

PARTICIPATORY GEOGRAPHIC INFORMATION SYSTEM (PGIS) FOR DEVELOPED THE ONLINE MAP OF HISTORICAL SOURCE IN WORLD WAR II, PAK PHRAEK ROAD COMMUNITY, KANCHANABURI THAILAND

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ABSTRACT: The objectives of the research article were: To making the online Historical map of the Pak Phraek road community, Kanchanaburi. The samples and Key Informants included; villagers, philosopher of the Pak Phraek road community, historical scholars, and the government agencies. This research used the Geo-informatics concept, Participatory Geographic Information System concept (PGIS), and the walking map concept were the main concept for this studies. The research results appeared as follows:

The online Historical mapping of the Pak Phraek road community used the Geoinformatics Information System Processing for developed the Pak Phraek historical map included; field work, data input, data edited, data management, data manipulation, data analysis and data display with The Participatory Geographic Information System concept (PGIS) and Walking Map methodology on The free and open source software processing included; (1) Data edited from the field work in online map software, (2) Online map import testing and (3) Web page editing and displaying layers before show in The web server.

1. INTRODUCTION

The use of the development concepts with the development of science, technology, research and innovation and the policy of Thailand 4.0, which is considered as the main policy for the development of local community to be wealthy and sustainable. Adopting such development policies in the local community requires research and development methods. By the community in which researchers looks at for the potential and readiness to bring science, technology, research and innovation to develop into a wealthy and sustainable community by adopting the Smart City concept to be deployed at the local community level (Smart Community), including Pak Phraek community, which is a community located in the urban area in Kanchanaburi. The Pak Phraek community is a commercial district, which is a tourist attraction and learning center in ancient history of World War II and architecture located on Pak Phraek Road, that is the point and territory of passing between the Wat Nue (Devasangkham Temple) and Wat Tai (Chaichumphon Chanasongkham Temple). Pak Phraek community is a multi-cultural community such as religious learning resources, ancient architecture and historical learning resources, and tourism learning resources, etc. This was a community that supported as a tourist community of Kanchanaburi province. (Office of Tourism and Sports, Kanchanaburi, 2016). From the data, it was found that Pak Phraek community is a community with sufficient potential to develop into a Smart City and Smart Community. Pak Phraek community was founded since the reign of King Rama III and has a history related to the early Rattanakosin period until the Second World War II. The Smart City Concept is a presentation of digital economy and social drive by applying the digital technology to effectively development to the city. However, the important topic to community development should to understand the problems and needs of people in the community and participatory design that is most suitable for the properties of that city to provide people with a better quality of life and sustainable growth. (Ministry of Digital Economy and Society, 2016) By developing the community tourism with the innovation including map (From

Geographic Information Systems: GIS) which is an innovation that can be used to develop communities, Management and develop the community tourism by the surveying and developing into a historical map to tell information about history of Pak Phraek community and can be used as a guide to the historical attractions of the community.

As an introduction, the researcher became interested in the research and development of the Integration of Anthropological Surveying tools, Walking Maps with the Geographic Information System to develop the Online Historical Map of Pak Phraek road community, Kanchanaburi in order to survey data for the historical map of Pak Phraek community, Mueang Kanchanaburi district, Kanchanaburi to be a Smart Community map (Smart Map) that can be used to map in the area of community development and the tourism management. There are two research questions: 1) What does it look like? in surveying data for historical maps of Pak Phraek road community, Kanchanaburi province. and 2) To making the online historical maps of Pak Phraek community, Muang Kanchanaburi district, Kanchanaburi, how and how it looks like In order to develop the Pak Phraek community to be ready and develop as a Smart Community model in Kanchanaburi.

