Culture Bump App

P5 Report

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ABSTRACT & INTRODUCTION

Culture Bump is an approach to cross cultural communications that promotes a deeper level of connection beyond cultural differences. With that agenda in mind, Culture Bump has already created a mobile application compatible on both iOS and Android devices. While the application meets basic functional requirements, the user experience and interface design of the application is in need of an overhaul. Our project group plans to take the barebones of the current application and iteratively revamp it into the most refined version of itself. To accomplish this goal, we will need to eliminate interface redundancies, simplify navigation, and display relevant information in a concise and creative way to maximize user engagement. In order to establish consistency and portability between mobile operating systems, we may need to consider the positives and negatives of using a different development platform than was initially used to create the application. Additionally, we intend to maintain feature parity between our iterative refinement of the application and the current version.

1 Literature Reviews

Section 1: Design Matters

1.1 Simplicity in UX Design

Robert Hoekman Jr. 2018. When It Comes to UX Design, Simplicity Is Overrated. (June 2018). Retrieved October 28, 2019 from https://www.wired.com/2015/12/simplicity-is-overrated-in-ux-design/

Throughout the initial analysis phase of the project, the goal was to fully recognize the shortcomings of the currently implemented Culture Bump application. Without much deliberation, it was obvious that the key issues plaguing the application were primarily related to information presentation and interface redundancies. In order to resolve these problems, it is necessary to have a thorough understanding of interface *simplicity*. The article titled *When It Comes to UX Design, Simplicity is Overrated,* provides useful insight into the complex issue of simplicity within a system. Although many designers define simplicity in an interface as something "incredibly easy to use", simplicity is more than that. "Simplicity is "a relative word… It has no definite value, the simplicity of a thing can only be measured in comparison to something more complex." In other words, it is not a difficult task to *simplify* the currently implemented Culture Bump application if we define the word to mean easier to use. This meaning of the word is not a useful metric for evaluating the quality of future iterations of the application. Simplicity does not necessarily reflect quality. However, a redefinition of understanding simplicity to mean *clarity* may be a more valuable metric for comparing two implementations. Thus, it is highly probable that clarity and quality have a positive correlation in the realm of interface design.

In the Wired article, Robert Hoekman Jr., veteran product designer with twenty years of experience in User Experience and Amazon bestselling author, redefines simplicity as clarity and presents the idea that clarity is always a useful metric for assessing a product. "Practically every designer who's used an iPhone relies on it as the hallmark of simplicity. This is absurd." Hoekman explains that it is perplexing that the iPhone is used as a hallmark of design simplicity when the reality is that the product is incredibly complex. A system that is capable of handling phone calls, weather reports, text messages, navigation systems, and more is far from simple. If the system is so complex, why do so many designers use it as an example of a *simple*? Rather than simplicity meaning *straightforward and easy to use*, these designers are defining simplicity as clarity.

It is imperative to understand that not all systems can be simplified. Many products require a complex implementation because they are an abstraction of incredibly complex systems. With that being said, it is possible and preferred that all complex systems are implemented *clearly*. According to Hoekman, the fundamental building blocks of clarity are chunking, headings and labels, visual hierarchy, progressive disclosure, defaults, and feature limitations. Using these fundamentals as a guide, it is straightforward to break down a complex system into a clearer version of itself. Without reducing functionality, it is possible to improve quality through clarity. If a system is implemented as clear as possible then it does not matter how complex that system may actually be.

The fallbacks of the current implementation of the Culture Bump application are primarily tied to poor information presentation and interface redundancies. Both of these issues can be attributed to a lack of *clarity*. These problems can be resolved, without reducing functionality or limiting system complexity, by re-building the application in a way that supports Hoekman's fundamental building blocks of clarity. The end goal is that the users of the Culture Bump application describe the system as *simple*, or *easy to use*, but the designers understand that the product is complex but presented clearly.

1.2 Simplicity in a Smartphone Interface

Junho H. Choi and Hye-Jin Lee. 2011. Facets of simplicity for the smartphone interface: A structural model. (October 2011). Retrieved November 15, 2019 from https://www.sciencedirect.com/science/article/pii/S1071581911001261

In article [5], the proper meaning of the word simplicity in user experience design was discussed in depth. A conceptual understanding of the meaning of simplicity in terms of user experience makes it significantly easier to portray simplicity in a practical application. In the case of the Culture Bump application, simplicity must be fully realized by a cross-platform mobile application. In the article *Facets of simplicity for the smartphone interface: A structural model*, Junho Choi and Hye-Jin Lee examine the principal concepts of Human-Computer Interaction and seek to project those concepts into a foundational framework for smartphone interface design. Although much has changed in the realm of smartphones since 2011, many of the core ideas presented by the authors could still stand the test of time.

