

BumpMe: Solving Involuntary Flight Bumping

by
Tiffany Aiken
May 2016

Presented to the
Division of Science, Information Arts, and Technologies
University of Baltimore

In Partial Fulfillment
of the Requirements for the Degree of
Master of Science

Approved by: _____

Gregory Walsh, Thesis Advisor

IDIA Program Director

Abstract

When an airline sells seat tickets, it will overbook a flight in anticipation of cancellations or no-shows. The hope is that the amount of people that do not show up matches the overbooked surplus in a perfect manner and each plane that leaves has exactly its number of seats full. This overbooking holds a considerable risk because if the perfect situation does not happen, the airline must find customers willing to take an alternate flight to their destination, known as being bumped. Airline employees attempt to convince passengers to voluntarily bump themselves to a later flight through incentives. Where the problem becomes much more significant is when there are not enough volunteers to be bumped, in which time passengers will be involuntarily bumped from the flight they already paid for.

Ninety-five percent of web users have searched the Internet to gather travel related information. Global e-commerce and mobile commerce (m-commerce) transactions will hit \$2.4 trillion by 2019 and 23 percent of these transactions will be coming from mobile devices. However, little research has been done on creating user-friendly mobile tourism applications. It is not the number of features but the usefulness of the features that is important in mobile commerce. For a mobile tourist information system to have an effective design, the right information must be delivered to the user in a way that is satisfying to that user. This is where aspects such as the interface design and information presentation on a small-screened mobile device come into play.

The purpose of this project was to develop and user-test a prototype for a user-friendly mobile tourism application that solves the problem of involuntary flight bumping done by airlines. The BumpMe mobile application works with the airline's internal systems to allow consumers to view flight details and voluntary bump incentives in order to pre-emptively volunteer to bump themselves from a flight should they feel the incentive is worth it. Tests of the prototype received positive reviews from users.

Table of Contents

List of Tables	iv
List of Figures	v
Chapter 1: Flight Overbooking	1
Introduction: The Problem	1
The Product	2
When The Law Does Not Apply	3
Chapter 2: Literature Review	2
The Industry as a Whole	2
Customized Customer Needs	4
The Airline Industry and M-Commerce	4
M-Commerce and Payment	5
M-Commerce and User Trust	6
Designing for Mobile Devices in the Tourism Industry	7
Product Competition	8
AirHelp	9
RefundMe	9
Internal Flight Load Checkers	10
The Solution	10
Chapter 3: Research Goals of User Testing	12
Research Objectives	12
BumpMe Round 1	13

Participant Demographics	20
Screening Question	20
Demographics	21
Protocol	22
Instructions	22
Testing Scenario	22
Chapter 4: Findings	24
Usability Findings from Round 1 Testing	24
Notable Participant Responses to Written Questions	28
Chapter 5: Revisions	30
Revisions Based on User Feedback	30
Chapter 6: New Findings	37
Demographics	37
Usability Findings from Round 2 Testing	38
Notable Participant Responses to Written Questions	42
Chapter 7: Discussion	44
Consistency	44
Convenience/Efficiency	45
Trust	47
Further Consideration	49
Chapter 8: Conclusion	50

Summary	50
Considerations and Next Steps	50
Importance of the BumpMe App	50
Features of BumpMe.....	51
The Modern Scenario.....	51

List of Tables

Table 4.1. BumpMe Round 1 Screens and Descriptions..... 24

List of Figures

Figure 2.1. Model for customer trust formation and retention.....	16
Figure 3.1. BumpMe home screen.....	24
Figure 3.2. Welcome screen.....	24
Figure 3.3. Flight overbooked.....	25
Figure 3.4. Flight not overbooked.....	25
Figure 3.5. Select an offer.....	26
Figure 3.6. Voucher details.....	26
Figure 3.7. Choose a replacement flight.....	27
Figure 3.8. View profile.....	27
Figure 3.9. View bump history.....	28
Figure 3.10. View booking history.....	28
Figure 3.11. View offer history.....	29
Figure 3.12. Screener question used in usability study.....	30
Figure 3.13. Gender demographic.....	31
Figure 3.14. Income demographic.....	31
Figure 3.15. Age demographic.....	31
Figure 4.1. Participant ratings of the usefulness of the tagline.....	34
Figure 4.2. Participant ratings of the usefulness of the select offer screen.....	36
Figure 4.3. Participant ratings of likeliness to accept an offer to be bumped.....	36
Figure 4.4. Participant ratings of the difficulty of finding information.....	38
Figure 5.1. BumpMe home screen.....	42
Figure 5.2. Login screen.....	42
Figure 5.3. Welcome screen.....	43
Figure 5.4. Flight overbooked.....	43
Figure 5.5. Flight not overbooked.....	44
Figure 5.6. Select an offer.....	44
Figure 5.7. Voucher details.....	45

Figure 5.8. Choose a replacement flight.....	45
Figure 5.9. View profile.....	46
Figure 6.1. Gender demographic.....	47
Figure 6.2. Income demographic.....	47
Figure 6.3. Age demographic.....	47
Figure 6.4. Participant ratings of the usefulness of the tagline.....	48
Figure 6.5. Participant ratings of the usefulness of the select offer screen.....	50
Figure 6.6. Participant ratings of likeliness to accept an offer to be bumped.....	50
Figure 6.7. Participant ratings of the difficulty of finding information.....	52
Figure 7.1. BumpMe original home screen.....	55
Figure 7.2. BumpMe revised home screen.....	55
Figure 7.3. BumpMe original welcome screen.....	57
Figure 7.4. BumpMe revised welcome screen.....	57
Figure 7.5. BumpMe revised select offer screen.....	58
Figure 7.6. BumpMe revised offer detail screen.....	58

BumpMe: Solving Involuntary Flight Bumping

Chapter 1: Flight Overbooking

Introduction: The Problem

In the airline industry, overbooking is a significant issue that both plagues and sometimes delights flyers that have already completed their purchase of a seat on a plane. When an airline sells its seats, it often overbooks a flight anticipating that there will be cancellations or no-shows, and the hope is that the amount of people that do not show up match the overbooked surplus in a perfect manner and each plane that goes into the air has every seat full with no surplus or deficit. Airlines invest great resources into trying to make this happen through the science of Yield Management. From the perspective of the airline, it makes sense to do this because of their scale. The plane is going off whether there are no empty seats or 20 empty seats, which can drastically hurt the airline's bottom line (Donovan, 2005).

Overbooking holds a considerable customer service risk because if the perfect situation does not happen, which is a common occurrence, then a flight attendant is required to attempt to convince enough customers to take the next flight to their destination. This is done so that the plane is filled entirely with the runoff going towards another flight, to the same destination, that hopefully will not also be overbooked already. Airline employees attempt to convince passengers to voluntarily bump themselves to a later flight through incentives. The incentives offered differ between airlines and value. For example, sometimes the airline may offer customers \$100 cash, and/or hotel room stays, while others may offer significantly less such as a food item or a free drink ticket (Kurtzleben, 2014). Where the problem becomes much more significant is when there are not enough volunteers, in which time passengers will be bumped from the flight they already paid for involuntarily.

BumpMe: Solving Involuntary Flight Bumping

The Product

Should a flight overbooking cause an involuntary bump, which lead to a substantial delay, there is legal recourse that a passenger can take to collect a cash award. More details will be discussed further.

The issue is so large that in 2013, there were 26 million instances of involuntary bumps in which only 0.06% of the cash entitled to wronged passengers was ever collected (Elliott, 2014). The answer to this problem is the mobile app, BumpMe. BumpMe works with the airline's internal systems to allow consumers to view flight details and voluntary bump incentives in order to pre-emptively volunteer to bump themselves from a flight should they feel the incentive is worth it. BumpMe is also set up to report data of app usage back to the airline so that they can collect valuable data in order to optimize their voluntary bump offerings. The purpose of this research is to show how BumpMe allows both airlines and passengers to get ahead of the overbooking epidemic in a cohesive manner to provide a win-win solution for all interested parties.

The process of overbooking a flight is not illegal. In fact, there does not appear to be any federal regulations that describe rules on how overbooking should be done. There also does not appear to be any legal maximum percentages as to how far a plane can be overbooked by any individual airline or in the industry as a whole. The only legal regulations for overbooking involve some cash entitlements to qualifying involuntary bumps due to overbooking procedures.

Incentives

When a passenger has been involuntarily bumped from a flight which leads to a delay to their destination of 1-2 hours, it is policy they are entitled to 200% of the one-way ticket price at a maximum of \$650.

BumpMe: Solving Involuntary Flight Bumping

When a passenger that has been involuntarily bumped from a flight which leads to a delay to their destination of more than 2 hours, the policy states that they are entitled to 400% of the one-way ticket price at a maximum of \$1,300 (Elliott, 2014).

Airlines may try to negotiate a lower reimbursement in this case, but if the passenger is aware of their rights, they are entitled to the money as described in overbooking regulations. It is also important to note that some flights, especially international flights, come with a price tag of near or above the prescribed maximums.

When The Law Does Not Apply

These laws do not apply to airlines in which the involuntary bump leads to a delay of less than 1 hour of original arrival. They also do not apply to voluntary bumps, as the transaction of receiving an airline consolation in exchange for a voluntary bump does not constitute a reward for being involuntarily bumped (Kurtzleben, 2014). This reimbursement also does not apply to other types of airline flight delays such as tarmac delays or any involuntary bumps that occur due to an airline having to switch out a larger plane for a smaller plane for the flight.

BumpMe: Solving Involuntary Flight Bumping

Chapter 2: Literature Review

The Industry as a Whole

The airline industry has a unique situation on its hands when it comes to customer care and how it affects each airline's competitive advantage. This is because unlike most industries, it is difficult to ascertain the true propensity of industry forces and how it affects the overall sustainability of each player's corporate health. Michael Porter provided a framework known as Porter's Five Forces. The framework models an industry as being influenced by five forces (competitors, threat of new entrants/entry barriers, threat of substitutes, buyer power, and supplier power) (Porter, 2008). This framework can be used to analyze the level of competition in an industry as well as business strategy development. The five forces are used to determine competitive intensity and attractiveness of an industry. Attractiveness in this context is defined as overall industry profitability. When looking at Porter's Five Forces, it is easy for players in other industries to come up with competitive strategy using the Four Building Blocks of Competitive Advantage (Customer Responsiveness, Innovation, Efficiency, and Quality). (Lake, 1991) Each of the 4 building blocks can be largely affected through policy changes limited mostly in-part by Porter's Five Forces. The following industry analysis highlights what is unique enough about the airline industry to warrant a paradigm shift in the overbooking process, which has high potential to impact the bottom line of an airline through Customer Responsiveness.

1) **Current Competitors** – (Medium-Sized Risk) – Current competition in the airline market can be rigorous to a degree, but it is each airline's job to develop its own branding in order to be competitive such as Southwest Airlines foregoing innovation in exchange for efficiency in order to reduce internal costs and arguably foregoing quality in order to be price leaders.

BumpMe: Solving Involuntary Flight Bumping

2) **Threat of New Entrants** – (Low Risk) – With the huge costs associated with creating an airline from scratch and the entire infrastructure necessary for success, threat of new entrants has a low effect on competitive strategy.

3) **Threat of Substitutes** – (Unique Risk) – Substitutes for using an airline include other ways to travel such as using a car, bus, train, etc.

The threat of said substitutes is unique for the airline industry because in some situations, people can choose to travel without flying. However, in some situations, it is not just impractical, but impossible for people to achieve their necessary destinations in a permissible time frame without using an airline. This leads to a distinct break in competitive strategy because the threat of substitutes force cannot be applied to a foreseeable customer base at any given time.

4) **Power of Suppliers** – (Risk Fluctuates) – Each airline uses different contracts, futures, and resources in different manners in order to remain competitive vis-à-vis economic atmospheres. To dissect this in accurate and reliable detail would take a great deal of inside knowledge from each airline.

5) **Power of Buyers** – (Unique Risk) – For an airline passenger to switch from one particular airline to another is not considerably predictable in a wide-scale manner. Some routes are exclusive to only 1 airline at a time, and prices can sometimes be widely different enough to keep upset customers loyal to a certain airline. These passengers are a low threat to the airline because they have very little power to renege, especially if they cannot make use of a substitute to flight. However, these limiting circumstances might change sometimes even overnight. On the other side of this customer division, there are some customers that have a multitude of price comparable airlines to choose from which results in a higher churn risk because those customers have a great deal of power (Porter, 2008).

BumpMe: Solving Involuntary Flight Bumping

Customized Customer Needs

The largest consideration to take into account as to why these forces make competitive strategy hard to achieve is that each ticket sold is basically a customized offering. Though the service itself is rather identical between customers, the need that the service is fulfilling may be entirely different from one passenger to another. This is the fact that makes customer responsiveness a difficult strategy to put into place, but if done while weighing the correct risks, may lead to huge benefits to airlines that adopt the right strategy.

Ninety-five percent of web users have searched the Internet to gather travel related information. The consumer has vast amounts of information in their pocket. In 1998, two percent of the travel market was transacted over the Internet. Analysts predicted a rise to seven and a half percent by 2003. Online bookings tripled in 2004 and the issuing of paper tickets dropped to an all-time low of only 6 percent from twenty-four percent in 2002 (Mamaghani, 2009). The competition is fierce, forcing travel and tourism businesses to be more user focused. They do this by using information technology to provide real time data and additional convenience to the user. New developments show that users change behaviors in relationship to travel planning, reservations, and purchasing. A travel company will be successful depending on how well they make use of the available technology.

The Airline Industry and M-Commerce

Mobile airline services (such as booking, check-in, boarding pass, flight information, etc) have been increasingly used over the past several years. These services offer a very competitive advantage to the airlines using them, attracting more and more customers. The quality of these services is very important (Zervaki, Vlachopoulou, Stiakakis, Manthou, 2010). Therefore, a low-quality or excellent service has a strong impact on users and can create strong feelings (positive or negative) towards a company and its services. Airlines must make an important decision.

BumpMe: Solving Involuntary Flight Bumping

If they adopt this innovative way to sell or deliver services and to manage customer relationships they must make significant technological and strategic changes (Wang, Cheung, 2004). However, by doing so an airline can reduce costs, can create switching costs and lock-in, and can create competitive advantage by providing extra services for its passengers (Lehtinen, 2006). Consumers' mobile readiness is directly related to their perception of value. That is the value of making bookings, receiving information, and other services on their mobile devices (Lubbe, Louw, 2010).

Unlike e-commerce users, mobile commerce (m-commerce) users often find themselves in an unfamiliar environment. Thus, the development of mobile commerce environments that have user-friendly features is very important. Some features are crucial to the success of mobile air ticketing commerce and related aspects such as voluntary flight bumping. A successful web presence for an e-commerce company does not automatically translate to m-commerce success. The goals of each user vary based on location or time pressures. It is not the number of features but the usefulness of the features that is important in m-commerce (Wei, Ozok, 2005). A mobile app in the airline industry can enhance the user-friendliness of the interface in order to gain popularity against competitors.

M-Commerce and Payment

Airlines are realizing that they need their own payment channels. In addition to ticket sales, payments can be a means of competitive advantage for increasing revenues. Global e-commerce and m-commerce transactions will hit \$2.4 trillion by 2019 and twenty-three percent of these transactions will be coming from mobile devices. Aside from the popular cards such as Visa, MasterCard, and American Express, there are more than 300 types of alternative payment. This includes direct debit, prepaid cards, and bank transfers as well as e-wallets or something as simple as providing a mobile number to pay. It is estimated that by 2019 these alternate payments will claim fifty-five percent of global e-commerce and m-commerce turnover (Jenner, 2016).

BumpMe: Solving Involuntary Flight Bumping

This is a great opportunity for airline apps to establish a powerful relationship with each passenger. The relationship can then be leveraged in many other areas.

M-Commerce and User Trust

While difficult, it is possible to gain customer trust in m-commerce. The Internet creates unprecedented opportunities for initiating customer relationships, and trust is an essential part. Almost all users refuse to provide personal information to a website or mobile app at one time or another, because they lack trust (Siau, Shen, 2013). Many users miss social cues and personal interaction such as body language and ability to feel/touch/inspect products and then perceive online business as risky. M-commerce faces these issues and more. While mobile devices are convenient for anytime use, their small screens, tiny keypads, and low resolution displays make it difficult to develop user-friendly interfaces. Figure 1 shows a model developed for customer trust building, in order to explore means of gaining and retaining customer trust in mobile commerce (Siau, Shen, 2013).

