GIS TOURISM WEB BASED OF KAMPUNG SEBERANG RAMAI, PERLIS

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Abstract:

Tourism is an industry with significant economic impact as it contributes to the development of other economic sectors through a multiplier effect. The location of Kampung Seberang Ramai, which is relatively unknown to the public, makes it difficult to discover this area with paper maps. In addition, this area has a good potential to become a tourist attraction in Perlis. Currently, the area is being upgraded by MAIP under the Diraja Program Transformasi Kampung Seberang Ramai project to make it more attractive. The technology of GIS has many potential applications in tourism management and planning. Some of the most important aspects of GIS that could support tourism planning are managing spatial data and providing important value-added information. The objective of this study is to develop a web-based system for Kampung Seberang Ramai, Perlis. This web-based

system will allow public users to access and visualize all information about Kampung Seberang Ramai, Perlis. Web-based design and development using SDLC method with waterfall model, digitization process, attribute table creation and software for this research. The software used is ArcGIS, Google Earth Pro, ArcGIS Online, and Wix Web Editor. The method of this study was used to collect the tourism information and present the tourism web-based content for tourists and analyze the user satisfaction in developing web-based content in four phases: Planning, data collection, web-based design and development, and testing phases. The result of this study is the creation of a web-based GIS of Kampung Seberang Ramai that provides history information and supports tourism development in Perlis Land. The benefits of this study will encourage Kampung Seberang Ramai to become an attractive place in the tourism sector and provide benefits to local villages in the form of profit in the socio-economic sector. Kampung Seberang Ramai should become an attractive place in the tourism sector and provide benefits to the local villages in the form of profit in the socio-economic sector.

Keywords:

Geographic Information System, Tourism, Web-Based, Kampung Seberang Ramai, Socio-Economic

Introduction

The global tourism industry is a trillion-dollar industry that generated 10.4% of global GDP and 319 million jobs, or 10% of total global employment, in 2018 (World Travel & Tourism Council, 2019). Tourism is a major source of foreign exchange earnings and employment in many developing countries, including Malaysia. According to Zamrodah (2017), tourism is one of the economic sectors that have the greatest impact on the economic and social context of nations, as its multiplier effect contributes to the growth of other sectors. It includes transportation, accommodation, food and beverage, entertainment, leisure, historical and cultural experiences, tourist attractions, shopping, and other amenities available to travelers in foreign countries.

Most countries rely on conventional methods such as brochures, books, radio and television broadcasts, and online platforms with non-interactive maps to manage and promote tourism (Mango et al., 2021; Kimbu, 2011; Lepp et al., 2014). So far, the applications of Internet and TV in tourism are very popular and well-known to the public, but in terms of the depth of the application of information technology, the development of information technology in tourism management lags behind the general level of tourism development (Wei, 2012). These conventional and static methods are costly because they require extensive production such as printing and distributing the latest updates and information. As a result, this method cannot answer some essential and specific questions of tourism, such as which historical sites exist in a particular country and where they are located.

Almaimoni et al., (2018) noted that providing accurate and complete information about destinations is widely considered the most effective way to promote a country and increase the number of tourists. Therefore, the use of online platforms is necessary as it is much easier for tourists to get information about these tourist places, such as location, restaurants, and events. Nowadays, gadgets such as tablets and smartphones are ubiquitous and there are no more boundaries between people and the world. Moreover, technology plays an important role in sharing this information with tourists by uploading details about tourist attractions on the websites (Almaimoni et al., 2018). Rahman (2010) had mentioned that people

increasingly rely on the internet to get information before visiting a tourist attraction. At GIS, spatial and attribute information can be put online so that tourists can get location-based information that is valuable and reliable. Tourist information is nowadays transmitted over the Internet using web-based GIS (Sipkes, 2002; Othman et al., 2010; Sabet Teimouri, Forghani and Baghban, 2022). Therefore, Mango et al., (2021) stated that the GIS software system facilitates the process of map generation for spatially georeferenced features and can handle both spatial and non-spatial data. Because of these special features, GIS has become the world's most popular tool for processing and displaying geographic data. Therefore, the use of web-based and GIS is necessary to promote the tourism sector in the country (Sipkes, 2002 and Sabet Teimouri, Forghani and Baghban, 2022). Ibrahim, Zakariya and Wahab (2018) mentioned that GIS mapping is a tool commonly used in built environment and tourism studies to map and analyze places. Evaluations have shown that GIS mapping is a very useful tool for studying tourism.

