significance of more frequent dines and less frequent diners in regards to actual wait time. Less frequent

diners waited longer than more frequent diners. There were no other significant factors in comparison to how often the subjects dine out. In regards to demographics the only significance found was comparing income to wait area enjoyment where. Results were insignificant when testing gender; ethnicity, generations, and income with the exclusion of wait area enjoyment. It can be concluded tablets did not impact wait time management.

5.4 Limitations and Future Research Recommendations

The sample size goal was reached for the study, although it was potentially too small. The smaller number of non-tablet users may have resulted in insignificance compared to the number of tablet users. Limitations also included location of study and lack of demographical differences. Lack of diversity of ethnicity and age may have affected outcome of results. Future studies should look into location and increase number of subjects to recruit a more diverse group of participants. This will help eliminate false negatives as a result of power related issues, in terms of demographic data.

Another limitation included the 15-minute time slot between every seven reservations. Future studies should consider increasing the time between reservations to ensure no bias is created for the next reservation when the subjects participating in the study wait over 15 minutes. Tablet users chose to play either a game or use the Internet during the study, it would be recommended to record, which one the subjects used to provide more results. It is also important to keep in mind there was a free lunch offered once the study was concluded as an incentive for recruitment.

Increasing sample size and having a more diverse population will be useful to conduct future studies. Tablets can be tested throughout the stages of service in a controlled restaurant setting.

APPENDIX A



Campus Institutional Review Board
University of Missouri-Columbia

485 McReynolds Hall
Columbia, MO 65211-1150
PHONE: (573) 882-9585
FAX: (573) 884-0663

December 5, 2014

Principal Investigator: Wolf, Justin Walter
Department: Food Science

Your Application to project entitled *Guest perceptions of wait times using tablet technology in restaurant environment*. was reviewed and approved by the MU Campus Institutional Review Board according to terms and conditions described below:

IRB Project Number	1214095
Initial Application Approval Date	December 5, 2014
IRB Expiration Date	December 5, 2015
Level of Review	Exempt
Project Status	Active - Open to Enrollment
Regulation	45 CFR 46.101b(2)
Risk Level	Minimal Risk

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

1. No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
2. All unanticipated problems, serious adverse events, and deviations must be reported to the IRB within 5 days.
3. All modifications must be IRB approved by submitting the Exempt Amendment prior to implementation unless they are intended to reduce risk.
4. All recruitment materials and methods must be approved by the IRB prior to being used.
5. The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date.
6. Maintain all research records for a period of seven years from the project completion date.
7. Utilize the IRB stamped document informing subjects of the research and other approved research documents located within the document storage section of eIRB.

If you have any questions, please contact the Campus IRB at 573-882-9585 or umcresearchcib@missouri.edu.

Thank you,

Charles Borduin, PhD
Campus IRB Chair

Be Our Guest!

Dec. 8-9, Culinary Café

The Culinary Café will be testing tablet technology and guest perceptions of wait times on Dec. 8th and 9th. Reservations are required to participate and can be made at the Café's website <http://culinarycafe.missouri.edu/>. Your participation will require about 45 minutes and include a complimentary meal provided by the Culinary Café. Please contact the Café staff with questions culinarycafe@missouri.edu.

Research Participant Information and Consent Form

Dear Study Participants:

You are being asked to complete a experiment and a research questionnaire entitled “Waiting time.” You must be eighteen years of age or older to participate in this research study. You should feel free to ask the researchers any questions you may have. The experiment and survey will only take within 1 hour.

STUDY TITLE: Guest perceptions of wait times using tablet technology in restaurant environment.

Researchers: Leslie G. Jett (Executive Chef and Asst Teaching Professor) and Justin W. Wolf (Research Assistant)

Department and Institution: Hospitality Management, University of Missouri-Columbia

Address and Contact Information: Leslie G. Jett (phone: 573-884-3485; office: 115 Eckles Hall; email: JettLG@missouri.edu) or Justin Wolf (phone: 618-830-4482, email: jww5g4@mail.missouri.edu)

PURPOSE OF RESEARCH:

Your answers will help us better understand differences between perceived waiting time, gender differences in perceived waiting time, and attributes which can influence waiting time as it relates to using tablet technology in the restaurant waiting area.

