



## Mobile-D Approach-based Persona for Designing User Interface

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### ABSTRACT

Nowadays, many people use social media in different aspects of their life. One of the most important fields is education, where both faculty members and students communicate frequently to facilitate collaboration between them. In this paper, we aimed to design and develop a new interactive academic, social application called Shake Hand, to reduce the gap that exists between faculty members and students and to improve the users' experiences with one another. The proposed design is based on Mobile-D approach by dividing the application's functionalities into three releases. Persona was used to collect the requirements and help analyze and visualize the target user to design interface that meet and fulfill their needs.

The proposed application offers two main functions: hosting discussion forums and exchange services, and addresses many academic and social needs. The usability testing approach was applied to measure the performance, productivity, and satisfaction of the user. Our contribution demonstrated in this paper is to measure the user's productivity by mapping the design implication of cognitive process to the user interface of the application. The output of the mapping is a set of guidelines which guide the designer through the designing of a mobile application in a distracting environment.

**Key words:** Mobile-D Methodology, Persona, Designing User Interface, HCI Principle, Experimental Test

### 1. INTRODUCTION

The significant recent developments in social media has made these platforms an important method of communication and information distribution. Social media can be defined as online technology platforms that help form and build relationships between individuals in varying geographic vicinities.

The use of social media in education provides students the ability to acquire more useful

information, connect with learning groups, and other educational systems that make education more convenient. Social network tools afford students and institutions multiple opportunities to improve learning methods. Two essential roles in the educational environment are faculty members and students. The strength of the relationship between them depends on the communication methods that meet their requirements. One of the existing academic social networks that support their communication are academic sites such as Academia.edu and Blackboard. However, having multiple accounts on different academic sites and unnecessary features on social media may distract students and faculty members [1], [2].

A typical scenario for students facing a problem in a course is that they find it difficult to reach out to those who can help them solve the problem. According to our survey that was distributed to the students in King Abdulaziz University in fall 2018 61% of students prefer to search for solutions on Google instead of asking faculty members. There are some apprehensions towards using public social media sites in education, such as youth privacy, and student disengagement [2]. If students want to discuss technical topics, they do not know how to reach the right person. So, a specialized application or site that combines academic services and social needs in the university would be helpful.

According to Jabr there is a big gap between students and faculty members in terms of communication outside the classroom [3]. Warin et al. state that "A Persona is an archetypical figure and a fictional character that represents a typical user of a system" [4].

#### 1.1 Objective of the work

The objectives of this study are listed below:

- To facilitate communication and collaboration between faculty members and students at KAU to improve the efficiency and engagements outside the classroom [2].
- To facilitate exchanging academic and voluntary services between faculty members

and students, such as reviewing a report, and helping in a presentation and poster event.

- To encourage discussion and collaboration among the students within each course to facilitate learning from one another’s input and experiences.
- To elevate the academic level by giving students the chance to exchange their experiences.
- To recognize students’ problems and help them solve those problems by matching them with an experienced user.
- To propose a personal model for faculty members and students.

Therefore, the aim of this paper is to design and develop a mobile application-based persona [5]. We have named the application ‘Shake Hand’, to connect students with faculty members. The persona reflects the characteristics and the needs of two users (students and faculty members). The proposed application allows users to request services and provide services. As a proof of concept, the project was applied in the faculty of Computing and Information Technology at King Abdulaziz University (KAU) in spring 2019. The application supports iOS because 78% of the target users owned iOS mobile devices. The services provided are listed below in Table 1 and 2 based on the feedback that we received from the survey provided to the users (18 faculty members and 18 students). The services vary between students and faculty members according to their needs, priorities, and abilities. Because the listed services are only an initial list of services, the application was developed to automatically add any service requested by at least 25% of the users to the list.

**Table 1:** Faculty member services

Provided Services	Required Services
Helping in a specific course.	Helping in the preparation of a celebration.
Volunteering to set up a conference.	Volunteering to collect data for a project.
Reviewing a paper/poster.	Volunteering in setting up a conference.

