COMMUNICATING ALUMNI RELATIONSHIP USING SHAPING BUBBLE GROUP IMAGES ON MOBILE APPLICATION

Sumitra Nuanmeesri

Abstract—Alumni are one of the most significant assets that can boost the institution’s reputation. This research aims to develop alumni relationship communication management through a mobile application which uses the shaping bubble group images to display pictures of classmates. Alumni can download from the App Store and Google Play for iOS and Android operating system. The application can be used for storing and updating the alumni’s contact information using a bubble group display. It also includes a link to social media for sharing class stories to create bonds between the alumni and the university, which could also promote the universities’ and increase their prestige.

Index Terms—Alumni, Mobile Application, Bubble Group Images, Relationship

1 INTRODUCTION

Alumni are university academic and ethical leaders, and are a valuable asset that can improve the prestige of the institution. Alumni are one of the most important assets of college success. Many leading universities in different countries have alumni who love their institutions and are committed to them, and are excellent role models for students. Upon graduation, many students continue to support the universities in various areas, such as giving advice, granting scholarships and offering junior career opportunities. Numberless alumni networks emerged from national alumni organizations that organized to support activities at universities. After that, the importance of these networks was slowly recognized in terms of institutional growth because of their far-reaching ability to serve the university and to support current students in their professional advancement. Alumni associations have been around for decades and are growing constantly [1]. So, encouraging these alumni to keep in touch with their colleges is advantageous. Alumni relationship management is a crucial feature of any alumni association or university. Educational institutions understand for adequate to have accurate information and communication services [2] however, higher education institutions need to establish a relationship with their graduates, but often without adequate information on which to base decisions.

Presently, the technological development of the internet, smartphones, social networking and the easy installation of mobile applications which has greatly influenced the conduct of the consumers. As stated in a recent study conducted by the Center for Marketing Research at the University of Massachusetts-Dartmouth [3], 98% of the participatory students had a Facebook account. Social networks are an important medium for people to interact and express their common interests. This research thus proposes the development of communicating alumni relationship on mobile application displaying the bubble group image of classmates for alumni to download towards the iOS and Google Play operational systems in order to collect and update their contact information as well as displaying the classified information by using Bubble group linked with Google Maps and social media. The developed mobile application will allow the alumni to contact and stay connected with their friends, including sharing their reunion photos on social networks to promote the application itself. It is expected that this kind of alumni bonds will benefit not only universities but also alumni and current students. It could be a platform for the current students to communicate with their senior alumni and gain some guidance in terms of career paths, here and now expectations and so on. For the alumni, the advantages of engaging in alumni groups give them opportunities to keep in touch and meet their friends, professors and university staff, even after their graduation. It additionally offers the alumni a chance to share their professional or personal advice, discover mutual interests and gain new collaborative opportunities [4]. This can also support the elderly alumni by enhancing their quality of life, reducing loneliness and increasing their social interactions towards news, photos, and stories of their old friends embedded in the application. This paper is consisted of different sections as follows. The Section 2 includes the previous researches and studies on the Alumni Relationship Management as well as the circular-shape display on smartphones. The principles and concepts of circular shape will be applied to the development of the Bubble Group. The overall structure of the developed mobile application displaying the bubble group of classmates is presented in Section 3. In Section 4, there are the results of the effectiveness evaluation of the Bubble Group. Finally, a conclusion is provided in Section 5.

2 REVIEW OF LITERATURE

To the human brain, faces are a collection of conscious and subconscious information. The difficulties in survival have pressured us to be able to recognize faces and from as early as two days old we learned to interpret and imitate facial expressions [5]. Brains do not even stop analyzing infinite emotions and senses embedded in motionless pictures. A lot of sales pages rely on ‘social proof’ [5] to convince potential customers to consider them. A simple smile, for example, can positively influence one’s impressions (both consciously and subconsciously) of a product, service, or a piece of
The utilization of the circular shape for pictures of people accentuates the faces and can be operated by adjusting the size of any rectangular picture into a square picture by cropping the image. The program compares the image width (w) and the image height (h) of any rectangular picture and chooses the shorter side as the width and height of the new square image, which is equal to the double of the radius (r) of a circle. The r value can be calculated [6] as shown in Formula 1:

\[
    r = \begin{cases} 
    \frac{w}{2}, & h > w > 0 \\
    \frac{h}{2}, & w > h > 0 
    \end{cases}
\]  

where

- r refers to the radius of a circular disc image displaying a user profile image.
- w refers to the width of a user profile image before being resized into a square image.
- h refers to the height of a user profile image before being resized into a square image.

