Research paper

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Visitor Circulation and Spatial Legibility in Regional Libraries: A Comparative Study of Semarang, Surakarta, and the Special Region of Yogyakarta

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Abstract

Regional libraries, as educational public spaces, require circulation systems that support spatial legibility, efficient movement, and user comfort. This study compares visitor circulation in regional libraries in Semarang, Surakarta, and the Special Region of Yogyakarta using D. K. Ching's architectural circulation framework. A qualitative descriptive and comparative approach combined field observation, visual documentation, and literature review. Observations were conducted between 10:00 and 14:00 Western Indonesian Time and involved approximately five to seven visitors. The analysis considered entrances, primary and secondary routes, and spatial circulation patterns. The three cases exhibit predominantly linear, centralized radial, and loop or network configurations, respectively. The visual analysis suggests that clear access, differentiated routes, and appropriately located circulation nodes may support spatial legibility and distribute movement more evenly. Given the limited observational scope, these findings should be interpreted as case-based spatial assessments rather than measured differences in user comfort. The study offers design considerations for improving circulation in regional libraries.

Keywords: Circulation pattern, D.K. Ching, public space, regional library, visitor circulation

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Introduction

As the capital of Central Java Province, Semarang provides a range of educational facilities, including numerous public and private higher education institutions (Kumara 2018).

The Central Java Provincial Library is a public institution that supports the provincial government in providing library services. Its location in Semarang is expected to facilitate public access to information, particularly for city residents (Heri and Ati 2012). An organized circulation service helps regulate interactions with patrons and informs them of the library's rules and procedures (Maulida 2015).

Circulation services are among the most frequently used library services because they involve direct interaction with patrons, particularly the lending and return of materials (Sumiyati and Wijaya 2023). Visitor circulation within the building, however, presents a distinct architectural challenge. Regional libraries must accommodate diverse users, fluctuating visitor numbers, and constraints imposed by existing buildings. Examining visitor circulation therefore helps clarify the relationship among spatial organization, movement patterns, and user behavior. Ching's theory of architectural circulation provides a conceptual basis for assessing how effectively these spaces support library use.

Methods

This study used a qualitative descriptive and comparative method. Data were collected through field observation, visual documentation, and literature review. Field observations took place during the day, between 10:00 and 14:00 Western Indonesian Time, and involved approximately five to seven library visitors. Following the study's interpretation of D. K. Ching's circulation framework, the analysis considered (1) entrances, (2) primary and secondary circulation routes, and (3) spatial circulation patterns. These indicators were applied to regional libraries in Semarang, Surakarta, and the Special Region of Yogyakarta.

Results and discussion

Functions of regional libraries

Regional libraries perform educational, informational, recreational, and preservation functions. They provide opportunities for learning, access to scholarly and general information, reading for pleasure, and the preservation of collections related to local culture and history. By broadening access to information and supporting literacy, they can contribute to community well-being (Karim and Krismayani 2016).

Visitor circulation in architecture

Architectural circulation concerns how people move through and between spaces. It includes horizontal and vertical connections that link building functions and enable users to navigate them efficiently (Ummah and 2019).

In libraries, visitor circulation describes movement among service areas, collections, reading rooms, and other shared facilities. A well-designed circulation system can improve comfort and the efficiency of space use (Sumiyati and Wijaya 2023).

Principles of public space and circulation design

The design of public buildings, including regional libraries, requires careful attention to spatial organization and circulation to support comfort, efficient movement, and access. Ching (1993) describes circulation as an architectural system that connects spaces and guides users through a building. Clear circulation routes help users understand spatial orientation and reduce uncertainty when navigating the building.

In a public setting such as a library, circulation has social and psychological implications as well as a movement function. Effective circulation should support accessibility, unobstructed movement, and connections between spaces. Routes should be identifiable and visually clear while limiting conflicts between users moving in different directions.

Components of architectural circulation in Ching's framework

Ching identifies several interrelated components of a circulation system: approach, entrance, path, nodes, and circulation space. Together, they shape spatial legibility and the experience of movement.

The approach and entrance establish users' initial orientation to a building. Paths connect its various functions, while nodes are points where routes converge and where congestion may occur. Circulation space also has physical attributes, including width, lighting, and visual connections to adjacent spaces Ching (1993).

Using Ching's framework, Wati and Martana (2024) show how the identification of circulation components can reveal orientation problems and barriers to movement in public buildings.

Analytical framework

This study adopts Francis D. K. Ching's circulation framework because it connects movement routes, spatial organization, and the user's experience of a building.

The comparison uses three indicators: entrances; primary and secondary circulation paths; and spatial circulation patterns. Together, they provide a common basis for evaluating the apparent legibility and efficiency of the three cases.