**Table 2:** Student services

Provided Services	Required Services
Helping in a specific course.	Helping in a specific course.
Volunteering to set up a conference.	Printing papers.
Helping in the preparation of a celebration.	Volunteering to collect data for a project.
Volunteering to collect data for a project.	Reviewing a poster.

The proposed application design provides the following features:

- Allows faculty members to offer academic and voluntary services to the students and other faculty members.
- Allows students to offer academic and voluntary services to faculty members and other students.
- Allows students to discuss interesting technical topics with faculty members and other students.
- Show statistics related to other students’ problems and interests.

The rest of this paper is organized as follows: section 2 highlights related work in social networking, academic networking, and academic social networking. Section 3 present the proposed persona for academic and student members. Section 4 covers the designing and development of the Shake Hand application, including the releases and algorithms. Section 5 presents the mapping HCI principle to interface design. Section 6 illustrates the experimental testing. And finally, the future work and the conclusion are presented in section 7.

## 2. RELATED WORK

According to the Dictionary of Computer and Internet Terms a "social networking site is a website where users can build a personalized community to socialize with" [6]. Social networks have become increasingly powerful communication tools and have become widely used in different areas. For instance, faculty members and students have begun using social media applications within the educational field. Students use social media to communicate with each other and with their instructors. We conducted a feature comparison between some social networks to select the applicable feature in the Shake Hand application. The comparison is based on application trials between Facebook, Twitter, Instagram, Snapchat, WhatsApp Messenger, Discord, and YouTube. Some of the platforms use special terminology, such as twitter calling their posts “tweets”, and the republishing of an existing post a “retweet”. Discord allows the user to react to posts with emojis called “reactions” and shows how many people react with each emoji. Most of the platforms are not specialized for specific people, while Discord is specialized for gamers, and YouTube is specialized for video creators and their audiences. All of the platforms provide a direct or private message feature. Also, all platforms allow groups or community creation and messaging. The ability to create posts and reactions to the posts of others through likes, comments, and the ability to

republish and share posts are provided by most platforms. Stories or snaps (consisting of a photo or short video that can be edited to include filters and effects) are offered by Snapchat, Facebook, Instagram, WhatsApp messenger. Live video streaming is available on Twitter, Snapchat, Facebook, Instagram, and YouTube. Most platforms allow Profile customization. Voice calling is available through Snapchat, Facebook (in a separate application), and WhatsApp messenger. Video calling is available on Snapchat, Facebook (in a separate application), Instagram, and WhatsApp Messenger [7], [8], [9], [10], [11], [12].

Jabr studies how to utilize a social network for academic purposes and making the learning process more interactive [3]. He pointed out that students need to receive training on using the social network for superior academic performance. Additionally, academic staff should be encouraged to communicate with students.

Al-Bahrani *et al.* discuss that some instructors in university do not understand the main goal of interaction between students and instructors inside and outside classes [13]. Meanwhile, students like when universities have social media accounts, having interactive lessons through social media and also when instructors interacted with students through social media.

Sutherland *et al.* conclude that social media engages students in a face-to-face connection [14]. Since students spend an ample amount of time online, it is important to focus on how to increase collaboration between students and instructors on social media.

- Academic networks:

Academic networks refer to the sites that connect researchers, faculty members, and students such as Academia.edu and Blackboard. We compared the academic networks Blackboard, Edmodo, SHMS Saudi, MyKAU, iTunesU, Google Classroom, and Schools App in the same manner as we did with the social media platforms. Blackboard, Google classroom, iTunes U, Edmodo are learning management system which provide tools to instructor and students such as adding assignments, grading assignments, adding quizzes, allowing student to solve quizzes and upload their assignments, as well as giving access to course resources and discussion boards. Creating groups of students in the same section of the course to improve the teamwork is a feature available in Blackboard, Edmodo, and Google classroom. Group messaging is a feature in Schools App, Blackboard, Edmodo, SHMS Saudi, and Google classroom. Sharing favorite courses through social media applications is available in iTunes U. All

