

# BOOSTING THE PROMOTION OF MALAYSIAN GEOSITES THROUGH DIGITAL PLATFORM IN THE NEW NORMAL TIMES

Muhammad Mustadza Mazni<sup>1\*</sup>, Norbert Simon<sup>2</sup>, Anuar Ishak<sup>1</sup>, Abd Rahim Harun<sup>1</sup>,  
 Zamri Ramli<sup>1</sup>, Dana Badang<sup>3</sup>, Che Aziz Ali<sup>2</sup>

<sup>1</sup> *Department of Mineral and Geoscience Malaysia, Headquarters*

<sup>2</sup> *Geology Program, Department of Earth Science and Environment, Universiti Kebangsaan Malaysia*

<sup>3</sup> *Department of Mineral and Geoscience Malaysia, Sarawak*

*\*Corresponding author: mustadza@jmg.gov.my*

Received 17 March 2021; Accepted 22 July 2021.

## Abstract

Undeterred by the interrupted local and global activities due to the current health crisis, the Department of Mineral and Geoscience Malaysia (JMG) has boosted its promotion of geological sites and related information to the public. The JMG has initiated the creation of a smartphone application called ‘MYGeotapak’, which directly translates to ‘Malaysian Geosites’ in English. Initially, the application was solely for within-department and expert use. Given the significance of sharing such a platform to the public, its second version will be soon available for public use. Both versions include information on Malaysian geosites. The first version was successfully launched in early March 2020 in collaboration with the Malaysian Geoheritage Group and local university representatives. Surprisingly, it garnered 205 views on YouTube, 241 application downloads and 240 user manual downloads in eight months. The sites containing this material were also visited by more than 1,047 viewers. However, the first version is not available in the Apple Store and Google Play Store. The continuous effort by the JMG to promote Malaysian geosites resulted in the second version of the application, which contains hundreds of potential geosites around the country. The current version also boasts innovative and interactive tools, which are an improvement from its predecessor. This latest application, which is currently in its prototype phase, follows the ISO MS1759 (geology) standard. This user-friendly application suits the requirements of the general public. This application is part of JMG’s effort to promote awareness amongst the public on the significance and wonders of geological heritage in the country. It also serves as an alternative for the roadshows often carried out around the country before the pandemic. Other efforts for conservation and promotion of geosites in Malaysia are currently being planned and will be utilising the digital platform.

**Keywords:** Digital Platform, Geoheritage, Malaysian Geosites, MYGeotapak

## 1. Introduction

Geotourism is a national effort under the sustainable tourism programmes, which has gain momentum in recent years. However, this initiative would be for nothing if not shared with the public (Filocamo, 2020). Aside from its economic benefits, people learn the history of the earth through its concepts. Hence, the promoted sites can become the natural capital of the people (Gray, 2019). The term ‘natural capital’ refers to the world’s stock of natural assets, which also includes geology (<https://naturalcapitalforum.com/about/>).

Digital devices and platforms have altered science and are driving new ways to deal with geoheritage and geotourism education, communication and interaction amongst the public (Tormey, 2019). Few applications or digital platforms for geotourism contain geosite descriptions, glossary, geological itineraries, sketch maps and other non-geological sites, such as cultural and natural sites (Filocamo et al., 2020).

Researchers (e.g. Norbert et al., 2018) from the Malaysian Geoheritage Group and the Department of Minerals and Geoscience (JMG) utilised web applications to promote geosites around the country. They employed the Story

Map tool, which is an opensource web application made by ESRI. The proposed web applications present geothermal sites with basic scientific information for the Gombak-Hulu Langat National Geopark and different rock types and their petrographic minerals around the famous Dayang Bunting Geoforest Park in the Langkawi UNESCO Global Geopark.

Digital platforms have greatly contributed to many aspects during the current pandemic. Nowadays, government agencies, education institutions and businesses are rapidly changing their ways to adapt to this new norm without comprising the quality of service as provided before. The current pandemic situation has highlighted the significance of advance technologies for governments and businesses to continue their activities. The education sector also has the same needs (Tejedor et al., 2020).

On the basis of the above discussion, introducing geology to the public is relevant, especially during the current health crisis where social gatherings are prohibited, and travel is minimal and supervised. Thus, the JMG, together with the Malaysian Geoheritage Group and pool of educators, has initiated the creation of a smartphone application called 'MYGeotapak' (Malaysian Geosites). This application provides graphic information on some of the geosites around Malaysia. This project aims to create awareness and promote these sites continuously even during these trying times. This study presents the proposed design, achievements and future improvements of the MYGeotapak application.