The authors reduce three complex domains of Human-Computer Interaction into a final measurement model consisting of six individual components: reduction, organization, component complexity, coordinative complexity, and visual aesthetics. The accepted hypothesis states that "user satisfaction was positively affected by simplicity perception and that the relationship between the two constructs was very strong." Therefore, it is reasonable to conclude that "a *simplified* interface design… contributes to positive satisfaction evaluations." [6]

Much like article [5], the researchers here note the "zeitgeist" of Apple's iOS software to be a clear guide for simplistic mobile user interface design. Additionally, Choi and Lee take a similar approach to the author of article [5] and begin presenting their conclusions by providing an "extensive and revamped conceptualization of simplicity." [6] Through a process consisting of literary analysis (identifying the dimensions of simplicity), scale construction (developing an appropriate measurement model), and structural modeling (satisfaction testing and result evaluation), the researchers are able to successfully derive a foundational framework for simple smartphone interface design.

There are two primary limitations to this study: the study was conducted shortly after the introduction of smartphones to the public market and it is therefore reasonable to believe that the early adopters participating in the study may have above average digital device skills, and secondly, all of the participants in the study were in South Korea and therefore the study may be limited due to a lack of cultural variation. Regardless, the study provides substantial evidence to support the acceptance of the hypothesis that "user satisfaction was positively affected by simplicity perception and that the relationship between the two constructs was very strong." Lastly, the six component measurement model (reduction, organization, component complexity, coordinative complexity, and visual aesthetics) constructed by Choi and Lee is gracefully supported by the findings of the study.

Section 2: Cultural Matters

1.3 Culture Bump: An Instructional Process for Cultural Insight

Alsudairi (Al-Sudairy) Mohammed A. T., Mohammed A.T. Alsudairi, William Buskist, William F. Buskist, and James E. Groccia. 2012. Handbook of College and University Teaching, Chapter 26: Culture Bump, Archer, Carol M., Nickson, Stacey C.

In this original paper by Dr. Carol Archer, one of the original founders of Culture Bump, she describes the process of cultural training as an epistemological pursuit,

rather than that of acquiring knowledge itself. What that seems to suggest is that by reframing the issue of cultural differences as "opportunities to learn more about ourselves and others", people can achieve a lot more success crossing cultural boundaries. Building upon her research from 1991, this essay evolves the method in which businesses and schools should train their staff for impending "Culture Bumps" that are inevitable in this rapidly multicultural world.

Take for example, this interesting finding by Dr. Archer: Her approach to tackling "Culture Bumps" is to set up "hermeneutic conversation" between members of different cultures to find shared realities. These kinds of conversations trigger a great deal of empathy in its participants, and can also lead each member to reflect upon their own culture. This is done by guiding the conversation to tackle topics in which the two cultures are similar, but also by finding common ground in places they are dissimilar.

Dr. Archer breaks down the process of getting over a Culture Bump, as a series of components that need to be addressed as follows:

Emotional Component: Instructors must be cognisant of the fact that certain Bumps will be perceived with negative, positive, or neutral. What's important is that they know that this emotional attribute can change at any given time, depending on the individual. The takeaway is that this emotional component is a function of the individual, not the cultural concept itself, and the individual's perception can be changed.

Rational Component: In another paper from 1996, Dr. Archer discusses how "feelings of disconnectedness" result from a "sense of not knowing". This should be fairly intuitive, since it is well known that people fear the unknown. A good way to get over these feelings is to focus instead on how two cultures are similar. This technique, called "Mirroring" reinforces perceptions of the other culture, by framing it in a way that is understandable in the individual's own.

In summary then, the Culture Bump Approach, is one that identifies differences between two cultures, but attempts to reframe it in such a way that respects the complexity of cultural differences and the individual.

1.4 10 Ways to Bridge Cultural Diversity

Jose Ruiz 2017. 10 Ways to Understand Cultural Diversity. (Dec 2017). Retrieved October 28, 2019 from https://alderkoten.com/10-ways-to-bridge-cultural-diversity

We interact with people from different cultures each day. This happens to such a point, we often do not think anything special of these interactions. It can be really easy to talk to an Indian international student in the same way we would an American peer going to the same school. In this article, Koten aims to challenge individuals to meet others in their culture halfway in order to better understand their background, and also overcome natural cultural barriers.

