INFO508 – Final Design Document
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Introduction

Design thinking provides a means by which ideas can be identified, evolved, and implemented in an innovative and collaborative manner. In this paper, Group 4 will provide an overview of how the empathy, ideation, experimentation, and test design thinking processes were leveraged as part of the INFO508 course assignments to identify the Future Vision Weather & Travel Application (Future Vision) as a plausible solution for those feeling overwhelmed due to variables affecting travel.

Empathy

The responsibility of planning for and navigating between destinations is something that everyone will eventually do in life. To obtain qualitative insight into and understanding of the processes and perceptions related to planning for and navigating between destinations, Group 4 chose team experimentation and leveraged the ethnographic research methods of participant interview and observation. Team experimentation was selected as it would promote understanding of one's own perspectives and feelings about planning for and navigating between destinations prior to engaging with the participants. In sharing this information with one another, Group 4 team members realized that they all considered travel and navigation activities to be simple, easy and unburdened by intense feelings.

The decision to use interview and observation methods on the participants was primarily based on an understanding that eliciting information during loosely planned and unscripted interactions in personable environments will help yield sincere and revealing information about a participant's own experience. As such, over the course of three days, Group 4 conducted 30-minute Zoom-facilitated interviews for eight participants between the ages of 19-75 with varied educational levels, personal and professional experiences, ethnicities, and geographical locations. The interview and observation activities resulted in a myriad of insightful responses and revealed the standout topics of planning, personalization, weather, and traffic. Group 4 was very interested to learn that planning for and then navigating between destinations caused some sort of stress and anxiety for participants regardless of how extensive or abbreviated the event may be. As a result, this became the focus going forward, and the problem statement was defined as, "***People are overwhelmed by the variables that can affect their travels.***"

Ideate

To further explore the problem statement identified during the empathy process, Group 4 sought to generate a register of potential mobile application related solutions. Considering the need to fulfill assignment requirements, accommodate the varied schedules of Group 4 team members, and ensure feasibility of ongoing collaborative ideation, brain-netting and group brainstorming were determined to be the best ideation techniques and processes to use. Specifically, brain-netting was used to spawn initial ideas, and group brainstorming was used expand and clarify ideas. Group 4 also agreed to leverage use of Stormboard to document, share and track ideas.

Group 4 produced 47 ideas ranging from simple and easily achieved (e.g., changing theme background colors) to complex and implausible (e.g., "best of" application aggregation). The count of ideas was then reduced to 25 through merging of like concepts, grouping according to similar themes, and elimination of duplicates. With a goal of whittling down the list to three of the most "promising" or "interesting" ideas, Group 4 further defined the 25 ideas, removing complications of idea interpretation and simplifying through the down-select process. In reviewing the refined idea descriptions and conducting a team vote, three of the 25 ideas were chosen for low-fidelity prototyping: "Future Vision," "True View Map," and "Travel Wallet."

Experiment & Test

To determine which of the three most promising and interesting mobile application ideas would be the best possible solution to the problem statement, Group 4 decided to explore user validation through use of prototype development and comparison. The process to determine how the prototypes should be created involved collaborative evaluation and selection of key features/scenarios for development, time and cost constraints, as well as functional intent or ability to discern user interaction as part of the testing process to come. Selection of the key features/scenarios for each idea were identified via group voting. The need to only develop for these key features/scenarios was emphasized as it was believed that anything additional would prove distracting for the tester and inhibit Group 4's ability to the stated goal. Time and cost constraints influenced the decision to create low-fidelity prototypes using clickable wireframes in user experience design tools. To maximize use of time and enable the team to meet assignment deadlines, each of the three team members assumed responsibility for creation

of one of the three ideas. The "True View Map" and "Travel Wallet" prototypes were developed using Adobe XD, and the "Future Vision" prototype was developed using Sketch and Invision. To ensure that all Group 4 team members were included in the prototype development process for each prototype, Zoom meetings were held to review and provide feedback for the prototype being developed. When all prototypes were completed, Group 4 team members conducted a peer review prototype walkthrough that focused on sharing feedback and resolving questions to decrease the likelihood of tester confusion. The walkthrough session was also used to collaborate on the creation of test session agendas, align on testing goals, and develop a test plan to be followed during the test session. Necessary edits identified during the walkthrough session were made by each team member who developed the prototype and test plan documentation.

