



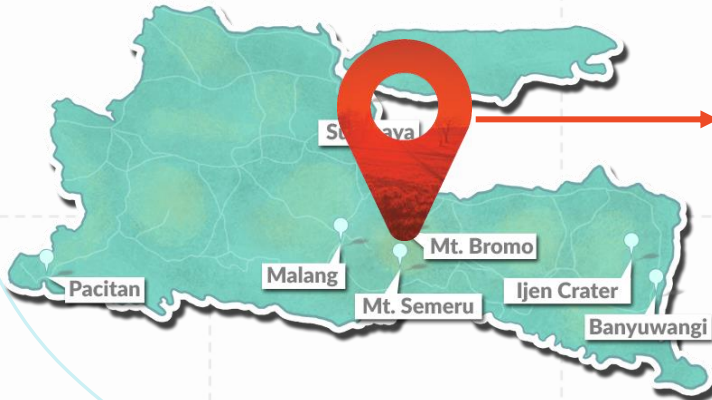
# **PROMOTING BROMO GEOLOGICAL HERITAGE: DEVELOPMENT STORY MAPS AS WEB GEOGRAPHIC INFORMATION SYSTEMS FOR EDUTOURISM**

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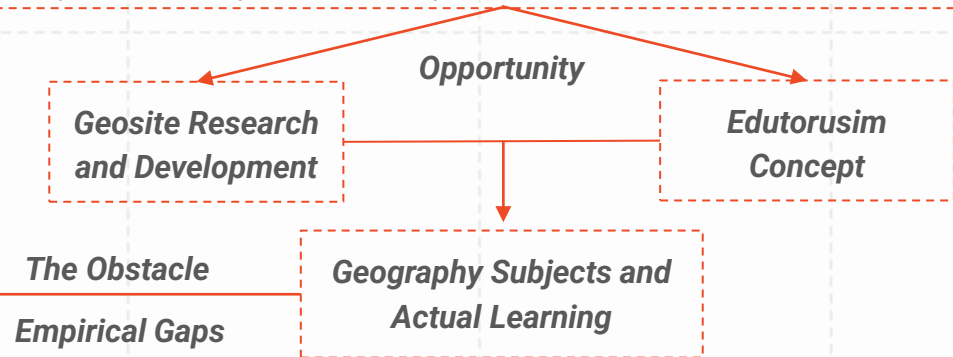
**The 5th IGEOS: International Geography Seminar  
Universitas Pendidikan Indonesia  
November 29, 2021**

# Introduction



Administratively, the location of **Mount Bromo (2,329 masl)** is in the province of East Java, Indonesia. Forming as a result of the **macro-genetic process the complex geological activity** of the subduction zone (Types of Form and Eruption). But Also the diversity of **Biodiversity and Community**.

1. It's only **10% Universities Implementation of Filed Activity** (Geography Teaching and Learning, including Edutourism)
2. The **accessibility** aspects are **costs and risks**.
3. The various regulations in education and teaching during the **COVID-19 pandemic** affected **field learning activities**.



**Edutourism and Geosites have great potential in the study of Geography**

1. **Learning Object** → **Contextual Practice**
2. **Edutourism as Natural Laboratory** → **comprehensive exploration of learning materials**
3. **Fostering Student's Geographical Literacy**

**“Web Geographic Information Systems (GIS) Story maps of Geography Edutourism”**

# Literature Review



## Geological Heritage

A site that contains information on the dynamics of the planet Earth.