2. RESEACH OBJECTIVE

To making the online Historical map of the Pak Phraek road community, Kanchanaburi with Participatory Geographic Information System concept (PGIS)

3. CONCEPTUAL FRAMEWORK

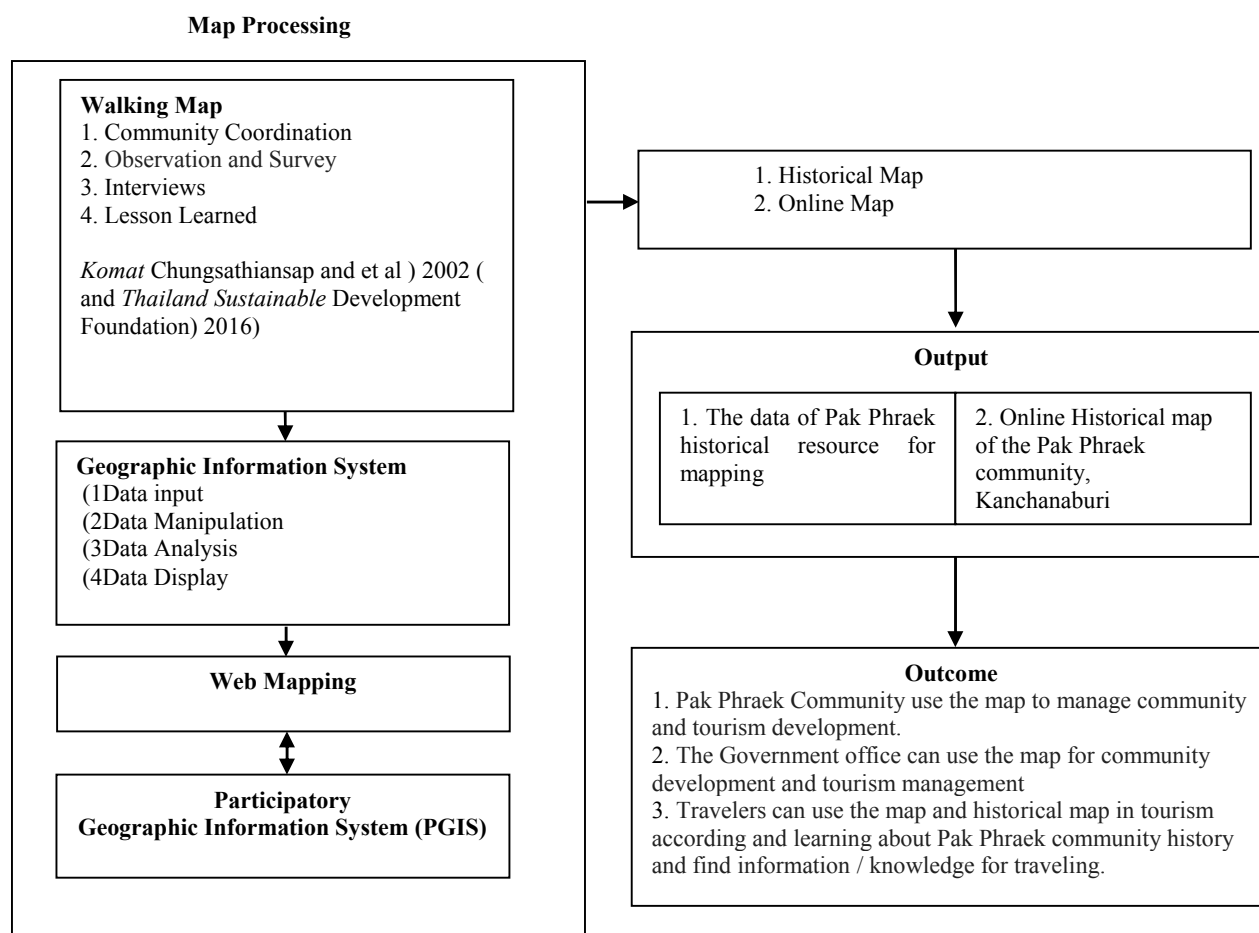


Figure 1 Conceptual Framework

This Research uses Anthropological tools to survey the community including walking maps. (Komat Chungsthiansap and et al, 2002) and (Thailand Sustainable Development Foundation, 2016) This is to be a process of survey the Pak Phraek community from the location, physical, economic characteristics, architectural features and the settlement of the community by using a participatory action research process (PAR) allowing villagers and groups of historic homeowners to jointly create the map, interview, joint surveying and lesson learned. After that, the information from the survey of the walking map to manage the geographic information system (GIS) preparing to the map processing by using the Participatory Geographic Information Systems (PGIS) conceptual process as the way to join the online Historical Map processing according to Figure 1.

4. RESERCH METHODOLOGY

4.1 Population and Sample

Samples and Key Informants included; 30 villagers of the Pak Phraek community, 1 Philosopher of the Pak Phraek community, 2 Local historical Scholars and The government agencies included 1 person form Muang Kanchanaburi Municipality and 1 person form The department of Tourism and Sport, Kanchanaburi.

Key Informants are villagers in Pak Phraek community to provide information about the contexts of Pak Phraek community including; Mrs.Supatra Tantivanich to provides information about the history of Pak Phraek community, information checking and providing the historical map data. Kanchanaburi history academics providing historical information on Pak Phraek community and proving historical map data including; Assistant Professor Monthon Kongtawthong and Kraingkrai Thongsri, the government agencies included Muang Kanchanaburi Municipality; Mrs.Kamolmas Premprayool (Chief of the Administrator of the Kanchanaburi Municipality) and 1 person from the department of Tourism and Sport, Kanchanaburi.

4.2 Research Instrument

