

DESIGNING GEOGRAPHIC INFORMATION SYSTEM CULINARY TOUR LOCATION IN THE WEST LOMBOK REGION MOBILE-BASED APPLICATION

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Abstract— Lombok Island is an island in West Nusa Tenggara which is separated by the Lombok and Bali straits to the west and Alas Strait to the east of Sumbawa. The tourism potential in the West Lombok region is currently in great demand by local and foreign tourists because the tourist objects offered in the West Lombok region are very diverse, such as natural, religious, cultural, and culinary tours. Many restaurants offer culinary but often when indicating the location of a culinary, the information obtained is sometimes limited to street names and location characteristics. Meanwhile, the clarity of where the culinary location is not mapped in detail. So far, culinary connoisseurs use manual methods to find culinary locations such as Instagram, Facebook, and Blogspot. For tourists, this manual method is less effective because it consumes a lot of time and address information for getting to culinary locations is inadequate. One solution that can be used to obtain information is a geographic information system (GIS). The goal is to make it easier for culinary lovers to find culinary tourism locations. The research method used in this research is the Research and Development research method with preliminary stages, data and information collection, interviews and observations, system design with modeling, design validation, design revision, development, limited trial, limited trial revision, trial field, revision of field trials, dissemination, and implementation.

Keywords: Geographic Information Systems, Tourism, Culinary, Culinary Locations, Lombok.

Abstrak— Pulau Lombok adalah sebuah pulau di Nusa Tenggara Barat yang dipisahkan oleh Selat Lombok dan Bali di sebelah barat dan Selat Alas di sebelah timur Sumbawa. Potensi wisata di kawasan Lombok Barat saat ini banyak diminati oleh wisatawan lokal maupun mancanegara karena objek wisata yang ditawarkan di kawasan Lombok Barat sangat beragam, seperti wisata alam, religi, budaya, dan kuliner. Banyak rumah makan yang menawarkan kuliner, tetapi seringkali ketika

menunjukkan lokasi suatu kuliner, informasi yang diperoleh terkadang terbatas pada nama jalan dan karakteristik lokasi. Sedangkan kejelasan lokasi kuliner tidak dipetakan secara detail. Selama ini penikmat kuliner menggunakan cara manual untuk mencari lokasi kuliner seperti Instagram, Facebook, dan Blogspot. Bagi wisatawan, cara manual ini kurang efektif karena memakan banyak waktu dan informasi alamat untuk menuju lokasi kuliner kurang memadai. Salah satu solusi yang dapat digunakan untuk memperoleh informasi adalah Sistem Informasi Geografis (SIG). Tujuannya untuk memudahkan para pecinta kuliner dalam mencari lokasi wisata kuliner. Metode penelitian yang digunakan dalam penelitian ini adalah metode penelitian Research and Development dengan tahapan pendahuluan, pengumpulan data dan informasi, wawancara dan observasi, desain sistem dengan pemodelan, validasi desain, revisi desain, pembuatan sistem, uji coba terbatas, revisi uji coba terbatas, uji coba lapangan, revisi uji coba lapangan, diseminasi, dan implementasi.

Kata Kunci: Sistem Informasi Geografis, Wisata, Kuliner, Lokasi Kuliner, Lombok.

INTRODUCTION

Information and Communication Technology has made Geographic Information Systems (GIS) develop significantly. Internet connections that are easier to get and speed are getting higher, making GIS easier to use. From just being used in web-based applications, now it can be integrated with mobile-based applications. One of the most important things in many applications, especially GIS, is the ability to determine the position or location of an address. The synergy between the internet and GIS provides an increase in the value of benefits between the two. GIS, as a tool designed to obtain, store, repair, manipulate, analyze, and display all forms of geographically referenced information will be easier to use (Yun,

2011) with the presence of internet technology (Zulius, Daulay, Informasi, Lokasi, & Kuliner, 2019).