Moreover, the centre of the circular image is located at (r, r) when the top-left point is located at (0, 0) [7]. The circular-shaped display area is represented in Formula 2 [8]:

\[
    A = \pi r^2
\]  

A refers to the display area of a circular-shaped user profile image.

\pi refers to the Pi constant value which is equal to 22/7.

After calculating the radius value (r) and cropping the image, the exceeding length is cut off and the width and height of the image is now equal (or double the radius to create a square). The cropped square image is then reshaped into a circular image which has the equivalent content and smoothness to the application of Fernandez Guasti Squircular Mapping. This method is used for mapping each point (x, y) inside the square image to a point (u, v) inside a circular disc image [9] as shown in Formulae 3-4:

\[
    u = \frac{x}{\sqrt{x^2+y^2}} 
\]  

\[
    v = \frac{y}{\sqrt{x^2+y^2}} 
\]

At the display processing stage, several circular images are connected in the form of a Bubble Group. The gap (g) between each circular image is equal by which the distance (D) is set in accordance with the center of each circular image ([10] as shown in Formula 5:

\[
    D = 2r + g
\]

The circular shape is selected due to the fact that a circular profile picture works better for accentuating faces [11] for the following reasons.

1. Corner Brightness: The reason why a square profile picture is harder to process is because it has sharp corners. Sharp corners tend to make shapes look more luminous. The luminosity can disrupt facial processing in profile pictures. A circular profile picture has no corners, so does not have this problem. This helps users to notice faces without visual noise.

2. Centre Focus: Faces are usually set at the center of a profile picture. When detecting a face in a square profile picture, users need more time to recognize it because the distance from the center of a square to each corner is longer than the distance to the sides. Users have to move their eyes to each angle to observe everything. In contrast, with a circular profile picture, users see everything by looking at the center, for the distance from the center of the circle to each edge is equal. Therefore, users spend less time concentrating on it as they do not need to move their eyes around.

3. Background Area: Since the most important part of a profile picture is the face, the less background area there is allows users to focus on the face more easily. While a square profile picture exhibits more backdrop area than a circular one, the background of a circular profile picture is trimmed at the corners.

4. Non-facial Pictures: A circular shape for profile pictures operates effectively because it emphasizes the face, but it is not as practical for non-facial pictures. The backdrop of a non-facial picture may consist of content which users would like to see, and trimming the corners off would mean cutting out depth and detail.

5. Shaping the Experience: Circular profile pictures highlight faces better than square ones. Emphasizing faces allows users to point out their classmates more easily and identify usernames from content. This makes a small difference to the user experience, so is a worthwhile change.

6. To enhance the effectiveness of the mobile application and due to the advantages of using the circular shape for profile pictures in accentuating faces, this article applies the circular shape to develop the Bubble Group to display pictures of classmates. The mobile application is expected to be available for both iOS and Android operating systems. It can support the alumni in recording and updating their profiles and profile pictures. There is also a map feature linked to Google Maps. The profiles of each class member are beautifully displayed on the mobile application, which provides the educational institutions with current information about the alumni which they can use to contact and create bonds with them.