A literature review of national and international publications from 2015 to 2025 informed the conceptual discussion of visitor circulation.

Library and Archives Agency of the Special Region of Yogyakarta

The Library and Archives Agency of the Special Region of Yogyakarta (BPAD DIY) are a provincial institution involved in the development of inclusive public services. A study cited as Rahmadani (2018) describes a linear movement sequence from the entrance to the service desk, collections, and reading spaces. Although this route is easy to follow, it may create conflicts between entering and departing visitors during busy periods.

Research attributed to Universitas Negeri Yogyakarta also reports that limited integration between service and reading areas can lead to uneven visitor flow. An open-plan arrangement in which collection shelves define intuitive paths has been proposed to address this issue. These observations suggest that circulation depends on space management and visitor behavior as well as architectural organization.



Figure 1
Main Entrance to the Library and Archives Agency of the Special Region of Yogyakarta

Surakarta City Library and Archives Office

The Surakarta City Library and Archives Office (DPKD) develop facilities for public library services and community literacy. A study cited as Windensi (2024) associates facility quality and spatial organization with visitor satisfaction, particularly ease of access and spatial comfort. Connections among collections, reading areas, and information services are important aspects of its internal circulation.

Observation indicates a predominantly radial arrangement centered on the main service area. This may concentrate visitors in the building's central zone while leaving other areas less used. Additional linear and loop routes have been suggested to enable visitors to access spaces without returning to the starting point, potentially distributing activity more evenly (Fitri et al. 2025).



Figure 2
Front entrance to the Surakarta regional library

Semarang City Archives and Regional Library Office

The Semarang City Archives and Regional Library Office (DAPD) provide public access to information and supports community literacy. Its internal circulation affects reading, information seeking, and visitor comfort. Research cited as Nugroho and Tri (2025) describes uneven circulation and crowding around entrances, collections, and reading areas during busy periods. These reported conditions suggest that the layout may not fully support efficient movement (Sugiarto and Priyanto 2020).



Figure 3
Book area at the Semarang regional library

Circulation Patterns in the Three Libraries
Special Region of Yogyakarta

The Yogyakarta diagram indicates a loop or network pattern organized around an open space that serves as a principal activity node. In Ching's terms, the approach and entrance establish a clear initial orientation, after which interconnected routes allow visitors to move between areas without retracing their steps. A discernible hierarchy of primary and secondary paths, supported by open transitional corridors, improves spatial legibility and flexibility. Nodes designed as open activity spaces can accommodate both gathering and movement, potentially reducing circulation conflicts. This arrangement appears to distribute visitor movement more evenly and to support comfortable and efficient use of library space.

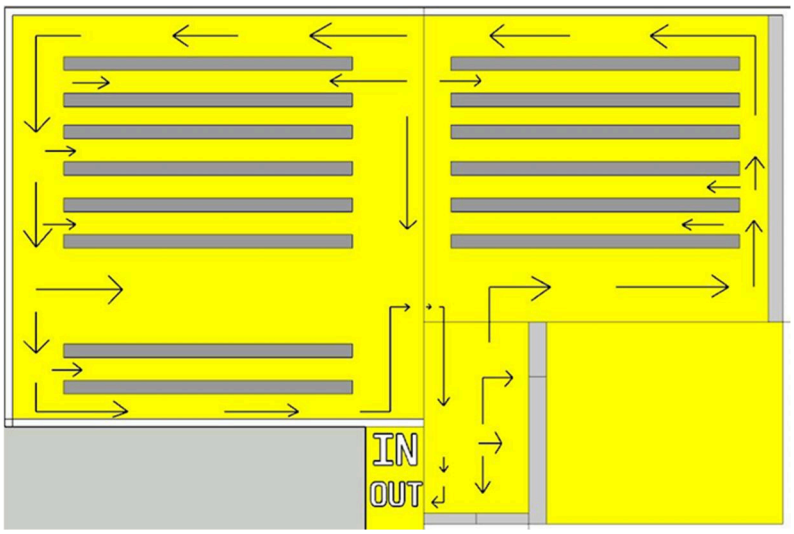


Figure 4
Visitor Movement Patterns at the Semarang City Regional Library.
Light gray: lockers, attendance point, service area, and coworking space; dark gray: book collection; red: void

Surakarta

Analysis of the entrance, primary and secondary paths, and overall spatial circulation pattern is illustrated in figure 5. The Surakarta library has one main entrance and visitor routes that repeatedly connect to a common center, producing a radial pattern. This configuration can clarify initial orientation, but reliance on a single main node may create congestion and movement conflicts. Without adequate secondary or loop routes, the radial layout may be less adaptable when visitor numbers increase.