## 2. Methodology

Ease of use and satisfactory user experience are the primary focus in designing applications for public use. In general, geology is not a common subject to lay people, and apprehending specific fields in geology, such as geoconservation, geotourism and 'geosites', would be more difficult to the public. The schematic in Fig. 1 presents the application design. The design flow is as follows: Users are first presented with a walkthrough page, which contains a tutorial on how to use the application, followed by a 'discover' page that

displays the application's main themes (geosite, geopark and geodiversity). Users can navigate these themes through their menu, which contains the definition and list of locations. The menu also provides other information, such as glossary, disclaimer and tutorial pages apart from simple explanations on each site.

The first version of MYGeotapak mainly includes 348 geosites in 11 states and the Federal Territory (Table 1). However, the application does not yet include all the geosites in Malaysia. This inventory thus requires further studies and continuous updates. To date, the sites provided in the application have almost complete information.

### a) Geodiversity Option

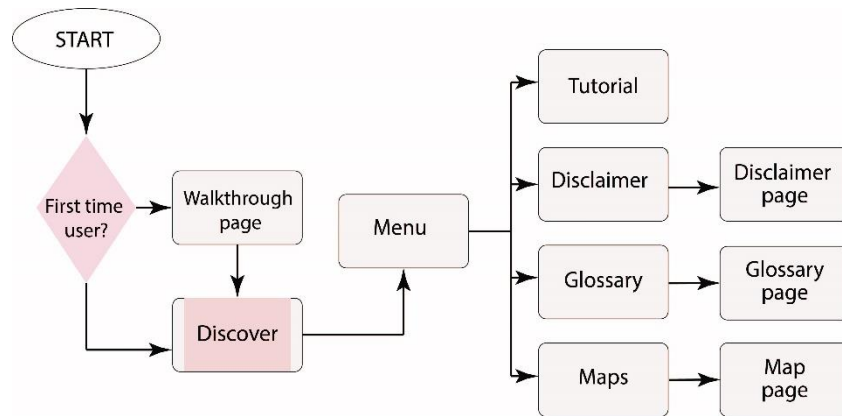
The application categorises the sites for each state into different geodiversity groups. Some sites naturally have multiple geodiversity categories. This option helps users discover the uniqueness of each state on the basis of the given categories. These categories involve nine geodiversity groups as follows: rock types, minerals, fossils, geological structures, stratigraphy, geological process, landforms/landscapes, geohazards and geological sites (e.g. mining area). These sites showcase the geodiversity of each state. Table 2 presents the site distribution.

### b) Site Information

The site description includes no geological jargons or complex terms to facilitate understanding amongst the public. Each site has six information headings. Table 3 shows the information and rationale of each heading for end users.

### c) Geological Map

The geological map provided in the application is for geologists and non-experts who wish to know about the distribution of rock types and their ages in Malaysia. The location of the geosites is overlaid on top of the map provided for users. In this way, users can easily identify them with geological information provided with the geological map. Users can simply click on the map to view or read the geological attribute of their choice.



**Fig. 1:** Workflow schematic diagram for the MYGeotapak App.

**Table 1:** Number of geological sites and geosites in Malaysia.

State	Number of Geological site/geosite
Negeri Sembilan	53
Sarawak	52
Johor	43
Kelantan	36
Pahang	33
Terengganu	30
Sabah	27
Kedah	24
Perak	18
Perlis	12
Labuan	11
Selangor	9
<b>Total</b>	<b>348</b>

**Table 2:** The distribution in percentage of sites that have various geodiversity in each state.

State	Sites	Rock	Min	Fos	Struc	Strat	Proc	Land	GeoH	GeoS
Negeri Sembilan	53	15%	-	-	24%	-	-	46%	-	3%
Sarawak	52	23%	9%	7%	15%	-	9%	35%	-	3%
Johor	43	39%	3%	3%	16%	4%	-	36%	-	-
Kelantan	36	22%	5%	6%	30%	-	2%	3%	-	4%
Pahang	33	42%	-	10%	-	-	-	48%	-	-
Terengganu	30	42%	6%	7%	24%	-	-	18%	-	4%
Sabah	27	36%	5%	-	18%	-	-	38%	3%	-
Kedah	24	39%	12%	6%	-	6%	-	24%	6%	6%
Perak	18	34%	7%	7%	17%	-	-	34%	-	-
Perlis	12	5%	14%	29%	-	14%	-	24%	-	14%
Labuan	11	-	33%	8%	21%	8%	-	8%	-	21%
Selangor	9	-	-	-	56%	-	-	33%	-	11%

**Note:** Rock = rock type; Min = Mineral; Fos = Fossil; Struc = Geological structure; Strat = Stratigraphy; Proc = Geological process; Land = Landform/landscape; GeoH = Geohazard; GeoS = Geological site (e.g. mining area).