Nowadays, culinary tourism is an activity that must be carried out by local and foreign tourists when visiting an area. Lombok Island is an island in West Nusa Tenggara which is separated by the Lombok and Bali straits to the west and Alas Strait to the east of Sumbawa. The area of this island reaches 5,435 km² and it makes Lombok in the 108th rank of the list of islands based on its size in the world (Wikipedia, 2020)

The tourism potential in the West Lombok region is currently in great demand by local and foreign tourists (Rahmi, 2017) because the tourist objects offered in the West Lombok region are very diverse, but often when indicating the location of a culinary, the information obtained is sometimes limited to street names and location characteristics. Meanwhile, the clarity of where the culinary location is not laid out in detail and also how the services provided are rarely available.

One of the factors in determining the culinary location you want to visit is a strategic, comfortable place and cheap and delicious dishes. So far, culinary connoisseurs use manual methods to find culinary locations (Chan & Utna, 2017), (Chan & Wahdi, 2018) such as Instagram, Facebook, and Blogspot. For tourists, this manual method is less effective (Ramadhanu, 2018), (Muhardi, Febriani, & Oktavia, 2018) because it consumes a lot of time and addresses information for getting to culinary locations is inadequate.

One solution that can be used to obtain information is a geographic information system (GIS). The goal is to make it easier for culinary lovers to find culinary tourism locations.

Several previous studies related to geographic information systems, research conducted by (Wirangga, Piarsa, & Purnawan, 2014) with the title "Geographic Information System Application for Mapping the Location of a Restaurant in the Denpasar Area" produce an application that can be used by the community to map the location of a restaurant so that it can help the community to determine the culinary tourism places they want to visit.

Research conducted by (Prasetyo, Widiartha, & Albar, 2017) with the title "Geographic Information Systems Search for Locations of nearby Culinary Tourism in Mataram City". Produce an application that provides information about the location of the closest culinary tour from the user's position based on the menu category. The drawback is that the menu category is not specific, culinary entrepreneurs cannot directly manage their culinary location data and the information obtained is limited to tourist

locations and user reviews, there is no price for each culinary menu.

Research conducted by (Palabiran, Cahyadi, & Arifin, 2015) with the title "Geographic Information System for Culinary, Arts and Culture Balikpapan City Android-Based " has resulted in an android-based information system that provides information on the position of culinary, arts, and cultural tourism. The drawback is that the information obtained is limited to tourist positions. There is no list of culinary menus along with a list of prices for each menu.

Research conducted by (Afnarius Surya, Ningsih Vivi Mulya, 2014) with the title "Development of the West Sumatra Culinary Tourism Geographic Information System Mobile-Based Application" has produced a culinary tourism application based on a mobile geographic information system that can help tourists get information about culinary. The drawback of this research is that there is no photo upload feature, sharing to social networks, an account for users, a means for culinary tourism owners to have an account, and add and manage their culinary information.

Research conducted by (Fitriani & Faturochman, 2018) with the title "Designing Tourism Geographic Information Systems and Industries Web-Based" has produced a tourism and industry geo-geographic information system that can manage information about tourism sites, industrial sites, and upcoming events.

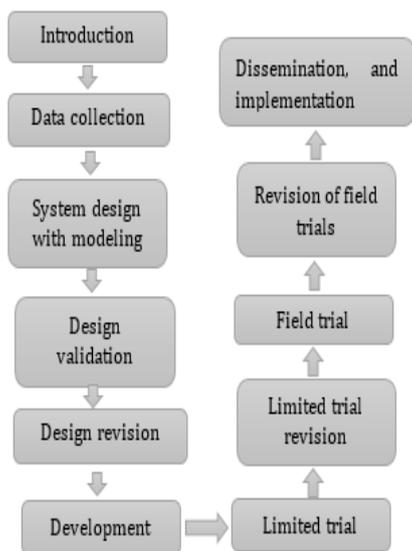
Based on previous studies related to GIS, the previous researchers made a culinary tourism GIS to map the location of culinary places and menu categories in general, while the innovation of this research is apart from mapping the location, the system also provides a more specific category menu grouping culinary can directly manage their culinary location data and there is a price list for each culinary menu. This is made using Android mobile-based programming, is multiuser for all users related to culinary tourism.

The purpose of this research is to produce a geographic information system for culinary tourism locations mobile-based in West Lombok, making it easier for culinary lovers to find culinary tourism locations.