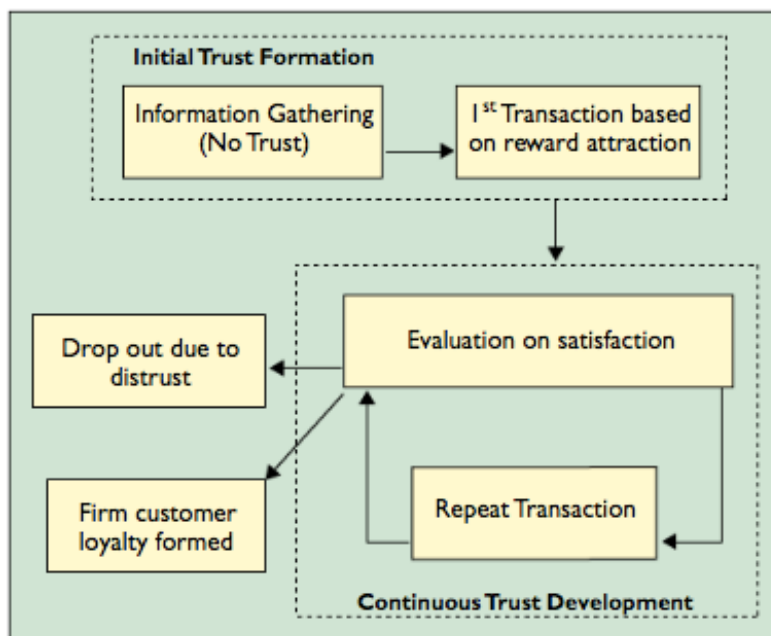


Figure 2.1. Model for customer trust formation and retention

BumpMe: Solving Involuntary Flight Bumping

The model demonstrates that the key to forming trust is getting customers to interact with the mobile app or site through reward attraction or by demonstrating convenience, cost efficiency, or necessity. Once convinced to buy, customers must have a positive experience with the vendor in order for the relationship to form. This positive experience is the strongest trust signal with the highest probability of reducing perceived risk. Of course, there are many factors for the vendor to consider along the way such as buyer characteristics, customer perception of security, and third-party recognition. Corporate branding, factual signals, transparency, familiarity and more are all elements that can instill trust in the mobile app.

Designing for Mobile Devices in the Tourism Industry

It is increasingly common for people to combine several purposes with traveling, including leisure, entertainment, education, and business. These people probably do not have time to plan out a detailed travel schedule. They need location-aware information and expect personalized information and services. The EU funded research project CRUMPET (creation of user-friendly mobile services personalized for tourism) addresses this issue and takes four key technology domains and applies them to the tourism domain: location-aware services, personalized user interaction, seamlessly accessible multimedia mobile communication, and smart component-based middleware or “smartware” that uses multi-agent technology. BumpMe’s design follows a similar outline in order to ensure a user-friendly mobile tourism app (Poslad, Laamanen, Malaka, Nick, Buckle, Zipi, 2001).

In the tourism industry, specifically airline travel, content is ever-changing. Flight prices rise and drop, gates are changed, dates vary, flights are cancelled, etc. The predominance of location-based context-aware applications and systems do not leverage the richness of available information (Moore, 2009). These mobile tourist information systems must keep up with changing data. In fact, not many systems consider the user’s interests or surrounding area at all.

BumpMe: Solving Involuntary Flight Bumping

For a mobile information system to have an effective design, the right information must be delivered to the user in a way that is satisfying to the user. This is where aspects such as the interface design and information presentation on a small-screened mobile device come into play. Conducting user research to understand what the user wants is simple. However, this adds interactional complexity. It is not always feasible to simply give the user what they want. In addition, consistency is a highly desirable characteristic for an interactive system. Yet, when a system meets with fluid changes in context, the appearance and content will constantly be changing and therefore sacrificing consistency (Hinze, Buchanan, 2010). Such consequences are not well-known in other context-aware systems and the limitations of interaction and display in a mobile context-aware system further push the issues.

The airline industry especially has fostered a dependency on Information Communication Technologies (ICTs). They were early adopters and have a long history of technological innovation compared to other travel and tourism businesses. Airlines are one of the most interdependent organizations in the travel industry and therefore need to use technology to handle all of their business functions. This is done through enterprise resource planning, developing successful extranets as collaboration channels with partners, etc. These technologies can improve the user traveling experience because frequent travelers demand quicker check-in processes and more flexibility/control over their travel arrangements (Buhalis, 2004). By providing self services through mobile devices the airlines are improving customer satisfaction and reducing costs. ICTs are used dynamically to assist users and reinforce the airline brand.

Product Competition

There are some applications that currently exist that try to combat the problem of involuntary bumps due to overbooking. Unlike BumpMe, the current solutions do not attempt to minimize the amount of involuntary passenger bumps.

BumpMe: Solving Involuntary Flight Bumping

The current solutions mainly focus on trying to win cash awards for eligible passengers that have already been involuntarily bumped. Below are a few examples of what solutions currently exist.

AirHelp

AirHelp is a mobile app that allows airline customers to type in details about their flight to see if they are eligible for cash reimbursement for involuntary flight bumps. It is rather straight-forward and easy to use, but this app does not create a win-win solution like BumpMe will attempt to do. Strategically, this app is a great resource for customers to use against the airlines when a problem occurs. However, for all intents and purposes, it is an effective weapon to use against the airlines. This also occurs after the negative customer experience of an involuntary bump has taken place and begun to take its toll on the airline's brand image.

The creators of AirHelp created the app because they noticed a widespread lack of knowledge of customer rights. Their estimations before creating this application (based on 2013 statistics) showed that out of all flight bumps that happen in the United States annually, 26 million of them result in an involuntary flight bump resulting in a delay long enough to make that bump eligible for cash compensation (AirHelp.com, 2015).

However, without people knowing they were entitled to this cash amount, if those 26 million bumps were quantified into a cash amount, only 0.06% of the total eligible cash pool was being awarded to eligible passengers (Lapowsky, 2014).

In addition to AirHelp not being a win-win solution, AirHelp does not just inform passengers of their rights for the sake of patriotism. AirHelp takes 25% of the eligible cash award for use of the app. Unlike BumpMe, it does not allow passengers to see voluntary bump incentives beforehand (Lapowsky, 2014).

RefundMe

RefundMe is an app that works similar to AirHelp. RefundMe allows customers to seek their involuntary bump cash award eligibility like AirHelp does. It also takes 25% of the cash award if the passenger is legally eligible for one.

BumpMe: Solving Involuntary Flight Bumping

RefundMe boasts the competitive difference from other solutions on the market as it streamlines the full complaint-filing process. They market everything as hassle-free, easy, risk-free, and even a 98% success rate if the case goes to court.

The other main competitive advantage that RefundMe boasts is that it enforces passenger rights worldwide. This is easily shown by different country flags all over their virtual real estate. The claim is that they are the better solution because they are leading to cash awards in over 125 countries (RefundMe, 2015). However, that claim is somewhat vague and could be statistically accurate without necessarily being statistically relevant.

Internal Flight Load Checkers

Some airlines give passengers the ability to view the flight loads of certain flights so they can try to avoid bumps, or even to go after bump awards for personal gain (Jet, 2014). In fact, there are several sites and articles that attempt to teach people how to avoid or predatorily go after voluntary bump incentives. While there are economic theories behind why both of those activities could be marginally good or marginally bad for an airline, the actions of a vast minority of the customer population would not be considered a qualified widespread solution such as BumpMe. The only way to get a reasonable handle on incentive optimization would require collecting and analyzing data through a system similar to BumpMe's reporting services.

The Solution

The BumpMe app consists of several features that will create tangible to both customers and airlines. In summary, the app will be a customer tool that will show passengers information about their flight, as well as what benefits the airline will offer if a passenger voluntarily bumps to a later flight, and information about the later flight. With all of this information available, the passenger will also have the ability to nominate themselves for voluntary bumping in case overbooking does occur.

BumpMe: Solving Involuntary Flight Bumping

This decision will be based on whether passengers feel that the compensation plus the later flight information is enough to buy their inconvenience.

BumpMe does all of this while, on the back end, is collecting valuable data about the overbooking situation for the airlines to later use for strategic purposes. This provides a huge benefit to the airline because it allows them to measure customer behavior against different voluntary bump incentives, marginal changes to those incentives, and their relationship to length of delays. The airline can then use their existing data to weigh the risk of involuntary bump cash awards to figuring out the appropriate size of the cash rewards offered for airline passengers to voluntarily bump themselves from an overbooked flight. By doing this, airlines will ideally be able to achieve constraints for linear programming to both maximize profits and minimize costs (Dorfman, 1986).

BumpMe's capabilities can increase the economic stance of the overbooking practice. With more transparency available to passengers, voluntary bumps will go up, which means involuntary bumps will go down. More attention will be cast on the voluntary bump incentives. This will lead to less overspending in incentives, and more effective spending when offers are found to not be substantial enough for each specific category of occasion. Once this strategy is nailed down and scaled, the quantitative savings and bottom-line benefits from qualitative measures have the potential to be tremendous.

BumpMe: Solving Involuntary Flight Bumping

Chapter 3: Research Goals of User Testing

Research Objectives

As previously stated, the purpose of the BumpMe app is to give users the features that are lacking in current competitor apps and websites when it comes to using a mobile device to plan travel- specifically optimizing the process of booking or rebooking of overbooked flights with the intent to gain compensation. The BumpMe App is designed with the findings of the competitive analysis in consideration. User testing was conducted with the following research objectives in place:

- Gather feedback on what improvements could be made to BumpMe
 - What would users like to see, that is currently missing from the app?
 - What features would make this app more useful/helpful?
- Observe whether users excited about the overall idea of the app
 - Is this app something that users would want to use when traveling?
 - Does this app fill a need?
- Determine whether the BumpMe app is user-friendly
 - Is the user flow intuitive?
 - Do users struggle with the various steps of the process?
 - What usability issues do users encounter as they move through the app?

BumpMe: Solving Involuntary Flight Bumping

BumpMe Round 1

A high fidelity prototype of the BumpMe app was designed using Axure RP Pro software. The BumpMe app, before revisions, consisted of 11 screens:

Name of Screen	Description	Figure
Home Screen	First screen users see.	3.1
Welcome Screen	Seen after logging in to the app.	3.2
Flight Overbooked	Would be shown if the user's flight is overbooked.	3.3
Flight Not Overbooked	Would be shown if the user's flight is not overbooked.	3.4
Select Offer	List of example offers the user could be offered as incentive for voluntary bump to another flight.	3.5
Voucher	Details of the travel voucher	3.6
Flights	User can book an alternate flight/view availability	3.7
Profile	User profile screen.	3.8
Bump History	For users to check their bump history.	3.9
Bookings History	Users can determine what flights have been booked in their history.	3.10
Offer History	Shows what offers the user has accepted or needs to claim.	3.11