**Table 3:** Description of each information group provided for end user in the application.

Information	Description
Name of geological site/ geosite	Conventional geological site/geosite's name that is commonly practiced in geoheritage.
Location	Based on known location that is familiar to the local such as district, place of attraction
GPS Coordinate	For better accuracy, user can use the coordinates to find ways to get to the site's location
Age	Given in 'numbers' (e.g 15 million years instead of geological age (e.g. Miocene)
Geoheritage value	The values which are often described as scientific, recreational, aesthetic
Short description	Some explanation on the site and what can be expected when the user reaches the location

They can also acquire site information by tapping the location icon on the geological map.

#### d) *User Manual*

The application includes a user manual as one of the promotional efforts by the JMG. This feature allows users to be familiarised with the application and its system requirements. The manual also explains the contents and the distribution of geosites for each state. The manual design is similar to a catalogue. In this way, users can obtain relevant information before installing the application without taking the fun out of the process.

### 3. Result and Discussion

The first version was successfully launched in early March 2020 in collaboration with the Malaysian Geoheritage Group and a pool of scholars (Fig. 2). However, this version is not available in the Apple Store and Google Play Store. Initially, the application was created specifically for internal use only. Later on, the JMG perceived the significance of the application on the promotion of the valuable sites in Malaysia amongst the public.

Hence, the application's user manual and montage video was made available in the JMG official websites for the public to download. From mid-March to 28 November 2020, the application garnered 205 views on YouTube, 241 application downloads, 240 user manual downloads and 1,047 viewers (Fig. 3). These numbers are encouraging as this application has been only made available on the web for

around eight months, and this subject is somewhat new to the public. The JMG believes that the above statistics will reach new records if the application becomes available in the Google Play Store.

The second version of MYGeotapak application is a complete revamp of the previous version. It contains better interactive features and additional information, which are valuable for geologists and non-expert users. The second version introduces the following innovative features:

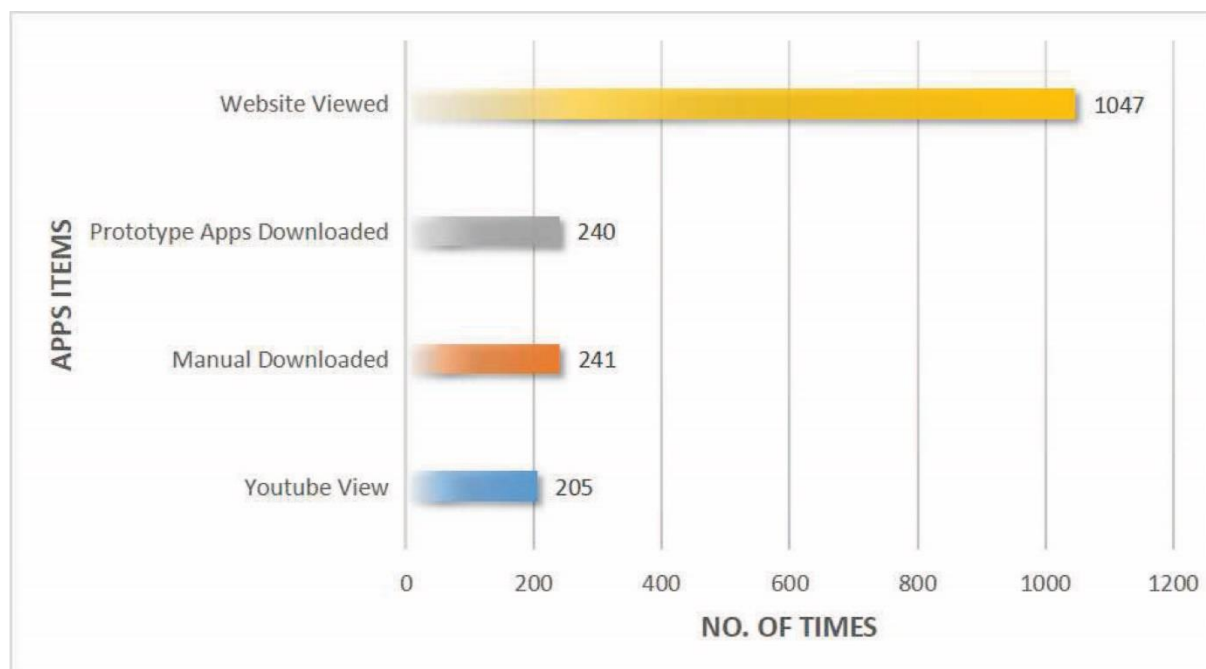
- Step-by-step tutorial on how to use the application
- Splash screen
- Definition of terms, such as 'what is geodiversity', for each page
- Three selections to view sites in Malaysia (geosite, geopark and geodiversity)
- Glossary
- Search and filter capability
- Number of sites displayed for each state
- Point location on a map for each site
- Biosites

The second version of the application comprises a step-by-step tutorial displayed at the launch screen. This feature is a great improvement from the previous version and a good starting point for users to learn about geological heritage (Fig. 4). The application also defines special geological terms, especially on the main categories (geosite, geopark and geodiversity; Fig. 5). Each category design follows the significance of geological heritage and geoconservation fields.