This research have used research Instrument including; research interview form, walking map paper survey, community map, lesson learned instrument, the free source software on Geographic Information System (GIS) and global positioning system (GPS).

4.3 Collection of Data

Walking Map Processing

Survey of Pak Phraek community map by walking map concept, the walking map processing as follows:

1) Community Coordinate was the first process of community survey by coordinating with community leaders, community philosopher and government sector leaders including The Muang Kanchanaburi Municipality for survey the Pak Phraek community map through the walking mapping survey tool. This process has the objective to lead the cooperation between researchers and villagers including group leaders, abbot (Tevasunkharama Temple and Chaichumphon Chanasonghkram Temple), groups of historic homeowners and staff of the Muang Kanchanaburi Municipality.

2) Observation and Survey, to survey the occupational characteristics, social characteristics, culture and the environment of the community. The researcher used participatory observation techniques to obtain complete information. By observing it along with analyzing the data and using other methods in field work. The survey tools are used, such as community maps, the surveys paper, and Global Positioning System (GPS) to making the community map and historical map.

3) Interview, to query and interview information about community maps and historical maps of Pak Phraek community with the key informants including Pak Phraek community philosopher, Chairman of Walking Street, Leader of Ban Nue and Leader of Ban Tai

4) Lesson Learned, Researcher used the Participatory Geographic Information Systems (PGIS). (Francoise Urban-Ferauge, 2011) The PGIS processing use the ground map and paper map and used the Participatory Mapping has made the communication, understanding and the participatory representation of spatial knowledge easier for the community with 5 steps including; Identification of the problems, Building of the partnership, Data gathering, Data processing and Scenarios towards alternative (Figure 2) by the Meeting of villagers in Pak Phraek community, Pak Phraek community philosopher, Kanchanaburi history academics, The government agencies included Muang Kanchanaburi Municipality and the department of Tourism and Sport, Kanchanaburi.