The core of his process comes down to understanding differences between cultures, the main goal of culture bump. There are so many things in America that we do that we take for granted as the correct and normal thing to do. However, other countries and cultures have their own "correct" way to do things. Understanding differences in behaviors can allow for both parties to better accommodate to each other, further respecting their differences. Taking time to understand these differences can similarly help one with self-examination, and challenge natural ideas of what is right and proper, taking what is so often considered objective fact, and revealing it as cultural subjectivity.

Above all, this whole process boils down to respecting other cultures. As such, it's easy to see why it is so important to learn how respect is culturally shown across cultures. Although just saying "yes sir" or "no ma'am" may cut it in America, if someone finds themselves in Japan, you should take it to the next step and bow to greet their peer.

Throughout this learning and exploring process, transparency is key. Being transparent leads to more conversation, and it introduces new perspectives through one-on-one interactions, which can be even more valuable than general research.

Ultimately, culture bump should aim to keep these goals in mind to better point back to the exploration of unfamiliar cultures.

1.5 Understanding Cultural Context in Responding to Literature: Researching the Teaching of Literature in EFL/ESL Classroom Context

Ali Mustofa and Jonnie Lyn Hill. 2018. Understanding Cultural Context in Responding to Literature: Researching the Teaching of Literature in EFL/ESL Classroom Context. (March 2018). Retrieved November 21, 2019 from https://files.eric.ed.gov/fulltext/EJ1179237.pdf

Reading literary works within academic settings is difficult. It requires understanding the context of the paper, which can be hard to do for a paper within one's own culture. This

is even harder when attempting to relate to and understand a work from a different culture. This introduces new vocabulary, different customs, and new concepts.

The authors point out a few key steps to fully understanding literature. First, it is above all necessary to understand what the text is saying. This means discovering new vocabulary presented in it. This text is then observed by students and further interpreted. After understanding what the text is saying, the reader should recognize personal connections to them. This involves taking what was said and applying it to personal, prior experiences. Similarly, taking the things one does not understand and expanding on them through research helps to really understand the article.

This process actually relates very similar to the aims of CultureBump. People from different cultures are encouraged to better understand unfamiliar cultures around them. CultureBump allows for users to highlight their similarities and differences, which can help to accommodate the unfamiliar circumstances and practices.

Once understanding the purpose and ideas behind text, one can engage in a conversation with the topics at hand, as they are more able to relate to it. This exists similarly to discussing and sharing ideas with people of other cultures. All it takes is making an effort to understand and accept differences from each other.

1.6 The Role of Culture Bump in Developing Intercultural Communication Competency and Internationalizing Psychology Education

Carol M. Archer and Stacey C. Nickson. 2012. The Role of Culture Bump in Developing Intercultural Communication Competency and Internationalizing Psychology Education. Psychology Learning & Teaching 11, 3 (2012), 335–343. DOI:http://dx.doi.org/10.2304/plat.2012.11.3.335

For this paper, Archer and Nickson took a look at some reasonable applications of the Culture Bump Approach as described in a previous section. The researchers examined two separate groups of international students and American students, as well as a group of factory workers to find the effectiveness of the micro-cultural approach outlined by Archer in 1991. In 2004 Archer developed the Toolkit for Culture and Communication for the University of Houston, as a course to teach the Culture Bump Approach.

In each study, Archer guided the group in completing the basic training in the Toolkit for Culture and Communication. If there were any language barriers between the two groups, supplemental language support was also added to the curriculum.

In the first group, as part of a Sociolinguistics Course Project, a diverse group of international and American-born students completed and executed the Toolkit. In mixed teams, they identified and analyzed bumps within their group, and then presented them in front of the entire class.

The second group involved Archer visiting a synthetic rubber plant that needed help developing a training program for gender and professional differences. The group was given the Toolkit course by Archer, with follow ups after the course completed.

Group three was comprised of international and native-born elementary school students at a fifth-grade level. Archer adapted the same Toolkit course, and trained the students using much of the same methods as adults. This study was concluded by analyzing essays the students wrote after completing the training.

After analyzing the results from these studies, the researchers concluded that each group overall grew positively toward better cultural understandings. Their cultural understanding after the training, as measured by the Bennett Developmental Model of Intercultural Sensitivity, improved beyond statistical projections. An overall majority (31 of 41) reported that they "developed a more positive attitude about cultural differences".