MATERIALS AND METHODS

This research is a type of research development or Research and Development (R&D). According to (Sugiyono, 2015) Research and Development (R&D) is a research method used to produce certain products and test the effectiveness of these products.

The steps taken in this study include an introduction, data and information collection, interviews and observations, system design with modeling, design validation, design revision, development, limited trial, limited trial revision, field trial, revision of field trials, dissemination, and implementation.



Source : (Sugiyono, 2015)
Figure 1. Tahapan Metode Penelitian R & D

RESULTS AND DISCUSSION

In the Research and Development (R&D) research method, the discussion and results of the research are as follows :

1. Introduction

The process of searching for culinary tourism locations in the West Lombok region by local and foreign tourists currently still uses manual methods to search for culinary locations such as Instagram, Facebook, and Blogspot as well as asking directly to the public.

2. Data Collection

Sources of data in this study are primary data in the research location, namely West Lombok, and secondary data in the form of books and journal articles.

Based on observations, the system requirements include:

a. Functional requirements

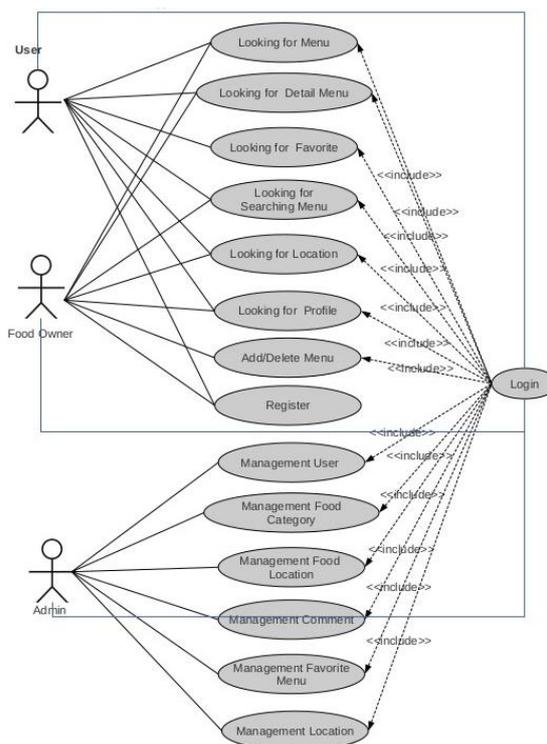
- 1) Where the culinary owner inputs the culinary place Id, place name, address, telephone, latitude, longitude, opening hours, closing hours, pictures.
- 2) Culinary owners can add culinary menus, view menus, menu details, search, delete, view locations, view profiles, and update profiles.

- 3) Users or users can see culinary menus, culinary menu details, favorite menus, perform searches, can see tourist locations for culinary places, be directed to culinary places, and also update profiles.
- b. Non-functional requirements
- 1) Require Android OS v.6.0
 - 2) Android Smartphone
 - 3) 2 GB RAM, 16 GB memory

3. Design System

a. Use Case Diagram

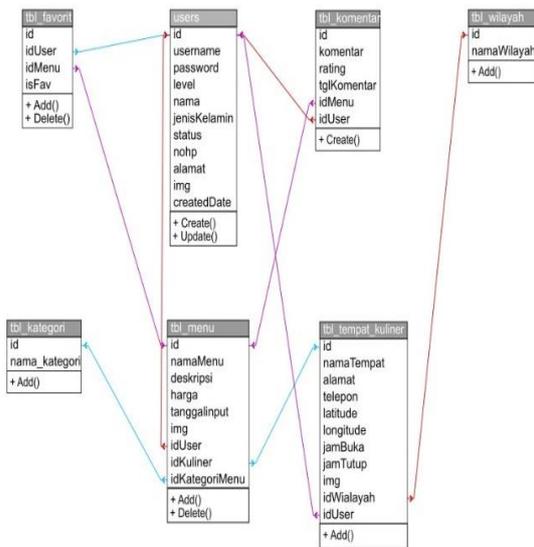
The use case diagram is a process of modeling system functions in the context of a business process, an actor (not an) actor who initiates it, and how the system or software responds to these conditions. In this culinary tourism geographical information system, there are three main actors, namely system admin, culinary place admin, and users who have different access rights and activities as seen in Figure 2.