**Fig. 2:** The framework for the first version of MYGeotapak app (a) Geological map of the area (b) Google map (c) Menu bar (d) Developer contact (e) Manual on using the app (f) The main interface (g) Distribution of geosites (h) Information for each geosite.



**Fig. 3:** Statistics of visitors viewing and downloading the 1<sup>st</sup> version MYGeotapak Apps and manual.

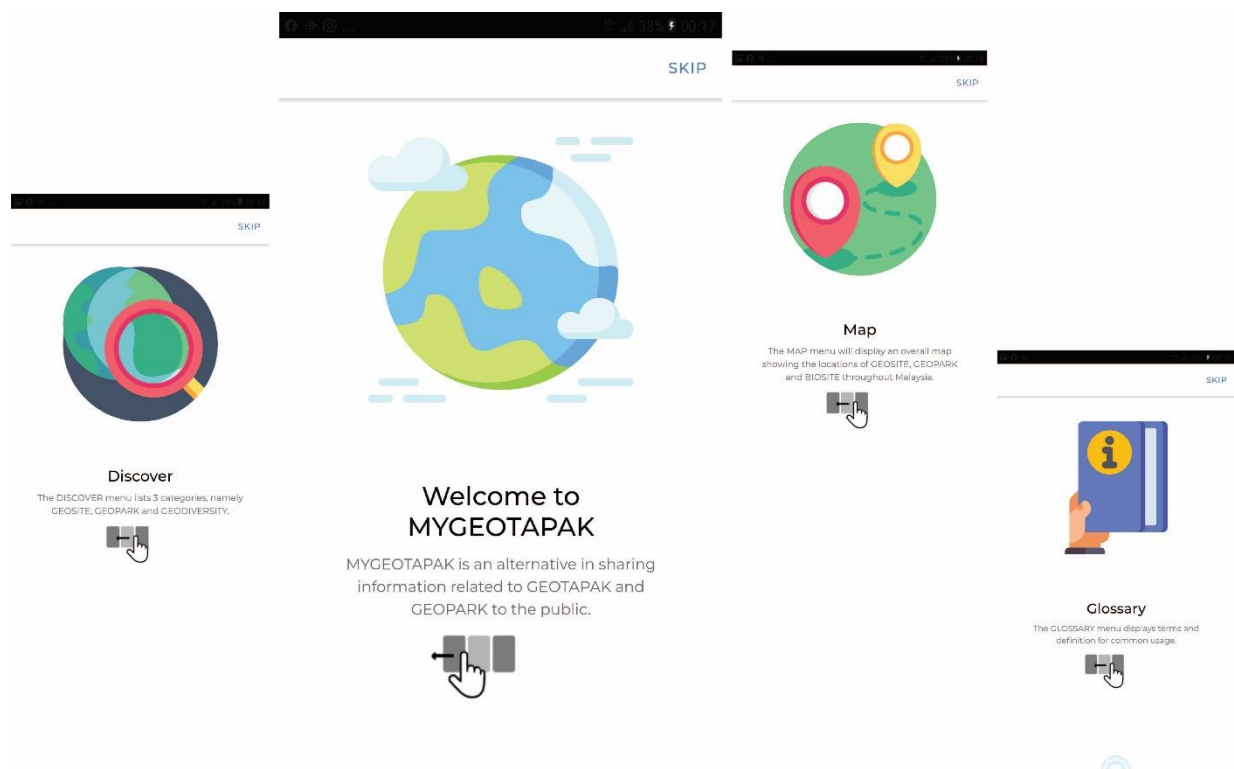
The geosite category comprises geological sites in each state (Figs. 6 and 7), and the geopark category includes UNESCO Geopark and National Geopark in Malaysia (Fig. 8). The division of the featured geosites follows their geodiversity category. Users can obtain information about each site by pinpointing their location on the map (Fig. 9). A glossary of scientific terms is also available for those terms that geologists commonly use, facilitating understanding amongst non-experts (Fig. 10; Filocamo et al., 2020).