1.7 Conclusion of Findings

A few key findings from the papers summarized in this section:

- Conversations are important, they foster curiosity about different cultures
- It is important to understand the explicit differences between cultures
- Don't try to make an exceedingly complex system simple
- Simplicity should mean *easy to use* to the user and *clarity* to the developer.
- Simplicity can be obtained by applying the principal concepts of Human-Computer Interaction for a smartphone or other similar mobile device
- Finally, the Culture Bump Approach has been shown to work, making the work on this project meaningful to a broad audience

2 Implementation

One of the most important considerations when deciding how to implement the app was how easy the codebase would be to manage across multiple platforms. There are several softwares and development tools required to continue development and maintenance of the Culture Bump application. The application will be built using Ionic Framework V4 and Angular 8, since it excels at cross-platform support. A single code-base can run on Android, iOS, and a web browser. The only programming language used to develop the application is Typescript (which will be *transpiled* at build-time into Javascript for compatibility), with HTML and SCSS for layout and styles respectively. A code editor is recommended when working on the application and the recommended editors are Ionic Studio and Visual Studio Code. Node.js, a Javascript runtime environment (handled by the browser), and NPM, a Javascript package manager, should be installed on the developer's system. Lastly, it is recommended to use Git for version control.

3 Specifications & Requirements

3.1 Project Schedule

The project schedule has been laid out in advance to facilitate timely progression. The conceptual model, or high-level representation of the end-goal system, was completed October 18, 2019. Following the model, the details and additional project related research are combined into a single preliminary paper that is to be submitted on October 29, 2019. Next, the team will evaluate the usability of the prototypes through extensive testing. This usability testing phase is to be completed by November 2, 2019. The results of the evaluation, additional research, and implemented improvements from October 29 to date will be included in a final paper that will be submitted on December 1, 2019. Lastly, the product will be completed and presented to all fellow classmates by December 2, 2019.

10/26 Preliminary paper
11/2 Usability Testing/Evaluation
12/1 Final paper
12/2 Final Presentation

3.2 HW/SW Requirements

3.2.1 Application Requirements
The hardware and software requirements for using and developing the Culture Bump application are the officially supported and tested device specifications for any application built using Ionic. Additionally, because Ionic is based on web technologies, it works just as well on desktop browsers as it does on mobile devices. In order to use the application on a desktop computer, it is recommended that the user is on a machine running Windows 7 (or later) or MacOS Yosemite 10.10 (or later). Supported desktop browsers include Firefox, Chrome, Microsoft Edge, and Safari. If the user wishes to run the application on a mobile device, it is recommended that the user is running a device with Android 4.4 (or later) or iOS 10 (or later) installed. Supported mobile browsers include Firefox, Chrome, Microsoft Edge, and Safari.

3.2.1.1 Specific Application Requirements:
Windows PC (7+)
Firefox, Chrome, and Microsoft Edge
macOS (Yosemite 10.10+)
Firefox, Chrome, and Safari
Android Mobile Device (4.4+)
Chrome, Firefox, and Microsoft Edge
iOS Mobile Device (10+)
Chrome, Firefox, and Safari

3.2.3 Software / Development Tools:
Ionic Framework 4.x (Angular Framework)
Programming Languages
TypeScript (Javascript)
Environment Setup
Code editor: Ionic Studio or Visual Studio Code
Node.js, NPM, and Git (recommended)

3.3 Lexicon

3.3.1 Culture bump
/ˈkəlCHər/ /bəmp/ (noun) - a situation in intercultural communication that one or more people have experienced as confusing, strange, irritating, embarrassing, or amusing. Think of it like a cultural speed bump.
Ex: A student in the United States may consider it acceptable to eat food during class, but a student in Algeria would find it unacceptable to behave in this manner.

3.3.2 Home country
/hōm/ /ˈkəntrē/ (noun) - the country in which a person was born and usually raised, regardless of the present country of residence and citizenship
Ex: In the Culture Bump application, I set my home country to the United States because I was born and raised there.

3.3.3 Multi-Compare

/ˈməltē/ /kəmˈper/ (verb) - estimate, measure, or note the similarity or dissimilarity between more than two different things
Ex: In the Culture Bump application, one can use a multi-compare functionality to analyze the culture bumps between more than two countries

3.4 Interaction Type

The primary interaction type utilized by the system is instructing. The only currently implemented interaction between the user and the application is the user issuing instructions to the application. These commands are issued via text entry, mouse clicks, or gestures. Some commands include clicking to navigate to a certain page of the application, entering a country name into the search bar, or swiping to upwards to view the complete list of culture bumps between countries.

