SMYK: Meeting cultures through food

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ABSTRACT
Many international students of KU Leuven attend events organized by local and international organizations which purpose is to involve international students into the local community. However, those events have not the success to establish the channel between international and local students, even when international and local students want to share their experiences. Show Me Your Kitchen (SMYK) is presented as a tool to facilitate such exchange of culture trough dinner experiences. This paper is focus in the design and evaluation phases of the User-Centered Design process. I present the main decisions taken according with experts' approaches and the artefacts and procedures followed during the evaluation phase. I conclude by discussing about the advantage or disadvantages found during this process.

Author Keywords
Cultures; Global Awareness; Application Design; Application Evaluation: Food; Students.

ACM Classification Keywords

INTRODUCTION
Nowadays, technology has a big impact in the way people interact with each other, we are living in an interconnected world where physical and cultural borders are disappearing. This creates new opportunities to spread knowledge about and interactions between different cultures. [19]
Global awareness is the understanding of global and cultural aspects of different societies. Such understanding of concepts that impact the world includes also environmental, social, cultural, political, and economic relations among the countries. Diversity, defined as the recognition of differences and commonalities among people from which they can begin to understand each other, include, is also other important aspects of global awareness that are includes the ethnicity, religion, age, gender, culture, cognitive ability, life experiences, family situations, and sexual orientation. [9]
Such understanding of other cultures helps to take better decisions to improve the common good of not only one social group but also all societies that are involved directly or indirectly in the effects of that decision. Those decisions can be made in institutions, government organizations and businesses. Indeed, some studies [2, 5, 11, 14] underline the importance of the global awareness as an important professional skill in business. This is why it is crucial to develop global awareness as well as strengthen the understanding and management of cultural differences while studying in order to prepare students for the increasingly globalized labor market. Besides the added-value students acquire in relation to their employability, they also develop important social skills for everyday life. Students that are aware of the benefits, challenges and consequences of the globalization process find it easier to form objective opinions about social, economic and political developments. This is highly important in order to ensure a peaceful co-existence.
Through Show Me Your Kitchen (SMYK) prototype app, which encourages the "soft" exchange of cultural experiences, we contribute to the development of global awareness in the student community in Leuven. I mainly focus on the design and evaluation phase of user centered design process and briefly I explain the analysis phase and the rationale behind the adopted procedure. This document consists in (1) showing the analysis which leads us to implement the app prototype, (2) providing the design decision for the prototype, (3) explaining the testing process and (4) reporting the results and conclusion.

RELATED WORK
During the creation of SMYK, we took into account three different aspect (1) the students' context and habits, (2) structuring navigation (easy navigation) of the app and (3) making decision. We conclude this section with the (4) presentation of SMYK. Aspect (1) was related with the analysis phases (rationale behind the creation of SMYK) while aspects (2), (3) and (4) are related with the design phase.

Students' context and habits

Maureen S. Andrade [17] discusses the main challenges international students face and links these to difficulties related to the English language and cultural aspects. In general, international students have problems to form new friendships with local students, which contributes to the exclusion of international students and the difficulty of getting involved in the local community. [16] This statement can also imply that local students are not inclusive in the intercultural atmosphere that is taking place in the local community.

In order to get an insight into the students' habits and their social context in Leuven, we decided to conduct a field study in Leuven and explored preferences international and local student might have in common, we decided to conduct a field study in Leuven.

At KU Leuven, there are organizations, like LOKO and PANGEA, that are aware of their potential to build bridges: they support international students and organize different types of events to create a channel of communication that facilities interaction between local and international students. The interviews made with members of both the LOKO and PANGEA organization indicate that the events set up and announced as international events are popular, but the majority are international students. In addition, the relatively small percentage of local students that assist at these events are students who attend these events frequently, there are hardly any local newcomers.

Furthermore, according to interviews made with international students, the barriers that they perceive in the intercultural communication are anxiety, language and possible incorrect judgement of other groups based on their own culture, also known as ethnocentrism. [7] First of all, the language barrier is not necessarily due to the lack of knowledge of another language, for instance English, it is not only about vocabulary and idiomatic equivalence but also experiential and conceptual equivalence. Words have different meanings and nuances and this may create misunderstanding, even between native speakers. Hence sharing a common language does not always guarantee a successful intercultural interaction. [6, 23] This "imperfect" command of the language could lead to an anxious behavior; one can feel awkward when he or she expresses his or her feelings. This creates an unconscious barrier while interacting with local people. Consequently, international students may try to avoid as much as they can the use of the foreign language.