### 3 METHODS

#### 3.1 Data collection

The data collection process was analyzed using requirement analysis processing in order to determine the features in the mobile application as produced by alumni of Suan Sunandha Rajabhat University based on the feedback of volunteer groups who communicated via social media for a period of 120 days which comprised 35 Generation B (born before 1946), 35 prospective Generation X (born between 1946-1979), and 35 prospective Generation Y (born between 1980-1996) [9]. Each volunteer contacted the team by telephone and full information about the survey was provided and all queries were answered.
3.2 Design and Development

Information of the features in the mobile application from data collection process, the designed and developed application consists of key mandatory features recommended by five experts in the field of information technology. The evaluation applied the index of item objective congruence (IOC) [12][13] to calculate scores. Each indicator was determined by the IOC where the value was higher than 0.5 (the highest IOC value is 1). This means that each feature met the objective, occupied content appropriate for the alumni-associated functions on the mobile application and, for this reason, worked effectively. The IOC value of each indicator was 0.8 which indicates that each feature met the objective and was acceptable to be used for evaluation [12][13]. The results of the content relevance assessment to identify features for developing the mobile application. This research develops a mobile application which can be used on both iOS and Android operating systems by applying the ionic framework as a tool to develop the cross platform. This allows multiple platforms to be used and the so-called ‘Hybrid Mobile Application’. The map menu is linked with Google Maps which allows users to record and adjust their current addresses so their classmates can see where they live and arrange to visit them. The Classmates Menu in this study applies the bubble group on CSS and uses Java Script to display the circular-shape classmate profile pictures. Once the alumni have uploaded their profile pictures from the alumni information menu, the Classmates Menu will display the same picture in the bubble group, show in Figure 1. The users can click on each profile picture to see the profile and current address of the profile picture’s owner and keep in touch with their friends. The link with social media and the posts and shares can be considered a public relations strategy for both the mobile application and the university. The pictures of the alumni on social media allows outsiders to discover the profiles of their fellow classmates. This can help a university to advertise itself which could enhance their reputation. The distribution of the mobile application which is available on Google Play and from the App Store for smartphone users is presented in Figure 2.

Fig. 1. Example display Bubble Group Images on Mobile Application.

Fig. 2. Example display Bubble Group Images on Mobile Application.

3.3 Effectiveness Evaluation of mobile Application

The effectiveness of the mobile application was evaluated by black-box testing which is a technique that disinterested the internal process of parts or components in software [14] such as the programming structure, software internal details. It focusses only inputs and output of application or software. The scope of black-box testing was separated into five assessment indicators: user requirements test, functions test, usability test, system performance test, and system securities test. There are five experts in information technology and business to assess the system and questionnaires. The overall results black-box testing, the mean for experts was 4.36 and the overall standard deviation was 0.44, showing that the developed mobile application was high effective. Eventually, 105 participants who volunteered to study it assessed the reliability of the learning outcomes and consumer acceptance for the mobile application. The samples were alumni from Suan Sunandha Rajabhat University, who were classified into three age groups (35 samples/group): 1) Generation B, Generation X and Generation Y. Online questionnaires were used to evaluate the mobile application. The data collected from the questionnaires was statistically analyzed. The arithmetic mean, standard deviation, percentages and T-Test were determined. The mean value and the standard deviation values were analysed according to the Likert-scale scoring criteria [15].

4 RESULTS

4.1 Evaluation with respect to the learning outcomes

The results of the efficacy assessment obtained from the learning results of the trained sample people were collected from the pre-test and post-test before and after the training. There were ten questions in each test by that changed the order of questions and the answers to establish some variations between the tests. The pre-test and post-test results after the One hundred five-person mobile application training showed that after testing, the study group’s post-test results were higher than their pre-test results. The results were analyzed by comparing the number of the subjects who could answer the questions correctly with their individual results. After the training, the learning results showed the subjects had more correct answers.

The learning results showed that the subjects had more
correct answers after the training. From the comparative test results obtained before and after the training, according to the statistical test of the following hypothesis:

The hypothesis was assumed as followed:

H0: The learning results before and after using the mobile application were not different.

H1: The learning results before and after using the mobile application was different.

Statistically tested by T-Test, the main hypothesis (H0) was rejected because the significance value was lower than the significance level (α) which was previously determined. In this study in which α = 0.05, the H0 was rejected and the H1 was accepted.

Table 1 of Pair Sample Testing, the significance value was analysed to consider whether the mean values of the two groups were different. Considering the comparative differences of the learning results both before and after the use of the mobile application, it was found that there were differences at the statistical significance p value < 0.001.