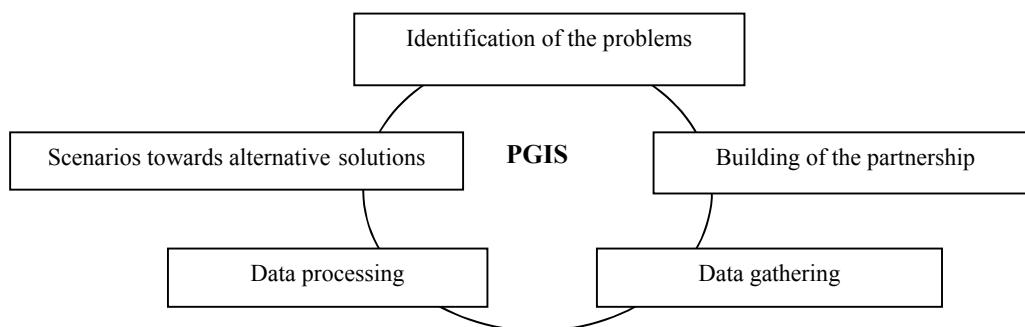


Figure 2 Process of Participatory Geographic Information Systems (Francoise Urban-Ferauge, 2011)

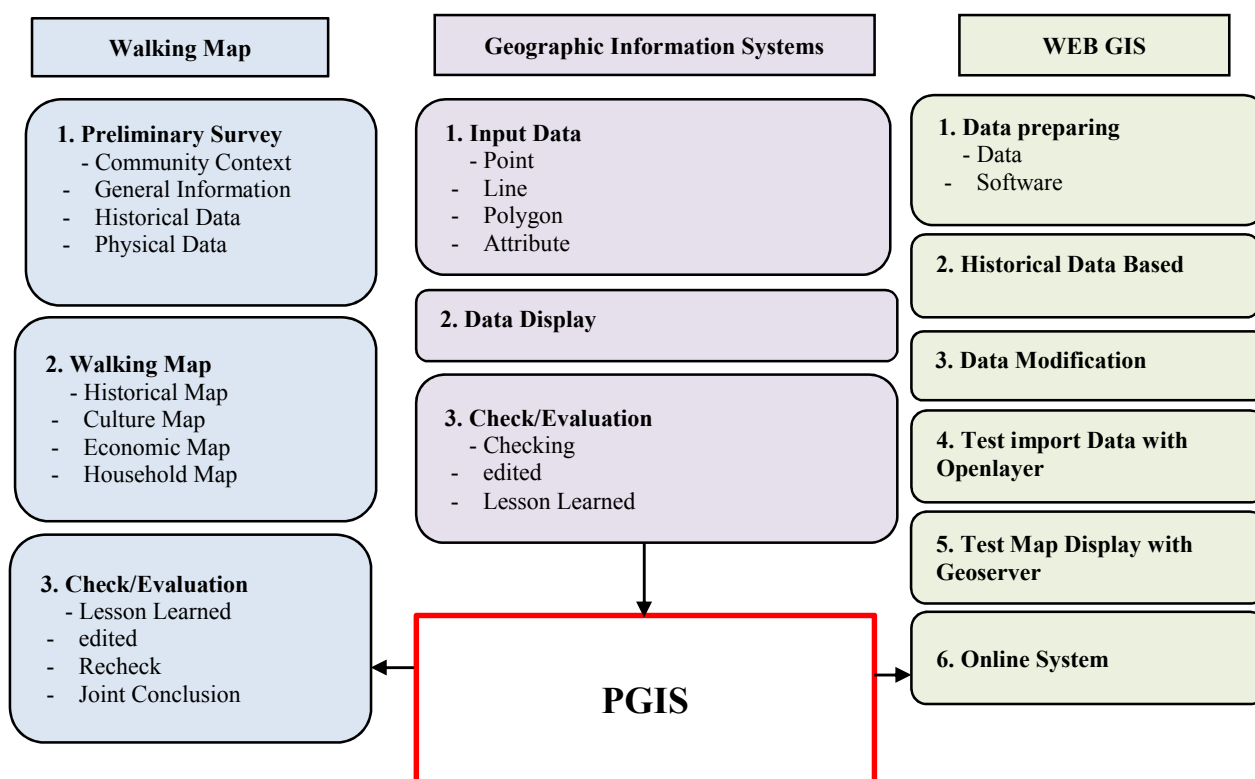


Figure 3 Research Processing

4.4 Data Analysis

In analyzing process, researcher analyzed two levels including; Community level and household level (historic homeowners). The analysis in the community level had the analysis unit which is the household level and divide the method of data analysis as follows;