This study will cover the use of GIS in order to promote Kampung Seberang Ramai, Perlis as a tourism place. Kampung Seberang Ramai's position is relatively unknown to the public make this area have difficulties to find by using a hardcopy map. Thus, to overwhelm this problem, need to generate a web-based of Kampung Seberang Ramai for the public user easier to access and visualize this area. Kampung Seberang Ramai's majority community is Malay, which has a medium population density and is located in Kuala Perlis. Many of them, working as fishers, farmers, and local businesses. Because of its secluded location, the region has limited road access. There are over 200 houses in this area, small jetty, bridge, old house buildings and open space area that which has potential to develop and become an attraction of local and oversea tourist. The data used from open sources data such as Google Earth and the open street map base map. From the result, the data can produce an interactive map and generate web-based by using open sources such as PHP/MySQL. The development of the website is using the waterfall model. In conclusion, this research will help the tourists to get accurate and up-to-date information about these tourist destinations, such as location, restaurants, and events.

Study Area and Datasets
Location of study area is Kampung Seberang Ramai, Perlis. The area lies at (6°24'20" N, 100°07'51" E). Kampung Seberang Ramai majority community is Malay, which has a medium population density and is located in Kuala Perlis. Many of them, working as fisher, farmer and business. The area has moderate road access because of its relatively hidden position in the public. Kampung Seberang Ramai has their own potential to be developed and become an attraction place for the domestic and oversea tourists.
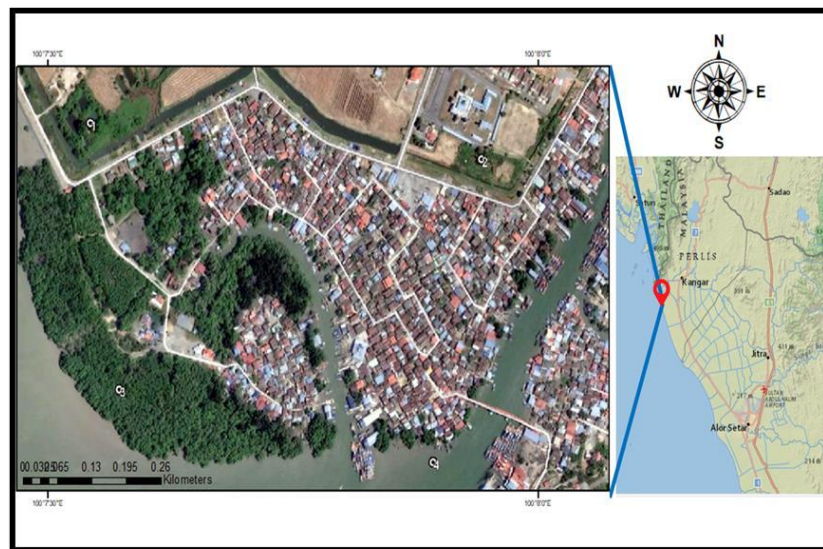
Figure 1: Study Area of The Project

This study comprises two or more datasets used, which are Google Earth data and Open Street Map base-map. Then, the data from the site visit such as photoshoot the best view of that area, and hotspot location and coordinate using Google Earth Pro software. The Google Earth data used throughout the year 2021, and their represent in WGS84 coordinate system.

