

Internal Grants

QUST-2-CENG-2020-16

PI Name:

Dr. Mark David Major, AICP, CNU-A

Students:

Raghad Alatoon 201601688

Ghalya Al-Maadeed 201802490

Aljazi Al-Banai 201801604

Hanae Taha 201610104

Introduction



Figure 1. View of (left) the southern façade of the Main Library

The Research and its Purpose

- Conducted a post-occupancy evaluation of the QU Main Library, drawing on fieldwork observations of entries, movement, and room/space use.
- This will positively contribute to future design refinements, alterations, and new university buildings in creating a world-class center of education and research.

How can we study its success ?

- Collect information to determine the use of each space in the building
 - Direct observations of the use of the library and the space functions

QU library

- It is the most important building on campus.
- Serves many needs: educational and professional.
- Opened in 2012.
- Located at the center of the university, therefore referred to as 'Heart of the university'.
- Building plot of ~26,725 square meters (m2) about 400 meters (m).
- Given its importance on campus, it's been used as an environment behavior study and space syntax research.
- Main purpose of study : is the building used as intended in its design?

Abstract

Entry and Exit Counts at Library Access Points

QU MAIN LIBRARY ACCESS POINTS	ENTRY (People/hour)	Exit (People/hour)	TOTAL (People/hour)
Main (North) Entrance	271.5	291.0	562.5
Male (East) Entrance	285.0	199.5	484.5
Female (West) Entrance	186.0	174.0	360.0
Restricted (South) Entrance	6.0	7.5	13.5
Total	748.5	672.0	1,420.5

Average number people per hour entering and exiting the four ground level access points of the QU Main Library over an entire weekday from 7:00 am to 5:00 pm. (Source: QUST-2-CENG-2020-16).

Movement Patterns

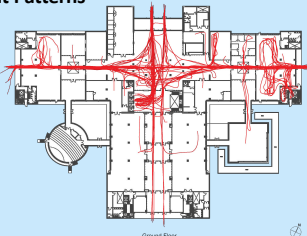


Figure 2. Movement traces of a typical 100 people during the first 10 minutes of their visit or until they reached their destination, whichever came first, from all access points at the ground floor of the QU Main Library during the weekday. (Source: ARCT 420/QUST-2-CENG-2020-16).

Methodology

The study involved two rounds

Round 1

Observers conducted a building room use survey of 900 spaces on five floors.

TYPE	TOTAL # OBSERVED	PERCENTAGE
Student (Female)	567	60.0%
Student (Male)	174	18.5%
Faculty	93	10.0%
Service Staff	96	10.0%
Security	10	1%
Visitors	7	0.5%
Total	947	100%

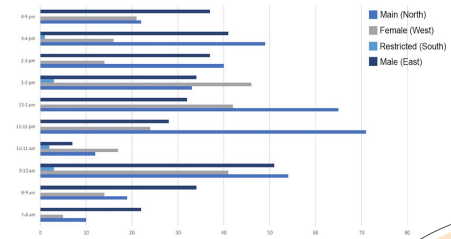
Demographics of building users of the QU Main Library based on the entry/exit counts over an entire weekday from 7:00 am to 5:00 pm

Round 2

Researchers conducted movement trace observations tracking the routes taken by 100 users during the first 10 minutes of their visit

QU MAIN LIBRARY/FLOOR	TOTAL # OBSERVED	PERCENTAGE
3 rd Floor (Administration)	327	6.5%
2 nd Floor (Male Library)	991	20.0%
1 st Floor (Female Library)	1,228	24.5%
Ground Floor	2,237	45.0%
Basement (Parking/Mechanical)	200	4.0%
Total	4,983	100%

Total number and percentage use of each floor of the QU Main Library based on the static snapshots of all public spaces of the building over an entire weekday from 7:00 am to 5:00 pm



Total observed use of the QU Main Library access points over time from 7:00 am until 5:00 pm during a typical weekday

Discussion

The purpose of this study is to observe the movement and space use, and space syntax modeling to further demonstrate that the QU Main Library is well-designed for its purpose. As the study shows the building is successfully used as what it was intended for, although some areas were not designed efficiently like the male vertical access to the library, other design strategies would have been more cost effective. The architects' use of a 'traditional' cross-axis arrangement for the layout highlights the efficiency of this method in this type of building, because of this layout circulation and accessibility throughout

Results

Sitting, Standing, and Interacting in the Library



Figure 2. Static snapshots of sitting, standing, interacting, and praying on all floors of the QU Main Library during a typical weekday. (Source: ARCT 420/QUST-2-CENG-2020-16).

Space Syntax Modeling

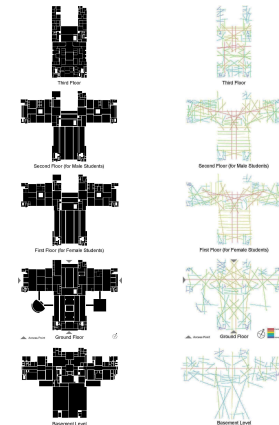


Figure 3. Convex mapping. (Source: QUST-2-CENG-2020-16).

Figure 4. Axial analysis of individual floors. (Source: QUST-2-CENG-2020-16).

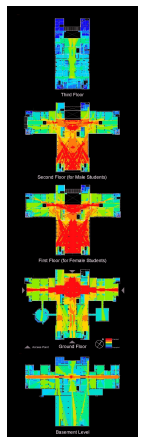


Figure 5. Pattern of integration (radius) in the visibility graph analysis (VGA) of individual floors of the QU Main Library set to the same color range. (Source: QUST-2-CENG-2020-16).