The current version and innovations of the application are all products of detailed consultation with experts and fruitful investigations on users' requirements. The application follows the recommended standard practice for geology in Malaysia (i.e. ISO MS1759) and the technology of geographic information systems (GIS). The updates of the GIS-based application can be done through its GIS platform. To date, the application is at the last phases of its testing stage and will be soon be available for public

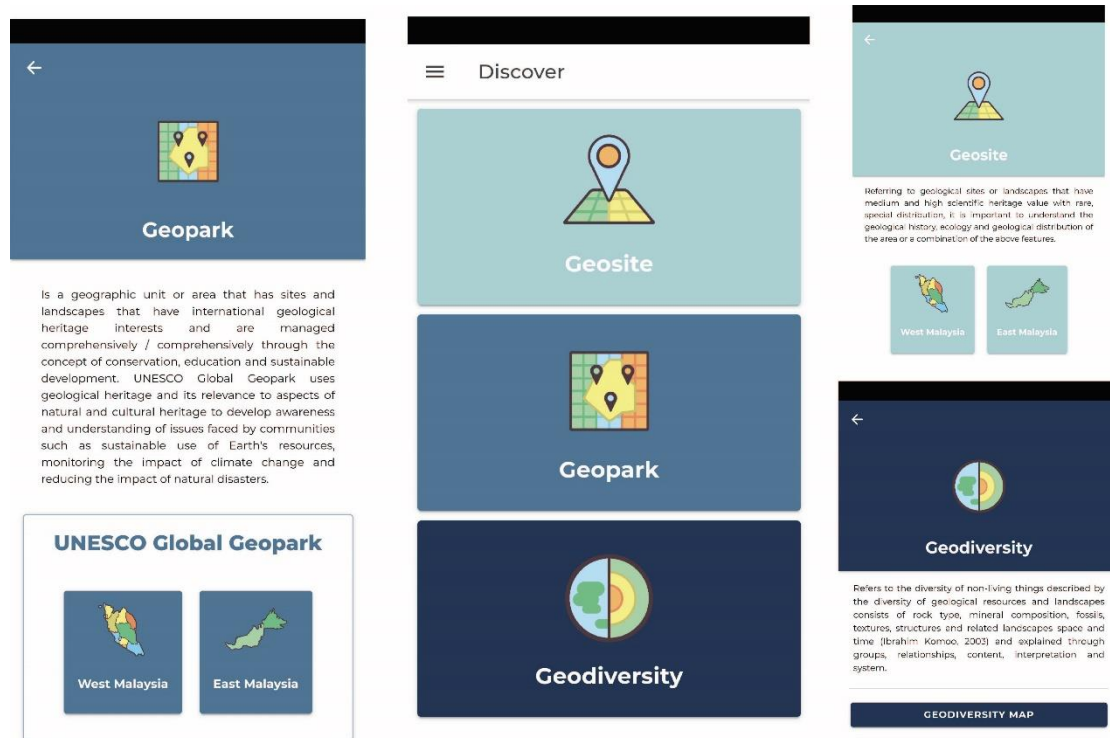
use. Similar to its previous version, the JMG believes that this innovation will promote further information dissemination to the public. Li et al. (2015) indicated that smartphone applications would accelerate information sharing on geopark and geoeducation amongst the public. Connecting the importance of geoheritage values to the people at large will foster the appreciation of geoconservation and geoheritage (Tormey, 2019).