Research Methodology

The method adopted throughout this study was divided into four phases, as shown in Figure 2. The first phase is to identify the research review, identify the study area, and discuss the issue of content in this research. In this phase, the selection of the model in system development and software needs to be determined. The study area is located at Kampung Seberang Ramai, Perlis. Meanwhile, the second phase is about the data collection that needs to be got in this research, which is the Google Earth data and the basemap that covered the entire study area. Then, doing in situ observation while visiting the study area to take photos of Point of Interest (POI). Next, the third phase is about the flow of web-based design and development that used SDLC method using Waterfall Model, the digitizing process, produce attribute table and the software used for this research. The software used is ArcGIS, Google Earth Pro, ArcGIS Online and Wix Web Editor. Last, the fourth phase is about the testing and analysis of the web-based development by distributing the questionnaire to analyze the tourist satisfaction on the GIS tourism web-based content development. The questionnaire analysis is divided into user analysis and system analysis.
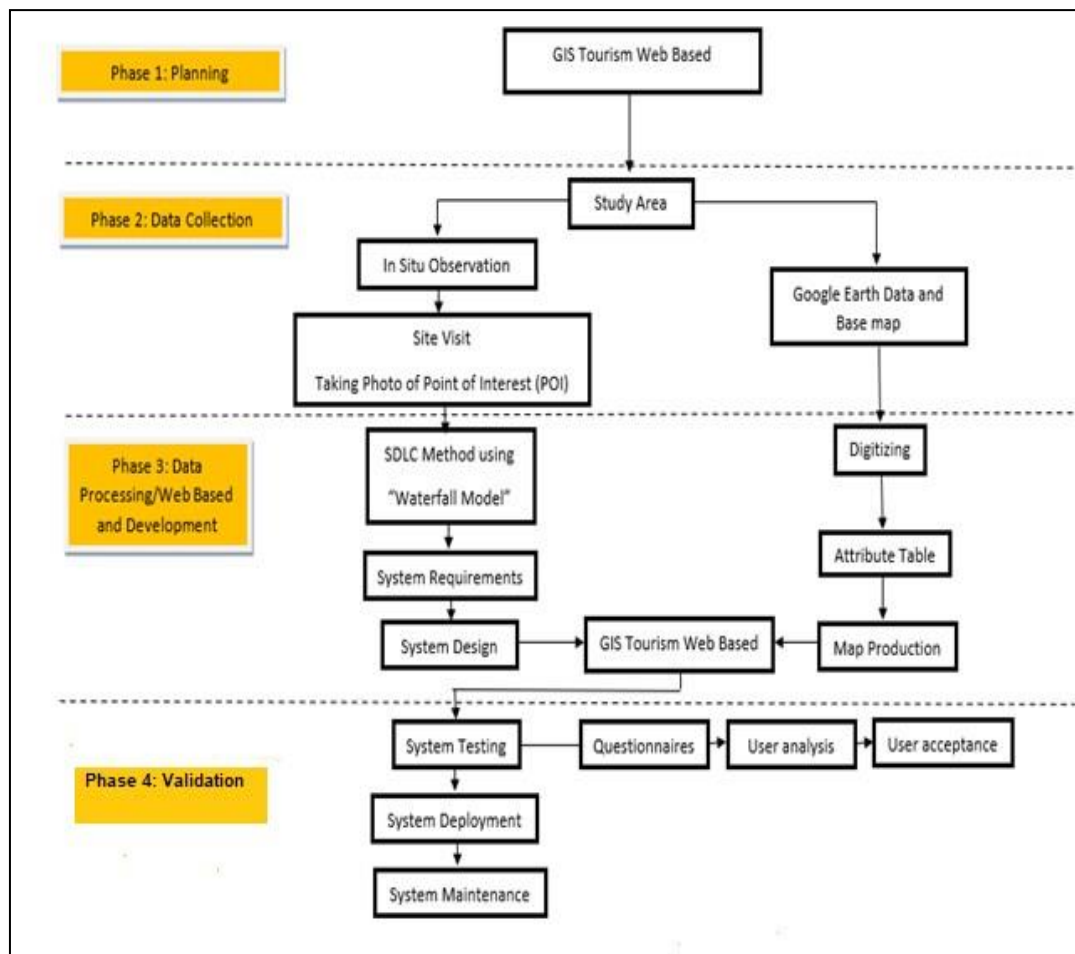
Figure 2: The Methodology Phases of This Project

Collect the Tourism Information and Places Using a Geospatial Approach.
In order to collect the tourism information and places using a geospatial approach, there are several steps to be carried out. First, a site visit to gain a general overview of the location. For this project, a site visit was carried out for taking photos of Point of Interest (POI). This POI comprises the image that has interesting value that have in the study area, like the old house buildings, small jetty, bridge, and the others. The images that have been captured are to be used in the development of tourism web based. Google Earth and basemap data were used as a reference to digitize the entire study area. This data is used to produce the detail in map production.

Develop Interactive Tourism Web-Based at Kampung Seberang Ramai.
Software Development Life Cycle (SDLC) method is used in developed web based using a waterfall model. There are five phases, which are system requirements, system design, system testing, system deployment and system maintenance. In the first phase, all system requirements to be developed are captured in this phase and documented in a requirement specification document. For the system design, the requirement specifications from the previous phase, this system design was helped in hardware specifying, system requirements and in defining the overall architecture system. In the last phase, which is system testing, are integrated into a system after testing or validate for each unit. The entire system is tested for

any faults and failures during the integration process. In system deployment, the product is deployed in the user environment or released into the market.

Validation the Output of Tourism Web-Based System.

The Validation system is used to test and analyze if the development is functional properly. Moreover, the map needs to indicate the area selected when the cursor moves on the maps. Thus, this needs to get user acceptance by giving the web-based sample and providing them with the questionnaire in the Google form. This questionnaire was used to analyze student satisfaction with the tourism web-based development. Hence, the developer can upgrade the web based, based on the response result and analysis. Students from the Faculty of Architecture, Planning and Surveying at the UiTM Perlis Branch were encouraged to use the web-based survey for assessment reasons. This stage was obtained from 30 respondents in order to get feedback about web-based development.

Results and Analysis

This study comprises the collection of tourism information and places using geospatial approach. From the data collected, the interactive web-based has been developed at Kampung Seberang Ramai and the analysis from user acceptance in system testing.