To ensure that the tester feedback was meaningful, Group 4 team members selected test participants that were aligned with need to use, likeliness to use, and familiar with travel and navigation mobile applications. The test group consisted of a female Social Media Reporting Analyst in her early 50s (Tester A), female Digital Marketing Manager in her mid-thirties (Tester B), and a male DevOps Senior Manager in his late 40s (Tester C). The test sessions were designed so that each test participant would be able to test each of the three prototypes. Each prototype test was performed in 20 minutes, with three prototype tests occurring within a one-hour session. The test sessions were facilitated via Zoom and started with an introduction, overview of the testing goals, explanation of interviewer and observer roles, and request for consent to record. Group 4 team members took turns in the interviewer and observer roles, with the interviewer role assumed by the team member that developed the prototype. The interviewer asked questions focused on ease of use and understanding of functionality. Questions about the value proposition, emotion during use, necessary improvements, and missed opportunities were also presented. At times, the interviewer had to adjust the line of questioning if the tester deviated from the path down which they were being led. The observers focused on unvoiced feedback and took notes during the test process. Following each interview session, Group 4 team members discussed what was observed. The final Group 4 test discussion included a comparison of observations for each test session, identification of test failures, and notation of specific improvements that should be made to the prototype. In general, it was noted that the ability to quickly adjust the prototypes and do iterative testing would be a cost- and time-effective way to improve the design before building it. A summary of specific strengths, weaknesses, and reflections for each prototype is shown below.

Prototype	Strength	Weakness	Reflection
Future Vision	Simple navigation, home screen had adequate information, all testers thought that "this was cool"	Hard to distinguish between weather forecasts for arrival vs. departure locations	Small details can make a big difference and interpretation of screen elements must be considered (e.g., buttons vs. just text)
True View	Icons easily interpreted on home screen, setting changes are easy to do, information on screen/UI settings are easy to use	Screen/UI lighting option icon is not easily identified, positioning of alerts "may block road view", source of on-screen visual may not be clear	Use of common layouts and icons is helpful to quickly orient users, complementing icons with words will also help users
Travel Wallet	Adding funds to the wallet, uploading receipts, and use of folders/tag was easily understood and considered "beneficial" to users	Scan icon was not understood, prototype pre-population caused confusion	Simplified steps in a prototype can be easily misconstrued as a missing function

Finalizing the Design Details

Based on the feedback received during the experiment and test process, Group 4 selected the Future Vision prototype for final design. The discussion surrounding the experiment and test process was then extended to focus solely on correcting failures to help improve the Future Vision prototype and identify specific scenarios for which improvements would be performed. Below is a summary of the key points that came from that discussion.

Failed aspects to fix for final low-fidelity prototype	Failed aspects to fix for future high-fidelity prototype

• Add location of each event listing on the Home screen • Provide clarity in presentation of arrival vs. departure location for weather details • Improve distinction between the Itinerary button vs Edit Travel button • Replace icon for screenshot feature, or improve feature to help users better understand what is happening • Increase duration of screenshot features popup for prototype use only • Add Fahrenheit distinction on Weather Details screen	• The purpose of the Weather Details handlebar went unnoticed and/or was not understood • Consider creating more than one prototype for various devices; prototype was specific to an Android user leaving some functions confusing to iPhone users

Group 4 revisited the problem statement and scenarios on which the experiment and test process was based for Future Vision and determined that they were still valid and appropriate for improving low-fidelity prototype. Those scenarios/features are as follows:

1. Additional Information and Screenshotting
    - User scrolls through list of trips he or she has planned
    - Each list-item has an additional options/tools icon on the right providing options like “delete,” “edit” and “additional.”
    - “additional” will bring up a modal screen displaying weather or traffic patterns in more detail with a button for screenshotting image.
2. Event notifications
    - User receives notification of events planned in and around location point at time of trip
    - Offers tickets to events
    - Offers alternate locations to go instead
    - Event location distance customizable by user
3. Current forecast
    - User will press button and be presented with a screen that shows current forecast (next 24hr) for a searched location
    - User will select weather type and date duration

Future Vision: Final Design

The Future Vision mobile application prototype provides an aggregated view of weather and traffic for user selected locations. This information is presented in a single application, eliminates the need to research weather trends when planning for a trip, and keeps the user up to date on any real time travel adjustments required to avoid potential delays due to changing weather. In general, the target audience for this application is any individual that has a responsibility or need to plan travel from one location to another.