1. The qualitative analysis; the first process was textual analyzed and summary of results from inquiries, interviews, surveys and observations and synthesize it to the meaning of the text and the interpretation or the debate from what has been seen in the study area. The second process was data check to find credibility by the data Triangulation methods and then analyze with the theoretical concept. And the third process was to summarize the data, validation of research results that was a summary of the results and participatory checked from villagers and community.

2. The Historical of Pak Phraek Mapping and Map of Pak Phraek Community analyzed by the geographic information source with satellite data and aerial photographs, using geographic information systems programs including Quantum GIS programs and Google Earth programs, through processes in geographic information systems (Department of Geography ChiangMai University, 2003) and (Phonpat Hemwan, 2013) as follows;

- 1) Data input
- 2) Data Manipulation
- 3) Data Analysis
- 4) Data Display

3. Online mapping process (Web-GIS) included; data preparation, creating a database, data modification, data import testing, map presentation test and online system.

5. RESULT

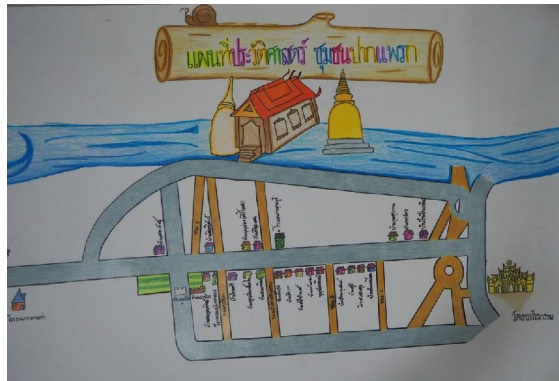
5.1 Historical Map of Pak Phraek road community

Historical Map of Pak Phraek community map is a map showing the location of history resource in Pak Phraek Road, Song Kwai Road and Sang Chu To Road by a survey of researchers, research assistants, community philosophers and villagers that participatory survey and developed the historical maps. The researcher developed a map in geographic information system to be the image and map file with the following details;

Process 1: The Historical Mapping conducted the survey by sketching with the walking map process on the sheet work and walk around Pak Phraek community and interviewed with the historic homeowners, The Pak Phraek community philosophers and villagers (Participatory Mapping and GIS) along with capturing the coordinates on the Global Positioning System (GPS) to capture the coordinates of the history learning home in Pak Phraek community by surveying 40 history learning home with the following details: Wat Thavornwararam (Vietnamese temple), The Supreme Patriarch Palace Tevasunkharama Temple (Wat Nue), History Hall of His Holiness the Supreme Patriarch “Somdet Phra Yana Sangworn”, ChinPinKliao Home (The last Vietnamese home of Pak Preak Community), Japanese military Police Station during World War II, Chinese School, Kotchawat Home, Kulasuwan Home, Amnuai Home, Niwas SaenSuk Home, Merchant House of Japanese Spy, Suthee Home, RattanaKusum Home, Boonchai Panich Home, Kanchanamas Home (Hiding place for the Allied prisoners), Tamthong Home, Sri Jamnong Home, Siwapha Home, Hua Hong Home, Kanchanaburi Hotel, Prostitutes Section, Chuan Panich Store, Siri Choomsaeng Home, Boonyiam Jiaranai Home (Khood Chantsiri), Boonpong and Brothers Home (Siri Osoth), Thai Seri Home, Sumitrakarn Hotel, Chao Mae Guan-im Shrine, Sitti-sung Home, Sahakul Panich Home, Somchit Setaphun Home, The City Gate, Na Muang Post Office, King Rama III Museum, City Pillar Shrine, Governor’s Resident, Kanchanaburi Paper Factory, The JEATH war museum and Chaiya Chumpol Chana Songkram temple and capturing the coordinates on the Global Positioning System (GPS) to capture the coordinates of the history learning home in Pak Phraek community.