The Collected Tourism Information and Places Using a Geospatial Approach

Figure 3 indicates the interactive web maps based on tourism data. Despite the well-designed website, the Google Earth data and base map have been used as reference data in the digitizing process. The map included all the attractions collected during the site visit to Kampung Seberang Ramai. An attraction layer can be found on the left side of the screen view. The users could make their own decisions, and they contained widget capabilities to help with navigation, such as zooming in and out, as well as finding features using location and information query-search tools.

The data that has been collected from the site visit is used in the web map production. Data like POI photos, coordinates, and descriptions of the attractive places are used to create an interactive web map with information about the attractive places in Kampung Seberang Ramai. The layers in the map like building, bare land area, mangrove area, paddy, road, water bodies, and attractive places are produced by using ArcGIS 10.6 software by digitizing process and the marking location from Google Earth Pro. In addition, the generated layer will be imported to ArcGIS Online for web map development, as shown in Figure 3.

Figure 3: Interactive Web Maps Based On Tourism Data

Result and Description of The Web-Based Tourism Content

This section describes the performance of web-based tourism. The web-based development has been implied according to the respective flow of SDLC. The interface of the web-based has been screenshot with details specifically. The menu bar of the web-based was divided into six (6) sections, which are menu bar, content of the Kampung Seberang Ramai, point location of the attractive places at Kampung Seberang Ramai, list of attractive places at this village and contact us and give some comment.

Home Page

Homepage is the first page of the website, which is the user login or signs up on the page (Figure 4). On the same tab, this area's location is shown in Google Maps application to help the tourist find the area using their gadget. The information was information about the website, which provides a short and compact characterization of the village. The footer of the website comprises the social media button that links directly to Kampung Seberang Ramai like Facebook, Instagram, and YouTube, as shown in Figure 5. The existence of this platform should improve the standards of informative web-based tourism and one way to help the development of tourism in the country, especially for the locality.
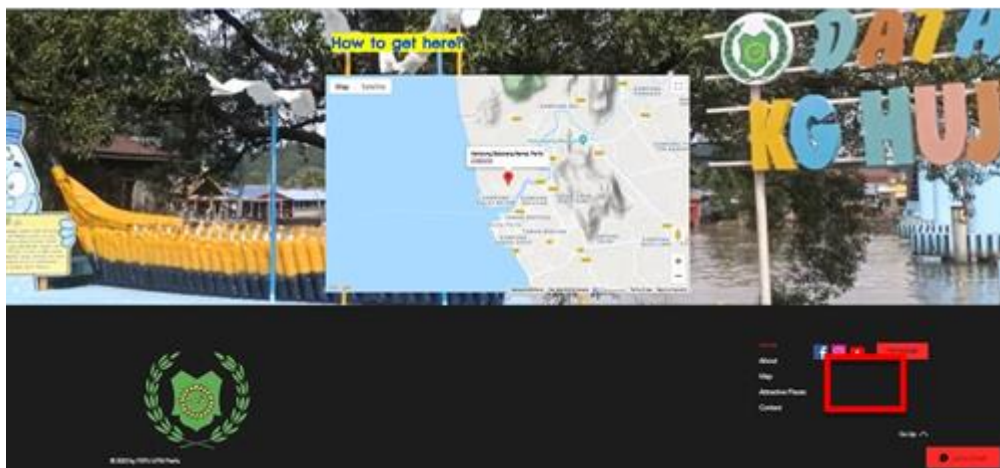
Figure 4: Home Page

Figure 5: Google Maps Plugin at Home Tab

The user can access this web by signing the e-mail at login or signing form. At the menu bar, the user can write the e-mail or log in using their Google account or Facebook account, as shown in Figure 6.

Figure 6: Login and Signing Page

Page Overview

The about page is the tab listed in the second order in web-based. This tab consists of the description of this village, such as a historical overview, coordinates for the entire area, the community, and the total houses in this village. In addition, this tab also notifies the user about the transformation of this village as a tourism place, the result of the initiative Tuanku Raja Muda Perlis and Perlis States government shows in Figure 7.
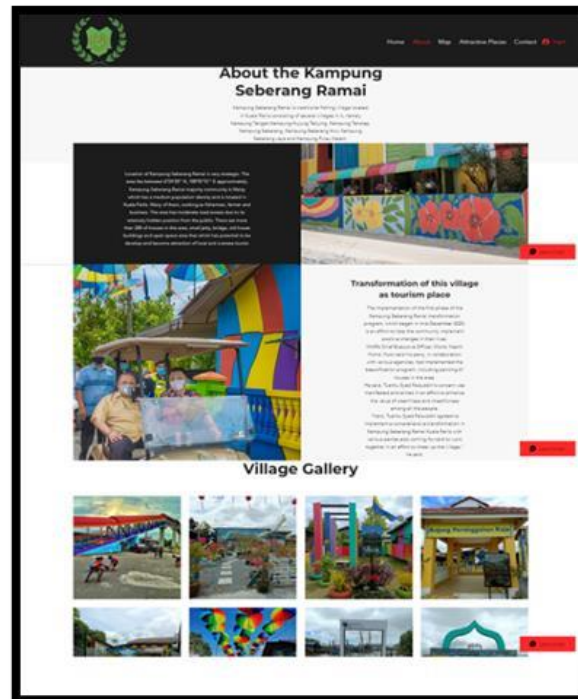