platforms provide private messages except SHMS Saudi. SHMS Saudi provides learning resources for different specializations without requiring the user to be a student at a specific university or school. Also, SHMS Saudi allows for the evaluation and ability to comment on the learning resources. instructor can follow interesting topics in Edmodo. The Schools app only allows discussion between students and their colleagues and the formation of study groups [15], [16], [17]. In [18] Sheikh compared the academic networks. He aimed to explore the awareness and usage of the most famous academic social networks in Comsats University Islamabad members. The success of academic networks depends on simplicity and ease of use. Also, training sessions on using academic social networks are the best way to raise awareness. This would ultimately result in an increase in the usage of these networks. Espinoza Vasquez and Caicedo Bastidas conducted a comparative analysis study between some academic networking sites [1]. Their study focused on comparing five services. The study results showed that each of the academic social networking sites specialized in one or two of the five discussed services. They recommend using academic network sites that meet the user's needs.

Academic orientation plays a significant role in the professional identity of the students. The authors in [19] investigated the benefit of the orientations of the students on the psychological variables that affect the academic orientations in terms of self-efficacy, collaboration with the teachers and an academic work or motivation to conduct academic task.

- Social academic network:

Ravishankar aimed to build a socio-academic site for the students in the college of Mass Communication and Media Arts MCMA at Southern Illinois university that combines useful features from already used sites, and does not lead to student's disengagement through unnecessary features, or not meeting user requirements [2]. Therefore, the study conducts a user group analysis to understand the target user by dividing the user into two groups: students, and graduate teaching assistants. Then the study developed a persona for each group. Ravishankar analyzed the competitor sites by defining each of the competitors' sites, describing their interfaces, and listing and defining their functionalities. The study then compared the common features between both sites. The useful features from both sites were then selected while avoiding features that lead to students' disengagements or distraction.

▪ Importance of social academic networks: Social academic networks improved the students' academic performance and students' experiences reciprocally [2], [3]. It help to understand students and improve the students' engagements outside the class [2]. Also, they help researchers to disseminate their research, review each other's work, and facilitate collaboration [1]. Social academic networks facilitate collaboration and communication within universities and facilitate volunteering opportunities. According to Oxford dictionary a " volunteer is a person who offers or agrees to do something without being forced or paid to do it"[20]. After the establishment of social media networks, volunteering opportunities were increased. For example, Facebook has a feature called crisis response to allow people to support others in crisis. Also, the social media network improves the communication between volunteers and people who need help. Also, SHMS Saudi has built volunteering as its base. Some of the social and academic networks allow users to create and discuss in discussion forums. Online discussion forums are a virtual learning context in which the learner can learn from one another or from online course materials [21]. Discussion forums improve the communication and collaborative between the students [22]. They improve interactions between students and faculty members which promotes the educational level. Also, discussion forums allow sharing information, resources, and improving the learning process. In [23] the authors proposed a new adaptive system for e-learning. The aim of the proposed system is to modify teaching strategy based on learner' needs. The system focused only on the learner and provide the recommended learning strategy that fits each student individually.

### 3. PERSONAL BASED DESIGN

Due to the evolution of technology, user-interfaces (UI) has become the most valuable part of a system for end users and critical for system success. Persona is a creation of a personal pool of common attributes for different characters and users for the user interface [24]. It helps in the understanding of specific users' groups, needs, and goals while avoid designing through introspection [25]. The data collection methods, such as surveying and interviewing, were used to collect the data to build the persona [24] [22]. Applying persona in the software design process has some benefits, such as facilitating communication about design choices, since persona provides a uniform language [25].

In this paper, we applied the persona on two types of users: students and faculty member. Figure 1

and 2 depict the final persona constructed from the survey, and interviews with 212 students and 7 faculty members respectively.