Picture 1 Mapping Survey and capturing the coordinates on the Global Positioning System (GPS)



Picture 2 The walking map with History of Pak Phraek community

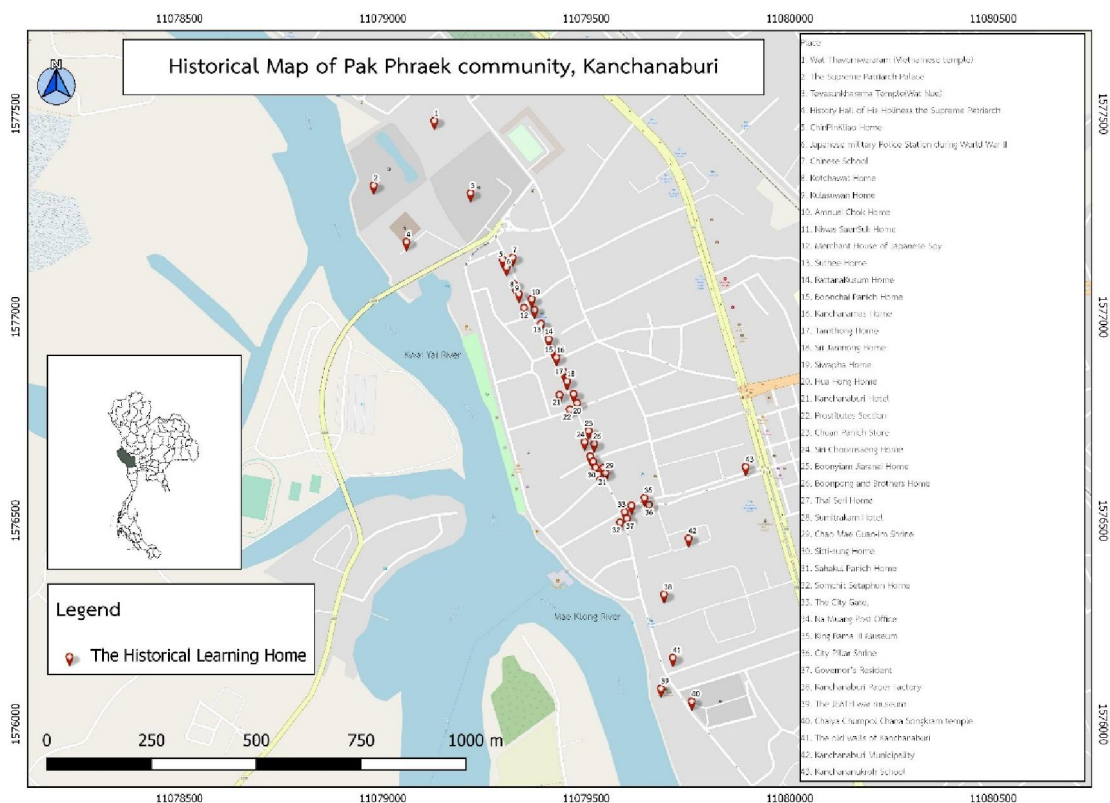
Process 2: The Historical of Pak Phraek community mapping when completing the survey and interview in order to verify the information correctly the researcher therefore organized a forum to summarize lessons. In the next process is to organize a forum to lessons learned and checked the walking map data together with the community.

Process 3: The researcher developed the map via geographic information system using a satellite image database that come together from the walking map data surveying along with the use of data from Global Positioning System (GPS) for the accuracy of map data.