**TABLE 1**

<table>
<thead>
<tr>
<th>Comparison issue</th>
<th>N</th>
<th>Pre-test Mean</th>
<th>Post-Test Mean</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning results</td>
<td>35</td>
<td>5.22</td>
<td>8.67</td>
<td>-14.224</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>6.78</td>
<td>9.33</td>
<td>-10.553</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>7.44</td>
<td>9.78</td>
<td>-14.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

**4.2 Evaluation with user acceptation**

The results of the evaluation with user acceptation were based on the concept of the numerous benefits of using circular shapes in the design [16]. They were analyzed based on four criteria, as follows: 1) the sense of familiarity, 2) the ease of interface reading, 3) the ease of handling buttons, and 4) innate background harmony. The findings show, and as evaluated by all sample groups, that the arithmetic mean was 4.61 and the standard deviation value was 0.49. For Gen X, Gen B and Gen Y, the sense of familiarity was rated as the most effective and the arithmetic mean was 4.58, 4.61 and 4.64 and the standard deviation values were 0.50, 0.49 and 0.48, respectively.

Shaping bubble group images to display pictures of classmates has high consensus. All of values the interquartile range no more than 1 [17] and the interquartile range no more than 0.5 [18] in all generations and all assessment indicators; 1) the sense of familiarity, 2) easy to read interface, 3) easy to handle buttons and 4) as a background of the innate harmony shows as Table 2.

**TABLE 2**

<table>
<thead>
<tr>
<th>Assessment Indicators</th>
<th>Mean</th>
<th>SD</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Interquartile Range</th>
<th>Quartile Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gen B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The sense of familiarity</td>
<td>4.57</td>
<td>0.50</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2. Easy to read interface</td>
<td>4.54</td>
<td>0.51</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>3. Easy to handle buttons</td>
<td>4.63</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>4. As a background of the innate harmony</td>
<td>4.57</td>
<td>0.50</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Gen B</td>
<td>4.58</td>
<td>0.50</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Gen X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The sense of familiarity</td>
<td>4.57</td>
<td>0.50</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2. Easy to read interface</td>
<td>4.57</td>
<td>0.50</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>3. Easy to handle buttons</td>
<td>4.66</td>
<td>0.48</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>4. As a background of the innate harmony</td>
<td>4.63</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Gen X</td>
<td>4.61</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Gen Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The sense of familiarity</td>
<td>4.63</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2. Easy to read interface</td>
<td>4.63</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>3. Easy to handle buttons</td>
<td>4.66</td>
<td>0.48</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>4. As a background of the innate harmony</td>
<td>4.63</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Gen Y</td>
<td>4.64</td>
<td>0.48</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>4.61</td>
<td>0.49</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>
5 CONCLUSION
This research developed communicating alumni relationship which displays classmates' in shaping bubble group images on mobile application. The alumni users can download this application from both the App Store for the iOS operating system and from Google Play for the Android operating system. The classmates’ profile pictures are linked with social media, which presents reunion photos, creates a valuable relationship between alumni and their universities, and promotes the university to the public. The effectiveness of the Bubble Group in this mobile application was evaluated by 105 users, who were alumni of Suan Sunandha Rajabhat University and who were classified into three groups; Generation Baby Boomers (Gen B), Generation X and Generation Y. The arithmetic mean of the numerous benefits of applying a circular shape in mobile application design was higher than 4.61 and the standard deviation was lower than 0.49. There were no differences in the evaluation results gained from the three generations. All of values the interquartile range no more than 1 and the interquartile range no more than 0.5 in all generations and all assessment indicators; 1) the sense of familiarity, 2) easy to read interface, 3) easy to handle buttons and 4) as a background of the innate harmony. There were also no differences in the evaluation results obtained from the users of two operating system. Indicating that the shaping bubble group images display of a classmates’ alumni on mobile application is highly effective and could be used to display alumni relationship communicating management.

ACKNOWLEDGMENTS
I would like to express our gratitude to the Institute for Research and Development, Suan Sunandha Rajabhat University, who offered us the opportunities to conduct this research.

REFERENCES