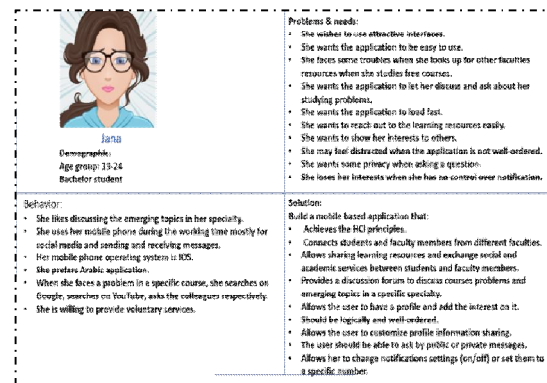


Figure 1: Persona for Students

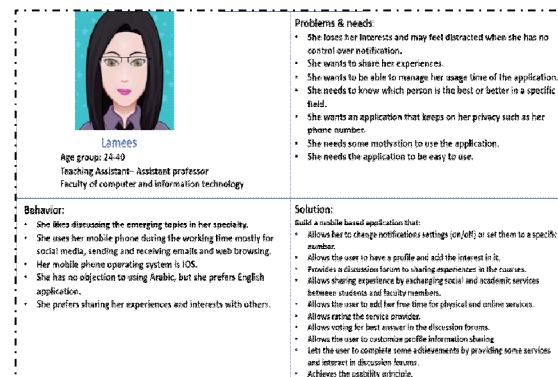


Figure 2: Persona for Academic Staff

## 4. MOBILE-D METHODOLOGY

Since our project focuses on regular delivery of working software [26], which requires continuous testing and user involvement, the authors apply the Mobile-D approach from agile methodologies [27]. Mobile-D is a combination of Extreme Programming (development practices), Crystal methodologies (method scalability) and Rational Unified Process (life-cycle coverage) [27]. It involves five phases: Explore, Initialize, Production, Stabilize, and System Test & Fix [28].

### 4.1 Project Releases

According to the Mobile-D approach, the project went through iterations of the phases, and is divided into groups of functionalities (releases). Table 3 display the number of releases of the application and the functionalities of each release. The following sub section summarize the functionality across three releases.

**Table 3:** Project Releases

Release	Functionality
1	Register, Login, Logout, Show profile, Edit profile, Add service, Search for a service.
2	Request service, Receive notification, Rate a service, Receive request, Accept/reject service, Manage service request, Manage notifications, Start chat.
3	Add a topic, Search for a topic, Reply to topic, Vote for best answer.

**4.2 Search Algorithm**

In this work, the authors build a new search algorithm to ease the search about any topic in the discussion forums. The algorithm consists of two parts related to the topic addition and searching respectively.

- Part 1: Add new topic

Each new topic's title will be tokenized into words. Then we will store the words and their synonyms in the database as keywords.

- Part 2: Search topic

The authors used the stored keywords to calculate the number of similarities between existing titles and titles that the user searched for. Then used the quick-sorting algorithm to show the results according to the increasing similarity.

**5. MAPPING DESIGN TO HCI PRINCIPLES**

For designing the user interface, the authors considered the user experience and applied the principle of design implication for improved visibility, feedback, consistency, and clarity [26].

In this work the authors examined the cognitive aspects of interaction design in terms of specific kinds of processes including attention, perception, and memory.

The above selected processes are interdependent, it is rare for one to occur in isolation. Attention is the process of selecting things at a point in time that are relevant to what we are doing. Perception refers to how information is acquired from the interface being used. Memory involves recalling knowledge allowing us to act appropriately [29].

**6. EXPERIMENTAL TESTS**

This section covers the usability testing divided into three iterations according to the system number of releases as mentioned in Table 3. The usability testing aims to ensure that the application

is error-free. The purpose of this section is to ensure that the application is easy to use and satisfies users. This was evaluated through the involvement of 10 participants (5 students and 5 faculty members) selected randomly from the application's target users for the testing of each release. The experimental asked each participant to complete sets of tasks while the development team observed them noting the time it took to complete each task [30]. Usability testing is an empirical method, focusing on the users and his behaviors. The testing team and participant feedback are important in finding and defining problems during the testing phase.

Applying the usability testing allowed us to do the following:

- Measure the satisfaction of the participants while using the application.
- Measure the participants' frustration while using the application.
- Determine if participants were bored while using the application.
- Identify the time required by the participants to complete specific tasks.
- Investigate problems to determine required improvements for the application to improve both the app performance and the user experience.

**6.1 Participants**

Our participant samples were made up of two types of users; students and faculty members belonging to KAU during the spring of 2019.