Source : (Erniwati & Subki, 2020)
Figure 2. Usecase Diagram

b. Class Diagram

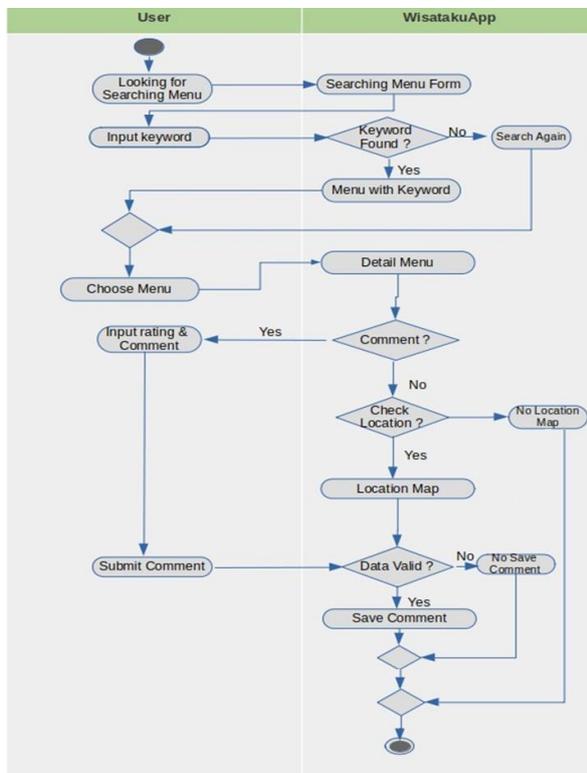
Class diagrams describe the structure, description, and relationships between classes, in this class diagram there are 7 interconnected tables, where the relationships between tables can be seen in Figure 3.



Source : (Erniwati & Subki, 2020)
Figure 3. Class Diagram

c. Activity Diagram

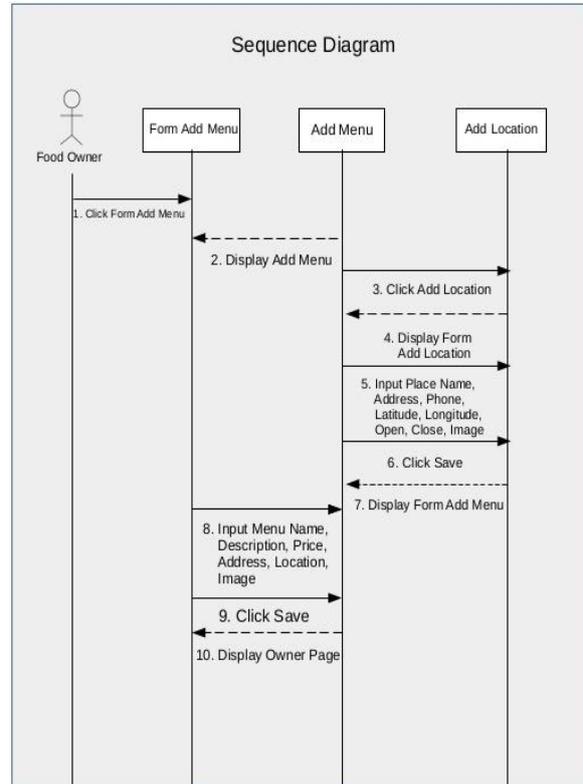
Actor activity on the searching page, which searching for the culinary menu, viewing search results and checking the location using the user entering the menu form then entering the keyword, if the entered keyword is found, information about the culinary place will be given, where actor activity for searching can be seen at figure 4.



Source : (Erniwati & Subki, 2020)
Figure 4. Activity Diagram

c. Sequence Diagram

Sequence diagrams describe how entities and systems interact, where an overview of the entities and systems interacting can be seen in Figure 5.



Source : (Erniwati & Subki, 2020)
Figure 5. Sequence Diagram

4. Design Validation

The results of design validation by experts in the field of analysis and design of information systems can be seen in table 1.