Besides, another problem that these students face may be related to the first of three stages of ethnocentrism that Bennett defined and Yner Keles mentioned in his research. [23] This first stage consists in denial: a person confronted with a cultural difference avoids or denies the existence of any difference and this can happen through isolation or separation. The main reason may be explained by the short period of time they stay in the new place. As a result, their main purpose is not to know new traditions and beliefs but to travel and explore the region around Leuven. Moreover, results of the interviews made with local students indicate that they are not interested in making new friends: most local students answered that they prefer to hang out with their friends rather than meet new people (i.e., not new only international people but new people in general). However, they are interested in new cultures and willing to experience events where the situation is mainly focused on the cultural exchange instead of building new friendships.

We concluded that, although there are many topics that international and local students are interested in, food is the most popular topic that emerged from the interviews, indeed it is also one of the most important factors which attracts more students. SMYK was inspired by this conclusion: it is an app prototype, which allows people to share dishes from their home countries and to involve both international and local students. Thus opens the opportunity to create an atmosphere where international students are free of anxiety and local people are attracted by the exchange culture through food.

Structuring navigation

Modelling is a powerful tool to construct the basis of every system create an overview of the process that each component of the application must follow. [4]

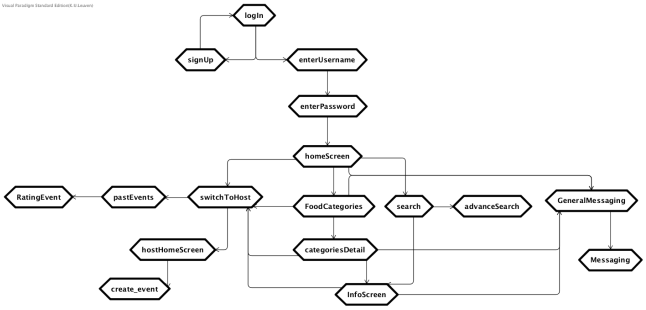

Figure 1. Structural diagram showing the flow of the main use case mane by the user.

Moreover, Franca et al. [8] describe a specific modelling process using the Hypertext Application Design approach. This process presents the structure of the app and how the different interfaces are connected. Our team used this approach in order to improve the understanding of the different steps and their interconnection. We started modelling the common user cases: create account, search a dish, send a message, rate event and create an event. This allowed us to create a structured overview, a flow diagram which contains 16 nodes, that were used in an earlier stage of the design to create an easy navigation, we concluded that the most important interfaces were "singup", "homescreen", "infoScreen", "create_event", "ratingEvent" and "GeneralMessaging". This decision was based on the amount of meaningful content to display in the interfaces, for instances, "infoScreen" had to contain the detail information about the event, such information included a picture of the dish, profile of the host, description of the

dish, place and time. Figure 1 shows this diagram flow with the main interfaces of SMKY.

Making decisions related to the design

User experience design allows describing the different interactions that the application offers to the user [1] and improving its usability, the easiness to navigate and finally providing content that is meaningful to the user.

Achieving a useful and consistent app requires following patterns and techniques that are already known by the user, such as navigation, scrolling techniques, persistent search, etc. [10] We started the design of SMKY making a research about best practices in order to generate consistency, authenticity and good performance in our application according with the user experience [10, 20, 22].

Continuous immersion and content base-navigation, which are techniques to categorized the content to be displayed on the interface according with the user perspective, were the basis to create the "home screen" interface of SMYK, such interface might contain a picture of the dish, the profile (name, rating and location), dish description and event description (number of guests, budget, time and date). The objective was to give the user the experience of navigating through the application with easy transitions going back and forward, following the user's intuition and without saturating the app with useless buttons. Moreover, the design principals, such as *direct manipulation* and *metaphors* used in iOS devices [10], take into account that the gestures are an essential tool to keep an easy flow in the navigation. We took advantage of the swipe and scroll down gestures of the mobile devices and we avoided button to navigate back and forward when the transition is made in a deeper or superficial path of the structure.

In addition, we used the concept of infinitely scrolling [22] when the content is too big to fit on one page in a clean and smooth way.