3.5 Interface Metaphor

The key idea behind the re-designed Culture Bump application is based on an interface metaphor. The application in its current form presents information in a bland and overwhelming format. The group plans to utilize a text message conversation metaphor to present all the information pertaining to the selected countries. Multi-compare will be displayed like a group message. The countries will have profile pictures associated with each sent message sequence to help identify which country is associated with each message. Additionally, metaphors such as a magnifying glass for the search bar, check-boxes for country selection, and arrows for clear navigation may be used.

3.6 Software Process

RAD/Agile - Extreme Programming (XP)
The group is using XP for a software development process. XP is a software engineering methodology which is intended to improve software quality and responsiveness to changing customer requirements. XP is the ideal process for a project of this scope because the majority of development will be done in a collaborative group of three. Most planning time is done as individuals, and the majority of meeting time is spent in development. Additionally, XP is fitting for small group sizes and rapid-paced development. Lastly, XP allows responsiveness to changing customer requirements and gives the opportunity to reflect on and respond to feedback from both the customer and the instructor. Since the project scope is relatively small, the scalability issues of XP will not have a negative impact on the production process. The expectation is that XP will allow for slight alterations of the product design throughout the development process.

3.7 Wireframe

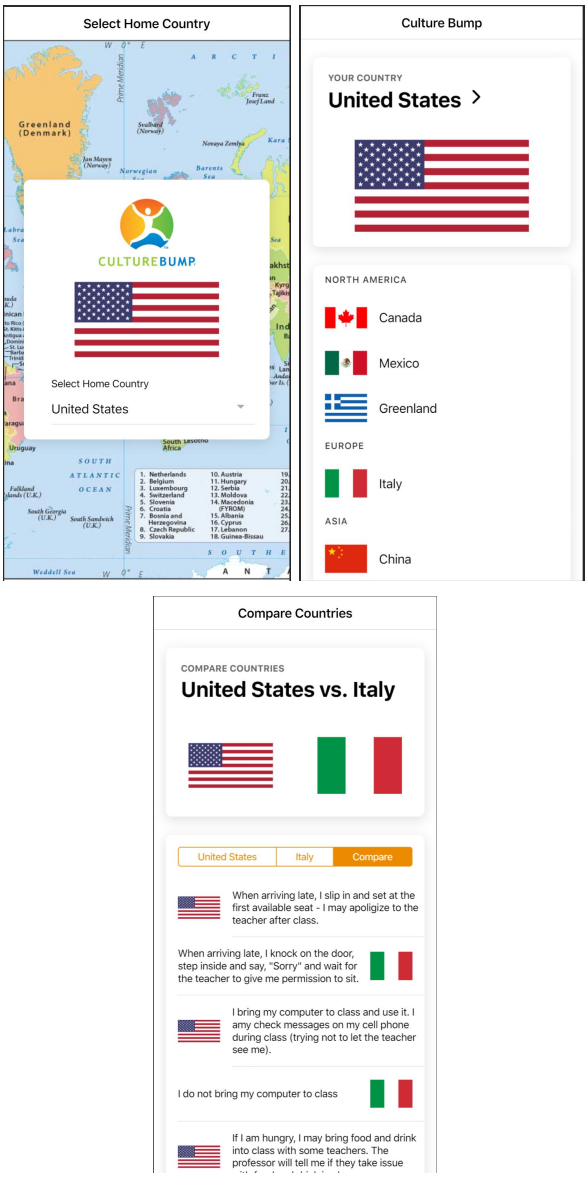

Figure 1: **3 screenshots showing initial wireframe fully prototyped.**

3.7 Use Case Diagram

Within the application, there are two different actors. The user is the average person who downloads the application to better understand different cultures. This user can set their home country, select countries to identify, and view

their culture bumps (which also allows for comparing multiple countries, as well as filtering bumps).

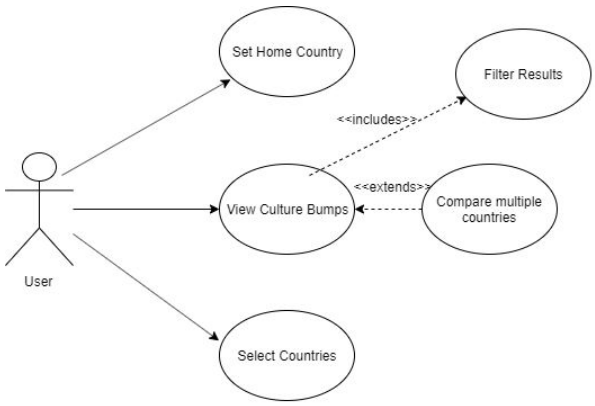

Figure 2: **The use case diagram highlighting functionality within Culture Bump**

3.8 Design Decisions

There were a few considerations to be made when designing the user interface for the app. From the literature review came the importance of not pandering to the audience and the metaphor of having a conversation.