#### 4. Conclusion

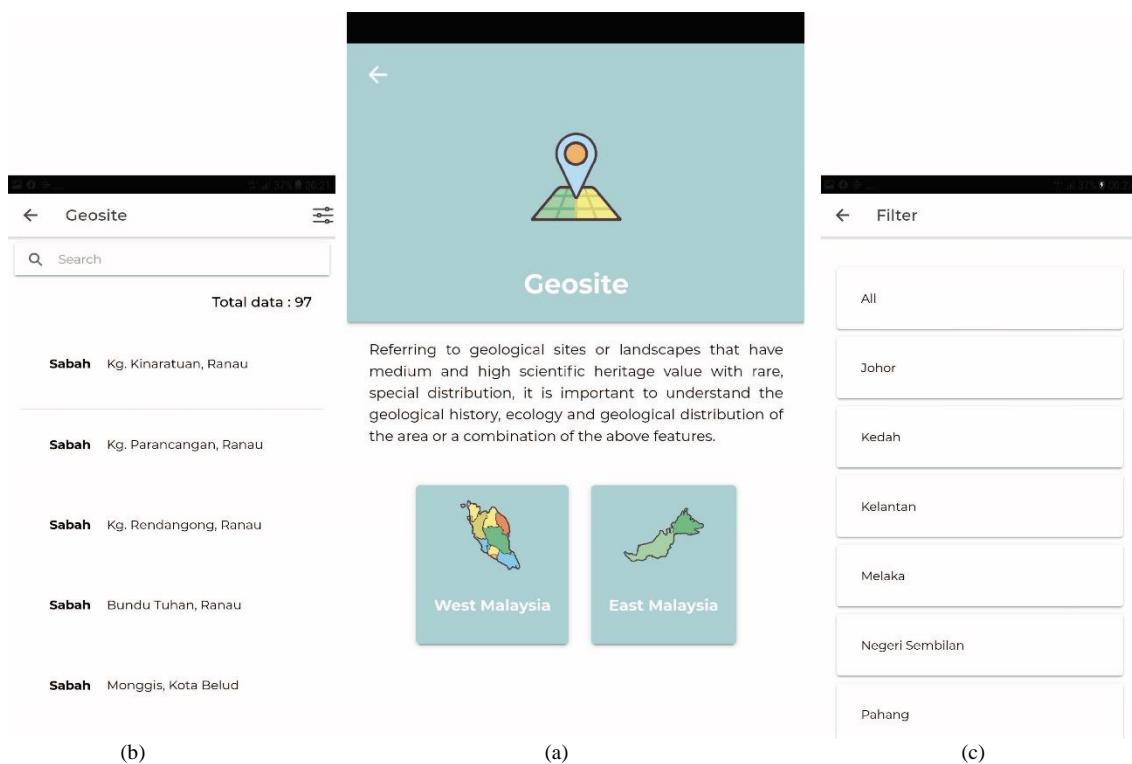
Although the current health crisis has disrupted many governmental projects and scholarly activities, the JMG has taken proactive steps to maximise the efforts to promote geology to the public through technological and digital approaches. The JMG hopes that the launching of the MYGeotapak application and other upcoming digital innovations will help instil geoconservation awareness to each user.



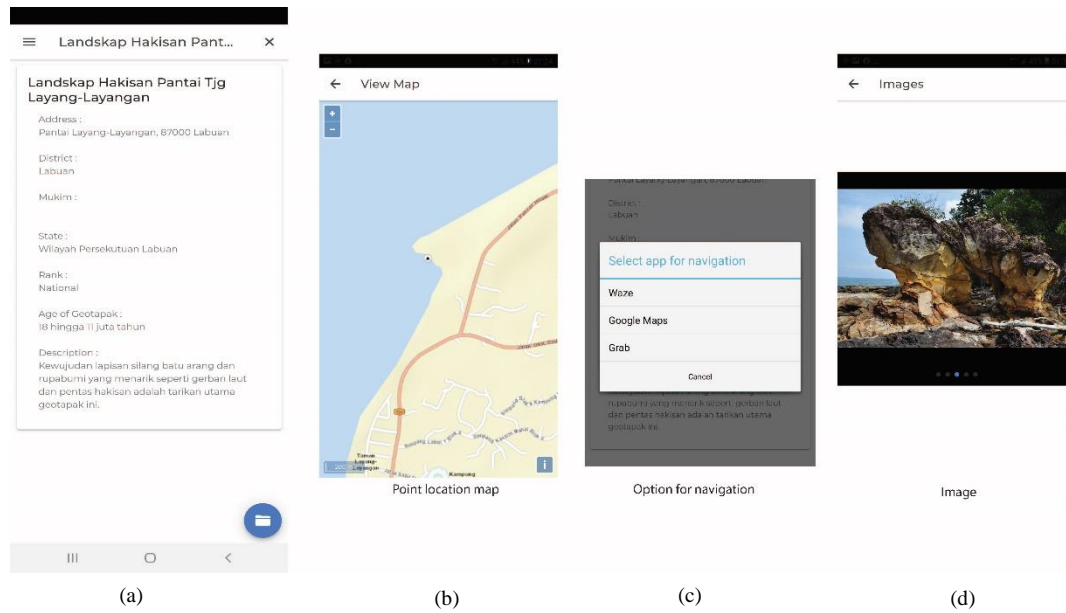
**Fig. 4:** The welcoming screen displays basic information and short tutorial for user to get familiar with the apps.