Providing quick access to important information without overloading the app with written content seemed essential to our team. The use of the toolbar for common actions and windows like messaging and home screen shortcuts are widely used in mobile applications [10, 20, 22]. This persistent toolbar not only helps the user to become familiar with the application design but also clears away some excessive disordered content by focusing on the important actions that are relevant to the user. Furthermore, it is expected that the amount of guests (users interested in finding dishes to eat) will be greater than the hosts (users interested in sharing the dish). This is why we decided that the main flows of the application should be oriented to guests instead of hosts. The use of modal overlays [10] allows the user to focus on the main actions with accurate information for him/her, hiding the secondary sections of the app, like the host tools, user profile, settings, etc.

Presentation of SMYK design

Figure 2 shows the gateway of SMYK, because we tried to focus content base-navigation, the application is based on images to encourage the user to explore it. Both Figure 2 and 7 simulate the interaction when the user scrolls down or up. Figure 3 shows a deeper screen in our application, categories design. Both figures 2 and 3 maintain the tool access with the shortcut to the main screen and the messages section.

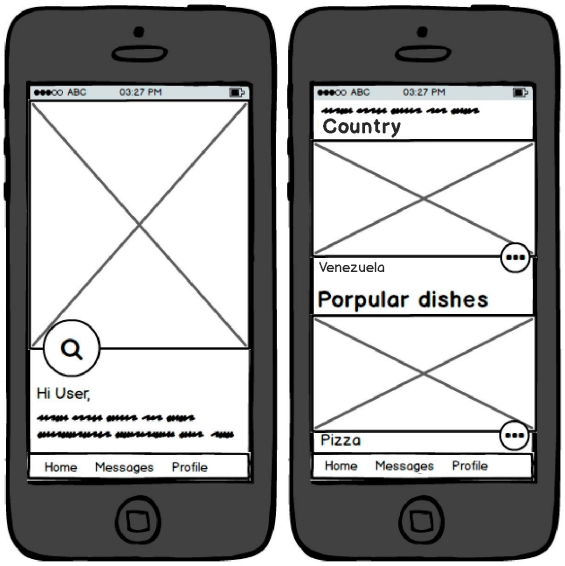

Figure 2. Main screen of SMKY, image content based-navigation.

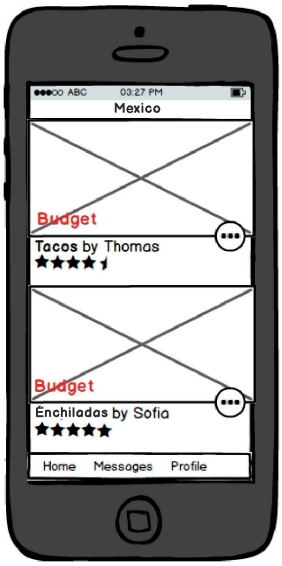

Figure 3. Mockup shows the category section of SMYK.

Figure 4 shows the modal overlay to show secondary information about the application, like settings and past events. Also provide the button to the host mode, which change the app environment from guest to host user.

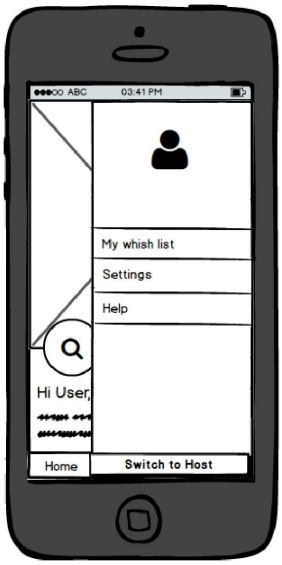

Figure 4. Mockup shows the secondary tools of SMYK.

Search and filter help the user to find what he/she intents to get from the application in a quick and soft fashion. SMYK pretends to handle large amount of events which can lead into a large set of information to the user which it is important to have a quick access to the search engine. Additionally, remaining previous search and autocompleting rise the usability and performance perceived by the user [10, 22].

Figure 5. Mockup shows the search engine tool of SMYK.

Figure 5 shows the implementation of the search engine, in this case this engine is able to search through the application by food, category and event near by the user.

Placing "confident" in the application is one of the important aspects to be considered in the design phase of the application. Users must trust the application whenever they decide to be a host or a guest. Joe Gebbia [12] refers to this non-functional requirement as one important factor to success in the design of the app. Moreover, he mentions how with a good structure rating and comment section the host gets credibility and the guests increase the confident not only in the host but in the application itself.