WHAT YOU WILL DO:

The following are the experiment to measure gap between actual waiting time and perceived waiting time and the questionnaire in English used in the study to determine customer behavior in restaurant, general waiting behaviors, and dining experiences.

Instructions:

This experiment and survey consist of a total of THREE sections as follows.

Section 1 (experiment). Actual waiting time

Section 2 (survey). Customer behavior in restaurant

Section 3 (survey). General waiting behaviors

Note:

At the beginning of each section, you will find instructions to help you understand the questions. Please complete the following questions to reflect your opinions as accurately as possible and to answer factual questions to the best of your knowledge.

PRIVACY AND CONFIDENTIALITY:

The data that are collected from you will be held in strictest confidence. No personally identifiable information will be used to link back to you, or shared with a third party. Your privacy will be protected to the maximum extent allowable by law.

Note:

For your privacy, the secondary researcher will need to keep your data for seven years after the research has been closed.

YOUR RIGHTS TO PARTICIPATE OR WITHDRAW:

Participation is voluntary. You may choose not to participate at all, or you may refuse to participate in certain procedures or answer certain questions or discontinue your participation at any time without consequence.

Research Participant Information and Consent Form

CONTACT INFORMATION FOR QUESTIONS AND CONCERNS

Researcher Contact Information:

If you have questions or comments regarding this study, if you have any questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspects of this study, please do not hesitate to contact Leslie G. Jett (phone: 573-884-3485; office: 115 Eckles Hall; email: JettLG@missouri.edu) or Justin Wolf (phone: 618-830-4482, email: jww5g4@mail.missouri.edu)

IRB contact information:

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the University of Missouri-Columbia's Campus Institutional Review Board at 573-882-9585, Fax 573-884-0663, or umcresearchcirb@missouri.edu or regular mail at 483 McReynolds, University of Missouri, Columbia, MO 65211.

Note:

You indicate your voluntary agreement to participate by completing and returning this questionnaire.

Campus IRB Approved 11/2/2011
IRB #1198180

Study Instructions

Good morning everyone, thank you for partaking in our study of guest perceptions of wait times while using tablet technology.

Your identity will remain confidential in the study.

Since this study involves wait times we ask you to please write your name on the back of the large envelope we have provided and put any watches/phones along with any other devices that tell time in it.

We have seven reservations per every 15 minutes. By randomization some of you will receive a tablet and some will not. We have provided you complementary access to play angry birds or surf the Internet. We will escort you to your chair, where you will begin the study.

Once you have been seated you will begin your wait. There will be a buzzer connected to each Ipad. Please press green when you are uncomfortable waiting and press red when you are finished waiting.

When you press the red button we will come and get you. We will escort you to a single table where you will place your food order and fill out our questionnaire. To show our appreciation we have a complimentary choice of pulled pork sandwich and fries or a choice of chicken strips and fries. While you are waiting please fill out the questionnaire. After completing the questionnaire you are welcome to rejoin or talk to people you know. We will also return your personal items. You are welcome to eat your meal in the café or you may take it to go.

Please keep talking to a minimal when partaking in the study and questionnaire.

Thank you for your time, we really appreciate it! Once you have turned in your envelope please proceed to the host stand to begin your dining experience.

Questionnaire

Thank you for your participation.

The purpose of this survey is to examine customers' waiting behavior. The responses of this survey will be utilized as a tool for statistical analysis and research purposes in a very confidential manner. We would appreciate your sincere response to the questions included in the survey.