When the user first launches the app, they are presented with a screen to choose which country they would like to set as the home country. The map view was eliminated from our design because it was determined that the map did not actually make it easier for the user to locate specific countries compared to the dropdown list.

Next the user can choose which country they are trying to compare to. This is a simple list, categorized by continent for easy identification.

Finally, the Compare screen is where a user will be spending the most time. The design borrows from the "conversation" metaphor, by framing Culture Bumps as a friendly conversation between students of two different cultures. As discussed, this is part of the "Culture Bump Method", and can lead users to empathize with the new culture they are trying to fit into.

3.9 New System Requirements

1. System should allow user to change home country
2. System should allow user to compare home country to one or more country/countries
3. System should allow user to view similarities and differences between the selected countries
4. System should allow user to view Culture Bumps for only one country
5. System should allow user to run app on an Android and iOS device and web browser
6. System should allow user to filter between different topics when doing a comparison of more than two countries
7. System should allow the user to view all non-redundant information presented in the live version of the Culture Bump application but with more *clarity*

4 Evaluation & Results

4.1 Evaluation Approach

Before evaluating the *goodness* of a product, it is necessary to first determine the *why* and *where* of the application's usage. Therefore, the evaluation of the product will be lead with empathy mapping, user personification, and surveying. After properly determining the environment and user's of the application, it is possible to value the appropriateness of the system redesign by how well it suits the criteria. Additionally, the system must possess all of the functionalities present in the initial Culture Bump application, but these functionalities must be implemented in a clearer manner. User satisfaction and usability analysis is likely to be carried out utilizing the think-aloud method that is paired with a set of pre-testing and post-testing questions. More details on usability analysis will be included in the following submission that is to be completed by November 2, 2019.

4.2 Preliminary Evaluation Plan

The results of the usability and satisfaction evaluations will be used to iterate on the design of the system. Both the pre-testing and post-testing questionnaire answers are valuable information that will be used to refine requirements and streamline functionality. If used, the think-aloud protocol will pinpoint specific and detail-oriented issues within the application. Ideally, the problems identified in a think-aloud session are surface level.

4.3 Final Evaluation Plan

4.3.1 Method of Evaluation

The team intends to utilize the *think-aloud* method to pinpoint specific and detail-oriented issues within the application. Selected participants will carry out a focused task list that covers all aspects of the application under the supervision of one or more project creators. Participants will be encouraged to vocalize his or her experience with the system while carrying out the tasks one-by-one. Ideally, the problems identified in think-aloud sessions are surface level.

In order to satisfy usability inquiries, questionnaires and surveys will be used. A survey will be distributed to

prospective usability testing candidates in order to select users matching specific criteria. A questionnaire will be provided after users perform a task list in order to gauge customer satisfaction.

4.3.2 Pre-Testing Demographic Questions and Post-Testing User Satisfaction Questionnaire

Candidate responses to the pre-testing questionnaire should be measured to determine whether or not a prospective candidate is a suitable match for usability testing. One can conclude the ideal criteria from a set of predefined questions, but typically a fitting candidate is a current student between the ages of sixteen to twenty four, interested in learning more about cultural differences, has used informative mobile applications, and has first-hand experience traveling outside of his or her home country.

Candidates will then be asked to fill out a post-testing questionnaire after completion of a think-aloud session, and utilizing a user satisfaction scale system [0, 9] consisting of the following questions, the user is able to fully record and reflect on their experience using the Culture Bump Application. All questions provide space to explain overwhelmingly positive or negative responses in the user's own words. Additional open-ended questions are appended to the end of the survey and are an optional way for users to share his or her opinion in greater detail.

These questionnaires and task list can be found in the Appendix

4.3.3 Analysis of Evaluation

The immediate focus of the team's analysis evaluation will be conducting a comparative study between the currently deployed Culture Bump application and the new, iteratively refined version of the application. The refined version is to be completed prior to any user testing. Following the completion of the comparative study, user testing will be conducted and the results will be evaluated based on both qualitative and quantitative measures. These measures include responses from both the pre-testing and post-testing questionnaires as well as the results obtained from think-aloud sessions. Some of the methods that will be utilized for evaluation of the quantitative measurements include statistical ANOVA and Heuristic Evaluation. For the qualitative measures, Heuristic Evaluation will be the primary method of data analysis. Usability tester criteria was determined based off of a number of factors derived from a short-run user study. The results from this data collection will be used for further refining of the final product as well as for future iterations and improvements.