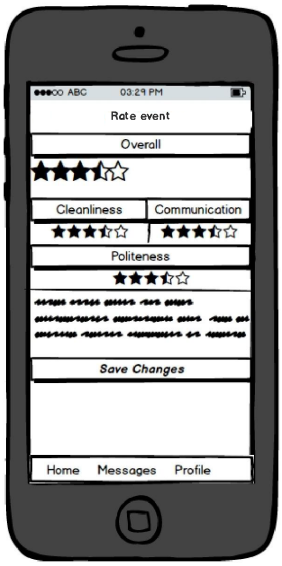

Figure 6. Mockup shows the rating process.

Figures 6 shows the process to rate the host. Figures 3 and 7 show how SWYK displays the rates of the user.

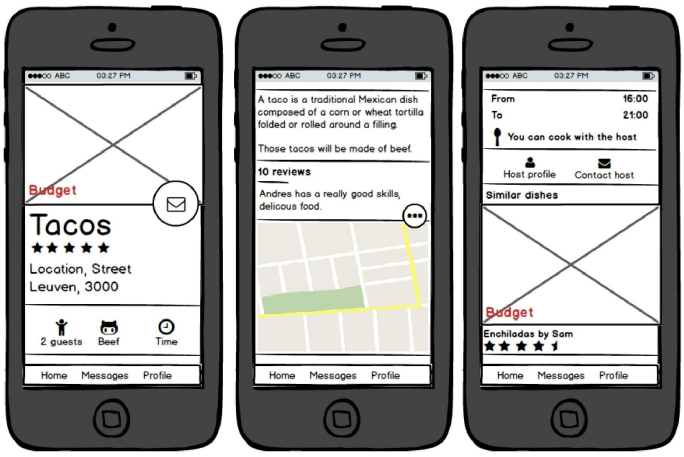

Figure 7. Mockups show the event details

EVALUATION

In this section I introduce the methodology implemented in the evaluation phase of the User-Centered Design. First I present the (1) participants, the (2) materials used in the evaluation and the (3) procedure.

Participants

We used two profiles of participants to conduct the evaluation phase, we referred to them as experts and users.
Experts were local individuals who were working parallel in an app prototype to tackle a global issue, similar to SMYK. They had a strong background about the purpose of the application and some of the main features of SMYK in early phases of the prototype. Additionally, the experts had strong knowledge about the technical aspect of the software development, in generally speaking. The experts were computer science student and were 20 to 25 years old.
Users were both international and local individuals who were university students. We interviewed users with different backgrounds and the ages were between 18 and 26 years. This type of users had no previous background about the application until the interview itself.
Both experts and users were students of KU Leuven university and owns an Android or iOS smartphone.

Materials

To create the structural diagram, we used the Visual Paradigm tool with a student license given by KU Leuven. This diagram was print out to make it easily accessible.
To create the prototype, we used the trail version of Balsamiq tool.
Balsamiq was also used as an interactive tool in the actual interviews with both experts and users, we used the built-in buttons and *link* tool to create the transition between the current interface and deeper child (next reachable interface) according with the structural diagram.
Nevertheless, Balsamiq has some limitation to emulate the gestures behavior which is why, in order to simulate the behavior of the gestures, we created a transparent canvas tool that liked with the proper mockup, our aim was just had a consistent transition within the evaluation process in the Balsamiq tool, making a more realistic performance.

We considered two possible scenarios in which the user might use the gesture:
If the user tried to use a swipe right gesture, the application ought to return one mockup, we simulated that behavior allocating the canvas on the top-left corner of the mockup when such gesture was valid.
If the user tried to swipe down or swipe up, the application ought to scroll down or scroll up the mockup, we simulated that behavior allocating a canvas on the bottom-right corner of the mockup when such gesture was valid.

Figure 8 shows how the user reach the "GeneralMessage" interface from the "homeScreen" using the built-in balsamiq button.
Figure 9 shows the position where is the canvas that simulate the behavior of the swipe right gesture.
Figure 10 shows the position where is the canvas that simulate the swipe right gesture.

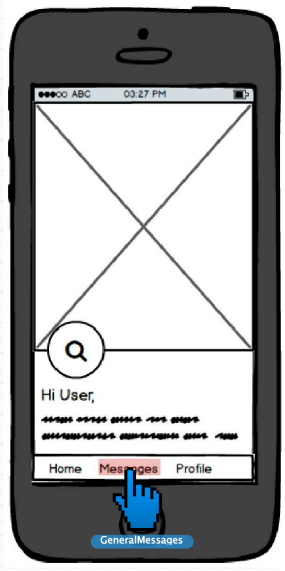

Figure 8. Mockup shows the interaction of the built-in Balsamiq button.