Process 4: Geometric coordinate transformation of the history learning home because the coordinates that are collected from the Global Positioning System (GPS) was wrong from the actual coordinates on the earth. The Researcher used the Ground Control Point (GCP) in the Image to Image concept (Suthinee Dontree, 1999) and (Weeraphart Khunrattanasiri, 2019) is to adjust the coordinates from other satellite images (Sentinel in 26 February 2019) that have been correctly coordinates and comparable with satellite images in Google Earth.



Picture 3 Geometric Coordinate Transformation of the history learning home



Picture 4 Historical Map of Pak Phraek community

5.2 The Online Historical Map of Pak Phraek road community

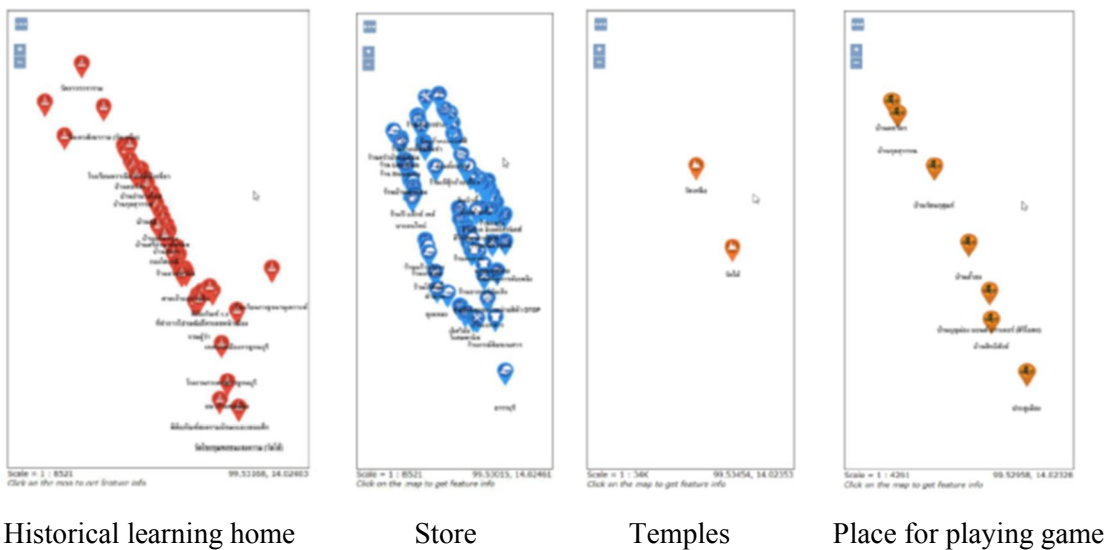
The researcher developed and designed the online map. By using the process from the concept of geographic information system in producing and developing Pak Phraek community map included; Field work, input data, manipulation, management data, query and analysis and visualization with Participation Geographic Information System concept. And making the online Historical map of the Pak Phraek road community with the Open Source Software included; Quantum GIS, Google Earth, Geo Server and Open Layer with the following process;

1) Geometric coordinate transformation of the history learning home

Geometric coordinate transformation of the history learning home because the coordinates that are collected from the Global Positioning System (GPS) was wrong from the actual coordinates on the earth. The Researcher used the Ground Control Point (GCP) in the Image to Image concept (Suthinee Dontree, 1999) and (Weeraphart Khunrattanasiri, 2019) is to adjust the coordinates from other satellite images (Sentinel in 26 February 2019) that have been correctly coordinates and comparable with satellite images in Google Earth. (Picture 5)