Textual Description of the Final Design

The final Future Vision design is a low-fidelity prototype that uses dynamic, full-screen transitions. The four master screens may be referred to as: *Home*, *Menu*, *Itinerary* and *Weather*.

The Home screen consists of system navigation, top navigation, search field, the main content, and the bottom navigation. The main content contains a scrollable list of future trips in ascending order, and key markers providing meta-information on when the trip will take place in relation to the current date. Each trip listing contains its own list that informs users of the trip name, location and date. Each trip listing is subject to a notification icon, informing users of trip-related warnings and hazards. A trip listing with an orange notification icon floating to the right of the listing's content would be the Home screen’s variation.

The Menu screen, encapsulated by an overlay, is titled with the selected trip’s name and displays six (2 x 3) cards. Each card directs the user to a different screen containing information or interactions regarding a specific function of the trip. Reading from left to right, the cards are: *Weather Details*, pseudo content, pseudo content, *Add to Favorites*, *Itinerary*, and pseudo

content. The overlay hugs the right-hand side of the screen and comes with its own top navigation and left-hand side handlebar. Like the Home screen, the Menu screen's variation is an orange notification icon hovering over the top-left corner of the card.

The Itinerary screen contains an ordered list of pre-determined tasks the user will have to complete before successfully arriving at the destination location. Each list-item contains a one-sentence overview of the task to be completed, the estimated time of completion, and an "additional options" icon to the right of each one-sentence overview. At the bottom-right of the Itinerary screen there is a fixed button with a "screenshot" icon. There are several variations of the Itinerary screen including:

- Screen Captured and Saved - In green and bolded font, "Screenshot Captured and Saved" is displayed below the ordered list as its own entity. This screen appears after the user taps the "screenshot" button at the bottom-right.
- Update Itinerary Preview - When the user makes an update to the trip itinerary based on a weather or traffic alert, they will have the opportunity to preview the itinerary updates before finalizing. Using orange arrows pointing to the updated times, the user will be presented with a "Save Changes" button to save the updated itinerary. The "screenshot" button will not be visible at this time.
- Save Changes Successful - After the user taps "Save Changes", an updated itinerary with the reflected changes will take the place of the old itinerary. Simultaneously, "Save Changes Successful" will append below the list of itinerary items in bolded green text. The "screenshot" button will have reappeared along with the newly saved itinerary.
- Save Changes Successful & Screenshot Captured and Saved - After the user taps the "screenshot" button, "Screenshot Captured and Saved" will have appended itself below "Save Changes Successful" in bolded green text.

The Weather Details screen is where users go to see weather forecasts for the arrival and departure locations. From top-down order, the Weather Details screen contains a search field containing the arrival location by default, the arrival location's weather forecast at the chosen time of arrival, and hour-by-hour weather data for temperature, cloudiness, precipitation. There are eight prototype screens for Weather Details which can be broken down into two main screen categories – Default/Master and Hazard/Alert. The Default/Master screens would likely be used proactively, but the Hazard/Alert screens would be used in reaction to a weather hazard or trip-related alert on the Home screen or Menu screen.

Default/Master Screens	Hazard/Alert Screens
Arrival / Search – Accessed by pressing on the search field, most of the screen is greyed out and the search field expands downward, displaying options of where the user would like to receive information on. When pressing the search field, while on Arrival Location Details, the expandable search field will list the arrival location first and the departure location second.	Arrival Location Details - This screen uses the continuity of orange to display when the hazardous weather will arrive and for what reasons. Icon elements and their paths have orange strokes, displaying hazards or warnings, for specific times of the upcoming trip. Like its default counterpart, the order and placement of screen elements are the same except for two buttons: • Winter Storm Advisory (More Info) - A ghost button placed to the right of the arrival location forecast. The button is labeled "more info" and is contained by an orange, 1-pixel, border. The functionalities for this button were not included in the prototype. • Update Itinerary – A regular button placed at the bottom of the screen, underneath the hour-by-hour forecast. The button is orange-filled and is labeled "Update Itinerary" in bolded white text.
Arrival Location Details – The default Weather Details Screen displays weather information on the arrival location, at the time of expected arrival. To the right of the arrival location, in the search field, floats a green dot which represents the user's starting point.	Arrival / Search – The functionalities for this screen are the same as the default counterpart. The background becomes greyed out while the search field expands, allowing the user to choose which location information is needed on.
Departure Location Details – The same as Arrival Location Details, except information will be displayed on the arrival location and the dot will be a neutral pink color instead of green, indicating the end of the trip.	Departure Location Details – The same as Arrival Location Details except for the fact that information is being displayed on the departure location, not the arrival location.