Figure 7: Page Overview

Interactive Map Page

Figure 8 shows the manuals on how to use the map to help users easily tour this website. The map is embedded from ArcGIS Online and displayed in Wix using embed tools from Wix Web Editor.

Figure 8: Manuals for User to Explore Map

The map can be zoomed in and zoom out to make the user easier and more suitable for the website. Based on that, the tourist can explore the map because the map was interactive and not static, plus they have a function for the query if tourist looking at something when using this website. The map can also be easier understandable because the different colors show the distinct information that is contained in the map. At the corner of the map, the student can refer to the legend (circles in Figure 9) to see the information of the point, lines and dots that contain.

Figure 9: Legend Button on The Map

Figure 10: The Legend Information

Figure 10 shows that the legend information. The map contains simple information about the attractive places and some facilities in Kampung Seberang Ramai. Based on that, the tourist can explore the map with colorful contents. Besides, when the user clicks the symbol on the located area, as shown in Figure 11. The pop-up information and photo from this web map may help tourists get an initial impression of this place. The map given for this initial model in constructing the web-based was two due to time limits, but the map offered more than enough to match the geomatic element requirement parts. According to Mokhtar et al., (2013) they mentioned in their study that GIS was integrating with spatial and non-spatial data models. Spatial data model focuses on the shape of the features such as road, building, tree, etc.. Therefore, several data models need to provide the digital maps that meet the demand of

Perlis tourists, such as service features (accommodation, facility's provided), fascinating places, transportation services and network.

Figure 11: The Pop-Up Information About Attractive Places

Attractive Places Page

The attractive places' page is the tab that lists the selected attractive places in Kampung Seberang Ramai as shown in Figure 12. In this tab, the blog post design is used because it is easy to arrange and looks systematic. The user can click on the topic title that is underlined to access the post that has been clicked. Masron et al., (2014) mentioned and agreed that most websites that use ArcGIS Online show their information through maps rather than text. This differs from most websites, which show information through text.
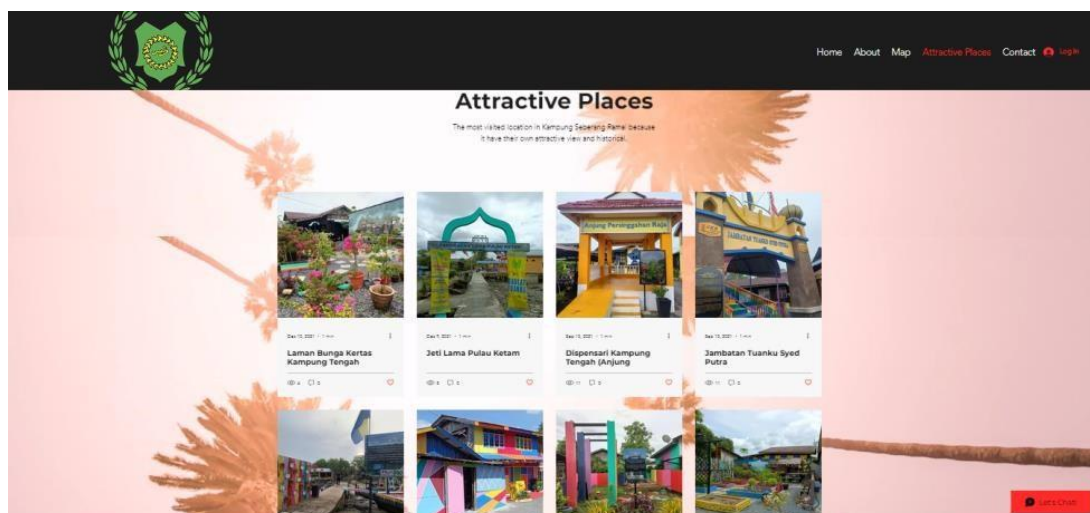

Figure 12: Attractive Places Page

If the user clicked on "Jambatan Tuanku Syed Putra", the content blog of Jambatan Tuanku Syed Putra will appear as shown in Figure 13. Furthermore, the user can click to take a

shortcut to go to the other post like the Jeti Lama Pulau Ketam that list in the recent posts, as shown in Figure 14.