4.3.4 Evaluation Results

The think-aloud sessions provided valuable first-hand information on the user's experience with the application, and the pre-testing and post-testing questionnaires allowed users to express their experience in their own words. After reviewing the responses received from the pre-testing demographic questions, three quarters of the selected users matched the ideal candidate specifications. The initial candidate pool consisted of six users, but only four users were chosen to continue to the task-list execution stage of the usability testing process.

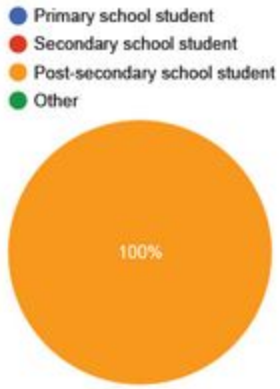

Figure 3: **Demographics Survey Response Data**

These four users carried out the task-list in individual think-aloud sessions along with a user experience designer and valuable feedback was obtained regarding text styling, button placement and identification, and confusing navigation. Additionally, some minor visual bugs were detected during this phase of evaluation.

After the users performed the task-list to completion, each answered the questions in the post-testing survey. As stated earlier, this questionnaire consisted of multiple questions utilizing a user satisfaction scale system [0, 9]. These questions provided useful feedback on the overall intuitiveness (avg. 6), readability and accessibility (avg. 7), design appeal (avg. 7), and usefulness (avg. 4). In addition to the satisfaction scale data, users utilized the open-ended response section to highlight key complaints such as hard to distinguish buttons and non-intuitive interaction. Lastly, the users identified the positive aspects of the application as the overall aesthetics and the usage of country flags.

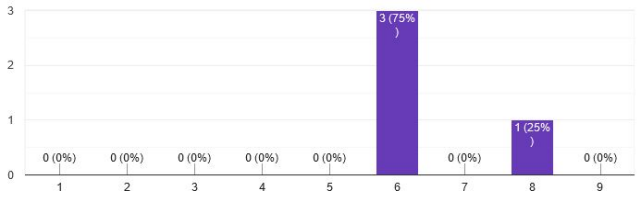

Figure 4: **User Satisfaction Response Data (Intuitiveness)**

This feedback helped inform a round of iterative updates to the user interface of the app, addressing the complaints the participants had. For example, details were added to the home page to address some non-intuitive touch targets. As well as adding some additional labels to the various sections. Some feedback could not be addressed, as it dealt with the data source of the app. Specifically, feedback relating to unreadable characters in the Culture Bumps, can not be fixed since this team does not possess the ability to translate the original works.

5 Discussion & Conclusions

5.1 Lessons Learned

Creating Complex Interfaces: Adding complex internal interfaces to the Ionic app proved difficult at first. For example, the proper method to implement persistent internal data states in the app is not obvious. Angular requires a service to be setup and storage permissions to store persistent data. The data can then be accessed by all the relevant pages.

Cultural Differences: Since this app will be used by an international audience, it is important to get the feedback of more than just American students. This can be problematic in certain situations where you do not have access to such students. What this team found useful was efficiently utilizing the time the team was in-class to conduct research. This was the most convenient as it had the greatest potential for diverse users.

5.2 Client Interactions

Client interactions were limited to our sponsor, Dr. Seals, and some interaction with those that previously worked on the app. What this team learned from Dr. Seals is the importance of the application, and some higher-level information about the implementation of the original app. The team also got to talk to someone who previously worked on the Android version of the app, and learned relevant information about the implementation and architecture. This second interaction proved very useful, as it helped guide the internal design of the application logic of this project.

5.3 Future Work

This team anticipates future work can be done on the back-end of this app. Currently, the app pulls from an online database for data. An interface could be written to allow editing this data, as currently it is hard-coded by the previous development team.

Another area that could be improved involves translations. The app is designed for an international audience, thus users may expect that the app can be displayed in their native language. This team did not have the resources to translate the current app to different languages.

Some more branding work could also be done with the interface, as it is very generic in the current state. Visually, the UI borrows a lot from system UI elements, which makes the app more intuitive, but lacks uniqueness. Some more work could also be done on the web interface, as it does not visually scale in a way that normal web users are accustomed to.