## Education Tourism

A combining tourism activities with the learning-learning process



## Web-GIS

The cloud-based geospatial technology represent geosphere phenomena



# Methods

## Object of Research

- Mount Bromo, East Java, Indonesia
- Elevation 2,329 masl
- Geological Unit Bojp (pyroclastic fall deposits)



## Research Methods

- Research and Development (R&D)
- ADDIE Model namely 1). Analyze; 2). Design; 3). Develop; 4). Implementation; and 5). Evaluation



## Prototype Design and Framework Development

- constructed with three main contents, namely 1). ArcGIS Online Content; 2). Research Data (Primary and Secondary Data); 3). Web Content (Articles, Posters/Infographics, and YouTube Videos)



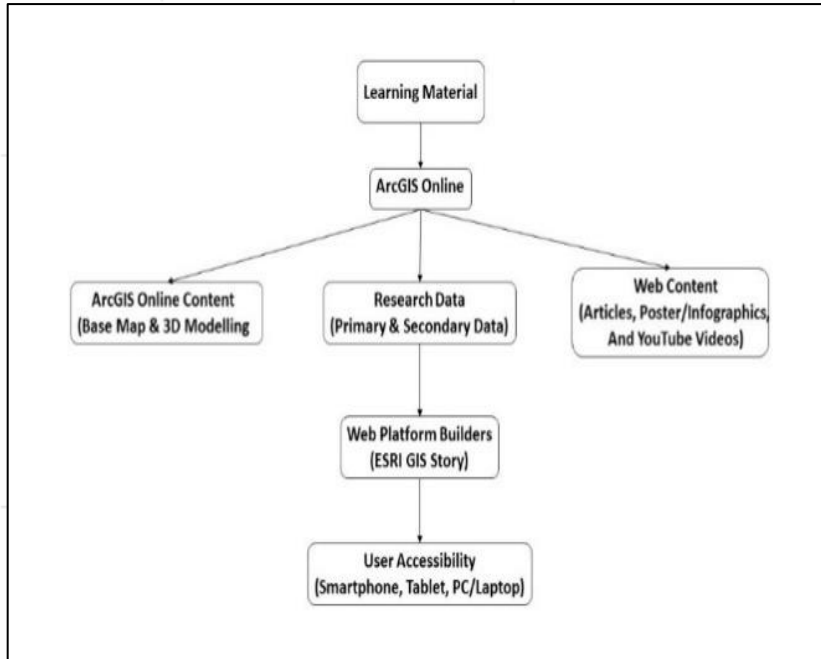
Adopting the structure of the exploratory website, which consist,

- Design Metaphor (Geographic Information Systems (GIS)) Learning Framework (Exploratory learning design)
- Data Organization (Interactive Map Components)
- Learning Path (User Control)
- Layout (Page and Map)
- Media (Text, Picture, Video, and Map)
- Navigation Operation (Page Movement and Selecting Interactive Map)
- Information (Learning materials).