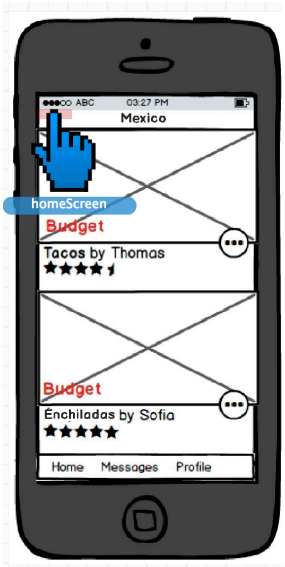

Figure 9. Mockup shows how the swipe right gesture is simulated.

The protocol used to get qualitied feedbacks in the interviews were Thinking Aloud protocol. [21] We set four main task that the user should complete in the following order:

1. Sign up to the application
2. Get information about an event where the dish is Tacos
3. Create an event as a host
4. Rate a past event

We mainly focused in the comments and tasks themselves rather than in the time that the user spent to complete them.

We were expecting than the user thoroughly explored the application without any feeling of stress or time pressure.

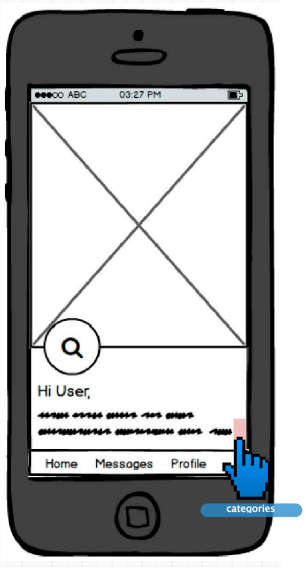

Figure 10. Mockup shows how the swipe down gesture is simulated.

To compare if the prototype has implemented the important features for the user when they actually use the application, we set up a questionnaire using the Kano Model [18], which provided a framework to classify the users' satisfaction and preferences in the prototype. Such questionnaire had 93 questions clustered in 7 sections:

- Log in and Sing up process
- Search engine
- Dish classifications (by countries and by popular dishes)
- Event details
- Event creation process
- Event rating process
- Host mode

Procedure

User-Centered Design process indicates that every step of the process must be iterate a certain numbers of time in order to receive the correct feedback of the user and improve the app step by step while we increase the functional and non-functional requirements of the app. [13, 15]

In this phase we mainly focus in the design and evaluation phases of the process. We set up 3 iterations for the design process and 3 iterations for the validation phase. The procedure we followed was:

1. Create initial interfaces (design phase)
2. First interviews with the users (evaluation phase)
3. Improve interfaces according with users' feedback (design phase)
4. Second interviews with the users (evaluation phase)
5. Second interfaces improvements according with users' feedback (design phase)
6. Third interviews with the users (evaluation phase)

The first interaction was made with 3 experts. The evaluation was made with the 3 experts at the same time. Fist we procedure to explain the structural diagram and the transition flow of the application while we showed the actual interface in the Balsamiq tool. We went through the interactive tool that Balsamiq provided while experts compared it with the structural diagram.

Each of the experts was able to make comments at any moment. Whether some feature was not clear for one of the expert or sufficiently explained, we always went back and clarify the found gap. We mainly focused this first interaction on the accessibility through the interfaces as well as the consistency of them.

For second iteration, we interviewed 4 users and they were interviewed individually. We proceeded with the following protocol:

1. Briefly explain the purpose of the interview and his/her data protections.
2. Briefly explain the issue found.
3. Briefly explain the how SMKY tackle the issue.
4. Explain the task to be done.
5. Give the task that the user should complete, the user is freely allowed to make any comment in this step.
6. Complete Kano questionnaire with the user's responses.

In this iteration, the user was the one that interacted/manipulated the Balsamiq prototype. We gave feedback when the user explicitly asked for it.

Finally, for third iteration, we interviewed 4 more users and they were also interviewed individually. We added a new step between step 3 and 4 of the former protocol. In this set of interviews, we explained how the swipe right, swipe down and swipe up gesture could be simulated using the Balsamiq tool. For this purpose, we used dummy mockups to avoid spoil any feature of behavior of the application before starting the actual evaluation.