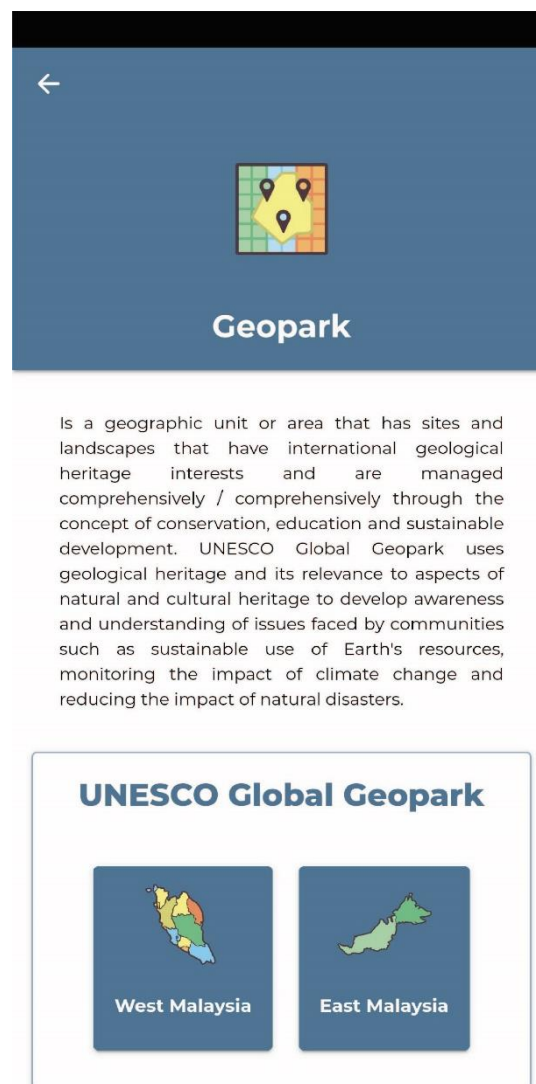
**Fig. 5:** Three categories for site selections. The Geosite category shows the distribution and information of each geosites in Malaysia; the Geopark tab showcases the UNESCO Global Geopark and National Geoparks; and the Geodiversity tab displays different groups of geodiversity in each geosite.



**Fig. 6:** Information on each geosite can be viewed through different filters (a) West and East Malaysia (b) Through different states (c) Example of geosites in the state of Sabah.



**Fig. 7:** Comprehensive information on a geosite and location (a) Information on a geosite (b) Its location on a map (c) Geosite picture and (d) Ways to get there.



**Fig. 8:** This page displays the geopark tab in the West and East Malaysia.



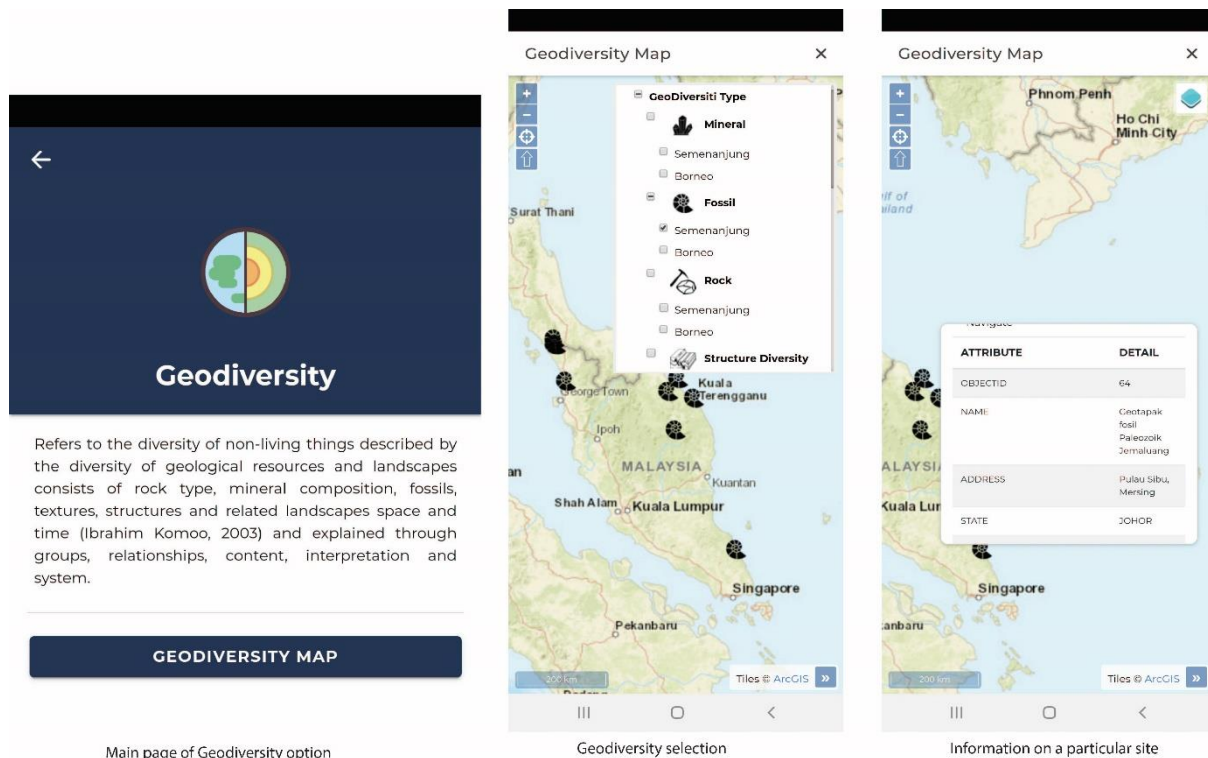


Fig. 9: Web pages showing various information on geodiversity in the application.