Table 1. Design Validation

No	Expert	Assessment	Conclusion
1	Expert in analysis and design of information systems.	Fairly Good	Revision functional suitability and usability characteristics

Source : (Erniwati & Subki, 2020)

5. Design Revision

Based on the results of validation carried out by experts in the field of analysis and design of information systems, the assessment was quite feasible and there were revisions from the experts, namely functional suitability and usability characteristics. Where the results of the design revision can be seen in table 2.

Table 2. Design Revision

No	Expert	Assessment	Assessment of Results after Revision
1	Expert in analysis and design of information systems.	Fairly Good	Good

Source : (Erniwati & Subki, 2020)

Table 2 shows the results of the design revision by experts in the field of analysis and design of information systems that the system design is feasible to build or has met all the needs based on the research problem.

6. Development

The following is a display of a mobile-based geographic information system, On the add page in the culinary menu, the admin of the culinary place can add to the culinary menus which can be found in the culinary place, add culinary page can be seen in Figure 6.



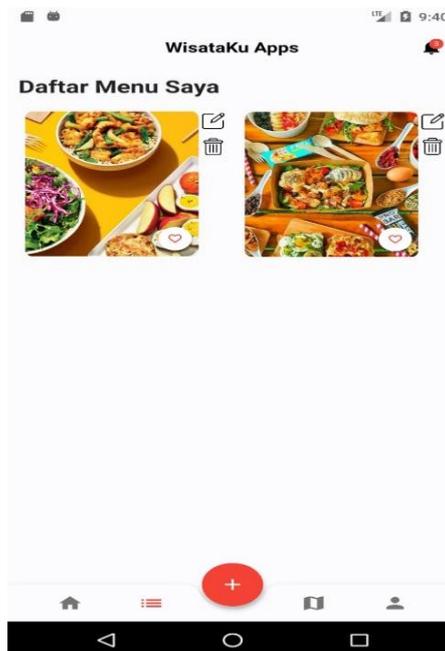
Source : (Erniwati & Subki, 2020)
Figure 6. Add Culinary Data Page

Source code for adding culinary data is:

```
<?php
require "../conn/con.php";
if($_SERVER['REQUEST_METHOD']=="POST"){
$response = array ();
$namaMenu = $_POST['namaMenu'];
$deskripsi = $_POST['deskripsi'];
$harga = $_POST['harga'];
$img = date('dmYHis').str_replace(
"","",
basename($_FILES['image']['name']));
```

```
$imagePath = "../upload/".$img;
move_uploaded_file($_FILES['image']['tmp
name'], $imagePath);
$idUser = $_POST['idUser'];
$idKuliner = $_POST['idKuliner'];
$idKategoriMenu =
$_POST['idKategoriMenu'];
$insert = "INSERT INTO tbl_menu
VALUE(NULL, '$namaMenu', '$deskripsi',
'$harga', NOW() , '$img', '$idUser',
'$idKuliner', '$idKategoriMenu')";
if(mysqli_query($con, $insert)){
$response['value'] =1;
$response['message'] ="Menu berhasil
ditambahkan";
echo json_encode($response);
} else {
$response['value'] =2;
$response['message'] ="Menu gagal
ditambahkan";
echo json_encode($response);
}}
?>
```

The culinary menu list page is a page where culinary menu data that has been inputted are registered in the menu list page. Where the culinary menu list page can be seen in Figure 7.



Source : (Erniwati & Subki, 2020)
Figure 7. Menu List Page

Source code for adding menu list is:

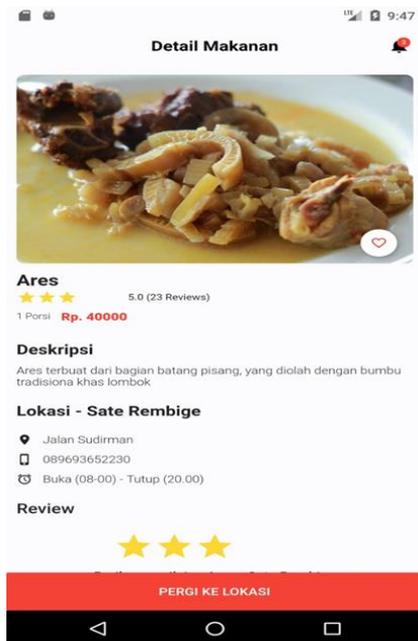
```
<?php
require "../conn/con.php";
$idUser = $_GET['id_user'];
$sql = "SELECT * from tbl_menu WHERE
idUser = '$idUser'";
$query = mysqli_query($con, $sql);
$data = array ();
while ($result =
mysqli_fetch_assoc($query)) {
```

```

    $data[]=$result;
}
echo json_encode($data);