Table 3.1. BumpMe Round 1 Screens

BumpMe: Solving Involuntary Flight Bumping

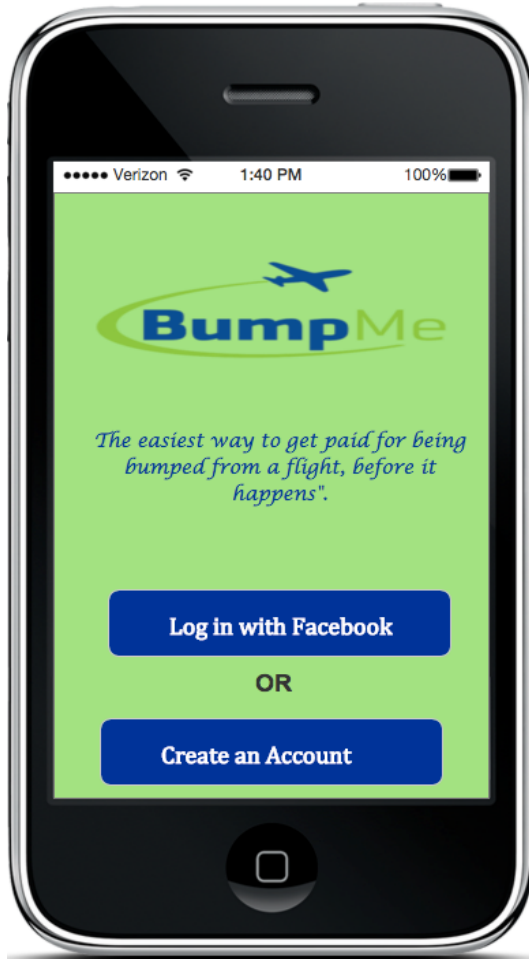


Figure 3.1. BumpMe home screen

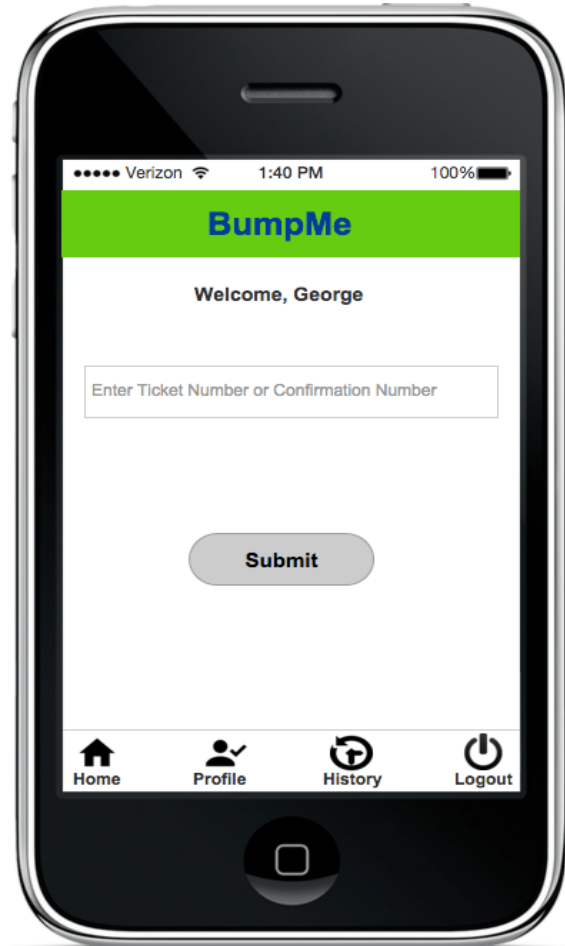


Figure 3.2. Welcome screen

BumpMe: Solving Involuntary Flight Bumping

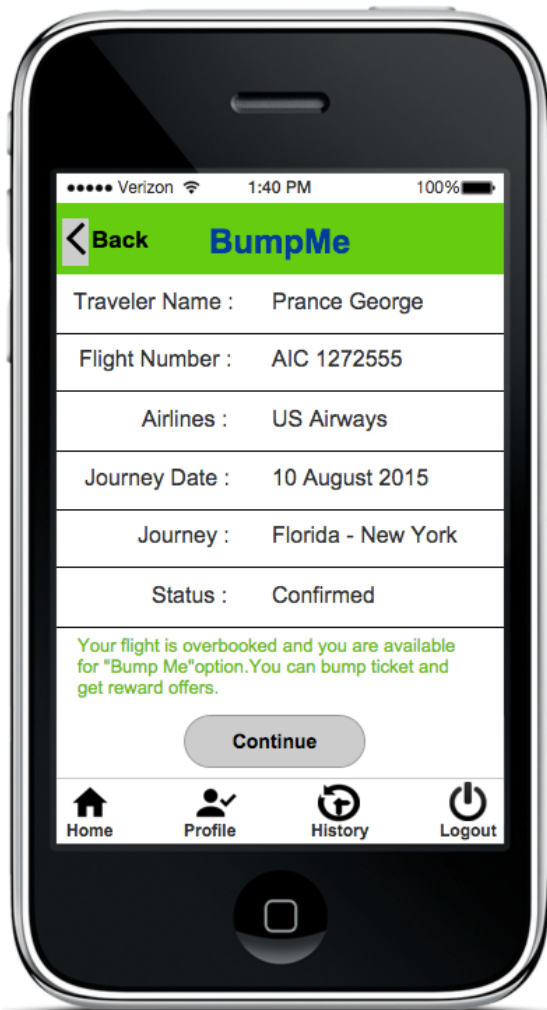


Figure 3.3. Flight overbooked

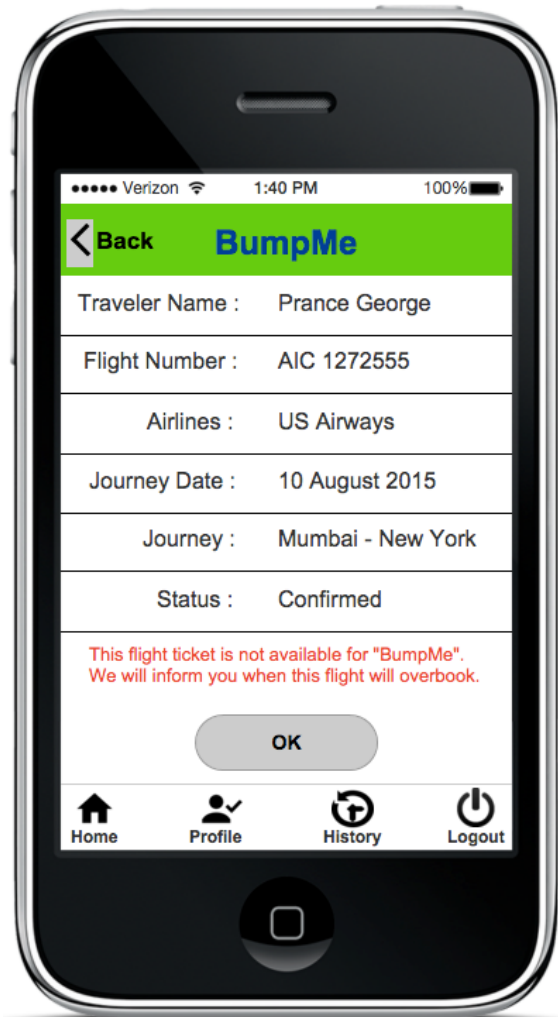


Figure 3.4. Flight not overbooked

BumpMe: Solving Involuntary Flight Bumping

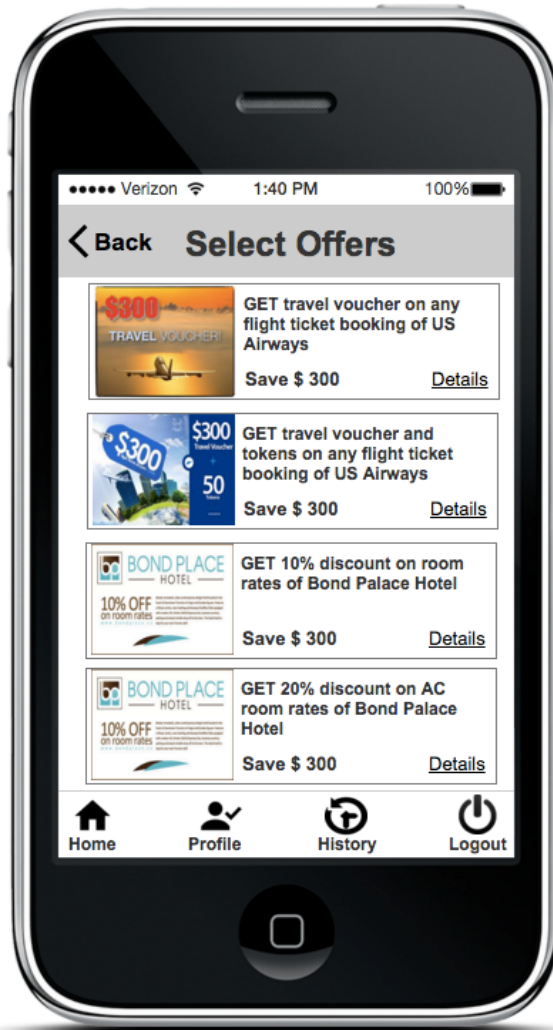


Figure 3.5. Select an offer

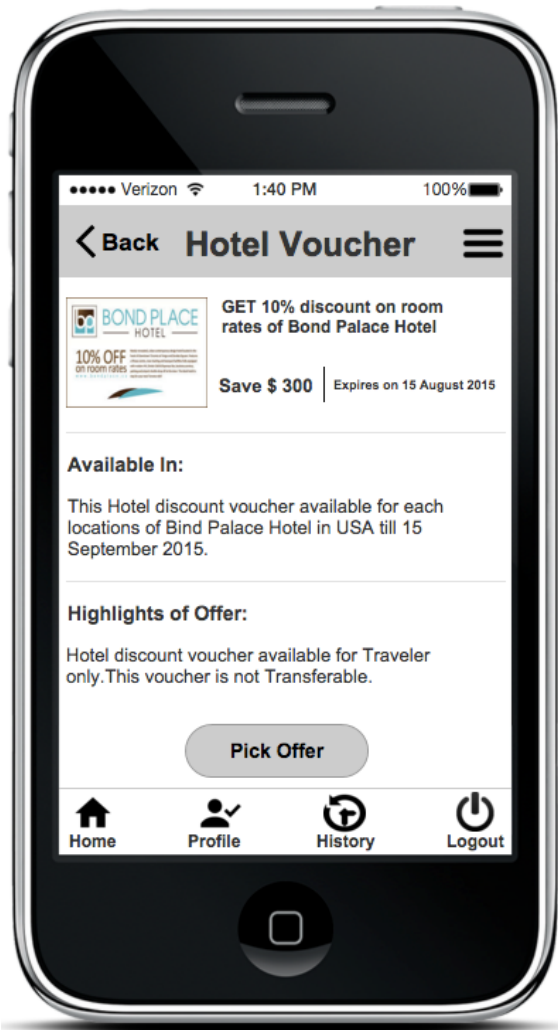


Figure 3.6. Voucher details

BumpMe: Solving Involuntary Flight Bumping

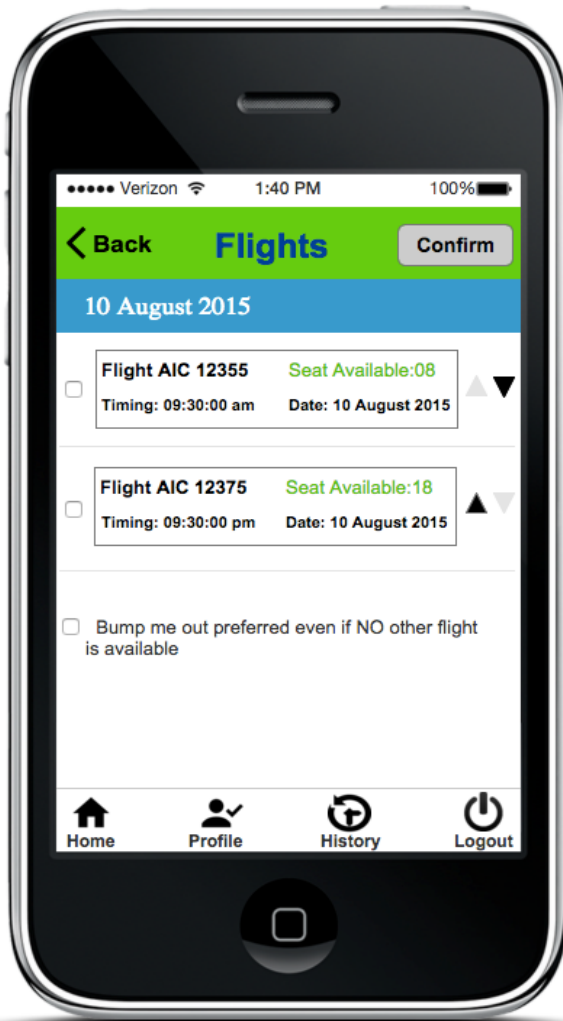


Figure 3.7. Choose a replacement flight

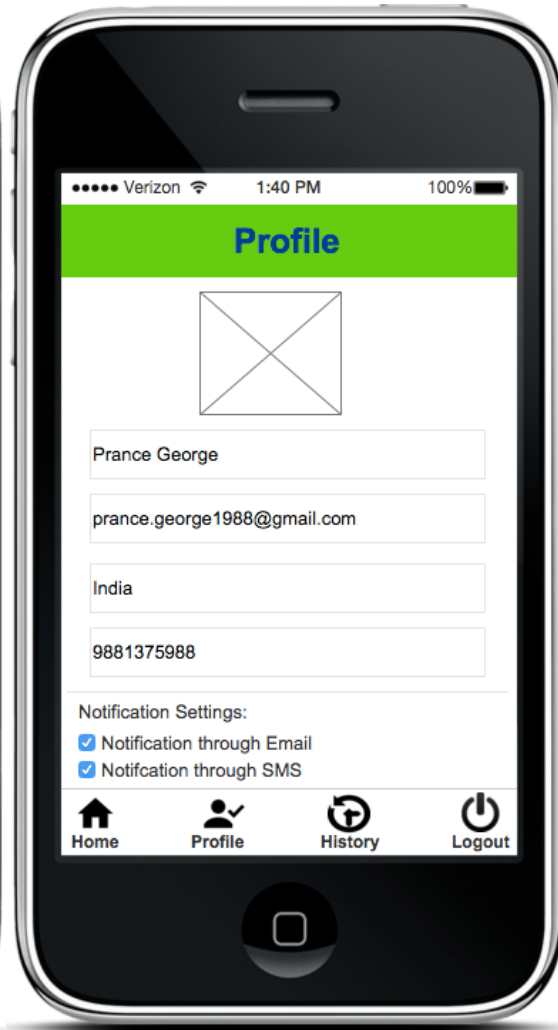


Figure 3.8. View profile

BumpMe: Solving Involuntary Flight Bumping

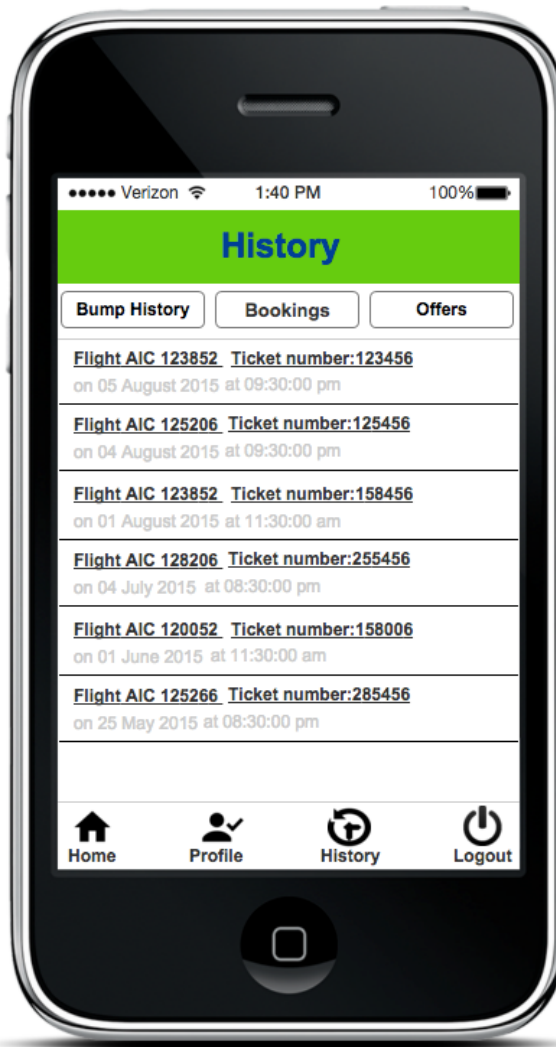


Figure 3.9. View bump history

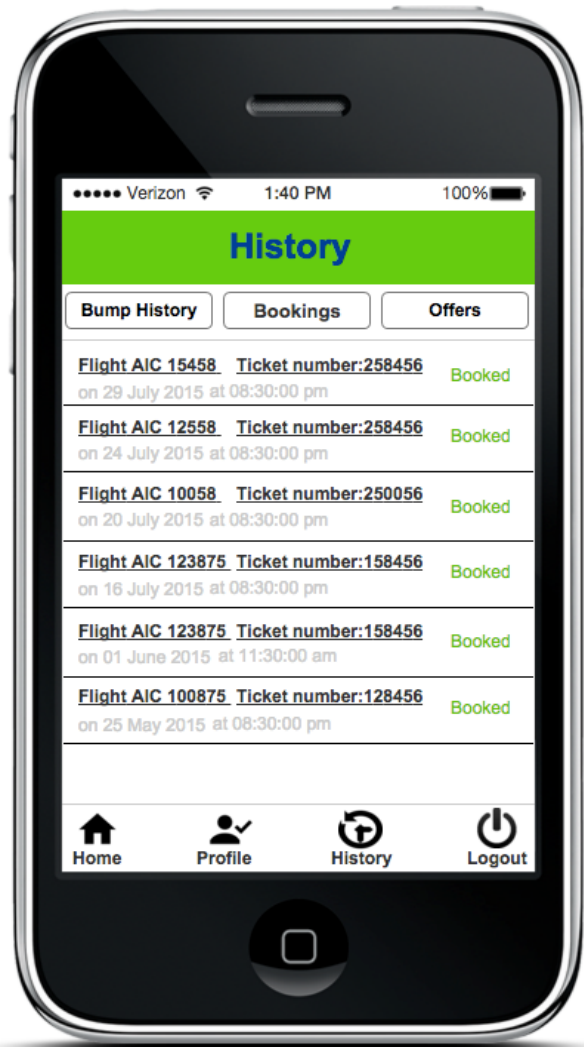


Figure 3.10. View booking history

BumpMe: Solving Involuntary Flight Bumping

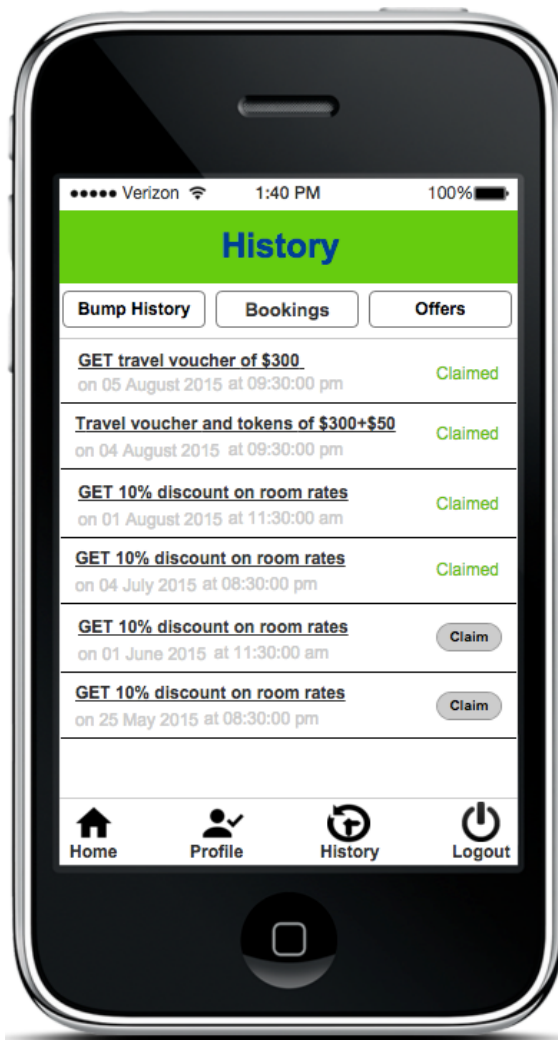


Figure 3.11. View offer history

BumpMe: Solving Involuntary Flight Bumping

Participant Demographics

A qualitative, remote, unmoderated usability study of the BumpMe app was conducted with 5 participants on desktop devices. The reason for choosing 5 participants instead of a larger number is that Jakob Nielsen conducted a study showing that while it takes 15 participants to find all usability issues, 85% of usability issues are found with the first 5 users. This is enough to inform the redesign. Nielsen's study also shows that conducting a second study with another 5 participants (as discussed later in this research) will uncover most of the remaining 15% of usability issues (Nielsen, 2000).

Participant ages were set to fall in the range of 25-55 and all users were to be from the United States or Canada. Participants were screened so that only those who identified as flying anywhere from 3-10+ times a year, for business or for pleasure qualified for the test.

Screener Question

In order to find, within the UserTesting panel, participants that were familiar with travel and would have probably experienced being bumped from a flight before, a screener question was put into place. The screener question can be seen in Figure 3.12 below. Participants that identified as traveling less than 3-5 times a year were disqualified from participating in the study.

Question 1: How often do you fly, for business or for leisure?
<ul style="list-style-type: none">• 1-3 times per year : [Reject]• 3-5 times per year : [Accept]• 5-10 times per year : [Accept]• 10+ times per year : [Accept]• Less than once per year : [Reject]• None of the above : [Reject]

Figure 3.12. Screener question used in usability study

BumpMe: Solving Involuntary Flight Bumping

Demographics

The demographics from the first round of usability testing are shown in the figures below.