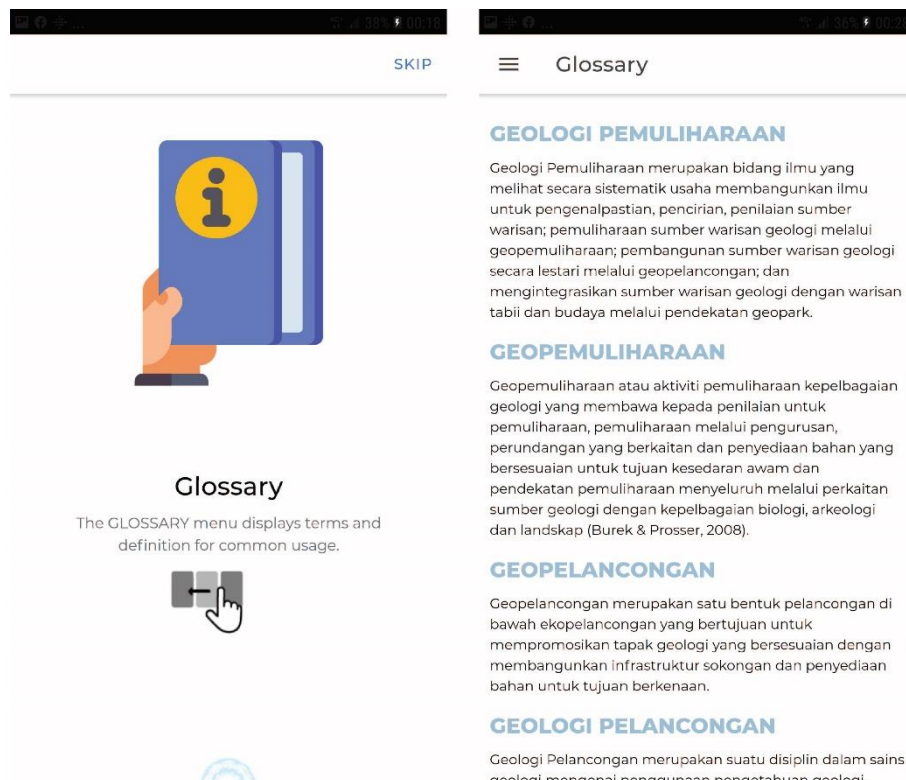


Fig. 10: Web page showing the glossary for speciic terms in the application. At the moment, only terms in Malay are provided in the app.

## Acknowledgments

The authors would like to thank the Director General of Department of Mineral and Geoscience Malaysia (JMG), Geoscience Planning Unit, JMG Headquarters, all JMG Geoscience Officers in every state for their advice and contributions. Also a special thanks to researchers from the Malaysian Geoheritage Group (KWGM) and the Geology Department of the Universiti Kebangsaan Malaysia for their expertise and contributions.

## References

- Filocamo F., Di Paola, G., Mastrobuono L., & Roskopf, C.M. (2020). MoGeo, a mobile application to promote geotourism in Molise Region (Southern Italy). *Resources*, 9(31), doi:10.3390/resources9030031.
- Gray, M. (2019). Geodiversity, geoheritage and geoconservation for society. *International Journal of Geoheritage and Parks*, 7, 226-236.
- Li, Q., Tian, M., Li, M., Shi, Y., and Zhou, X. (2015). Toward smartphone applications for geoparks information and interpretation systems in China. *Open Geoscience*, 1, 663-677.
- Saliola, F. & Islam, A.M. (2020, September 24) How to harness the digital transformation of the Covid Era. *Harvard Business Review*, <https://hbr.org/2020/09/how-to-harness-the-digital-transformation-of-the-covid-era>
- Simon, N., Ali, C. A., Sarman, M., Badang, D., Unjah, T., & Rahman M. N. (2018). AN Inventory Database For Geoeducational Outreach Based On Volunteered Geographic Information (VGI) Approach In Malaysia. *GeoJournal of Tourism and Geosites*, 23(3), 684–701. <https://doi.org/10.30892/gtg.23306-320>
- Tejedor, S., Cervi, L., Perez-Escoda, A., & Jumbo, F.T. (2020). Digital Literacy and Higher Education during COVID-19 Lockdown: Spain, Italy, and Ecuador. *Publications*, 8(48). doi:10.3390/publications8040048
- Tormey, D. (2019). New approaches to communication and education through geoheritage. *International Journal of Geoheritage and Parks*, 7, 192-198.