```

The food detail page is information about the menu or food and the culinary place itself, such as food prices, descriptions, ratings, cell phone numbers, and locations or addresses of culinary places, food detail pages can be seen in Figure 8.



Source : (Erniwati & Subki, 2020)

Figure 8. Food Detail Page

Source code for adding food detail is:

```

<?php
require "../conn/con.php";
$response = array();
$sql = mysqli_query($con, "SELECT
tbl_menu.*,
tbl_tempat_kuliner.namaTempat,
tbl_tempat_kuliner.alamat,
tbl_tempat_kuliner.telepon,
tbl_tempat_kuliner.jamBuka,
tbl_tempat_kuliner.jamTutup,
tbl_tempat_kuliner.latitude,
tbl_tempat_kuliner.longitude, users.nama
FROM tbl_menu INNER JOIN
tbl_tempat_kuliner ON tbl_menu.idKuliner
= tbl_tempat_kuliner.id INNER JOIN users
ON tbl_menu.idUser = users.id");
while ($a =
mysqli_fetch_array($sql)){
    $b['id'] = $a['id'];
    $b['idUser'] = $a['idUser'];
    $b['namaMenu'] = $a['namaMenu'];
    $b['deskripsi'] =
$a['deskripsi'];
    $b['harga'] = $a['harga'];
    $b['tanggalinput'] =
$a['tanggalinput'];

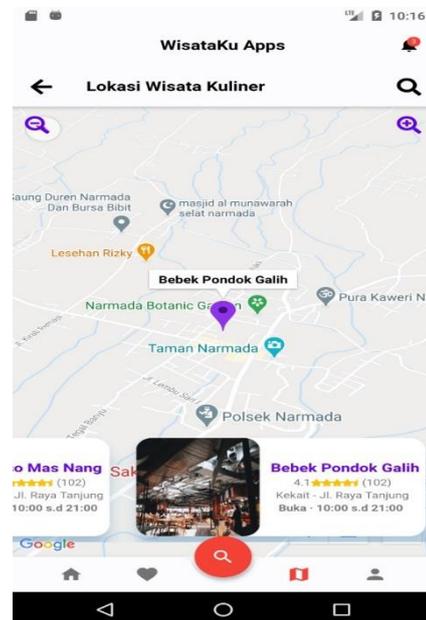
```

```

    $b['img'] = $a['img'];
    $b['namaTempat'] =
$a['namaTempat'];
    $b['alamat'] = $a['alamat'];
    $b['telepon'] = $a['telepon'];
    $b['latitude'] = $a['latitude'];
    $b['longitude'] =
$a['longitude'];
    $b['jamBuka'] = $a['jamBuka'];
    $b['jamTutup'] = $a['jamTutup'];
    array_push($response, $b);
}
echo json_encode($response);
?>

```

The culinary tourism location map page is a culinary tourism location information page that is displayed based on the search results of the system in the form of a map.



Source : (Erniwati & Subki, 2020)

Figure 9. Map of Culinary Tourism Locations

Source code for adding Map of Culinary Tourism Locations is:

```

<?php
require "../conn/con.php";
$sql = "SELECT * from tbl_wilayah";

$query = mysqli_query($con, $sql);
$data = array ();
while ($result =
mysqli_fetch_assoc($query)){
    $data[]=$result;
}
echo json_encode($data);

```

7. Limited trial

System testing is carried out with the ISO / IEC 25010: 2011 model which consists of functional suitability, Performance Efficiency, compatibility, Usability, Reliability, Security,

