Capturing Visitor Characteristics for Requirement Engineering for Museum Tour Guide Application

Riri Yunita 1, Jaidan Jauhari 2, Rahmat Izwan Heroza 3
1,2,3 Faculty of Computer Science, Sriwijaya University, Indralaya, Indonesia

Corresponding author: rahmatheroza@unsri.ac.id (Rahmat Izwan Heroza)

Abstract. One of the museum's functions is to communicate museum collections to the public, usually by museum tour guides. Given the limited number of guide and the ability of the guide to reach all visitors when the museum is crowded, the researcher attempts to create an innovation to support the role of the guide, which provides information collection of museums easily and quickly accessed by visitor through a mobile-based application, based on visitor characteristics. The output from the research is a mobile-based application that provides access to information services museum collections that visitors can use, which obtained SUS score of 68.9 or value of "Good" and fall into the above-average category.

1. Introduction

Based on government regulation of Republic Indonesia, museums are institutions that serve to protect, develop, utilize the collection, and communicate it to the public. Museums are often visited by various groups with the aim of studying, recreation and other specific purposes such as academic factors, in the form of additional insight and knowledge [1].

Museum of Sultan Mahmud Badaruddin II is one of the museums in the city of Palembang, this museum stores as many as 649 collection of historical objects about the Sriwijaya kingdom, the Sultanate of Palembang Darussalam and the development of Palembang itself, while the visitor segmentation of the museum is not well understood.

Regnell etc. suggest that it is important to gather requirement and opportunities from distinct market segments and use it for features prioritization [2]. Following that, some researches claim that potential customers must be identified and prioritized first [3], [4].

In the other side, based on the results of interviews about museum tours with the Head of Museum, there are problems that often occur that affect the service of the museum. The main problem is the lack of educators in the museum, because this museum only has one guide, so that when the museum is crowded by visitors, all staff must come directly to serve visitors. The existence of limitations on guides becomes a problem in terms of access to information and knowledge about museum collections.

Realizing the problem in terms of delivering information collection in the museum while seeing the museum’s market segmentation and IT usage to solve this problem then the solution offered is to make an information media in the form of a museum tour guide application used through smartphone applications that capture the dominant market segmentation. This application is expected to facilitate visitors in obtaining information about objects collections in the museum quickly.
2. Material and Method
Visitors of Sultan Mahmud Badaruddin II Palembang Museum is categorized in four groups: general, student, college student and tourist. Almost half of the museum visitors is in general category and then followed by category of student (6 - 19 years old) and college student (17 - 23 years old) (Figure 1). In the principle of grouping of generations by birth span, these two categories belong to the Millenial generation.

Since the age range for General category is not obvious, it is legitimate to see that visitors of the museum is dominated by millenial generation. Hence, we proposed the development of Museum Sultan Mahmud Badaruddin II Guide Application, that is based on the millenials characteristics.

Millennials are people born in the 1980s and 2000s [5]. So this means millenials are young people aged 17-37 this year. Millennials themselves are considered special because this generation is very different from the previous generation, especially in matters relating to technology. We then design the features (functional and non-functional) of Tourist Information Systems Museum Sultan Mahmud Badaruddin II Museum based on the user experience and characteristics of this target users.

2.1. Application Features
At this stage, we formulate features based on the characteristics of the target user, the millennial generation.

2.1.1. Self Service. In terms of accessing and obtaining information, the millennial generation is known as Do-It-Yourself Generation. They grow with the existence of very powerful technology in their lives [6]. Millennials generation is one that tends to educate themselves (self-educated generation) compared to other generations. They expect information to be available quickly and interact with as few people as possible to help and meet their own needs. This is in line with Forrester's research which notes that respondents prefer to use self-service in the form of a frequently asked question (FAQ) page on a company website rather than talking to a customer service agent on the phone. As well as a survey conducted Aspect found that 3 of 4 millennials prefer to solve their own customer service problems. 69% reported being comfortable with the company where they did business while solving the problem without talking to a customer service representative.

![Figure 1: Museum Visitor](image-url)
Based on that, through the application of Museum Guide Sultan Mahmud Badaruddin II Palembang, we designed a self-service (self-service) that can be used by users while in the museum. That is the feature of access to information about museum collections that can be used through the visitor’s smartphone. It aims to help visitors to get information easily and quickly without having to deal directly with the museum guide. This is in accordance with a good self-service strategy, which is to improve the service and not replace the existing services. Because there are situations when visitors want to talk to someone who can help them, answer their questions or guide them through a process.