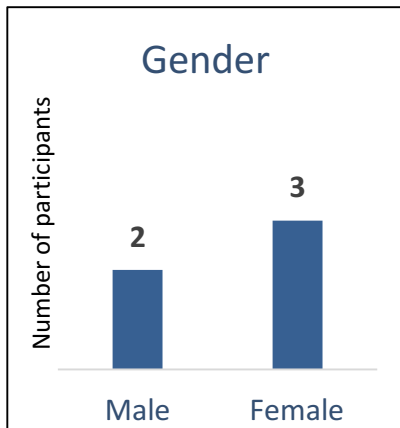


Figure 3.13. Gender demographic

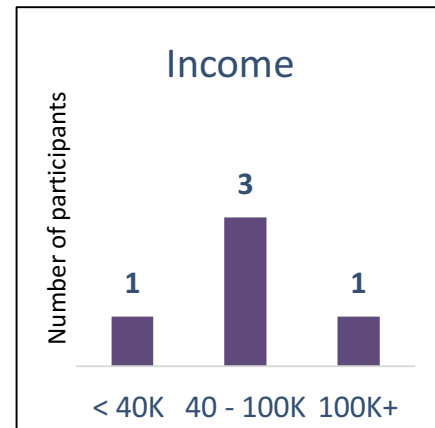


Figure 3.14. Income demographic

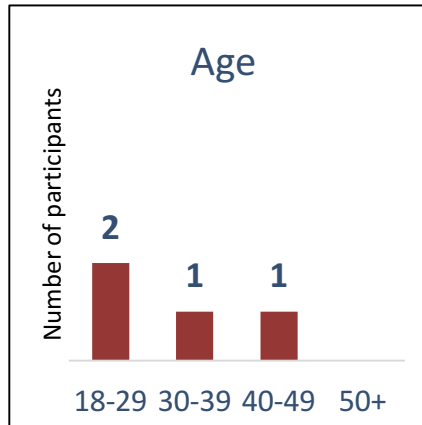


Figure 3.15. Age demographic

BumpMe: Solving Involuntary Flight Bumping

Protocol

All usability testing was conducted via UserTesting. UserTesting is a largely popular user research platform that allows for remote usability testing. UserTesting has a panel of over 1 million people of various demographics and backgrounds that have been trained on how to speak aloud as they record their voice and screen while they provide feedback on a website or mobile app. This erases any need for time consuming and expensive recruiting and opens the test to a significantly larger amount of people. The platform also allows for very quick turnaround times on feedback because it avoids the need to bring people into a usability lab and familiarize them with specific tools.

Instructions

Participants were told that they would be viewing a prototype rather than a released app and that they must follow instructions carefully. They were informed that because they were viewing a prototype, not all links would be functional and to just explain what they would expect to happen and then to move on. Participants followed a list of 21 tasks, in order to fully evaluate the design and content of the BumpMe app. Participants moved through the app as though they had a flight booked and wanted to see if it was going to be overbooked. Upon discovering that their flight was overbooked, participants were instructed to select a travel voucher and book a replacement flight.

Testing Scenario

Participants were given the following scenario shortly before beginning the usability test:

Today you'll be viewing an early stages prototype for BumpMe. BumpMe is a mobile app that allows users to volunteer to be bumped from their upcoming overbooked flight in exchange for incentives from the airline

BumpMe: Solving Involuntary Flight Bumping

such as travel vouchers or hotel stays. Please note that you are viewing a prototype and not everything is clickable. Please just explain what you would expect to happen and move on. (See Appendix A)

Before beginning the test, participants were told to imagine that they were user George Prance, and that they had already booked a flight.

Usability Findings from Round 1 Testing

While participants were excited about BumpMe’s concept, they were underwhelmed by the app itself. The participants came across several usability issues within the original design.

Home Screen

- 3 participants disliked the colors of the home screen, and found the app to look outdated or unreliable.
- The text on the home screen consisted of fonts that did not match.
- The tagline was disliked because of the small size of the font and the difficult to read italics.
- The login buttons were noted as being too large and “in your face”.
- 4/5 participants found the tagline to be useful, while 1 participant thought the tagline had a negative connotation.

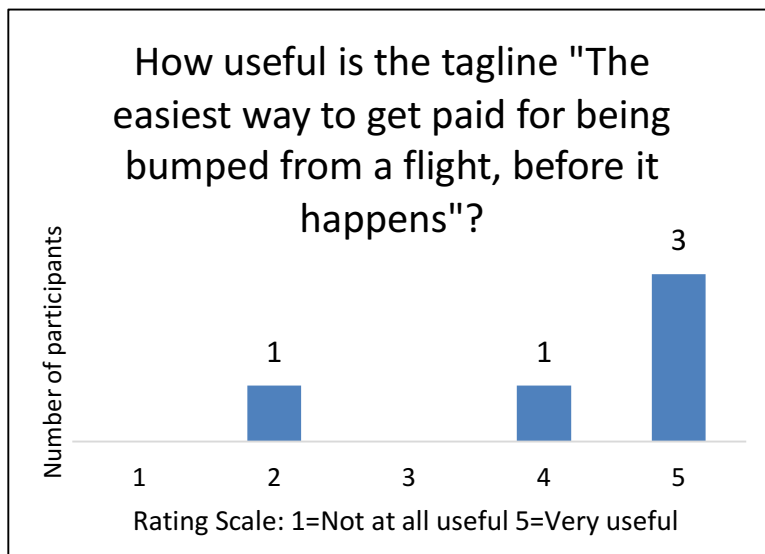


Figure 4.1. Participant ratings of the usefulness of the tagline

BumpMe: Solving Involuntary Flight Bumping

Welcome Screen

- The welcome screen was confusing to participants, who expected to see a different screen first, such as a “Log In with Facebook” screen, before being taken directly to George’s account and being asked for a flight confirmation number.
- Several participants noted that it is difficult to remember a flight number or confirmation number and wanted to see other, easier ways to look up their flight.

Flight Overbooked/Not Overbooked Screens:

- The status of the flight was not useful information to the participants, who instead expected to see flight departure/arrival times.

Select Offer Screen:

- After confirming that their flight was overbooked and that they had the opportunity to be voluntarily bumped, participants viewed the offer screen. Participants were thrown off by the plain images and confusing wording of the sample offers.
- Participants wanted to see more travel offers, noting that a hotel discount was not useful to them. One participant suggested discounts on airport shops instead.
- Although there were several usability issues, all 5 participants did rate the screen itself as “useful”.

BumpMe: Solving Involuntary Flight Bumping

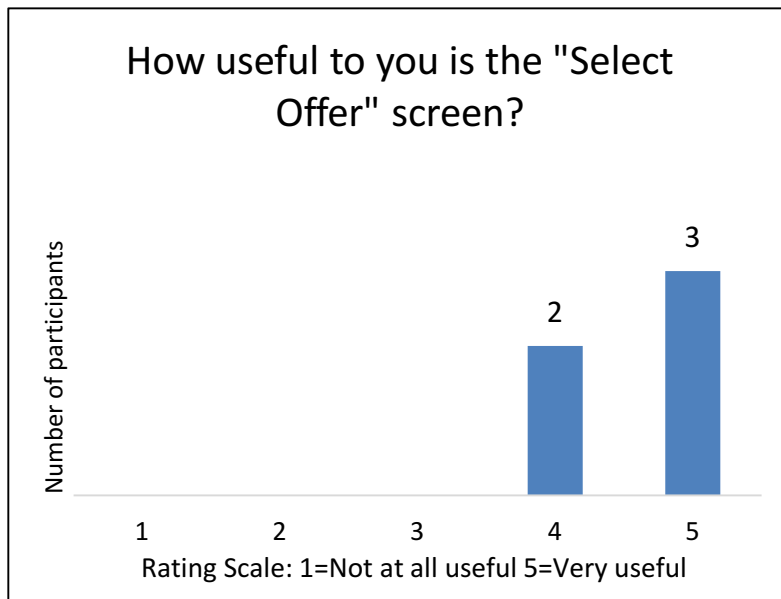


Figure 4.2. Participant ratings of the usefulness of the select offer screen

After viewing the “Select Offer” screen, participants were asked, at that point in their experience with the app, to rate their likeliness to choose a voucher and be voluntarily bumped from their flight. There was a very wide range of responses from participants, who for the most part still required more information to commit.

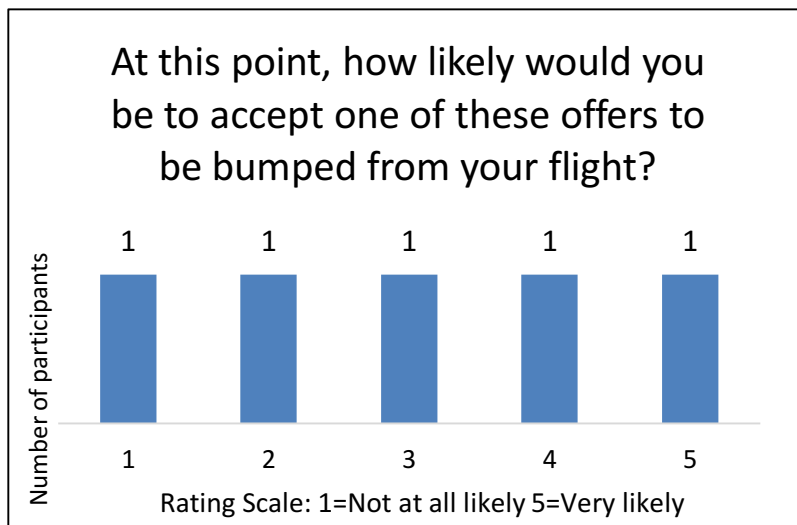


Figure 4.3. Participant ratings of likeliness to accept an offer to be bumped

BumpMe: Solving Involuntary Flight Bumping

Flights Screen

- While finding a new flight was considered a useful part of the app, some participants would have preferred to see this screen before the offer screen.
- The ability to view available seats on the replacement flight was expected by several participants, who were disappointed when that feature was not available.
- Participants expected to be able to choose a different date for a replacement flight rather than only seeing flights for the same day as the original booking.
- The awkward wording at the bottom of the screen confused several participants, who were not sure if they should check the box or not based on what they read.

Profile Screen

- George's lack of profile picture was noted by several participants, who had expected to see an image as well as profile details.
- One participant expected to be able to save voucher preferences for a more efficient future use of the app.

History Screen

- 2 participants noted that the history screen should include the airline name and destination/arrival locations rather than just the number, because that would make it easier to remember which flight they were on.

After completing all of the tasks, participants were asked a final question of how difficult or easy it was to find the information they needed to make a decision on being bumped. Overall, results were positive as five out of five participants found it easy to find the information they needed.

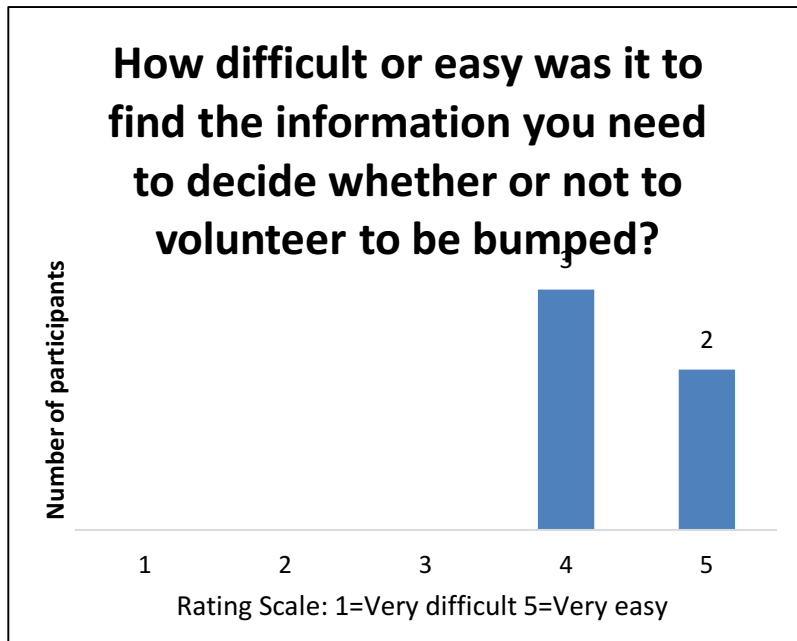


Figure 4.4. Participant ratings of the difficulty of finding information

Notable Participant Responses to Written Questions

Q: Was the information in each screen presented to you in a way that was clear?

A: “Yes. Everything was laid out well, simple, clear and concise.” –User 3

A: “The information on each screen was presented to me in a very clear manner. It was very easily navigated.” –User 5

Q: If you had a magic wand, what would you change about the BumpMe app?

A: “I would like to see additional voucher options (food, tourist attraction, sporting events, etc). Just getting additional partners other than hotels and flights.” –User 1

A: “I would change the colour palate of the app. The Green and blue do not seem to compliment each other and it was difficult to identify the links.” –User 2

BumpMe: Solving Involuntary Flight Bumping

A: "I would give more info about the offers in the offer section. I would also give the available flights options first or at the same time as the offer." –User 3

A: "If I had a magic wand to change anything on the Bump me App, I would change the step of getting from confirmation of Bump qualification to have an automatic way to view offers I felt I had to dig for the way to find it under the details section. It may confuse some users that are not use to navigation sites." –User 5

Q: How likely would you be to use BumpMe outside of a test setting? Please explain your answer.

A: "I would be willing to use this, if I had more options for rewards." –User 1

A: "If it were advertised properly and saved me the time and hassle of showing up at the airport for an overbooked flight, I would be very interested in using the app. Often the reason that I do not accept the incentive offers to give up my seat, is the idea of having to go back through the security screening, bag check, etc the following day. This often outweighs the money I'd save in the future." –User 2

A: "I would be willing to check it out. I don't know that I would be willing to be bumped but I would be willing to look at it periodically to see if its worth my while." –User 3

A: "I would be very likely to use the app in situations where I'd be okay with changing my trip itinerary. I like the idea of this app because it would give me more control over my flight schedule if I had to change things around. Using the app would reduce the stress of being bumped from a flight." –User 4

BumpMe: Solving Involuntary Flight Bumping

Chapter 5: Revisions

Revisions Based on User Feedback

Taking each participant's feedback into consideration, many revisions were made to the BumpMe mobile app. The user feedback from testing brought up many good ideas that had not been originally considered and also helped to present the app in much more clear and user-friendly way. Below is a list of the revisions made, followed by images of the newly redesigned screens.

Home Screen

- The previously overwhelming blue background color was changed to a neutral gray, to showcase the blue and green BumpMe logo.
- The tagline was given a larger font, with no italics so that it is easier to read.
- The “Create an Account” and “Log in with Facebook” buttons were made smaller and easier to read with a new font.

Login Screen

- This login screen was added after user testing showed several users feeling as though a step in the process was missing. The screen shows up when the user clicks on “Log in with Facebook” and shows their profile picture next to the BumpMe logo. The app asks for permission to connect through Facebook and the user has the option to select “Cancel” or “OK”.

Welcome Screen

- Users noted that it was difficult to remember a flight confirmation number and they did not want the inconvenience of pulling up their email to find a confirmation or ticket number. The option to enter by airline and last 4 digits of the user's social security number was added.

BumpMe: Solving Involuntary Flight Bumping

This ensures users the ability to find their booked flight quickly and conveniently.

Flight Overbooked/Not Overbooked Screens:

- Because the status of the flight was not useful to participants, it was removed and replaced with estimated departure/arrival times.

Select Offer Screen:

- The initial images and confusing wording of the offers were off-putting to users. In the newly designed screen, there are 3 clear offers (voucher towards future travel, voucher for airport restaurant, and a free hotel stay) with vibrant and self-explanatory images to avoid any confusion.
- The previous offers were redundant and users were not interested in some of the offers, such as a hotel stay discount. Instead, the BumpMe redesign took advice from 1 participant that wanted a voucher that could be used at any restaurant inside the airport.
- The wording of the actual offer including availability and details was updated to be clear and straight to the point.

Flights Screen

- The ability to view available seats on the replacement flight was added, as this was a feature that was missed by participants during testing.
- A calendar was added for participants to select an alternate flight date rather than only seeing flights for the same day as the original booking.
- The wording at the bottom of the screen was rewritten to read: “Bump me from this flight and I will rebook another flight later.” The previous wording confused users and this wording is more clear about what will happen should the box be checked.

BumpMe: Solving Involuntary Flight Bumping

Profile Screen

- A profile picture of George Prance was added to the Profile page to appear more personalized and credible.
- The option to save incentive preferences was added at the recommendation of 2 participants, who wanted the app to remember to show them vouchers based on their history and interests.