RESULTS

Expert interview results

The expert test was the first interaction we made. In the results of this first interview showed that the flow of the transitions of the application were consistent and logically allocated.

One main problem experts found was the classification part of the dishes. Figure 2 and 3 shows that the classification of the food was made by countries. Expert feedbacks suggested that this classification could be to specific. They mentioned that if the user knows a dishes that is not typically of his/her country and the user does not know

exactly which country the dish belongs to; it could be hard to fit it in a category considering that exists 196 countries. Instead of having a category by countries, we increase the range and modify the categories to be by continent. In this way the user will have a tiny amount of options to categorized the dish, making it easier and more consistence.
A second main problem experts found was the event rate process, they pointed out that the mockup was confusing, the focus of this interface might be better in the experience as a whole rather than every specific aspect of the event. Figure 6 shows the initial interface the experts judged, we followed an uncomplicated scheme and decreased the number of useless and confusing element to keep an easier and simpler event rate process.
The third major improvement was the search engine, experts mentioned that, since the search is an important usability element in our application because of the huge amount of information we could gather, we might include an advance search method. In that case, the user will be able to make more concreate searching when he/she need it. Indeed, this feature was already implemented but it was totally unclear how the advance search engine might be activated. We decided to explicitly add a new button with the label "advance search" in the interface showed in figure 5.

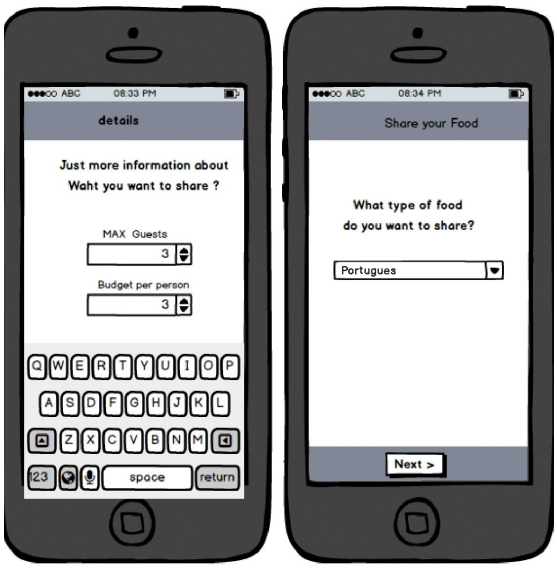

Figure 11. Screens show the first to step to create and event in host mode

Additionally, experts mentioned that the feel and look of creating new event, showed in figure 11, might be consistent with the other interfaces. The fact that those interfaces had different layout in the top side was a negative impact rather than was a good indicator of that the user was move from the guest to the host mockup. Furthermore, they suggest to have a mark that allows the user knowing in how many step more they have to complete to actually finish the process. The taken action to tackle this issue was preserved the feel and look of the interfaces in both guest and host mode and add a mark in the top indicating the number of the step in which the user was and the total number of step that he/she had to complete to create the event.
Finally, experts suggested to add more information, for instance the telephone number, and a sign up method from other providers, such as Google or Facebook, in the sign up process. They mentioned that asking for more information or linking the app to a social network might facilitate the trust in the application. We added the sing up methods to be used with Facebook and Google, moreover we added an extra layer of information that included telephone number and validation of the student card, which the user must provide either filling the traditional form or using the provider.

First user interview results

The second iteration was made with 4 users, this interaction was mainly focus in the users' functional and non-functional requirements.
The first common feedback was about uploading a photo of their student card in the sing up process. The aim we tried to achieve with this extra layer of security was increasing the truthfulness but the user did not understand the purpose of it. Moreover, all users agreed that they definitely do not use SMYK if they must upload a photo of the student card because they were feeling as unnecessary extra personal information. Actually two of them mentioned that it would better idea to change it to upload a photo.
Another common comment was the fact that we did not include whether the dish is vegetarian or it is not. Actually, the event information attempted to provided such information, however users mentioned that it was not clear so. We improved this issue changing the label of the middle icon of the detail event interface (right most screen of figure 7) to a more concrete label, "Not vegetarian" and "Vegetarian".
A third common comment was that the creation of an event must have a more accessible location. 3 of 4 users suggested a shortcut in the overlay modal interface (figure 4). Such suggestion was implemented as they mentioned.
The first remark behavior we observed in the interviews was the lack of using gestures. We did not explain the gesture whatsoever, in other words, we did not explain how in some screen the use could simulate a gesture. We noticed that the users did not try to explore using the scroll down gesture of the mockups, for instance the "homecreen" and "eventDetail" mockups (figure 2 and 7). Additionally, mockup of "categories" (figure 3) never was reached by the user. All users used the search engine to achieve task to 2.
Task 3 was the most difficult task; users did not expect more functions where they pressed the profile button in the bottom of the interface. We noticed that the main problem was the label in the button, users actually liked the idea of the over model layout, but the "profile" label gave them an impression of displaying a new interface instead of

displaying an over modal layer. To address this issue we changed the label from "profile" to "more".