The self-service feature of the museum guide app aims to help visitors to get information about museum collections quickly and easily. This is supported by the QR Code that can be read directly through the application of museum guides on the mobile phone visitors. Quick Response Code is an easy-to-read cell phone barcode and contains a small set of data. While the QR Code will be read that contains the code data of each object. The readable code is then used to connect data stored in the database and then displayed on the detail page of the object information.

2.1.2. Sharing Museum’s Information to Social Media.

The number of social media users who perform information sharing activities in Indonesia continues to increase. Social media users in Indonesia reach 106 million users and are dominated by millennial generation. [7] (Tetrapak Index Indonesia, 2017). From this fact, it can be concluded that millennial generation in Indonesia are passionate about sharing their experiences.

Motivation of social media users to contribute in information sharing in social media is divided into five types; namely personal information, sensational information, political information, casual information and information about the experience. With a total of 255 respondents and 81.2% of them are millennials. [8]. From the results of this study, for the type of sensational information, politics, casual and experience, dominant factors that become the motivation of social media users to conduct information sharing activities is the desire to share their personal impression of a thing. As for the type of personal information, the dominant factor that becomes the motivation to share is to maintain the relationship of friendship through social media. It can be concluded that the results of these studies show the social media users share information with intrinsic motivation, that is the encouragement that does not require stimulation from the outside, because in each individual there is an urge to do so.

With demographic visitors of Sultan Mahmud Badruddin II museum which is also dominated by millenial generation, the information sharing feature will be tested on the museum guide application whether the user will use the information sharing feature of museum collection to social media with motivation to convey his impression to the museum collection.

2.1.3. Share Visit Experience with Photos.

Based on reports released from Eventbrite, 72% of millennials prefer to use their money to gain experience or follow activities rather than using it to buy something. Millennial generations tend to be far from materialist and try to be productive by adding to their real-life experiences. This is because, for them, lifestyle is more important than following the traditional career concept, that is to buy tertiary purposes.

Social media is also one of the supporters that influence the millennial lifestyle. Because through social medias everyone can show their experience and lifestyle to others, and also, they can see the experiences and lifestyles of others. This is in line with previous studies, millennials sharing personal information in order to stay in touch with their friends in social media.

Based on the phenomenon that occurs in social media when teenagers get a lot like, a lot of comments on photos uploaded on Instagram, as well as many followers, they feel themselves valuable. Such self-esteem is determined by social approval factors in the form of approval from others. Not only can increase self-esteem alone but also can reduce adolescent self-esteem. Gonzales and Hancock [9] say social networks have been found to increase the user's self-esteem (when individuals are involved in social networking, the individual can control the information to be shared, thus tending to present positive information about oneself between the individual social networks know). In addition, the
researchers revealed that users of social media who perform various activities in cyberspace will show an accurate picture of himself. Examples such as, people who feel inferior tend to worry and think about what others will post about the individual self in social networking. While individuals who have high self-esteem, will tend to spend time to build a positive personal image in social media. [10]

Through this museum guide app, users can use the app’s photo-taking feature to capture their moment while in the museum, so that the images can be distributed to their social media as a form of self-actualization. This is in accordance with the intrinsic motivation to share information in order to gain recognition from the audience in social media.

Based on the above explanation, we will see whether the visitors of the museum Sultan Mahmud Badaruddin II Palembang will share their experience through photos they take during the museum. Thus, we include a photo capture feature, which they can then share in their social media as a form of self-esteem and received recognition from the audience.

2.1.4. Thumbzone Touchscreen.

How fingers interact on smartphone devices, a test is performed on users on wireframes that vary the location of design elements. The test runs with navigation elements at the top and bottom of the screen, and movable areas that can be reached outside and inside the thumb zone. [11]

The test results validate Hoober and Clark's research, while providing strong evidence of what works and what is not on the interface design. 49% of people hold their smartphones with one hand, relying on the thumbs to perform motion on the screen and 75% interaction is driven thumbs. With an understanding of the placement of hands on this device, we can conclude that there is a specific zone for thumbs-up motion that applies to most smartphones. The area is divided into three areas: areas that are easily accessible, difficult to reach and who are in between (figure 2).

Figure 2: Mapping the Thumb Zone to the user

Thumb-zone mapping for left-handed users and right-handed users. The "combined" zone shows the best placement areas for most users. This zone mapping then provides a framework for making better design decisions, creating a human-friendly experience without hesitation to use them.
In addition to keeping important navigation items within the thumbs zone, placing links outside of easily accessible zones may also be accepted. Because the general rule is to store frequently used links in easily accessible zones and to place less used links in hard-to-reach zones.