Based on that, the analysis that can be made is the user can understand the content easily with the font sizing suitable for everyone to read. Mokhtar et al., (2013) mentioned in her research that Attractive Places Page can integrate with a multimedia approach. The Hyperlink button is used to link the physical location to an image, and a video of the facilities offered by the accommodation. It will help such as tourists decide what to do because the picture shown shows how the room really looks and what amenities hotels and homestay operators offer.

Moreover, if the user likes the post, they can share through Facebook, Twitter and LinkedIn or share the link that automatically generated by clicking the share symbol. The user also can comment directly on the post at the comment box to show their expression about the post.
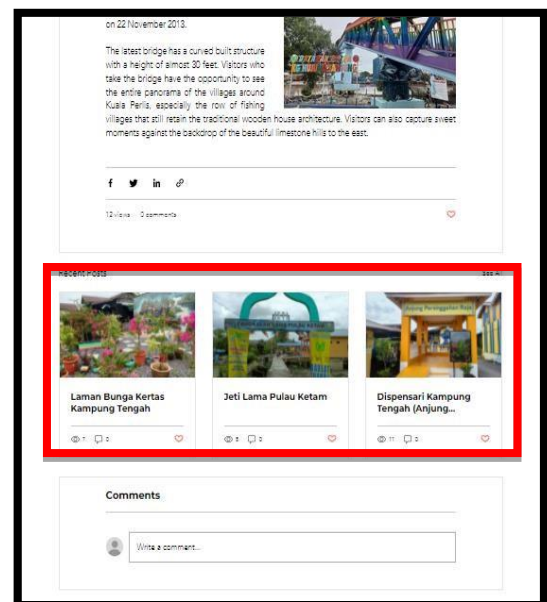

Figure 13: "Jambatan Tuanku Syed Putra" Blog Post

Figure 14: Recent Posts on the Attractive Places Tab

Result Of User Acceptance and Analysis

The evaluation was conducted by distributing the questionnaires to respondents in the Google form. Thirty (30) respondents evaluated the web-based development and generated feedback for web-based tourism content for web analysis. The completed questionnaire comprised two-part. The first part consists of a demographic information system, and the second part was the direct question about the satisfaction of web-based development. All the questions were direct for respondents to answer quickly.
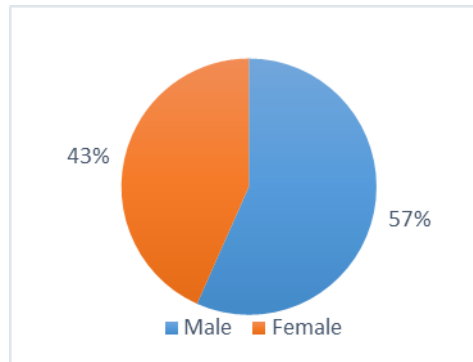
Demographic Information

Figure 15: Gender of Respondents

Based on Figure 15, the pie chart of gender respondents shows that 57% are the male respondents, while another 43% is the female respondents. It shows that males are more responsive to web-based information. More than half of respondents come from male participants or are viewed.
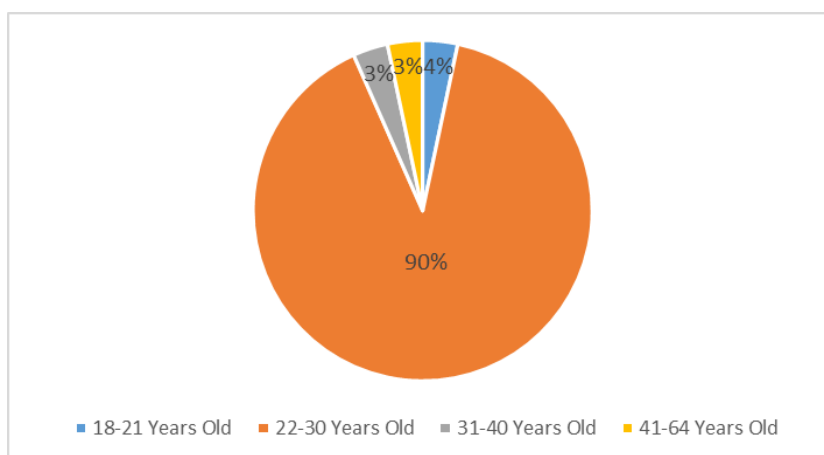

Figure 16: Pie Chart Shows Respondents Based On Ages.

Meanwhile, Figure 16 shows the pie chart of respondents based on ages. Based on that result, the ages that respond and rely on the website come from 22 to 30 years old, which is 90% of respondents. However, it is just 4% come from 18 to 21 years respondents and the rests are 3% 31-40 years old and 41-64 years-old respondent.