5.4 Final Conclusions

Overall, the conclusions of this team is that the final app is a successful redesign of the original Culture Bump mobile app. This app improved upon some shortcomings with the architecture of the original app, while maintaining the original's core featureset. This redesign was also successful in creating consistency between the iOS and Android versions of the mobile app, as well as expanding the experience to the web. The choice to move to Ionic as the development platform was key to this success. Now more people across the globe will have access to this vital resource when travelling outside their home country.

APPENDIX

[1] Ali Mustofa and Jonnie Lyn Hill. 2018. Understanding Cultural Context in Responding to Literature: Researching the Teaching of Literature in EFL/ESL Classroom Context. (March 2018). Retrieved November 21, 2019 from https://files.eric.ed.gov/fulltext/EJ1179237.pdf

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Pre-Testing Questionnaire

1. How old are you?
2. Have you ever used any digital media tools (website or mobile application) to view or analyze cultural differences between countries?
    a. If you answered yes to the previous question, please specify which tool(s).
    b. If you answered no to the previous question, do you have any interest in using a digital media tool for the purpose of viewing or analyzing cultural differences in the future?
3. How often do you use an informative mobile or web application with the purpose of learning something new?
4. Are you currently a student (full-time or part-time)?
    a. If you answered yes, choose which option best applies to you
        i. Primary school student
        ii. Secondary school student
        iii. Post-secondary school student
        iv. Other
    b. If you answered no to the above, what is the highest level of education you have completed?
5. What country do you consider to be your home or maiden country?
6. Have you traveled outside your home country before?
    a. If you answered yes to the previous question, which countries have you traveled to?
7. Have you ever relocated for school?
    a. If you answered yes to the previous question, did you relocate inside your home country or to another country?
8. Have you ever felt "out-of-place" in a social situation due to a cultural misunderstanding?
9. Have you ever taken part in an international-exchange program?
    a. If you answered yes to the previous question, to which country or countries have you attended school outside of your home country?
10. Do you travel for leisure?
    a. If you answered yes to the previous question, how often do you travel outside of your home country?
11. When introduced to someone of a new culture, do you find it hard to find commonalities between your two cultures?

Task List

1. Pick a home country
    a. This is done via the splashscreen when the user first launches the app for the very first time, or by selecting the current home country on the homepage of the app. Countries are displayed in a list, grouped by continents
    b. Question: How many countries can be selected from North America?
2. Pick any country you are trying to compare with.
    a. This can be done by selecting a country from the list on the homepage
    b. Question: What is the country at the bottom of the list?
3. (optionally) pick a third (or more) country(ies)
    a. This can be done by tapping a button to start the multiple selection process, followed by selecting the countries you would like to compare, followed by tapping the "compare" FAB button.
    b. Question: What is the maximum number of countries you can compare at a time?
4. Read and understand the significant Culture Bumps between the selected country and your home country
    a. This will be done cognitively by the user
    b. Share one interesting Culture Bump you learned between The United States and Italy.
5. Pick a category or country to filter Culture Bumps by
    a. This can be done by using the tabs and dropdowns near the top of the Compare page
    b. What are the differences between how students in the US and Italy handle being late to class?
6. Change home country

a. This can be done by selecting the currently set home country from the homepage, and then selecting the new home country.
b. Question: Name two Asian countries that you can select as a Home country.

Post-Testing Questionnaire
(Ranges marked with [x, y] are between [0, 9])

- In general, how intuitive did you find the Culture Bump application?
  - [extremely difficult to use, extremely easy to use]
- How useful would you rate the information listed under the "Culture Bump" category when comparing two or more countries?
  - [not useful at all, extremely useful]
- How would you rate the application's overall readability and accessibility?
  - [not at all readable or accessible, extremely readable and accessible]
- Follow-up: If you have specific accessibility needs that were not met by the application, please provide some details.
- How pleasing did you find the overall design of the application (consider color choices, fonts, layout, shapes, etc)?
  - [extremely displeasing, extremely pleasing]
- How likely would you be to use this as an informative or guiding tool in your daily life?
  - [extremely unlikely, extremely likely]
- How likely would you be to recommend this application to a friend?
  - [extremely unlikely, extremely likely]
- How would you rate the overall experience of comparing two countries?
  - [extremely disappointing, exceeds expectations]
- How would you rate the overall experience of comparing three or more countries?
  - [extremely disappointing, exceeds expectations]
- What feature did you find the least/most useful within the application?
- What visual aspect of the application did you find the least/most pleasing?
- Do you have any additional comments, questions, or concerns about the application?
- Do you have any additional comments, questions, or concerns about the Culture Bump usability testing process?