**6.2 Test Environment**

The test was conducted on one participant at a time in each faculty member's office during their office hours. The usability testing for the students was conducted in the faculty hall. Each participant was asked to perform a set of tasks. The usability testing begins with performing a pilot test in the selected task by an expert user with a good technical background to determine the task's performance measures. The selected set of participants consisted of five faculty members and five students for each release.

**6.3 Test Result Improvements**

Since the performance measure of the same task in one release might have different results or the user may not be able to complete the task successfully, we computed the decrease percentage of the unacceptable result from the previous release of the task to the current release for the same task. To

measure the improvement in the updated release. The decrease percentage can be calculate by this equation:  $decrease\ percentage = [(performance\ measure\ of\ the\ task\ in\ the\ previous\ release - performance\ measure\ of\ the\ same\ task\ in\ the\ current\ release) / performance\ measure\ of\ the\ task\ in\ the\ previous\ release] * 100$ .

Also, to measure the improvement in the ease of use task, the questionnaire was distributed to the users after finishing the testing in each release to measure their satisfaction. We counted the number of users who choose very easy, and easy in each release. Then we compared the new release with the old one for the same task through this equation:  $Increase\ percentage = [(subjective\ measure\ of\ the\ task\ in\ the\ current\ release - subjective\ measure\ of\ the\ task\ in\ the\ previous\ release) / subjective\ measure\ of\ the\ task\ in\ the\ previous\ release] * 100$ . The following subsections summarize the results of the same tasks that exist in the three releases.

### 6.4 Release 1

The usability testing began by giving participants a brief description of the Shake Hand application.

Then the usability testing instructions were explained to each participant, and required tasks were completed by each participant. The same process is repeated for each participant. The set of tasks of release 1 (Table 4) map to the different functionality in the application (view profile, edit profile).

**Table 4:** List of Task Scenarios for Release 1

Task	Task Scenario
1	Suppose you want to check your personal information in the Shake Hand application.
2	Suppose you do not like your profile image, so you are thinking in changing it.
3	Suppose when you entered your username, you forgot to write the last letter "e", so you want to correct it.

Table 5 depict how we applied the cognitive process in our tasks and proposed design implications for each one [29]. Figures 3 illustrates a sample of mapping of design implication with a specific color as mentioned in Table 5.

**Table 5:** Release 1 & 2 Design Implications

Cognitive Process	Design Implications	Tasks
Attention	Make information salient when it needs attending through use of color, item order, the sequence of information.	Release 1 (task 2,3) Release 2 (task 1,2,3)
	Avoid cluttering the interface with too much information. This especially applies in the use of color and graphics: it is tempting to use too much, resulting in media that is distracting and annoying rather than helpful to the user in finding information.	Release 1 (task 1,2,3) Release 2 (task 1,2,3)
Perception	Bordering and spacing are effective visual ways of grouping information that makes it easier to perceive items.	Release 1 (task 2,3) Release 2 (task 1,2,3)
	Text should be legible and distinguishable from the background.	Release 1 (task 1,2,3) Release 2 (task 1,2,3)
Memory	Procedures for carrying out tasks must be simple.	Release 1 (task 1,2,3) Release 2 (task 1,2,3)
	Design an interface that promote recognition rather than recall by using menus, icons, and consistently placed objects.	Release 1 (task 2,3) Release 2 (task 1,2,3)

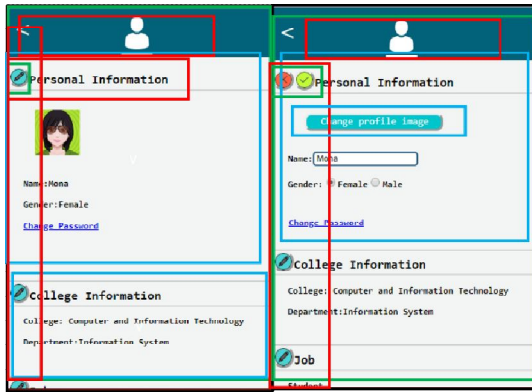


Figure 3: Design Implications of Release 1 - Task 2

Table 6 shows the results from faculty members in release 1, and Table 7 shows the results from students in the same release.