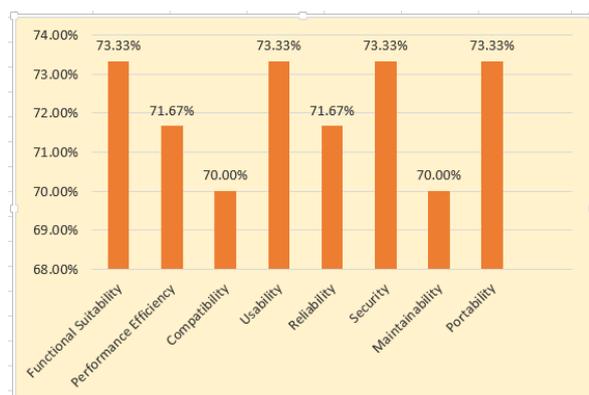
Maintainability, and Portability. The system test results can be seen in table 3.

Table 3. Limited trial

No	Characteristics	Persentase	Result
1	Functional Suitability	73.33 %	Good
2	Performance Efficiency	71.67 %	Good
3	Compatibility	70.00 %	Good
4	Usability	73.33 %	Good
5	Reliability	71.67 %	Good
6	Security	73.33 %	Good
7	Maintainability	70.00 %	Good
8	Portability	73.33 %	Good
Average Limited trial		72.08 %	Good

Source : (Erniwati & Subki, 2020)

Based on table 3, the limited trial graph with a total of 15 respondents is as follows:



Source : (Erniwati & Subki, 2020)

Grafik 1. Limited trial

8. Limited trial revision

Based on the results of limited trials with an average percentage of 72.08% "good" so there is no system revision.

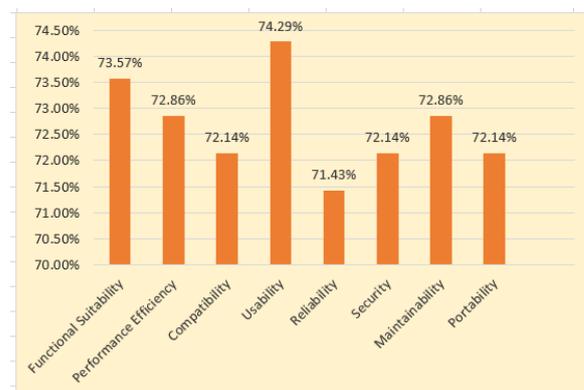
9. Trial field

Table 4. Trial field

No	Characteristics	Persentase	Result
1	Functional Suitability	73.57 %	Good
2	Performance Efficiency	72.86 %	Good
3	Compatibility	72.14 %	Good
4	Usability	74.29 %	Good
5	Reliability	71.43 %	Good
6	Security	72.14 %	Good
7	Maintainability	72.86 %	Good
8	Portability	72.14 %	Good
Average Trial field		72.68 %	Good

Source : (Erniwati & Subki, 2020)

Based on table 4, the limited trial graph with a total of 35 respondents is as follows:



Source : (Erniwati & Subki, 2020)

Grafik 2. Trial field

10. Revision of field trials

Based on the results of limited trials with an average percentage of 72.68% "Good" so there is no system revision.

11. Dissemination, and implementation.

Dissemination and implementation are carried out by socializing to the wider community the results of the research in the form of a geographic information system for culinary tourism locations in the West Lombok region.

CONCLUSION

The conclusion of this research is to build a geographic information system for culinary tourism locations in West Lombok. This application is built on a mobile basis. The features of this system include users or users can view menus, menu details, favorite menus, view locations, search for menus, update profiles and navigate to locations, culinary owners admin can view menus, view menu details, search for menus, view locations culinary tours, profile updates, culinary menu management, must have an internet network to be able to use or access a mobile-based geographical information system application for culinary tourism locations. Primary data sources were obtained from research sites, namely the West Lombok region, and secondary data were obtained from books and journal articles. The research method used in this research is the Research and Development research method with preliminary stages, data and information collection, interviews and observations, system design with modeling, design validation, design revision, development, limited trial, limited trial revision, trial field, revision of field trials, dissemination, and implementation (Sugiyono, 2015).

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