November 2014

Investigator:

Justin W. Wolf, Masters Candidate

Leslie G. Jett, Executive Chef and Asst Teaching Professor

University of Missouri, Columbia, MO

Department of Hospitality Management

Phone: 573-884-3485

I. The following questions ask you about your waiting experience today. Please give your opinion.

1. How long was your wait today? _____ minutes
2. For today's study did you have a ☐ tablet ☐ no tablet
3. If you had a tablet did it make the wait time more enjoyable? ☐ Yes ☐ No
4. Overall, the waiting area at the restaurant is:
☐ Very poor ☐ Poor ☐ Neutral ☐ Good ☐ Very Good
5. What describes your waiting time in the restaurant best?
☐ Waited much more than others ☐ Waited more time than others
☐ Waited the same time as others ☐ Waited less time than others
☐ Waited much less time than others
6. How do you feel today?
☐ Very bad ☐ Bad ☐ Neutral ☐ Good ☐ Very good
7. How busy are you today after lunch?
☐ Completely free ☐ Free ☐ Neutral ☐ Busy ☐ Very good

8. Do you have a meeting or obligations within 1 hour of your reservations?

☐ Yes ☐ No

9. Do you currently own a smart phone or tablet?

☐ Yes ☐ No

10. How long have you been using tablet technology? _____ years

11. Have you dined in an operation that uses tablet technology? ☐ Yes ☐ No

12. Did you engage in the use of technology in the above-mentioned question?

☐ Yes ☐ No

II. The following questions ask you about your views regarding the experiment you participated. Please give your opinion for each question.

Please indicate how much you agree or disagree that the statement describes your opinion about the experiment in which you participated.

Items	Strongly ←-----Neutral-----→ Strongly						
	Disagree			Agree			
13. The experiment was realistic	(1)	(2)	(3)	(4)	(5)	(6)	(7)
14. The experiment was confusing	(1)	(2)	(3)	(4)	(5)	(6)	(7)
15. It was easy to understand the procedure of the experiment	(1)	(2)	(3)	(4)	(5)	(6)	(7)
16. I pushed the buzzer on time	(1)	(2)	(3)	(4)	(5)	(6)	(7)
17. I was influenced by other people during the experiment	(1)	(2)	(3)	(4)	(5)	(6)	(7)

III. The following questions ask you about your general behavior to visit the restaurant. Please give your opinions.

18. In general, you are:

☐ Very Comfortable with waiting ☐ Uncomfortable waiting

☐ Neither comfortable nor uncomfortable ☐ Comfortable with waiting

☐ Very comfortable with waiting

19. How much time do you usually spend on lunch?

☐ Less than 20 min. ☐ 20-40 min. ☐ 41-60 min.

☐ 61-80 min. ☐ Over 80 min.

20. How many times did you eat out during the past month? (Including breakfast, lunch, and dinner)

☐ Less than 5 ☐ 5 to 10 ☐ 11 to 15 ☐ 16-20 ☐ More than 20

21. In general, how much do you usually pay for lunch? \$ _____

VI. Demographic information

22. Ethnicity: _____

23. Gender: ☐ Male ☐ Female

24. Highest level of education completed:

☐ High School/GED ☐ Some College ☐ Undergraduate Degree

☐ Advanced Degree ☐ Other: _____

25. What year were you born? _____

26. Annual Income:

☐ Less than \$24,999 ☐ \$25,000-\$39,999

☐ \$40,000-\$60,000 ☐ \$60,000-\$80,000

☐ \$80,000-\$100,000 ☐ \$100,00 or greater

We appreciate your sincere response to the questions included in the survey!

Monday December 8 th , 2014	Tuesday December 9 th , 2014
Research Randomizer Results	Research Randomizer Results
1 Set of 23 Unique Numbers Per Set Range: 1 to 56 -- Unsorted	1 Set of 17 Unique Numbers Per Set Range: 1 to 56 -- Unsorted
Set 1	Set 2
#55	#8
#47	#1
#18	#19
#42	#27
#20	#9
#53	#36
#45	#10
#13	#25
#25	#54
#34	#42
#33	#21
#21	#7
#5	#30
#56	#34
#51	#18
#31	#52
#4	#44
#43	
#46	
#54	
#15	Set One Randomized December 8 th , 2014
#23	Set Two Randomized December 9 th , 2014
#37	http://www.randomizer.org









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