2.2. Application Testing

At this stage we tested the application using the instrument System Usability Scale (SUS) with the assessment object is the application Guide Museum Sultan Mahmud Badaruddin II Palembang. Before doing the application testing, we calculate the number of population visitors of the museum Sultan Mahmud Badaruddin II Palembang. From the data obtained, it is known the number of visitors from January 2017 to August 2018 is as much as 14939. So that the average visitor of the museum in a day that is 61 visitors.

The number of samples is determined by population and level of significance. We used the level of significance of 10%. Using the Slovin formula, the sample that is needed to fill the questionnaire is 37 people.

Slovin formula:

\[ n = \frac{N}{1 + Ne^2} \]

\( n \) = sample size
\( N \) = population size
\( e \) = inaccuracy tolerance (in percent)

After the number of respondents is calculated, we ask them to fill 10 statements from SUS instrument to measure the performance of the application, which are:

- I will use the system regularly
- I think the system is too complex
- I think the system is easy to use
- I think I need help to use the system
- I found that there are many functionalities that are well integrated in the system
- I think there are many inconsistencies in the system
- I think people will learn using the system quickly
- I found that the system is impractical
- I am confident in using the system
- I have to learn a lot of thing formerly before I can use the system

3. Result

The interaction diagram of the application can be seen in figure 3. After being developed, the application usability is tested using System Usability Scale (SUS). The 37 respondents consisted of 19 female and 18 males. And for the age, they consisted of 1 respondent < 20 years, 33 respondents aged 20-24, and 3 respondents aged 25-30 years.

The result of the System Usability Scale assessment obtained SUS score of 68.9. Thus, the application of Museum Guide Sultan Mahmud Badaruddin II Palembang has usability which is on the value of "Good" which has a range of values from 68 to 80.3. Which means B is worth if converted by Bangor, Cortum & Miller standards (2008) and fall into the above-average category.
4. Conclusion
This research has successfully developed a Museum application that has features based on the main segment of museum visitors, which is Millennial, which has the characteristics of Self service and fond to share information. After being measured using the Usability Scale System (SUS), this application has a B value index which means users can use this application well and easily. So, this study concludes that, a Museum application can be developed by gathering software requirements based on the characteristics of the main visitors.

References
[1] Paramitasari A U 2015: Studi Persepsi Masyarakat tentang Museum Ideal. Temu Ilmiah IPLBI page. 215 (Bandung: Indonesia)
[2] B. Regnell, M. Host, J. N. och Dag, P. Beremark, and T. Hjelm, “An Industrial Case Study on
Distributed Prioritisation in MarketDriven Requirements Engineering for Packaged Software,”
Requir. Eng., vol. 6, no. 1, pp. 51–62, 2001.

[3] J. Zdravkovic, E.-O. Svee, and C. Giannoulis, “Capturing consumer preferences as requirements for software product lines,” Requir. Eng., vol. 20, no. 1, pp. 71–90, Mar. 2015.

[4] M. Sherkat, T. Miller, and A. Mendoza, “Does it Fit Me Better? User Segmentation in Requirements Engineering,” in 2016 23rd Asia-Pacific Software Engineering Conference (APSEC), 2016, pp. 65–72.

[5] J. M. Twenge, W. K. Campbell, and E. C. Freeman, “Generational Differences in Young Adults’ Life Goals, Concern for Others, and Civic Orientation, 1966-2009,” vol. 102, no. 5, pp. 1045–1062, 2012.

[6] K. K. Myers and K. Sadaghiani, “Millennials in the Workplace: A Communication Perspective on Millennials’ Organizational Relationships and Performance,” J. Bus. Psychol., vol. 25, no. 2, pp. 225–238, Jun. 2010.

[7] Tetrapak Index 2017: 132 Juta Pengguna Internet Indonesia, 40% Penggila Medsos (Indonesia)

[8] Putri A 2017. Users’ Motivation in Sharing Information on Social Media. 4th Information Systems International Conference, page 530-535 (Bali: Indonesia)

[9] Thoumrungroje A 2014. The influence of social media intensity and EWOM on conspicuous consumption. Procedia-Social and Behavioral Sciences, 148, 7-15.

[10] Fazriyati W 2013. Perilaku di Facebook Cermin Masalah Penerimaan Diri.

[11] Yiy ing L 2016. The Thumbzone Designing for Mobile

[12] Brooke, J. (1996). SUS - A Quick and Dirty Usability Scale. Usability Evaluation in Industry.