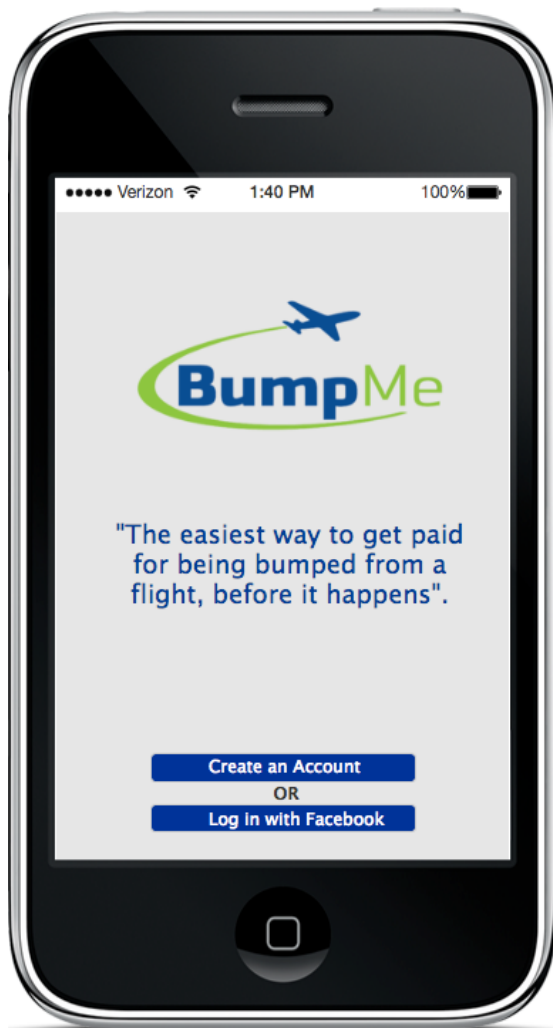


Figure 5.1. BumpMe home screen

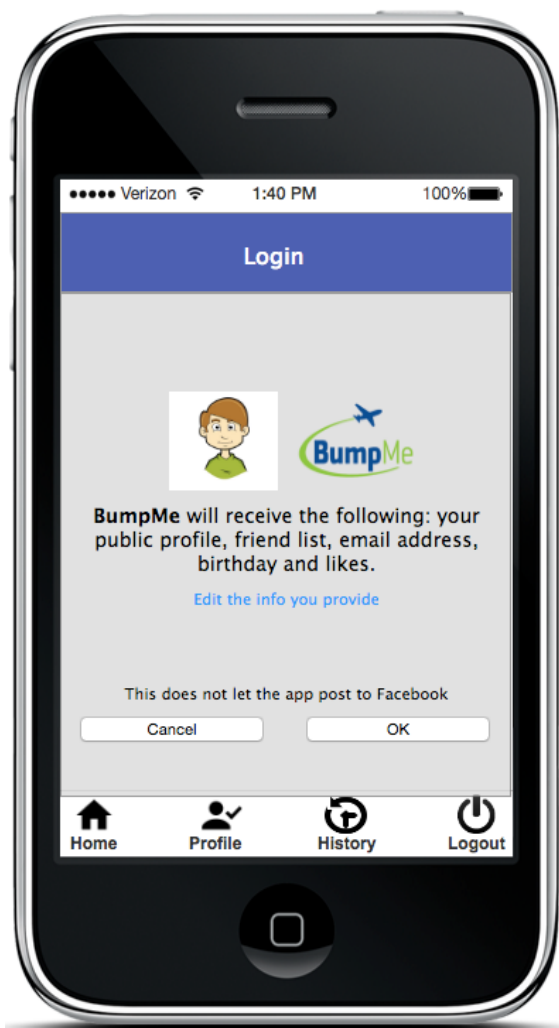


Figure 5.2. Login screen

BumpMe: Solving Involuntary Flight Bumping

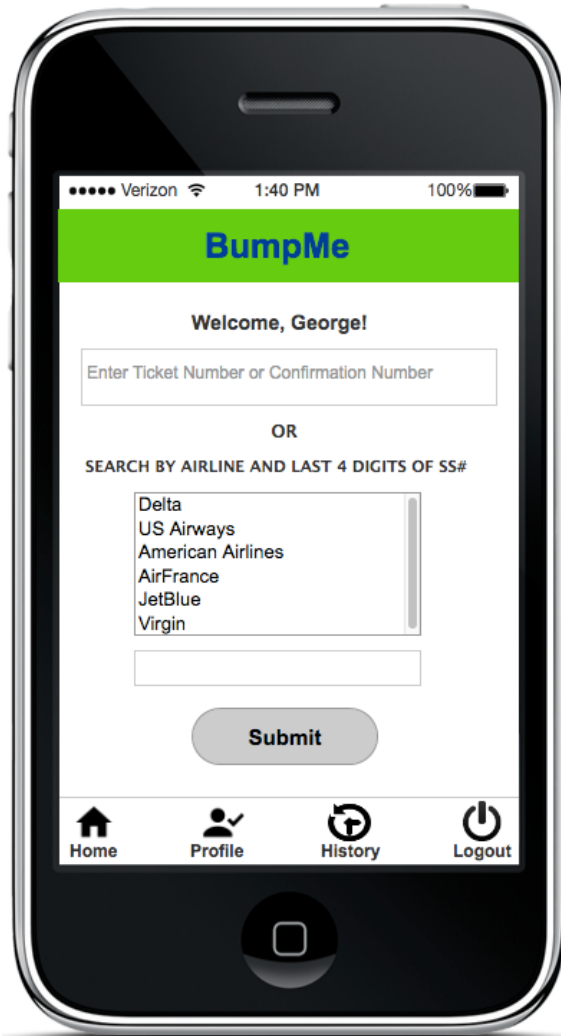


Figure 5.3. Welcome screen

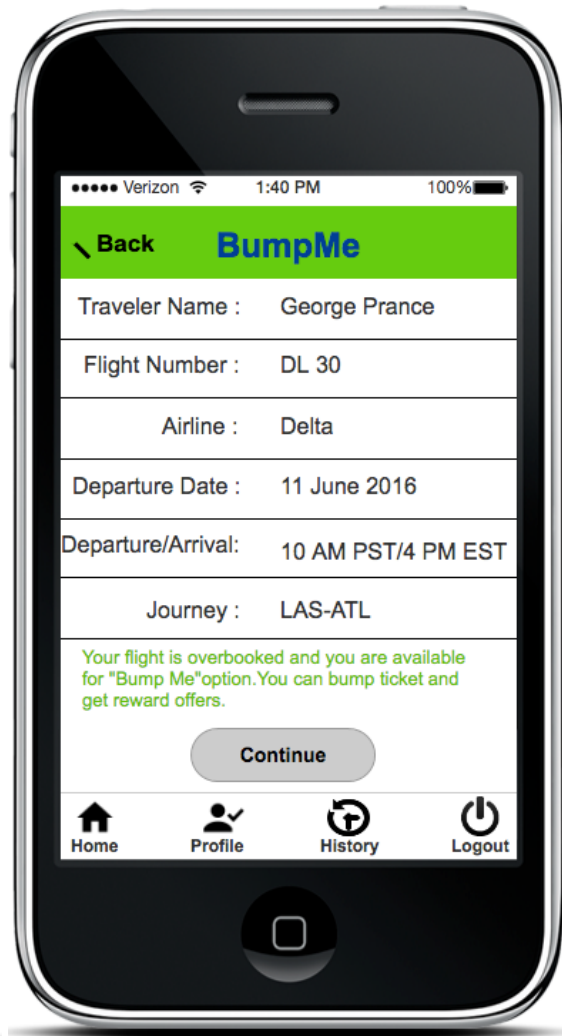


Figure 5.4. Flight overbooked

BumpMe: Solving Involuntary Flight Bumping

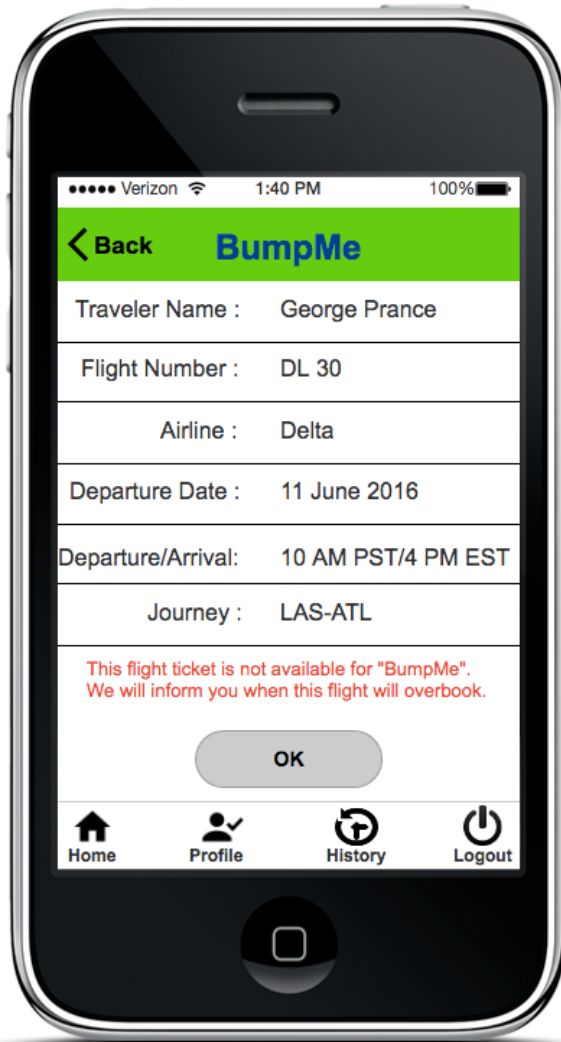


Figure 5.5. Flight not overbooked

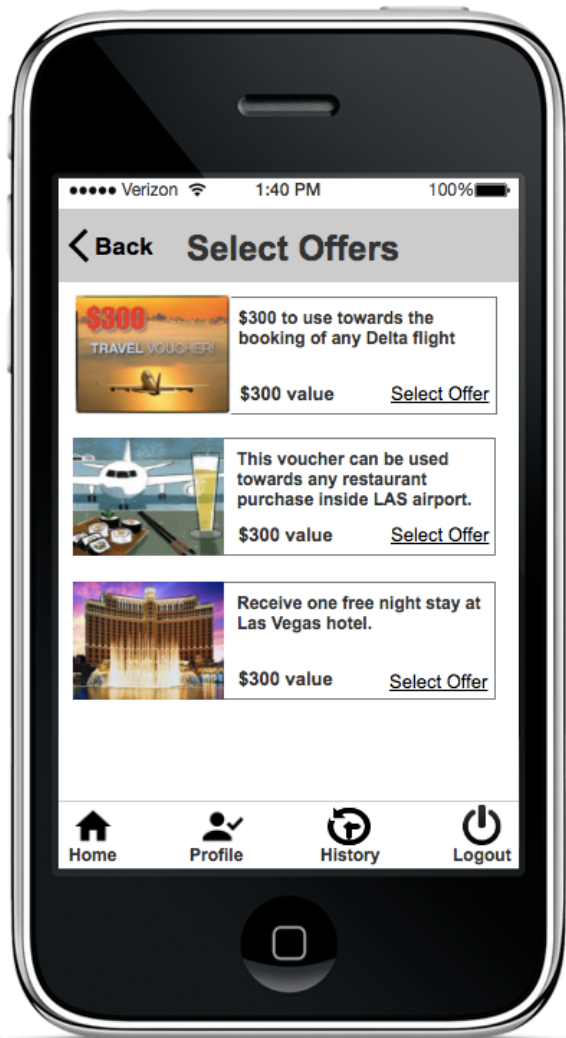


Figure 5.6. Select an offer

BumpMe: Solving Involuntary Flight Bumping

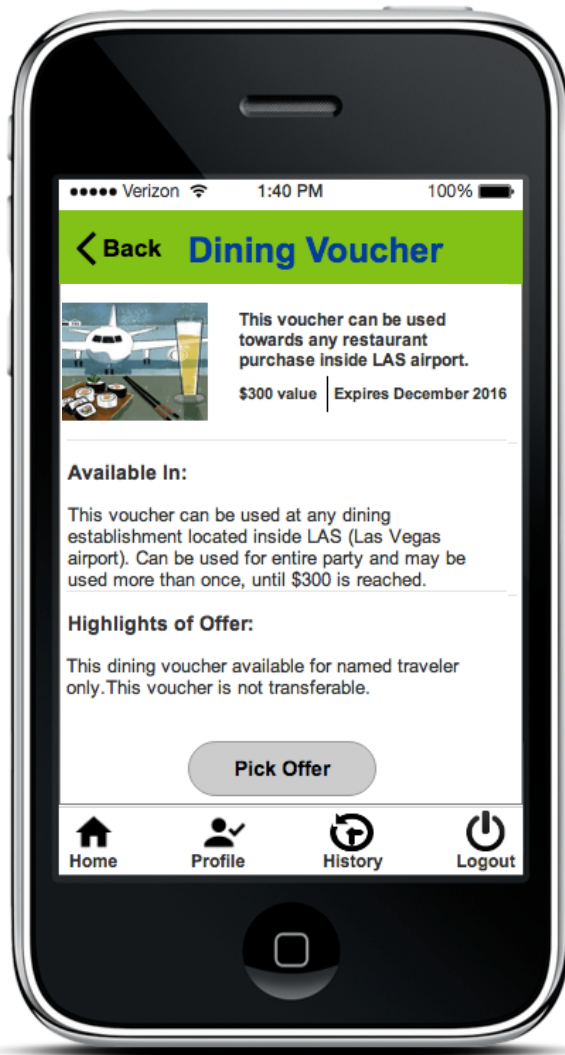


Figure 5.7. Voucher details

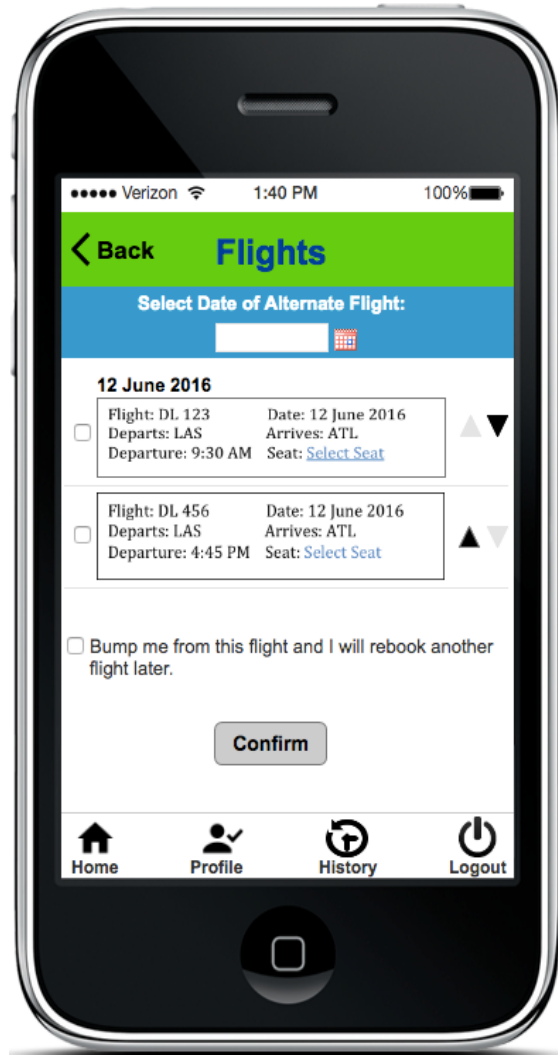


Figure 5.8. Choose a replacement flight

BumpMe: Solving Involuntary Flight Bumping

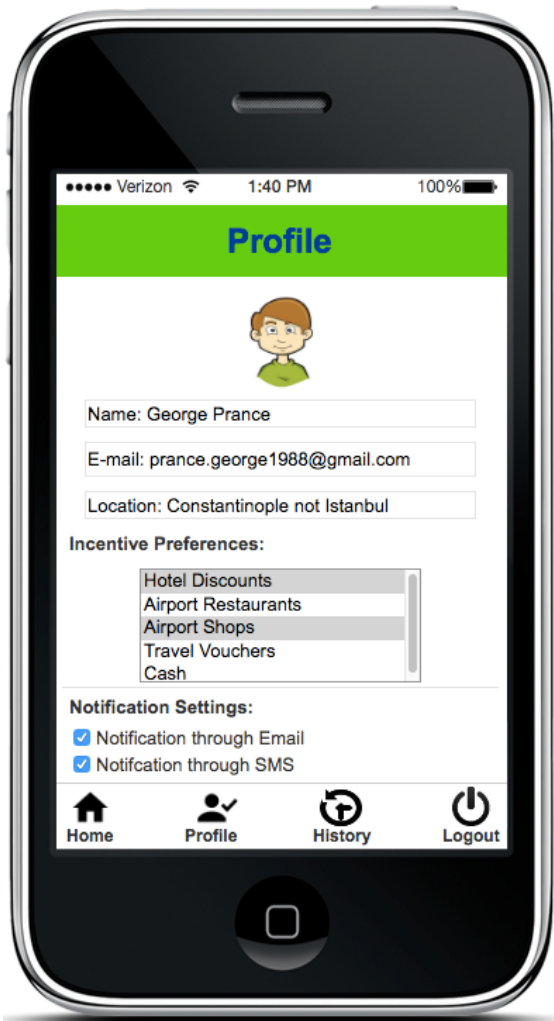


Figure 5.9. View profile

BumpMe: Solving Involuntary Flight Bumping

Chapter 6: New Findings

After the revisions were made to the BumpMe mobile app, a second round of user testing was done to gain further feedback and to determine if the app was more user-friendly and useful to participants. 5 new participants from the UserTesting panel participated in the study. The figures below show the participants' demographic information. The tasks given to users were the same as round 1 of testing, with a few tasks having revised wording to accommodate the prototype revisions.