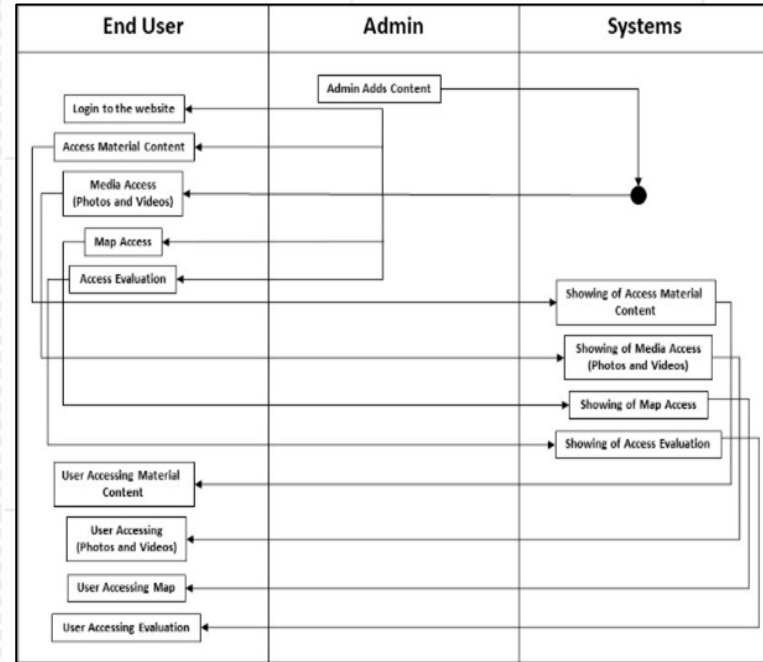




# Prototype and Activity Diagram of GIS Web Development Story maps Edutourism Geography



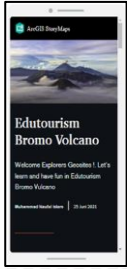
(a) Prototype in Content Diagram



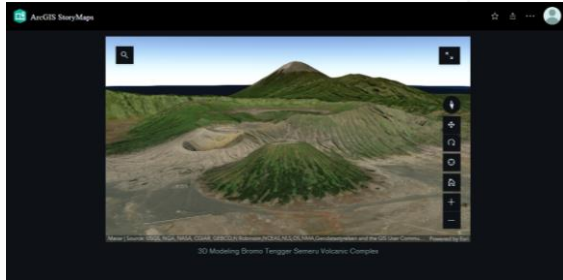
(b) User Activity Diagram

# Result

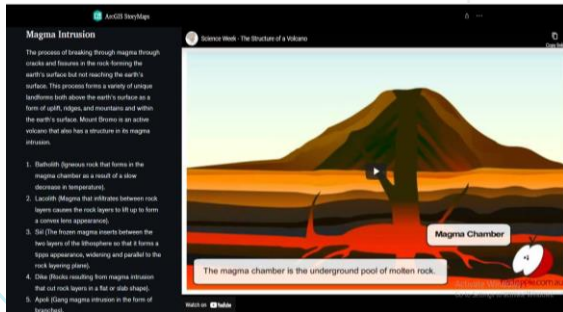
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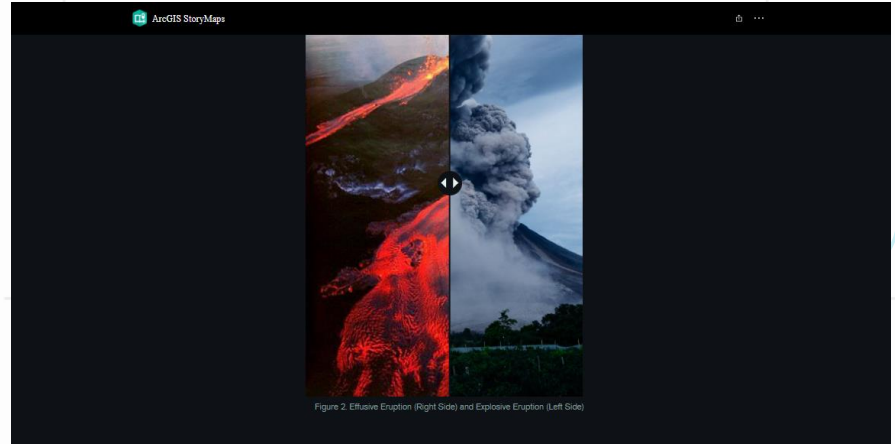
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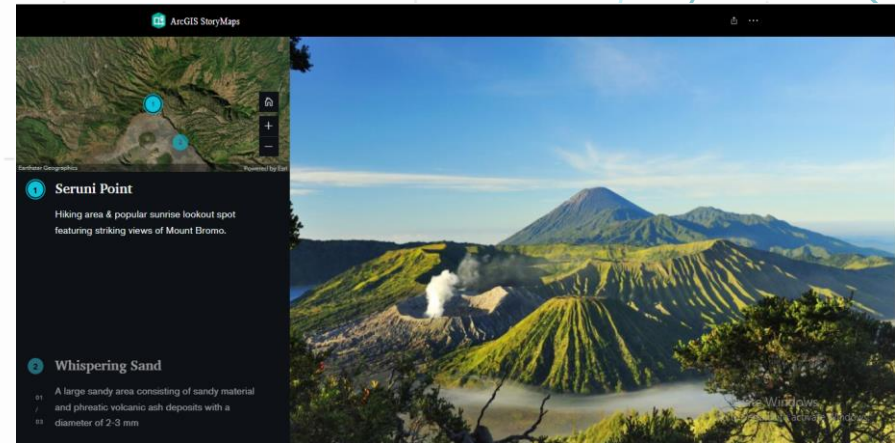
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4.