The Respondent's View for The Web That has Been Developed
According to Figure 17, it reveals that 90% of the respondent agreed and were interested in web development. However, 10% of the respondent did not agree and were interested in web development. Based on that result, we can conclude that the web-based presentation is acceptable because of the majority or 90% agreed. In contrast, they have 10% who were not cheerful about website development. But overall, the respondent agreed and was interested in web development.
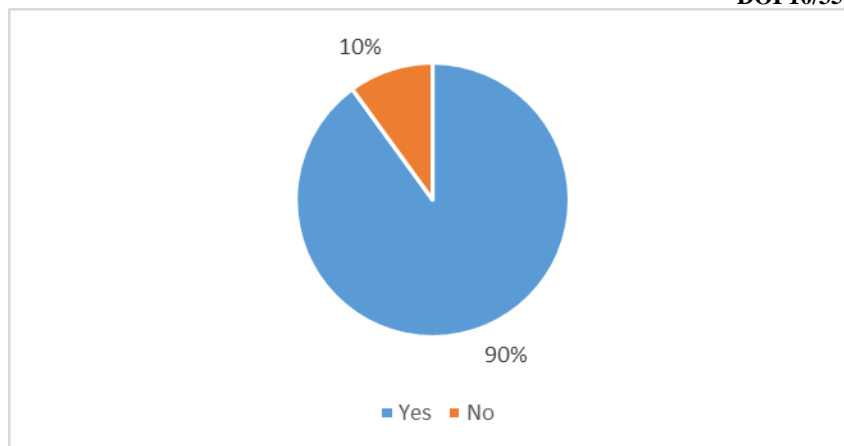
Figure 17: Question 1 (After Accessing the Attached Link, Respondent Opinion, How Does The Web Look, Is It Interesting?)

Therefore, many respondents agreed the website was easier to access and friendly use. A study conducted by Chen et al., (2022); Mahdi and Esztergár-Kiss, (2021); Masron et al., (2014); Mokhtar et al., (2013); Othman et al., (2010) found the most significant positive impact of respondent's view of the web that has been developed for tourism. The benefits of using GIS Web have also been supported by Mokhtar et al., (2013) in their study in Perlis's Tourism: Accommodation and Facilities Determination Based on GIS Application' which said GIS was used to figure out where to put a new tourist spot while trying to keep a natural area in good shape. Because of this, the GIS applications can make tourism planning stronger.
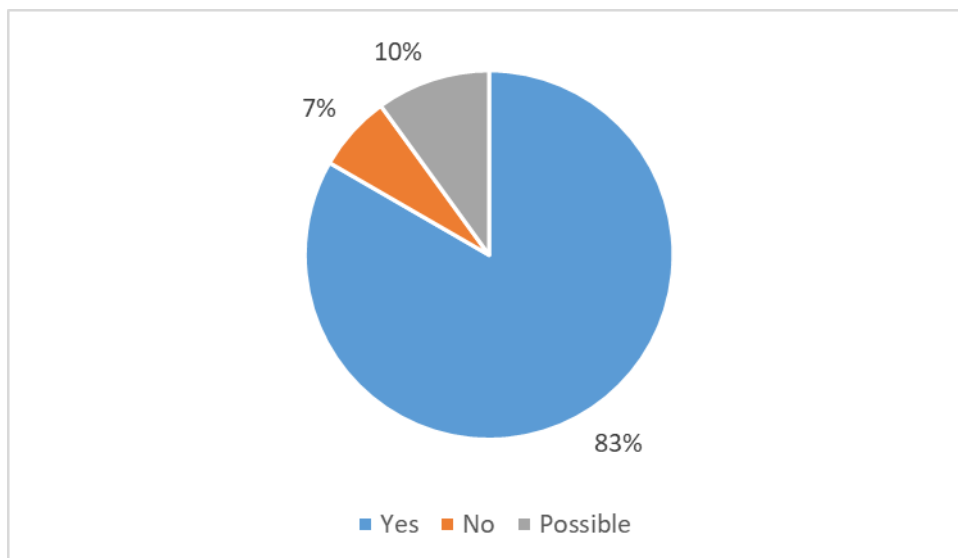

Figure 18: Question 7 (Overall, Are Users Satisfied With The Web They Access?)

Figure 18 shows that about 83% of respondents were satisfied with the web-based content. However, about 7% did not satisfy, and 10% did not know, which leads the web-based needs to be upgraded and improved. However, overall, the web-based was to meet the convenience and functionality for the user to use this web.