Demographics

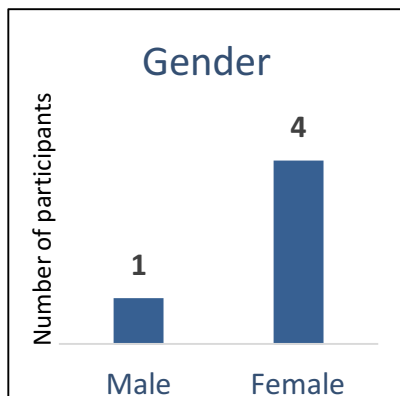


Figure 6.1. Gender demographic

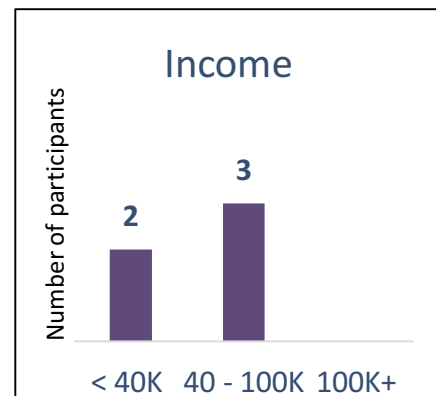


Figure 6.2. Income demographic

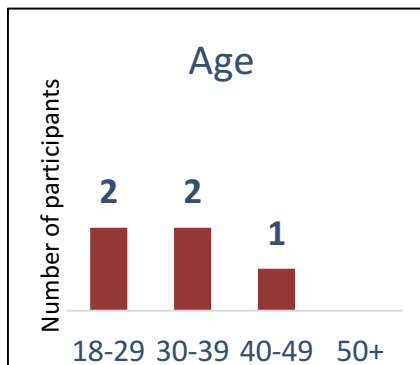


Figure 6.3. Age demographic

Usability Findings from Round 2 Testing

Home Screen

- The revisions to the home screen made a significant impact of the way participants viewed BumpMe. 4 out of 5 participants found the home screen to be “professional”, “straightforward”, and “clean”.
- Although participants in the first round of user testing found the blue background to be off-putting, 2 out of 5 participants in the second round of user testing found the grey to be dull and dated.
- 3 out of 5 participants found the tagline to be very simple and easy to understand, and noted that it was obvious that the purpose of the app is to help users volunteer to be bumped from a flight, rather than helping users that have already been bumped.

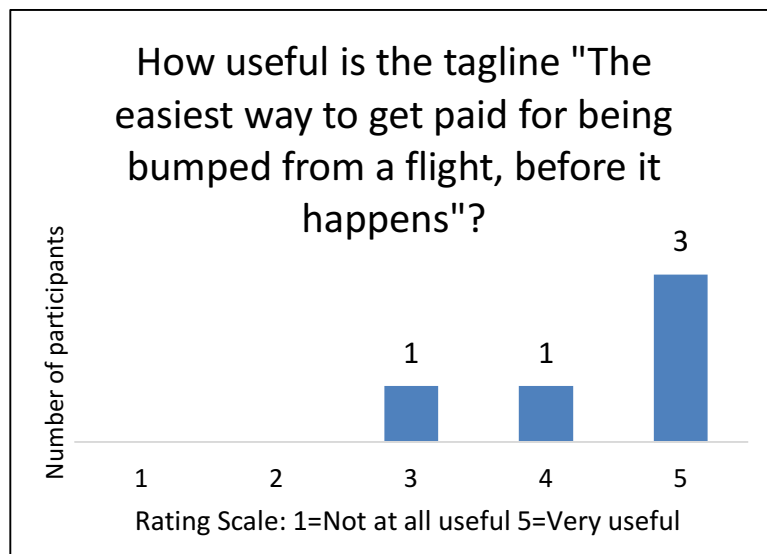


Figure 6.4. Participant ratings of the usefulness of the tagline

Login Screen

- The login screen was a 100 percent success, with 5 out of 5 participants noting that it was exactly what they would expect to see.

BumpMe: Solving Involuntary Flight Bumping

- Participants noted that there was nothing they would change about the login screen.

Welcome Screen

- The welcome screen was positively received by 4 out of 5 participants, who found the screen to be very easy to understand.
 - 1 participant noted that he would be uncomfortable entering in the last 4 digits of his social security number to look up his flight.
- Participants appreciated having multiple options for how to look up their flight information including airline, social security number, confirmation number, and ticket number.

Flight Overbooked/Not Overbooked Screens:

- The revisions to these screens were very successful. At first glance, 5 out of 5 participants noted that anything they would expect to see had been included.
 - Upon further prompting for what might be missing, 1 participant noted that he would like to know what would happen to family members on the same reservation. Would they be bumped as well?
 - 1 participant also noted that the “Continue” button at the bottom of the screen was unclear. He did not know if clicking on “Continue” was committing to being bumped or if it would simply show him incentives.

Select Offer Screen:

- Although the select offer screen caused less confusion than in the initial testing, there were still some usability issues that arose during testing:
 - 3 out of 5 participants did not find the offers to be credible and noted that they would need more proof that these offers were coming from the airline and would be honored, should they bump themselves from the flight.

BumpMe: Solving Involuntary Flight Bumping

- The offers available in the prototype are personalized for George, who is traveling to Las Vegas. For example, there is an offer for a Las Vegas hotel. Participants did not pick up on this and noted that they would want offers to be personalized, saying that they might never visit Las Vegas.

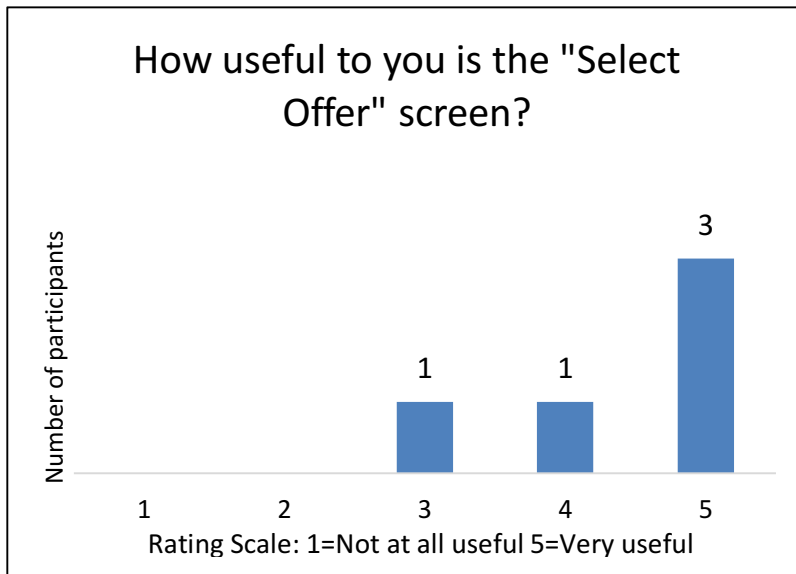


Figure 6.5. Participant ratings of the usefulness of the select offer screen

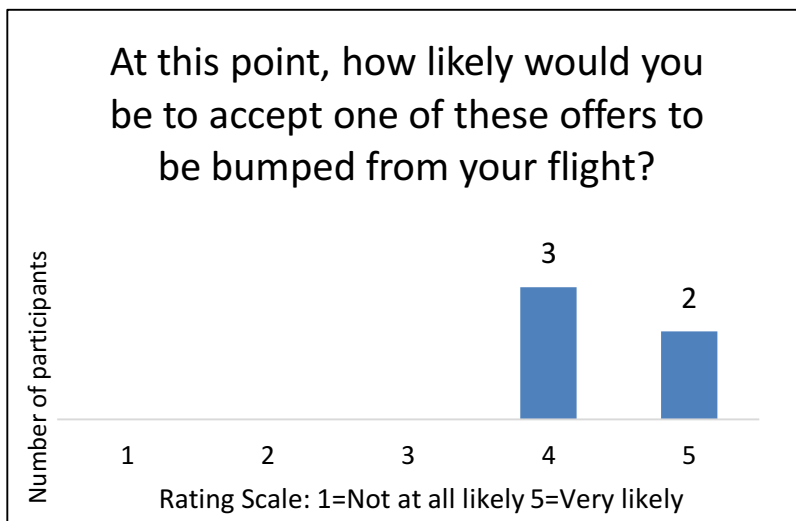


Figure 6.6. Participant ratings of likeliness to accept an offer to be bumped

BumpMe: Solving Involuntary Flight Bumping

Offer Details Screen

- The revised wording and updated images made the offer detail screen rate significantly higher. 5 out of 5 participants found nothing confusing about the offer and noted that nothing was missing that they might expect to see.

Flights Screen

- Adding a calendar and revising the wording at the bottom of the screen proved to be successful in making the flights screen more user-friendly. 5 out of 5 participants rated the flights screen as “5- Very Useful” and knew what the purpose of the screen was upon first glance.

Profile Screen

- 5 out of 5 participants were satisfied with the profile screen and recognized the image of George as the Facebook profile picture.
- The participants could not think of anything else that they would want to see on their profile and were very interested in the feature to choose incentive preferences.

Summary

After completing all of the tasks, participants were asked the final question of how difficult or easy it was to find the information they needed to make a decision on being bumped. Overall, results were positive, with no participants choosing “difficult” or “very difficult”.

The second round of user testing brought about some extra feature requests from participants. However, there was a difference in feature requests in round 2 versus round 1. In round 1 of testing, participants requested many features and identified them as “necessary” or “crucial”. However, in round 2 of testing the features requested were “suggested” or “would be nice to have”.

BumpMe: Solving Involuntary Flight Bumping

Some of the features requested were a “How to Redeem Your Voucher” section and customer service information.

Participants had a more positive response during the second round of testing, oftentimes exclaiming that they would love to use BumpMe or that BumpMe seems like an app they would keep on their phone.

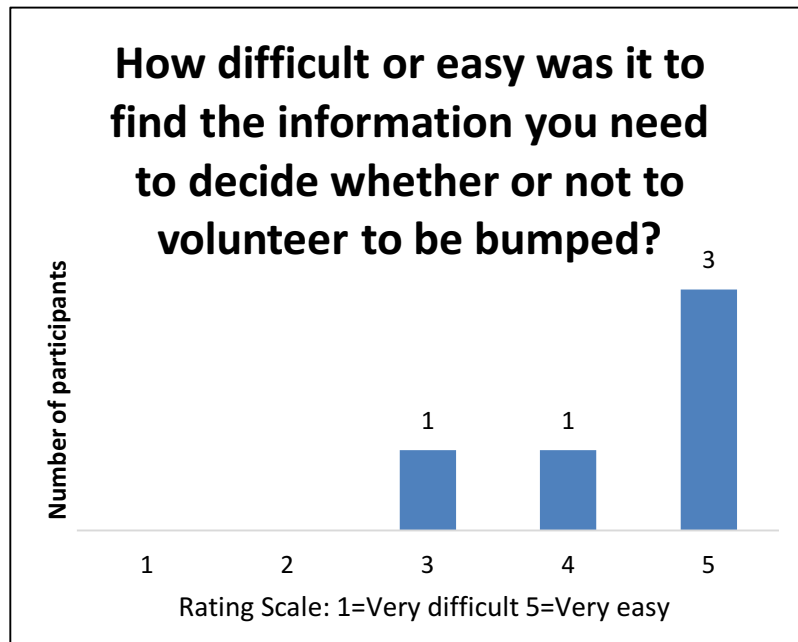


Figure 6.7. Participant ratings of the difficulty of finding information

Notable Participant Responses to Written Questions

Q: Was the information in each screen presented to you in a way that was clear?

A: “Yes, that majority of the information was very clear and easy to understand.” –User 1

A: “Yes, all the information was presented clearly. Everything was easy to navigate, which is essential on a mobile phone.” –User 3

Q: If you had a magic wand, what would you change about the BumpMe app?

BumpMe: Solving Involuntary Flight Bumping

A: "I would like a customer service information or a "how to redeem" section indicating how to redeem vouchers." –User 1

A: "Look at available flights before making the decision to bump or not." –User 2

A: "Better graphics. I would also explain how the process works. How can I give up my flight and get a hotel voucher instead? I would think it was a scam if I didn't know the app was legit." –User 4

A: "Nothing I loved it." –User 5

Q: How likely would you be to use BumpMe outside of a test setting? Please explain your answer.

A: "Quite likely, but only if you can bump a whole traveling party (or not) at once." – User 2

A: "I would be extremely likely to use BumpMe. It is a very neat idea! Last minute offers from airlines in airport to voluntarily bump yourself aren't always the greatest, so having a choice of voucher beforehand is great! The offers seem good as well." –User3

A: "Yes, I am definitely interested in trying it. Sometimes my travel plans are flexible. When that occurs again, I would be open to trying and seeing if I can get a free flight." – User 4

BumpMe: Solving Involuntary Flight Bumping

Chapter 7: Discussion

There are several takeaways from the literature review and the user testing research conducted on the BumpMe mobile app prototype. Most importantly, what has been discussed are some design best practices along with user preferences when it comes to a mobile tourism mobile app. Wei and Ozok remind the reader that a successful e-commerce platform does not automatically equal a successful m-commerce platform and that the user experience must be considered during the design process (2005).

Consistency

Hinze and Buchanan note the importance of consistency when designing a user interface (2010). Users confirmed this importance when providing their feedback on BumpMe. In the first round of user testing, the home screen had several different fonts (See figure 7.1). Users picked up on the different fonts right away and noted that it looked “unreliable” and “outdated”. The fonts were changed to matching for Round 2 of testing and the app was no longer referred to as “unreliable” (See figure 7.2).

BumpMe: Solving Involuntary Flight Bumping



Figure 7.1. BumpMe original home screen Figure 7.2. BumpMe revised home screen

Convenience/Efficiency

With the airline industry being as highly competitive as it is, it is very important for there to be a competitive advantage. Extra services (such as voluntarily flight bumping or alternate payment methods) will make an app or airline stand out for their convenience. Jenner argues that payments can be a means of competitive advantage for increasing revenues (2016).

BumpMe: Solving Involuntary Flight Bumping

When a user has multiple methods of payment to choose from (including scanning a credit card or simply entering a mobile phone number), they appreciate and value the convenience.

User testing of the BumpMe prototype also gave lessons in convenience. The first version of the prototype allowed users to search for their flight by ticket or confirmation number (See figure 7.3). However, users noted that it was extremely inconvenient to leave the BumpMe app in order to look up their ticket or confirmation number and requested a more convenient method of looking up their flight. The revised prototype allowed users to also look up their flight by airline and the last four digits of their social security number (See figure 7.4). This information is easily remembered and would not require users to look up information elsewhere, thus creating a user-friendly interface for users. In addition, the first version of the flight screen showed users most of their flight information. However, several users noted the inconvenient lack of displaying flight departure/arrival times. This was fixed during revisions to the prototype.

BumpMe: Solving Involuntary Flight Bumping

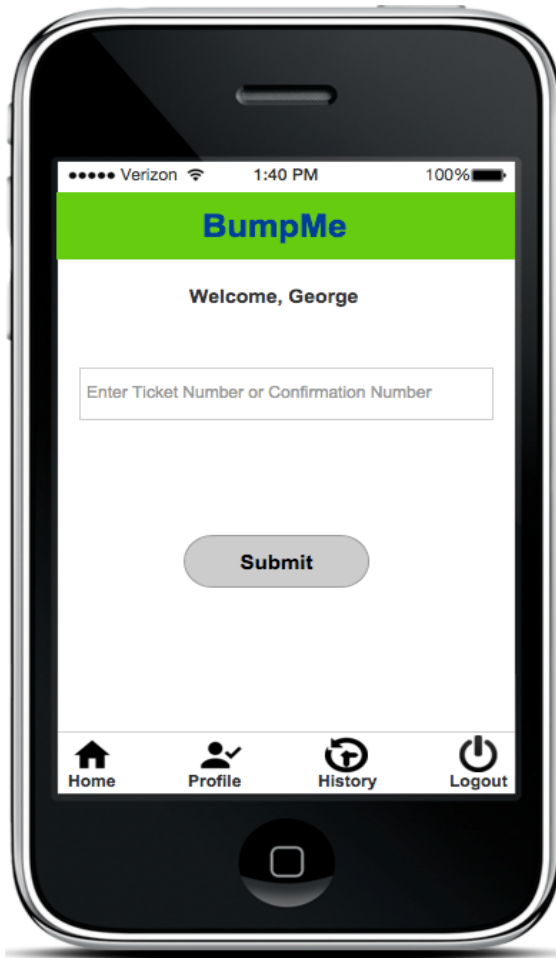


Figure 7.3. BumpMe original welcome screen

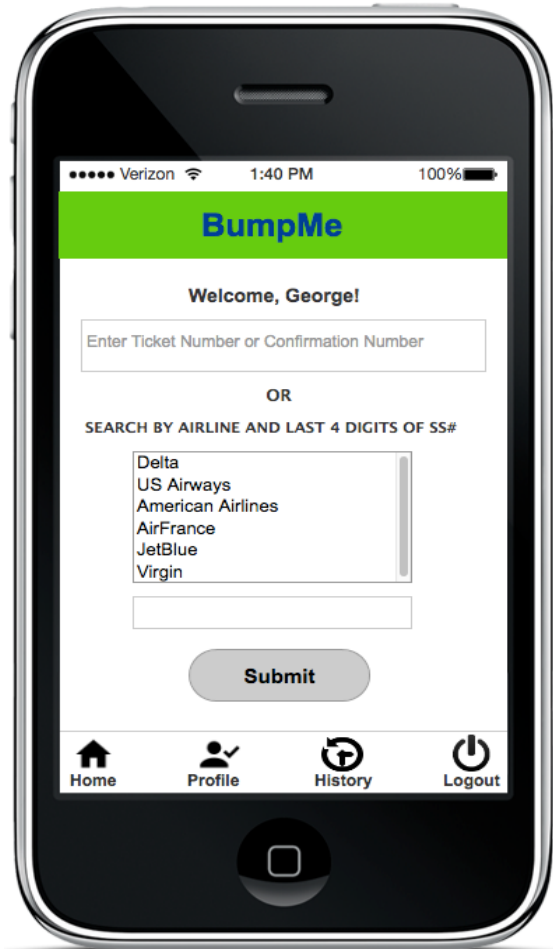


Figure 7.4. BumpMe revised welcome screen

Trust

The Internet creates unprecedented opportunities for initiating customer relationships, and trust is an essential part. Almost all users refuse to provide personal information to a website or mobile app at one time or another, because they lack trust (Siau, Shen, 2013). Trust can be built through familiarity, positive experiences, and reward attraction. A positive experience will reduce perceived risk.