Table 6: Release 1 Performance Measures for Faculty

	Task 1	Task 2	Task 3
User 1	U	N	N
User 4	U	N	N
User 6	A	U	U
User 7	U	N	A
User 8	A	U	E
Legend: <span style="color: green;">■</span> Excellent <span style="color: yellow;">■</span> Acceptable <span style="color: red;">■</span> Unacceptable <span style="color: gray;">■</span> Task not completed			

Table 7: Release 1 Performance Measures for Students

	Task 1	Task 2	Task 3
User 2	A	U	E
User 3	A	U	A
User 5	E	A	E
User 9	A	U	U
User 10	A	U	U
Legend: <span style="color: green;">■</span> Excellent <span style="color: yellow;">■</span> Acceptable <span style="color: red;">■</span> Unacceptable <span style="color: gray;">■</span> Task not completed			

• Findings from release 1

The usability testing was conducted with a random selected group from the target users. After the analysis of the results, a problem was found which affected the second and third task in the testing. Due to lack of clarity of the edit button, the users could either not complete the task or took an unacceptable time to finish.

6.5 Release 2

The set of tasks of release 2 (Table 8) map to the different functionality in the application (edit profile, request service, reject service request).

Table 8: List of Task Scenarios for Release 2

Task	Task Scenario
1	Suppose that you do not like your profile image, so you are thinking in changing it
2	Suppose that you want someone to help you in setting up a conference on 20 Mar 2019 at 12:00PM. Choose the provider with the highest rate.
3	Suppose that you do not have enough time to print the paper that was requested by another user, so you decide to reject her request.

Figure 4 illustrates the sample of mapping of each design implication with a specific color as mentioned in Table 5.



Figure 4: Design Implications of Release 2 - Task 1

Table 9 shows the results of faculty members in release 2, and Table 10 shows the result of students in the same release.

Table 9: Release 2 Performance Measures for Faculty

	Task 1	Task 2	Task 3
User 1	U	U	N
User 2	U	U	N
User 8	A	U	N
User 9	E	U	N
User 10	A	U	U
Legend: <span style="color: green;">■</span> Excellent <span style="color: yellow;">■</span> Acceptable <span style="color: red;">■</span> Unacceptable <span style="color: gray;">■</span> Task not completed			

**Table 12:** List of Task Scenarios for Release 3

Task	Task Scenario
1	Suppose that you want to provide "data collection" as a service. Please add "data collection" to your services.
2	Suppose that you do not want to provide "data collection". Delete "data collection" from your service.
3	Suppose that you decide to help Rana in programming 1. Please accept her request.
4	After you accepted Rana's request send her the message "hello".
5	Suppose that you want someone to help you in setting up a conference on 20 Apr 2019 at 12:00PM. Please select the provider with the highest rate.

**Table 10:** Release 2 Performance Measures for Students

	Task 1	Task 2	Task 3
User 3	E	U	U
User 4	A	U	U
User 5	A	N	N
User 6	A	U	N
User 7	A	U	N
Legend: <span style="color: green;">■</span> Excellent <span style="color: yellow;">■</span> Acceptable <span style="color: red;">■</span> Unacceptable <span style="color: gray;">■</span> Task not completed			

• Finding from release 2

The usability testing was conducted with a randomly selected group from the target users. After the analysis of the results, there were two main problems that the users faced. First, the naming of the services available for requesters was confusing and instead appeared as services available for providers. Secondly, the requests of a specific user should not only be placed in the notification tab of the application. Placing requests in the “manage my services” portion of the application, as most of users suggest, would be more intuitive. The recommendation was applied and tested with the updated iteration. Table 11 compares the results of the usability testing for the same task. Release 1 - task 2 and release 2 - task 1, to see if improvements on release 2 satisfied the users. The improvements have been calculated through the equations in section 5.2. Note that the number of unacceptable includes both the task that unacceptable and uncompleted. For the subjective measure, the questionnaire reveals that five faculty members and four students choose ‘very easy’, and one student chooses ‘easy’ for task 1 in release 2. However, for release 1 for task 2, one faculty member chooses ‘easy’, and three students choose ‘very easy’.