Conclusion

Finally, all objectives of this study were successfully achieved. The web-based development was implied according to the particular flow of SDLC using the waterfall model. During the system testing, the web-based development can be analyzed by distributing a questionnaire to analyze the users' satisfaction with the web-based development of GIS. The result of the web map has been successfully developed. The map is easier to understand because the different colors indicate the different information on the map. In addition, the web-based tourism development can help tourists get a first impression of the place based on the description and history included in the web map. The system testing showed that 83% of the respondents who evaluated the questionnaires were satisfied with the web-based content. The interactive web-based questionnaires were developed to meet the standard. This web-based platform allowed people from all over the world to stay in touch with attractive location. Therefore, the local villages in terms of profit in the socioeconomic sector will get a benefit.

References

Almaimoni, H., Altuwaijri, N., Asiry, F., Aldossary, S., and Alsmadi, M. 2018. "Developing And Implementing WEB-Based Online Destination Information Management System for Tourism." International Journal of Applied Engineering Research 13(10): 7541–50.

Chen, Y. C., Hsiao, L. Y., Shou, D. W., and Yang, F. T. 2022. "An Analysis of the Optimal Facility Location of Tourism Industry in Plain Region by Utilizing GIS." SAGE Open 12(2).

Deloney, L. A., Perrot, L. J., Lensing, S. Y., and Jambhekar, K. 2014. Radiology resident recruitment: A study of the impact of web-based information and interview day activities. Academic Radiology, 21(7), 931–937. https://doi.org/10.1016/j.acra.2014.03.009

Ibrahim, I., Zakariya, K., and Wahab, N. A. 2018. "Satellite Image Analysis along the Kuala Selangor to Sabak Bernam Rural Tourism Routes." IOP Conference Series: Earth and Environmental Science 117(1).

Illum, S. F., Ivanov, S. H., & Liang, Y. 2010. Using virtual communities in tourism research. Tourism Management, 31(3), 335–340. https://doi.org/10.1016/j.tourman.2009.03.012

Kimbu, A., 2011. "The Challenges of Marketing Tourism Destinations in the Central African Subregion: The Cameroon Example." International Journal of Tourism Research 113(November 2012): 101–13.

Lepp, A., Gibson, H., & Lane, C. 2014. The Effect of Uganda's Official Tourism Website on Travel Motivations and Constraints. Journal of Travel and Tourism Marketing, 31(6), 712–730. https://doi.org/10.1080/10548408.2014.884967

Lin, H. F. 2007. The role of online and offline features in sustaining virtual communities: An empirical study. Internet Research, 17(2), 119–138. https://doi.org/10.1108/10662240710736997

Mahdi, A., and Domokos E. 2021. "Modelling the Accommodation Preferences of Tourists by Combining Fuzzy-AHP and GIS Methods." Journal of Advanced Transportation 2021.

Mango, J., Ebru. Ç., and Xiang L. 2021. "Web-Based GIS for Managing and Promoting Tourism in Sub-Saharan Africa." Current Issues in Tourism 24(2): 211–27.

Masron, T., Azizan, M., Badaruddin, M., and Norizawati, M. A. 2014. "Conceptualise Tourism Support System Through Web-Based Gis for Collaborative Tourism Planning." Planning Malaysia Journal 12(4).

Mokhtar, S. E., Zainal, N., Abdul Wahab, S. M., Yusof, N. A., and Nayan, S. 2013. "Perlis's Tourism: Accomodation and Facilities Determination Based on GIS Application." International Conference on Tourism (February): 292–300. http://eprints.usm.my/35003/1/HBP30.pdf.

Othman, A. G., Mohamed, B., Bahauddin, A., Mat Som, A. P., and Omar, S. I. 2010. "A Geographic Information System Based Approach for Mapping Tourist Accommodations in the East Coast States of Malaysia." World Applied Sciences Journal 10(May 2014): 14–23.

Rahman, A., 2010. A Masters Thesis "Application of GIS in Ecotourism Development: A Case Study in Sundarbans, Bangladesh."

Sabet, T., Mozghan, A. F., and Sajedeh, B. 2022. "An Application of Remote Sensing Imagery for Geological Lineaments Extraction over Kaybarkuh Region in East of Iran." World Journal of Geomatics and Geosciences 2(1): 1–23.

Sipkes, J. 2002. "Use of GIS and Remote Sensing in East Africa." GIM International 16(3): 6–9.

Wei 2012. "Research on the Application of Geographic Information System in Tourism Management." Procedia Environmental Sciences 12(Icese 2011): 1104–9.

World Travel & Tourism Council. 2019. Travel and Tourism Economic Impact 2019. London, UK.

Zamrodah, Y. 2017. "Tourism Mapping: An Overview of Cartography And The Use Of GIS." BIMP-EAGA Journal for Sustainable Tourism Development Volume 6(1): 61–67.