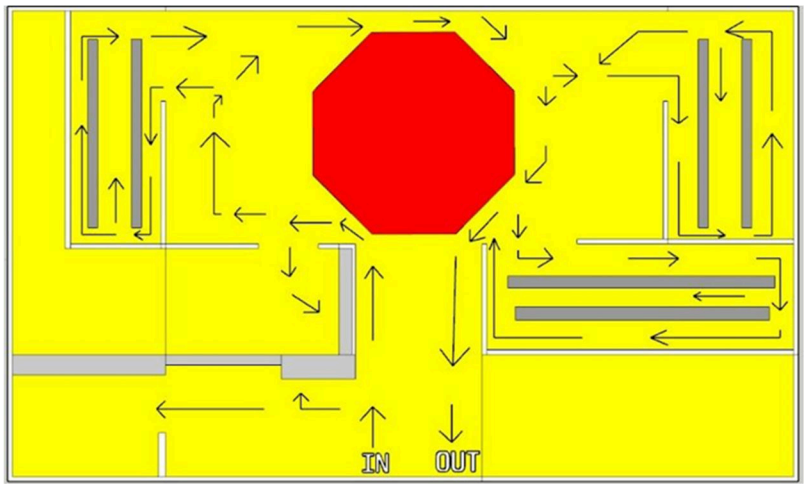


Figure 5
Visitor circulation diagram for the Surakarta regional library.
Light gray: lockers, attendance point, service area, and coworking space; dark gray: book collection

Semarang

Using the same three circulation indicators, the observations made between 10:00 and 14:00 among approximately five to seven visitors indicate a linear pattern (figure 6). The library has a single main entrance, and visitors tend to follow a common route. Although this route is straightforward, the limited alternatives and weak path hierarchy may concentrate activity at particular points. This arrangement can reduce flexibility and complicate spatial orientation beyond the main path.

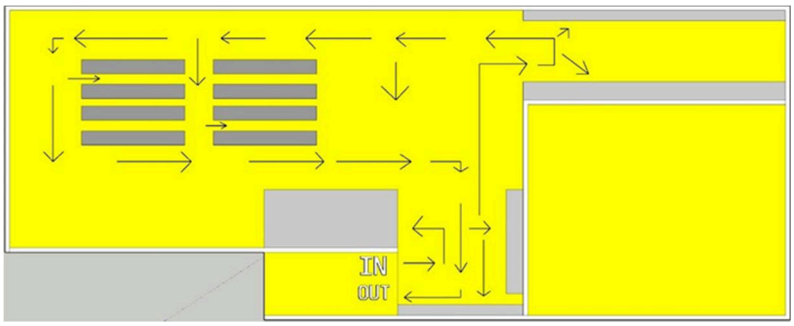


Figure 6
Visitor circulation diagram for the Semarang regional library.
Light gray: service area, lockers, attendance point, and coworking space; dark gray: book collection

Comparative analysis

Indicator	Semarang	Surakarta	Yogyakarta
Entrance	Initial orientation is less clear; activity concentrates at the entrance	Clear orientation toward the central service area	Clear orientation from the entrance
Spatial pattern	Linear	Centralized radial	Loop/network
Primary and secondary paths	Dominant main route with few secondary paths	Routes radiate from the center but remain centralized	Clearly differentiated and balanced primary and secondary routes

Table 1
Circulation factors in the three regional libraries

The comparison indicates that Semarang's dominant linear route provides limited alternative movement paths, while Surakarta's centralized radial configuration offers a clear focal point but may produce congestion around its main node. Yogyakarta's interconnected loop or network arrangement offers clearer path differentiation and additional movement options. On the basis of the diagrams and limited observation, the latter appears to support more even movement and greater flexibility.

These findings suggest that the clarity of the approach, the hierarchy of paths, and the placement and capacity of circulation nodes are relevant to the functioning of regional libraries. Linear and radial configurations without alternative routes may concentrate activities and produce potential conflicts. A loop or network arrangement can provide additional choices, although its actual effects on visitor experience require more extensive behavioral observation.

Conclusions

The three cases show distinct configurations: linear circulation in Semarang, centralized radial circulation in Surakarta, and a loop or network arrangement in Yogyakarta. The spatial comparison indicates that clearer entrances, differentiated paths, and well-organized nodes may improve legibility and distribute movement. Because the field observations involved only approximately five to seven visitors during a limited daytime period, the findings cannot establish measured differences in comfort or congestion across the libraries.

Library managers and designers should consider clearer zoning, stronger primary and secondary path hierarchies, and nodes that function as usable transition spaces. Future work should combine spatial analysis with systematic observation of user behavior and post-occupancy evaluation across different times and visitor volumes.

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