**Table 11:** Comparisons between Release 1 & 2

Factors	Release 1 and Release 2
Performance Measure	Decrease percentage = $(9 - 2)/9 * 100 = 77.78\%$
Subjective Measure	Increase percentage = $(10 - 4)/4 * 100 = 150\%$

**6.6 Release 3**

The set of tasks of release 3 (Table 12) map to different functionalities in the application (such as add service, delete service, accept service's request, send message, and request service).

Table 13 shows the results of faculty members in release 3, and Table 14 shows the result of students in the same release.

**Table 13:** Release 3 Performance Measures for Faculty

	Task1	Task 2	Task 3	Task 4	Task 5
User 1	U	A	A	U	A
User 7	A	A	U	A	A
User 8	A	E	E	E	A
User 9	A	E	A	A	E
User 10	A	A	A	A	A
Legend: <span style="color: green;">■</span> Excellent <span style="color: yellow;">■</span> Acceptable <span style="color: red;">■</span> Unacceptable <span style="color: gray;">■</span> Task not completed					

**Table 14:** Release 3 Performance Measures for Students

	Task 1	Task 2	Task 3	Task 4	Task 5
User 2	A	A	A	A	A
User 3	A	E	U	E	A
User 4	A	A	A	A	A
User 5	U	E	A	A	A
User 6	A	E	A	A	A
Legend: <span style="color: green;">■</span> Excellent <span style="color: yellow;">■</span> Acceptable <span style="color: red;">■</span> Unacceptable <span style="color: gray;">■</span> Task not completed					

• Finding from release 3

The usability testing was conducted with a randomly selected group from the target users. After the analysis of the results, there were very few frequently reported problems. As shown in the analysis of the testing the application successfully met the expectations of the users. Table 15 shows how the interface has been improved between release #2 to release #3 using the same task (release 2 - task 2 and release 3 - task 5). The improvements have been measured by the equations defined in section 5.2. For the subjective measure, the questionnaire reveals that four faculty members and three students choose ‘very easy’, and one faculty



member and two students chooses ‘easy’ for task 2 in release 3. However, for release 2 for task 2, one faculty member and two students chooses ‘very easy’, while two faculty members and three students choose ‘easy’.

**Table 15:** Comparisons between Release 2 & 3

Factors	Release 2 and Release 3
Performance Measure	Decrease percentage = $(10 - 0) / 10 * 100 = 100\%$
Subjective Measure	Increase percentage = $(10 - 8) / 8 * 100 = 25\%$

The results of the questionnaire from 15 participants gives us subjective measures of users' impression which represent the opinion of the users on the designed application. Each 5 point scale was divided to very easy, easy, neither easy nor difficult, difficult, and very difficult. On average, 73% of the participants said that Shake Hand was very easy and 27% of the participants said the Shake Hand was easy.

**7. CONCLUSION AND FUTURE WORK**

In summary, academic social applications are used in a wide variety of environments such as education. Customization of these applications should be done to limit distractions, while expanding on features that are most important to students and faculty members. Shake Hand application contains only features that serve faculty members and students. The customizations identified in this paper seek to increase the collaboration between students and faculty members.

It was important for the researcher as a designer to follow the Mobile D methodology as it ensures the accurate involvement of the users to fulfill their needs and expectations and objectively assess their common needs and overcome the personal variations and preferences. Also, the use of a persona in the analysis process made the requirements easy to remember, more realistic, clear and understandable to the team members.

In order to continue to improve the Shake Hand application, there are a few changes that would improve users' experience. We should develop a natural language processing system to automatically add an image appropriate for the service added to the list by the users. This feature would allow the user to show and browse the discussion forums without requiring a high level of cognition. This would improve the search for service providers by recommending the provider according to the

requester's similar users' choices. Improving the request service to include a request the service only in provider's free time would also be beneficial. Building a dictionary using Python to make the search on a specific topic more efficient is another potential way to improve the application. Finally, since the persona focuses on the similarities between the group of users' needs, it would be beneficial for the interviewer to involve more faculty members.

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