The user testing of the Select Offer screen demonstrated the fragility of trust and confirmed the conclusions of Siau and Shen.

BumpMe: Solving Involuntary Flight Bumping

Because the incentives offered including no sort of link to Delta (the example airline in the BumpMe prototype), users perceived BumpMe as a gimmick, even after the redesign (See figures 7.5 and 7.6). User ratings of their likeliness to use the app were lower because users did not see any confirmation that BumpMe worked directly with Delta. Users thought that their alternate flight booking would not “go through” and/or that they would not receive a redeemable incentive. Another revision of BumpMe would assuredly include an obvious connected between BumpMe and the airline to gain user trust by reducing perceived risk.

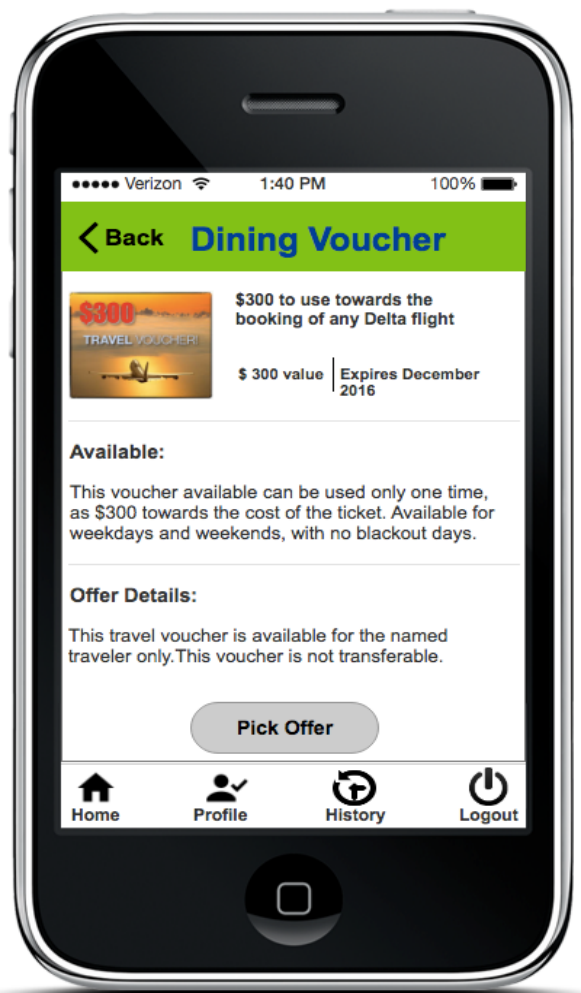
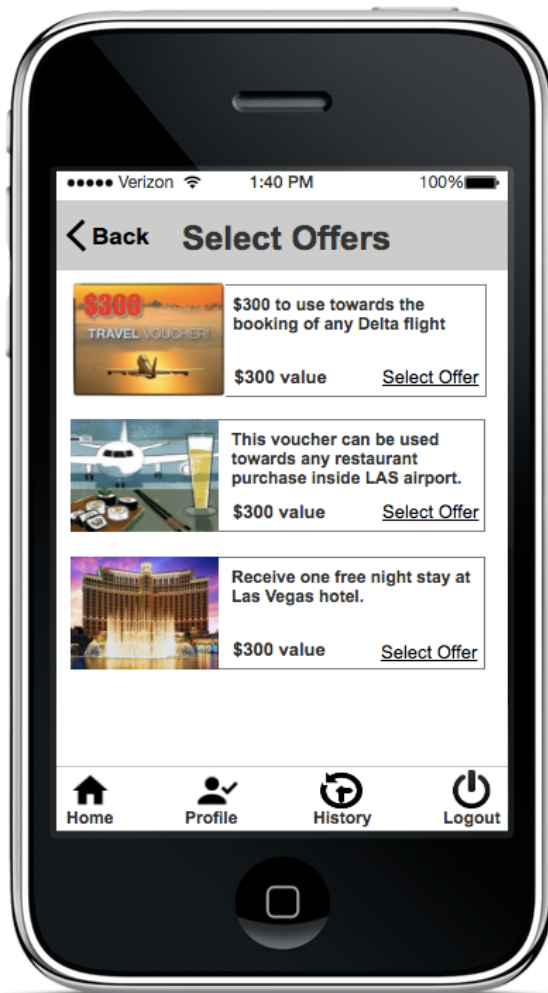


Figure 7.5. BumpMe revised select offer screen Figure 7.6. BumpMe revised offer screen

BumpMe: Solving Involuntary Flight Bumping

Further Consideration

Another important feature to consider in the user-centered design of a mobile tourism app is that of location awareness. Unlike a traditional e-commerce desktop platform, users expect their apps to be location-aware and to update in real-time. Such technology will place the app above less technologically advanced competitors.

For example, users of the BumpMe prototype noticed that one of the offers was a free hotel stay in Las Vegas, NV. Several users noted that they might not go to Las Vegas before the voucher expired and that the incentive was not enticing enough. Users would expect to see offers convenient to their current location and situation. Similarly, users would expect the flight departure/arrival times displayed on the flights screen to update in real-time. For example, if the user's flight was scheduled to depart at 6:30 PM EST and was delayed until 6:45 PM EST, users would expect to see the departure time on the flight screen to show the updated time that reflects the delay.

Although there is little research on designing a user-friendly mobile tourism app, there is useful research to be found and much of the research done on designing user-friendly mobile apps is most definitely applicable. Designers can learn what a user needs from the app in order to feel that they are interacting with a user-friendly system. The results of the BumpMe prototype research can act as further assistance in designing user-friendly mobile tourism app interfaces.

BumpMe: Solving Involuntary Flight Bumping

Chapter 8: Conclusion

Summary

Based on feedback from frequent flyer users who tested it, the BumpMe prototype mobile app was successful in meeting their needs. The majority of users rated it as an effective, exciting, usable, and informative tool to check flight information and to voluntarily participate in flight bump incentives.

Considerations and Next Steps

The literature review, competitive analysis, prototype, and user responses provide a solid base to develop a product. However, a number of considerations need to be addressed in order to turn this prototype into a fully functional app. Those considerations are:

- Functionality for all versions of iOS and Android mobile devices
- Versions for other devices, such as tablets
- Synchronization between devices
- Integration with other applications such as Facebook, Google Calendar, and each individual airline's app/site

Next steps for the BumpMe mobile travel are:

- Build a working prototype with more fully developed features, and of course,
- more user testing.

Importance of the BumpMe App

This mobile travel application meets a real need. When there are not enough volunteers to be bumped from an overbooked flight, passengers will then be involuntarily bumped from the flight they already paid for. BumpMe solves this problem while applying research on what makes a mobile interface design user-friendly.

BumpMe: Solving Involuntary Flight Bumping

Features of BumpMe

The BumpMe app consists of several features that will create tangible to both customers and airlines:

- Show passengers information about their flight.
- Display what benefits the airline will offer if a passenger voluntarily bumps to a later flight.
- Provide information about the alternate flights.
- The passengers will have the ability to nominate themselves for voluntary bumping in case overbooking does occur, based on whether they feel that the compensation plus the later flight information is enough to buy their inconvenience.
- Users are able to reserve an alternate flight in-app.
- Users can select and save incentive preferences within their personal profile.
- On the back end, the app is collecting valuable data about the overbooking situation for the airlines to later use for strategic purposes.
- Allows airlines to measure customer behavior against different voluntary bump incentives, marginal changes to those incentives, and their relationship to length of delays.
- The airline can use their existing data to weigh the risk of involuntary bump cash awards to figuring out the appropriate size of the cash rewards offered for airline passengers to voluntarily bump themselves from an overbooked flight.

The Modern Scenario

Let's revisit the earlier scenario in which George Prance has booked a flight from Las Vegas, Nevada to Atlanta, Georgia on June 11.

BumpMe: Solving Involuntary Flight Bumping

Because it is a popular flight at a peak time of day, he is concerned that it may be overbooked. Instead of arriving at the airport and hoping for the best, he opens up the BumpMe mobile app and logs in. He then can:

- View his current flight information.
- Determine whether or not his flight is overbooked and has volunteer bump incentives.
- View the available bump incentives such as travel vouchers or free hotel stays.
- Choose an incentive and volunteer to be bumped from his flight.
- View alternate flight options and either choose one then or revisit the option later.

A few months later, George remembers that he had used the BumpMe app and wonders if his chosen voucher has expired. He can then:

- Log in to the BumpMe app.
- View his bump history.
- View any claimed or unclaimed bump incentives.
- Click on the chosen incentive to read the description, which includes the expiration date.

The BumpMe mobile app is user-friendly because of its convenience, consistency, trustworthiness, and other standout features learned from research and user testing and designed with the user in mind. This is the user-friendly solution to flight overbooking!

BumpMe: Solving Involuntary Flight Bumping

References

- AirHelp.com. (2015). *AirHelp Get Compensation From Delayed Flights!* Retrieved August 10, 2015, from AirHelp.com:
<https://www.getairhelp.com/us#.VRDE1Y6EB8F>
- Arrow, K. (1975). *Vertical Integration and Communication*. Retrieved April 20, 2016, from The Bell Journal of Economics:
http://www.jstor.org/stable/3003220?seq=1#page_scan_tab_contents
- Buhalis, D. (2004). EAirlines: Strategic and tactical use of ICTs in the airline industry. *Information & Management*, 41(7), 805-825. doi:10.1016/j.im.2003.08.015
- Donovan, A. W. (2005, Spring). *Yield Management in the Airline Industry*. Retrieved July 1, 2015, from Embry-Riddle Aeronautical University:
<http://commons.erau.edu/cgi/viewcontent.cgi?article=1522&context=jaaer>
- Dorfman, R. &. (1986). *Linear Programming and Economic Analysis*. Retrieved June 30, 2015, from Courier Corporation:
https://books.google.com/books?hl=en&lr=&id=k5_vzaCNQP4C&oi=fnd&pg=PR5&dq=Linear+Programming&ots=tjhyrWMpHx&sig=amKOXHyCedwuGoJd8FT0Wj6Kfyw#v=onepage&q=Linear%20Programming&f=false
- Elliott, C. (2014, April 7). *Airlines Rarely Pay Full compensation To Bumped Fliers*. Retrieved August 30, 2015, from UseToday:
<http://www.usatoday.com/story/travel/flights/2014/04/07/flight-overbooked-compensation/7414701/>
- Hinze, A., & Buchanan, G. (2010) *Context-awareness in Mobile Tourist Information Systems: Challenges for User Interaction* (pp. 1-4, Rep.). doi:
<http://researchcommons.waikato.ac.nz/bitstream/handle/10289/1472/context-awarenessinmobiltouristinformationsystems.pdf?sequence=1&isAllowed=y>
- Jenner, G. (2016). Payment Power. *Airline Business*, 32(2), 28-31. Retrieved May 4, 2016, from <http://eds.a.ebscohost.com.proxy->

BumpMe: Solving Involuntary Flight Bumping

ub.researchport.umd.edu/ehost/detail/detail?sid=7bf8a7a9-783c-4184-afe4-ef7f9e904ec6@sessionmgr4003&vid=0&hid=4208&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#AN=113497045&db=hjh

- Jet, J. (2014, January 6). *Why You Want To Get bumped Off Your Next Flight (and How to Do It)*. Retrieved August 20, 2015, from JohnnyJet The Travel Insider: <http://www.johnnyjet.com/2014/01/why-you-want-to-get-bumped-off-your-next-flight-and-how-to-do-it/>
- Kurtzleben, D. (2014, December 26). *Why Airlines Bump Passengers, And What You Can Do About It*. Retrieved July 1, 2015, from Vox Life: <http://www.vox.com/2014/12/27/7450841/rights-airline-bumped-overbooking>
- Lake, D. U. (1991). *Organizational Capability: Creating Competitive Advantage*. Retrieved April 3, 2016, from Academy of Management: <http://amp.aom.org/content/5/1/77.extract>
- Lapowsky, I. (2014, May 6). *Bumped From A Flight? This Startup Wants To Get You Paid*. Retrieved August 15, 2015, from Wired.com: <http://www.wired.com/2014/05/airhelp/>
- Lehtinen Pekka (2006). Electronic services as a creator of competitive advantage in conventional scheduled airlines. Master's Thesis in Information Systems Science
- Lubbe, B., & Louw, L. (2010). The perceived value of mobile devices to passengers across the airline travel activity chain. *Journal of Air Transport Management*, 16(1), 12-15. doi:10.1016/j.jairtraman.2009.02.002
- Mamaghani, F. (2009). Impact of E-commerce on travel and tourism: An historical analysis. *International Journal of Management*, 26(3), 365-375,487. Retrieved from <http://search.proquest.com.proxy-ub.researchport.umd.edu/docview/233229533?accountid=28969>
- Nielsen, J. (2000, March 19). Why You Only Need to Test with 5 Users. Retrieved May 09, 2016, from <https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/>

BumpMe: Solving Involuntary Flight Bumping

- P. Moore, "The Complexity of Context in Mobile Information Systems," 2009
International Conference on Network-Based Information Systems, Indianapolis, IN, 2009, pp. 91-96. doi: 10.1109/NBiS.2009.10
- Porter, M. E. (2008). *The Five Competitive Forces That Shape Strategy*. Retrieved July 3, 2015, from Kampala International University Digital Library:
<http://elibrary.kiu.ac.ug:8080/jspui/bitstream/1/510/1/Michael%20Porter%20-%20The%20Five%20Competitive%20Forces%20that%20Shape%20Strategy.pdf>
- Poslad, Laamanen, Malaka, Nick, Buckle and Zipl. (2010). "CRUMPET: creation of user-friendly mobile services personalised for tourism," *3G Mobile Communication Technologies, 2001. Second International Conference on (Conf. Publ. No. 477)*, London, 2001, pp. 28-32. doi: 10.1049/cp:20010006
- RefundMe. (2015). *RefundMe Claim Compensation*. Retrieved September 1, 2015, from Refund.Me: <https://www.refund.me/>
- Siau, K., & Shen, Z. (2013, April). Building customer trust in mobile commerce. *Communications of the ACM*. doi:10.1145/641205.641211
- Wang, S., & Cheung, W. (2004). E-Business Adoption by Travel Agencies: Prime Candidates for Mobile e-Business. *International Journal of Electronic Commerce*, 8(3), 43–63. Retrieved from <http://www.jstor.org/stable/27751106>
- Wei, J. & Ozok, A. A. (2005). Development of a web-based mobile airline ticketing model with usability features.. *Industrial Management and Data Systems*, 105, 1261-1277.
- Zervaki, A., Vlachopoulou, M., Stiakakis, E., & Manthou, V. (2010). *Mobile Airlines Services* [Scholarly project]. Retrieved May 3, 2016, from [http://users.uom.gr/~stiakakis/download/C\[13\].pdf](http://users.uom.gr/~stiakakis/download/C[13].pdf)

BumpMe: Solving Involuntary Flight Bumping

Appendix A: Consent Form

Whom to Contact about this study:

Principal Investigator: Tiffany Aiken

Department: College of Arts and Sciences

Telephone number: 435-590-4604

CONSENT FORM FOR PARTICIPATION IN RESEARCH ACTIVITIES

I. INTRODUCTION/PURPOSE:

I am being asked to participate in a research study. The purpose of this study is to decide if there is a need for a mobile app that helps airlines connect with those willing to change their flights last minute. The purpose is also to user test prototypes of the mobile app. I am being asked to volunteer because I regularly take flights and am over the age of 18.

