Chapter 33
Predicting Potential Library Outlets with GIS-based technique (GISLib) to Improve Library Accessibility

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Abstract

In serving a wide range of geographically dispersed users, librarians need to analyse distance and physical accessibility of public library to ascertain that the community at large has an equal right to utilise in-house library resources. From a short observation, none of Library and Information Science study was carried out using GIS in Malaysian Citation Index (MyCITE) and Malaysian Abstracting and Indexing System (MyAIS). Furthermore, the application of GIS in LIS research is slowly developing and expanding \cite{8,9,10,11}. Against this background, the objectives of this project were twofold; (a) to analyse patron distance to Petaling Jaya Community Library network. (b) To determine potential library locations to better serve existing library patrons. Geographical Information System (GIS) was used in this project to map users' addresses retrieved from the library system. Geographical Information System (GIS) is a computer system which captures, stores, manipulates queries, analyses and displays geographically referenced data. It was recorded that a majority of the library users live within 1-3 miles from the library. Strategic areas for branch, mobile or library outlets were pictured accordingly. This study aids Library and Information Science (LIS) researchers to utilise GIS as a strategic tool in spatial-related matters.

Introduction

A. GIS Applications in Libraries

Geographical Information System can be used in a number of ways. Earlier studies indicate that GIS was used as an important component to investigate market profiling and market areas \cite{14}, library facility location \cite{13,20}, library use \cite{20,21} and accessibility analysis \cite{9,12}. Apart from that, several studies have applied GIS with socioeconomic elements to comprehend the use of library resources \cite{6,15,16}. Collectively, in a study to examine LIS literature that used GIS \cite{22,24}, it was found that LIS studies employed GIS mainly to (i) analyse the library service populations and (ii) examine collection, in-library and other facilities-based use. In short, applying GIS in libraries can be viewed as a holistic approach to enhance library roles to better serve existing and potential users.

B. Library Sitting & Accessibility

Distance has always been one of the most argued topics in library accessibility. From the literature, accessibility has a broad meaning and studied differently. Scholars may, for instance explore on Web accessibility or collection availability to the library users. Other spatial-related studies in LIS explored accessibility in terms of demographic and topographic aspects. This study, however, focuses on distance or physical accessibility of the library and its branches to the library users.

In the past, library sittings were determined by using a diverse selection of methods. Library managers relied on trial and error, experience, citizen experts to locate strategic library locations. These areas may include populated, educational, business, foot-traffic spots and shopping centres to attract users \cite{31}. Other classical method includes accepting gift land as opposed to acquiring optimal sites for library locations. Decisions on library placements were made with less emphasis given on rigorous, critical and scientific approaches. However, modern methods of analysis such as optimisation techniques and mathematical models have made available to planners and analysts \cite{31,32}.

Fundamentally, scholars have varied views on the relation between distance and library usage. Some argued that user distance can be viewed as an indicator for circulation of library materials \cite{25,26}. Others
assert that travel time by public transportation and its frequency leads to library visitorship [27, 31]. Interestingly, various distance standards were developed by library associations to aid librarians in the selection of library locations. For instance, a half-mile radius, one to four mile radius, 15 minutes travel by bus, or 30 minutes by car distance was used in a number of places [27, 28, 30]. In addition, facility location models and theories were also used such as retail location theories [9, 10, 31, 32].

Research Background

Petaling Jaya is a city located at the Peninsular Malaysia was purposely selected as study area. It is situated at the Petaling district of Selangor and home to approximately 61,367 residents with 97.2 km² space areas [22, 33]. Petaling Jaya Community Library was established in 1993 and the library currently has one main library and two branch libraries including Children Development Centre. The library used Integrated Library Management Utility (ILMU) as its library system.

Methods

This project utilised the methods used by numerous studies [9, 12, 13, 24]. Patrons who had checked out at least one item from the library were identified. Patrons’ information such addresses was extracted from the library system. Patrons who used in-house library resources without borrowing library materials were not available, thus excluded in this study. Data of the project was used and matched to the street network using ArcGIS 9.3 geocoding feature. Network Analysis tool in Arcgis 9.3 was used. The road network was retrieved from Malaysian Centre for Geospatial Data Infrastructure (MaCGDI). Travel distance from users’ home to the main library and its branches based on road networks were geocoded and mapped to represent users distance to the library. Addresses that did not match the street network were hand-plotted in Arcgis 9.3. Then, 1-3 mile radius (buffer) was measured to visualise patron distance. Potential library outlets and locations to serve existing library users were then suggested by analysing the findings of this study.

Findings

A. To analyse patron distance to Petaling Jaya Community Library & branches

![Figure 2. 1 - 3 miles buffer around existing libraries](image1)

B. To determine potential library locations to better serve existing users

![Potential library locations](image2)
Conclusion

Using GIS to visualise users’ locations is an effective approach to locate strategic areas for future library branch, mobile and outlet placements. In this study, it was found that the visual representation of the data enables library administrators to make sensible decisions on library-spatial matters.

References