Second user interview results

The third and last iteration was made also with 4 users, this interaction was mainly focus in the improvements of the application.

This iteration had more mixed feelings, the most controversy change was the "create event" shortcut. Two of them mentioned that, because that was part of the host mode, the action had to be in the host mode only. The other two agreed in having the shortcut and actually they disliked the idea of changing from guest to host mode and vice versa. They said that it worth nothing and only increased the number of step to find information, such as the recent event created by him/her.

As we expected because of the previous iteration, the users tried to use as much as they could the search engine to complete the task. The suggestion was to add extra functionalities to the search as searching by price and nearby should be part of the actual search engine and not as an advance search engine.

As a remark in this third iteration, the fact that we explained how the user could simulate the gestures in the interactive Balsamiq tool before start the proper tasks helped to improve the navigation through the application. Although we did not measure the amount of time to complete the tasks, we noticed a better timing performance in this iteration, also in this iteration the user explored "homeScreen", "eventDetail" and "categories" mockups. Furthermore, the fact that the label "profile" was changed to "more" made easier to complete task 3.

Kano questionnaire results

According with the Kano questionnaire the most attractive features in SMKY were the rating process and the search engine. The results revealed that users considered them as an advantage which increase the satisfaction.

As we can expect, having a profile of the host, number of attendees, location of the site and time of the event are a must in the description of the events.

Also we obtained that proximity search, rice search and rating search, which were part of the advance search, were indifferent to the use as well as section categories and popular dishes and the use of provider to sign up into the application.

DISCUSSION

The evaluation of the prototype reported that rating process and search engine were important tools in both interviews and questionnaires, in fact rate was an important threshold to the user whether he/she considered to go or not go to the event of a certain host, important tool that Gebbia [12] mentioned as an important aspect to create truthfulness among the users. However, not all the security method was accepted by the user, the fact that once must upload a sensible information, such as student card, reduce the credibility of the application. In general, the best practices and patters design prosed by experts [10, 15, 20, 21, 22] were well accepted by the user, the main problem we faced was the label of the application rather than the design itself. Finally, the interaction with the interactive Balsamiq tool was not perceived as good tool to interact with, users were complained about the lack of smoothness between the transition and the lack of the support of real gestures. Users also indicated they would prefer to test the application in a real smartphone, because in that case they would automatically try to use gestures, which gave a window to test the application with other methods such as an actual device prototype.

Further work will convert the Balsamiq prototype to a functional prototype and test the scenarios. This probably will delete the limitation of the use of gestures. Moreover, some of the users' comments were contradictories with the results we obtained from the Kano questionnaire, this represent for example, some users complained about the lack of Twitter as a provider to sign up to SMYK, however the results of the Kano questionnaire concluded that having provider to sign up into the application was indifferent to them. In fact, Boris Bartikowski et al [3] mention that inappropriate method for customer satisfaction could lead to useless interpretations, hence create a new questionnaire based on other methodology to be evaluate in a new iteration will be a good starting point to confirm or refuse the result already obtained with the Kano method.

CONCLUSION

Show Me you Kitchen is an app which purpose is to bring people with of different cultures together not only to share food but also to have a cultural experience. By iterate over the user-centered design we could improve the small details that give user an easy-to-use application.

Considering my experience in the design and evaluation process, it is important to start with proved patterns and design decision already explored by other experts, in fact, this process was a key element to focus in the small details that our users are looking in this type of application. Working in principles user cases and structural diagram, we could find the most important flow of transitions among the mockups and also the main tasks for the user. I stress the fact that always test the prototype based on the target user, no matter how well you follow the good practices describe by usability design expert, the user always have the last opinion and at the end they will be the ones that will use the application. Even slightly changes, like changing label's name, suggested by the user makes an interface more meaningful and useful to the user.

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