Departure / Search – Accessed by pressing on the search field, this screen is identical to Arrival / Search, except the arrival and departure locations, within the expanded search field, will be in reverse order.	Departure / Search – The same as Arrival / Search in reverse order.

Final Design Walkthrough

Group 4 created a persona to walkthrough the final design of Future Vision. This person, *Jane*, is a parent of two small children who has plans to attend a New Year's Eve party in Asbury Park, New Jersey. Jane experiences the following two scenarios which will need to be addressed to successfully arrive at the destination:

- **Scenario 1:** ***Receive weather and itinerary information on the New Year's Eve Party Trip***
  A few weeks before the New Year's Eve party, Jane plans out her travel. The trip is now closer to the current date and Jane want to ensure that she can get to the party by 10:00 pm. She opens her Future Vision application, scrolls down the homepage, and clicks on her New Year's Eve party event. In the new screen presented, she is most interested in Weather Details, Add to Favorites, and Itinerary. Jane opens the Weather Details to see if there are any weather conditions for which she should be aware. Jane sees that it will be cold and snowy but is already prepared for this. Next, she double-checks that her itinerary gets her on the road in time to get to the party by 10:00pm. Jane goes back to the New Year's Eve party overview and clicks on Itinerary. This brings up a list of all the steps that she and her parents discussed, including when to feed the kids! She sees that if she still she leaves her parents by 9:30pm, she will arrive by 10:00pm to the party.

- **Scenario 2:** ***Respond to inclement weather and arrive at the New Year's Eve Party Trip on time***
  It is three nights before the New Year's Eve party. Jane's father heard that there is a winter storm coming in and asks Jane if there are any changes to her travel plans. Jane opens her Future Vision app and sees an alert icon on her New Year's Eve party! Jane clicks on the alert icon to see what is happening and is taken to the Weather Details for her party. There is a winter advisory that might affect her travels. At the bottom of the Weather Details screen, there is an Update Itinerary button. Jane taps the button and sees in order to still get to the party by 10:00pm, she will have to adjust her scheduled itinerary. The app lists adjustments to each item on her list. At the bottom of the screen, there is a Save Changes button to confirm the adjustments to her itinerary. Jane taps the button, and the changes save successfully! Now Jane must leave at 8:30pm to make it to her party safe and on time.

Conclusion

The design thinking process is one that leverages the insight, feelings and consideration of actual people to uncover the root cause of problems and then craft worthy solutions to address them. The collaborative nature in which information is collected and assessed during this process, encourages innovation and evolution of ideas that stretch beyond a sole individual's perspective enabling identification of the best versus speculative needs. Group 4 evidenced these aspects as they executed empathy, ideate, experimentation and testing processes to identify a solution to people feeling overwhelmed by the variables that can affect travels.

Through this process, Group 4 has confirmed that travel is not as straightforward as initially believed during the Empathize assignment and before the initial interviews. Group 4 also determined it cannot solve all the issues that travel can pose. Concentrating and homing in on one set of issues allowed Group 4 to create a low-fidelity prototype that all three testing participants seemed to enjoy and agreed would help them better prepare for travel, specifically event-based travel.

Group 4's final design document demonstrates the design-thinking steps, human-computer interaction professionals may take, when designing new innovations. Through empathizing with real-life travelers, ideating based on travelers' experiences, and testing possible ideation solutions, Group 4 designed "Future Vision". Future Vision aims to nullify the factors that can affect people's travels and, while Future Vision's reception was generally positive, user testing showed refinements and add-ons were needed for Future Vision to be deemed as useful. Through following design-thinking methodologies, Group 4 learned why one should not design based solely on pre-conceived notions, the roles brainstorming and brain-netting have in the creative processes, and how to effectively gain qualitative information from a diverse group of users/research participants. Going forward, Group 4 could create an enhanced higher-fidelity prototype which includes features discussed but not included during the testing interviews.