II. PROCEDURES:

As a participant in this study, I will be asked to record my computer screen and voice as I take a survey about how often I fly and for what purpose. I will also be asked to record my computer screen and voice as I review paper and technical prototypes of the mobile app. I will be asked to participate in these studies remotely. No personal identifying information will be written with responses to the questions. Each recorded session will take approximately 20 minutes, with there being 3-5 rounds of testing.

III. RISKS AND BENEFITS:

My participation in this study does not involve any significant risks and I have been informed that my participation in this research will not benefit me personally, but the research will help to solve several issues seen daily with multiple airlines.

BumpMe: Solving Involuntary Flight Bumping

IV. CONFIDENTIALITY:

Any information learned and collected from this study in which I might be identified will remain confidential and will be disclosed ONLY if I give permission. All information collected in this study will be stored in a locked file cabinet in a locked room. Only the investigator and members of the research team will have access to these records. If information learned from this study is published, I will not be identified by name. By signing this form, however, I allow the research study investigator to make my records available to the University of Baltimore Institutional Review Board (IRB) and regulatory agencies as required to do so by law.

Consenting to participate in this research also indicates my agreement that all information collected from me individually may be used by current and future researchers in such a fashion that my personal identity will be protected. Such use will include sharing anonymous information with other researchers for checking the accuracy of study findings and for future approved research that has the potential for improving human knowledge.

Check if voice recordings are used during the research study:

Yes, I give permission to use my voice in scientific publications or presentations.

No, I do not give permission to use my voice in scientific publications or presentations

V. COMPENSATION/COSTS:

BumpMe: Solving Involuntary Flight Bumping

My participation in this study will involve no cost to me. I will be paid for my participation in \$10 cash for each 15-20 minute recorded session. If the session lasts longer than 15-20 minutes, I will be paid \$20.

VI. CONTACTS AND QUESTIONS:

The principal investigator Tiffany, has offered to and has answered any and all questions regarding my participation in this research study. If I have any further questions, I can contact Tiffany at 435-590-4604 or tiffany@usertesting.com

For questions about rights as a participant in this research study, contact the UB IRB Coordinator: 410-837-6199, irb@ubalt.edu.

VII. VOLUNTARY PARTICIPATION

I have been informed that my participation in this research study is voluntary and that I am free to withdraw or discontinue participation at any time.

VIII. SIGNATURE FOR CONSENT

The above-named investigator has answered my questions and I agree to be a research participant in this study. By signing this consent form, I am acknowledging that I am at least 18 years of age.

Participant's Name: _____ Date:

Participant's Signature: _____ Date:

BumpMe: Solving Involuntary Flight Bumping

Investigator's Signature: _____ Date:

BumpMe: Solving Involuntary Flight Bumping

Appendix B: Consent Form Responses

Timestamp	Please select whether	Please enter your	What is your UserTesting	Do you agree	Today's Date:
11/14/2015 18:31:33	Yes, I give permission	Bryan Mecsey	bmecsey	Yes	11/14/15
11/14/2015 20:37:29	Yes, I give permission	Jason Krumbine	jmkwriter	Yes	11/14/2015
11/14/2015 20:46:35	Yes, I give permission	Jessica Kelly	jikelly531	Yes	11/14/2015
11/14/2015 21:10:22	Yes, I give permission	Ben McLaughlin	BMcLaughlin	Yes	November 14, 2015
11/14/2015 21:32:05	Yes, I give permission	Tina Smith	txsmith	Yes	11/14/15
11/15/2015 1:11:13	Yes, I give permission	Christi Johnson	Clementine	Yes	Nov 15th 2015
1/22/2016 20:06:50	Yes, I give permission	Crystal Cox	CrysCox	Yes	January 22, 2016
1/23/2016 17:46:30	Yes, I give permission	Oren Litwin	orendog	Yes	1/23/2016
4/28/2016 18:42:50	Yes, I give permission	Terri Kellerman	tmathews87@yahoo.com	Yes	4/28/2016
4/28/2016 18:48:42	Yes, I give permission	Elizabeth Davis	userestingkid	yes	4/28/2016
4/28/2016 19:21:38	Yes, I give permission	Ashley Thomas	ashitho	Yes	April 28, 2016

BumpMe: Solving Involuntary Flight Bumping

Appendix C: BumpMe Test Plan (Round 1)

BumpMe Prototype 1

UserTesting Test Plan

September 27, 2015

TEST DETAILS

Methodology:

5 users to participate in remote, unmoderated testing sessions on desktop/laptop.

Demographics:

Number of users: 5

Gender: Any

Age: 25-45

Income: Any

Country: US

Starting URL:

Consent Form: https://docs.google.com/forms/d/1_xyiC_YuZjhe5sjUsExpZrOxf1oIP4g4-bkNHniFOMY/viewform?usp=send_form

Prototype 1: http://y546ic.axshare.com/#p=login_with_facebook

Scenario:

Today you'll be reviewing a prototype for a mobile app called BumpMe. The purpose of this app is to allow users to view information about their upcoming flight as well as what

BumpMe: Solving Involuntary Flight Bumping

benefits the airline will offer should they volunteer to be bumped to a later flight. The idea is to prevent so many flights from overbooking and involuntarily bumping passengers.

Note: You are viewing an early-stages prototype. If something does not work as expected, please explain what you would expect to happen and move on to the next task.

Screener Questions:

Question 1:

How often do you fly, for business or for leisure?

- 1-3 times per year
- 3-5 times per year. (Admit to next question)
- 5-10 times per year. (Admit to next question)
- 10+ times per year. (Admit to next question)
- Less than once per year
- None of the Above

TASKS

1. Before you begin reviewing the prototype, please follow the link to fill out the consent form.

https://docs.google.com/forms/d/1_xyiC_YuZjhe5sjUsExpZrOxf1olP4g4-bkNHniFOMY/viewform?usp=send_form

BumpMe: Solving Involuntary Flight Bumping

2. Did you fully fill out the consent form? [Multiple Choice: Yes/No/Other] If no, please do so now or exit the test as we are unable to use your feedback without your consent for this study.
3. Please take a minute to explain how often you fly and what airline you prefer.
4. Please explain any experience you have with being voluntarily or involuntarily bumped from a flight and whether or not you received compensation.
5. Now, please view the BumpMe mobile app prototype at http://y546ic.axshare.com/login_with_facebook.html. Without clicking on anything, what are your first impressions? What would you believe this app is for?
6. How useful is the tagline "The easiest way to get paid for being bumped from a flight, before it happens" to you? Please explain your answer. [Rating Scale 1=Not at all useful 5=Extremely useful]
7. Is there anything you would change about the home screen? If so, what and why?
8. Please click "Login with Facebook" to move to the next screen and take a minute to explain what you're viewing. Is there anything confusing or missing that you'd expect to see?
9. If you haven't already, please enter a confirmation code (just make up a number) and click on "Submit".
10. You should be viewing two screens now- one with green text and one with red with George's flight information. Both are examples of the screen a user would see after entering their flight reservation number. Please take a minute to review the information provided and to give your impressions.
11. Is there anything missing from these screens that you would expect to see?
12. How clear to you is the information that is provided? [Rating Scale 1=Poor 5=Excellent]

BumpMe: Solving Involuntary Flight Bumping

13. Imagine that you'd received the green confirmation screen informing you that benefits are available. Go ahead and click "Continue" to be taken to the "Select Offers" screen and review the page.
14. How useful to you is the "Select Offers" screen? Feel free to click around and read the details about each offer if you haven't already. [Rating Scale 1=Not at all useful 5=Extremely useful]
15. At this point, how interested would you be in accepting one of these offers to be bumped from your flight and moved to a later flight? Please explain [Rating Scale 1=Not at all likely 5=Extremely likely]
16. Go ahead and pick one of the offers and stop when you've reached the "Flights" screen. Is the purpose of this screen clear to you? Please explain.
17. Please take a minute to review the "Profile" option at the bottom of the screen. Is there anything missing there that you'd expect to see?
18. Please take a minute to review the "History" option at the bottom of the screen. Is there anything missing there that you'd expect to see?
19. How difficult or easy was it to find the information you need to decide whether or not to volunteer to be bumped from a flight? [Rating Scale 1=Very difficult 5=Very easy] Please explain.
20. Thank you! Do you have any final thoughts on the prototype you viewed today, before moving on to the written responses?

Written Questions:

1. Was the information in each screen presented to you in a way that was clear?
2. If you had a magic wand, what would you change about the BumpMe app?
3. How likely would you be to use BumpMe outside of a test setting? Please explain your answer.

BumpMe: Solving Involuntary Flight Bumping

4. How likely would you be to refer BumpMe to a friend, family member, or colleague? 1=Not at all likely 10=Extremely likely [NPS]

BumpMe: Solving Involuntary Flight Bumping

Appendix D: BumpMe Test Plan (Round 2)

BumpMe Prototype 2

UserTesting Test Plan

April 2016

TEST DETAILS

Methodology:

5 users to participate in remote, unmoderated testing sessions on desktop/laptop.

Demographics:

Number of users: 5

Gender: Any

Age: 25-45

Income: Any

Country: US

Starting URL:

Consent Form: https://docs.google.com/forms/d/1_xyiC_YuZjhe5sjUsExpZrOxf1oIP4g4-bkNHniFOMY/viewform?usp=send_form

Prototype 2: <http://q7ssx1.axshare.com>

Scenario:

Today you'll be reviewing a prototype for a mobile app called BumpMe. The purpose of this app is to allow users to view information about their upcoming flight as well as what

© 2016 Tiffany Aiken

BumpMe: Solving Involuntary Flight Bumping

benefits the airline will offer should they volunteer to be bumped to a later flight. The idea is to prevent so many flights from overbooking and involuntarily bumping passengers.

Note: You are viewing an early-stages prototype. If something does not work as expected, please explain what you would expect to happen and move on to the next task.

Screener Questions:

Question 1:

How often do you fly, for business or for leisure?

- 1-3 times per year
- 3-5 times per year. (Admit to next question)
- 5-10 times per year. (Admit to next question)
- 10+ times per year. (Admit to next question)
- Less than once per year
- None of the Above

TASKS

1. Before you begin reviewing the prototype, please follow the link to fill out the consent form.

https://docs.google.com/forms/d/1_xyiC_YuZjhe5sjUsExpZrOxf1oIP4g4-bkNHniFOMY/viewform?usp=send_form

BumpMe: Solving Involuntary Flight Bumping

2. Did you fully fill out the consent form? [Multiple Choice: Yes/No/Other] If no, please do so now or exit the test as we are unable to use your feedback without your consent for this study.
3. Please take a minute to explain how often you fly and what airline you prefer.
4. Please explain any experience you have with being voluntarily or involuntarily bumped from a flight and whether or not you received compensation.
5. Now, please view the BumpMe mobile app prototype at <http://q7ssx1.axshare.com>. Without clicking on anything, what are your first impressions? What would you believe this app is for?
6. How useful is the tagline "The easiest way to get paid for being bumped from a flight, before it happens" to you? Please explain your answer. [Rating Scale 1=Not at all useful 5=Extremely useful]
7. Is there anything you would change about the home screen? If so, what and why?
8. Please click "Login with Facebook" to move to the next screen and take a minute to explain what you're viewing. Is there anything confusing or missing that you'd expect to see?
9. Go ahead and click on "OK" to continue logging in with Facebook and to be taken to the welcome screen. Is there anything confusing about or missing from the welcome screen?
10. If you haven't already, please enter a confirmation code (just make up a number) and click on "Submit".
11. You should be viewing two screens now- one with green text and one with red with George's flight information. Both are examples of the screen a user would see after entering their flight reservation number. Please take a minute to review the information provided and to give your impressions.
12. Is there anything missing from these screens that you would expect to see?

BumpMe: Solving Involuntary Flight Bumping

13. How clear to you is the information that is provided? [Rating Scale 1=Poor 5=Excellent]
14. Imagine that you'd received the green confirmation screen informing you that benefits are available. Go ahead and click "Continue" to be taken to the "Select Offers" screen and review the page. Only the travel voucher is clickable.
15. How useful to you is the "Select Offers" screen? Feel free to click the travel voucher and read the details about each offer if you haven't already. [Rating Scale 1=Not at all useful 5=Extremely useful]
16. At this point, how interested would you be in accepting one of these offers to be bumped from your flight and moved to a later flight? Please explain [Rating Scale 1=Not at all likely 5=Extremely likely]
17. Go ahead and select the travel voucher and stop when you've reached the "Flights" screen. Is the purpose of this screen clear to you? Please explain.
18. How useful to you is the flights screen? Please explain your rating. [Rating Scale 1=Not at all useful 5=Extremely useful]
19. Please take a minute to review the "Profile" option at the bottom of the screen. Is there anything missing there that you'd expect to see?
20. Please take a minute to review the "History" option at the bottom of the screen. Is there anything missing there that you'd expect to see?
21. How difficult or easy was it to find the information you need to decide whether or not to volunteer to be bumped from a flight? [Rating Scale 1=Very difficult 5=Very easy] Please explain.
22. Thank you! Do you have any final thoughts on the prototype you viewed today, before moving on to the written responses?

Written Questions:

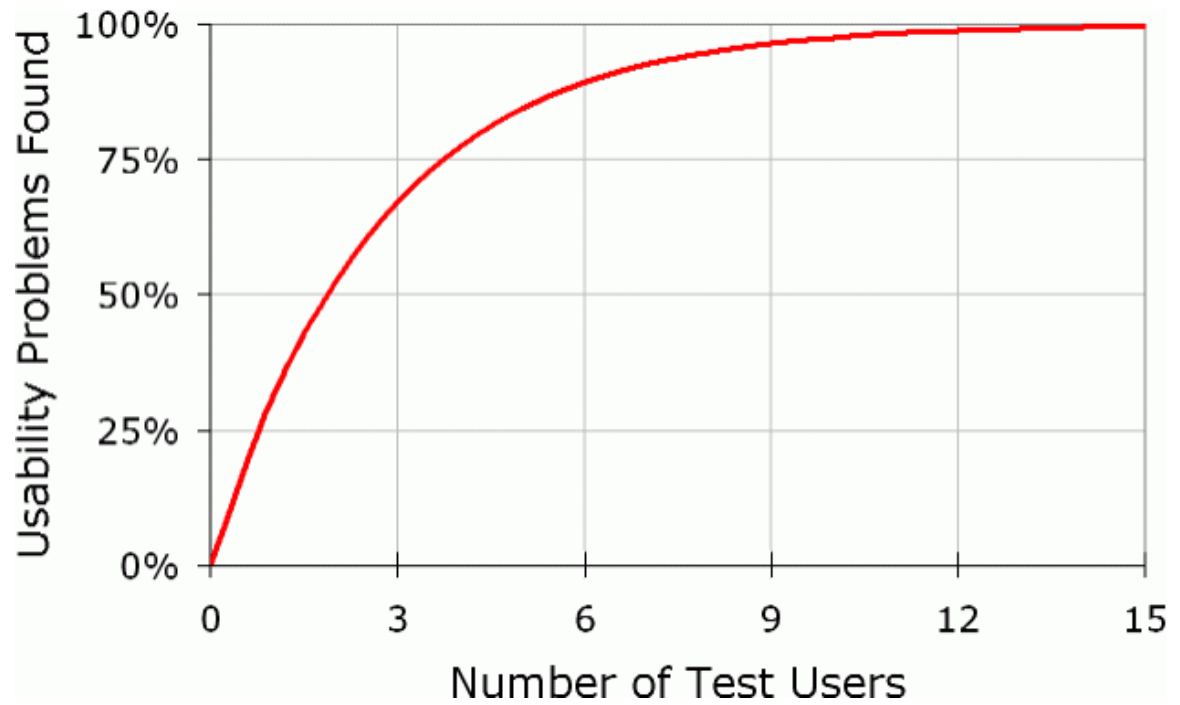
1. Was the information in each screen presented to you in a way that was clear?

BumpMe: Solving Involuntary Flight Bumping

2. If you had a magic wand, what would you change about the BumpMe app?
3. How likely would you be to use BumpMe outside of a test setting? Please explain your answer.
4. How likely would you be to refer BumpMe to a friend, family member, or colleague? 1=Not at all likely 10=Extremely likely [NPS]

BumpMe: Solving Involuntary Flight Bumping

Appendix E: Usability Participants Curve



Participant and Found Usability Problems Information from Nielsen (2000)'s study.

BumpMe: Solving Involuntary Flight Bumping

Appendix F: Porter's Five Forces



Porter's Five Forces from Porter (2008)'s article.