2) Test import data with Open Layers program

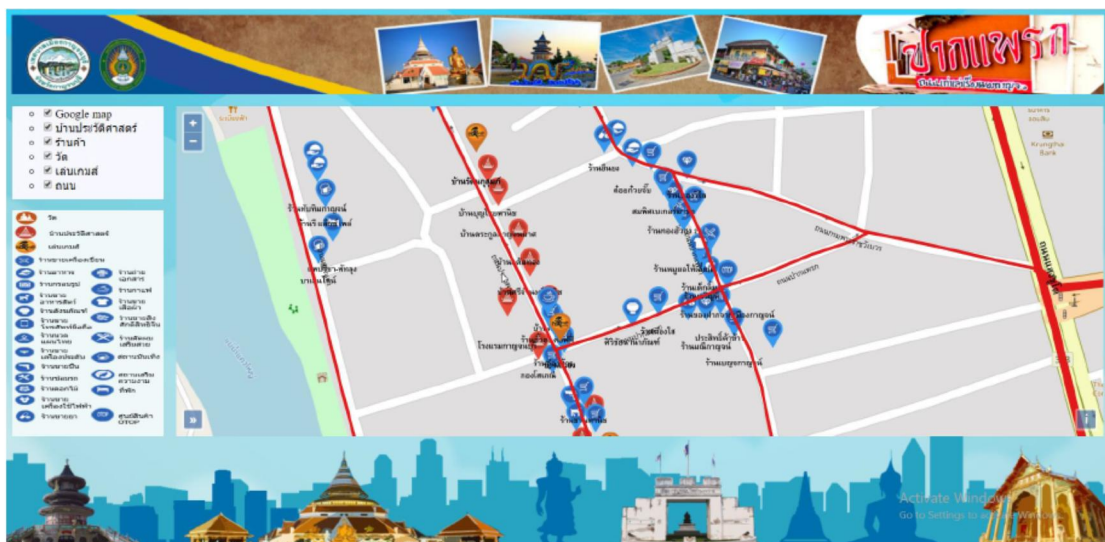
Testing and editing data for the display of online map data in the open layer program by dividing the data into 4 data layers included; the history learning home, store, temple and place for playing game.



Picture 5 Test import data with Open Layer program

3) Web page customization and map display with data layers from the geo server program

Customizing the web-map on the overlay concept by dividing the data that can be overlay into 6 data layers included; the history learning home, store, temple, places for playing game, hybrid map data and roads.



Picture 6 map display with data layers from the geo server program

4) Online System

The researcher made an online map on the website www.pakpraekmap.com, as well as created an infographic map for the tourism benefit of the community and government agencies in tourism management.



Picture 7 Infographic Map

6. Discussion

In Participatory Geographic Information System (PGIS) for Developed The online map of Historical source in World War II, Pak Phraek road Community, Kanchanaburi, Thailand, there is a finding the key issues including; the first issue, is the walking map process, which is the mapping process of historical home process; 1) Community Coordinate 2) Observation and Survey 3) Interview and 4) Lesson Learned and using the Participatory Geographic Information Systems (PGIS) conceptual process for the field work which has different study results from the research of Saviitri Ratanopad (2015) studied in Web site Mapping in archaeological site “KU” Tung Gula Ronghai area, Roi Et, that does not have a working process for the walking map before exporting data as maps and online maps can be wrong because that may not be accurate with the participatory field work survey and different study results from the research of Komsan Sriboonruang and Malinee Krumkrua (2017) in Community way of life Research Process for the Thung-SamoRelation re-Building in Walking Map and Community Calendar Concept in the Geometric coordinate transformation issue that makes the map more accurate.

7. Suggestion

1) Should develop the map data in other historical communities in Kanchanaburi and linking information between historical communities to the route of tourism in Kanchanaburi.

2) The Participatory Geographic Information Systems (PGIS) conceptual process is uses the Ground Map data from the participatory lessons learned and the Paper Map that work with the Geographic Information Systems (GIS). This concept can be used in the study of community resource management, water management mapping, community disaster management or a cultural map.

3) The Walking Map is a tools of Anthropological for location survey, the community physical that can be success with a collaborative process with community owners and Geographers has adopted this approach to develop into The Participatory Geographic Information Systems (PGIS) and The Participatory Mapping (Pmapping).

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