5.





## Learning Activities of Web GIS Story Maps Edutourism Geography

Edutourism Bromo Geosites				
Geosites Elements	Location	Geosites Content	Edutourism Activity	Affordance
Key Stages in Earth History	Sea of sand (Pasir Berbisik)	Volcanism Materials for the Mount Bromo-Tengger-Semeru Mountains Complex	Studying (identification and analysis) of materials resulting from volcanism processes (Natural-Landscape Attraction)	Online Access to the Web based GIS Story Geosites Edutourism Bromo Volcano
Major Structural Features	Seruni Point	Evidence of tecto-volcanism in the Bromo Tengger Semeru Mountains Complex Kompleks	Studying (identification and analysis) of the Bromo-Tengger-Semeru mountain range (Natural-Landscape Attraction)	
Formation of Minerals	Tengger Caldera Wall	Ancient Tengger Caldera Wall Rock Formation	Studying (comparison) mineral formations on the North-South Tengger Caldera Wall (Natural-Landscape Attraction)	
Representative Surface and Subsurface Features	Teletubbies Hill	Process of Volcanism (Magma Intrusion)	Studying (analyzing) the process of Teletubbies Hill magma intrusion volcanism (Natural-Landscape Attraction)	

(Modifications Crofts, R., & Gordon, J. E. (2015))





### Learning Stop Site 2: Seruni Point

The material content that can study is the main structural features (macro tectonic plate movements) as the content of Geosites Major Structural Features. The rock stadia at Seruni Point is a stage of the tecto-volcanism process with a landscape in a mountain range of Mount Batok, Mount Bromo, Mount Widodaren, and Mount Semeru.

### Learning Stop Site 1: Sea of Sand (Pasir Berbisik)

The focus of the Edutourism material is student learning activities regarding Bromo Geosites material in the form of volcanism resulting from the eruption of Mount Bromo, as a form of Key Stages in Earth History.

### Learning Stop Site 4: Teletubbies Hill

Teletubbies hills show magma intrusion from volcanism processes impacting landscape structures. The causal relationship of these phenomena can give students an initial picture in understanding the elements of Geosites Representative Surface and Subsurface Features.

### Learning Stop Site 3: Tengger Caldera Wall

The mineral lithology of the northern wall of the Tengger caldera is dominated by fallen pyroclastic deposits (volcanic ash, bombs, and lapilli). This is different from the mineral formations on the walls of the Cemoro Lawang caldera with the dominance of massive melt pyroclastic deposits.





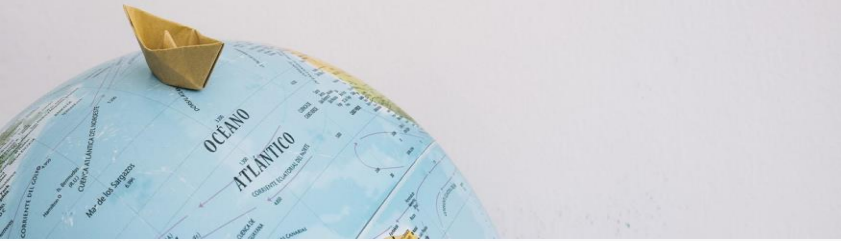


# Conclusion

- Development of Web GIS Story maps Edutourism Geography as a medium in Bromo Geosites can be an effective solution for the development of education-based tourism.
- Active and Joyful Learning
- Can help provide a good opportunity for the learning process to introduce and apply concepts through the content of Mount Bromo Geosites in Edutourism

## Limitation

- Integration of Web GIS Story maps Edutourism Geography cannot fully accommodate the acquisition of good knowledge as in field-based learning.
- Accessibility of users (students) on Web media GIS Story maps Edutourism Geography is very dependent on internet connection.
- Media design oriented to ArcGIS hyperlink and cloud technology also has limitations, especially for users who have problems with internet access so that they cannot access media properly



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