



Higher Education Design Quality Forum

www.hedqf.org



HEDQF Student Prize 2022

Design Research Collaboration

Learning Environments - Design Research Laboratory (LE-DR Lab)
Part of Masters in Architectural Design, Welsh School of Architecture

Andy MacFee – architect for HEDQF

+

Dr Hiral Patel – Cardiff University

Background to LE-DR Lab



www.futurelearningenvironments.org

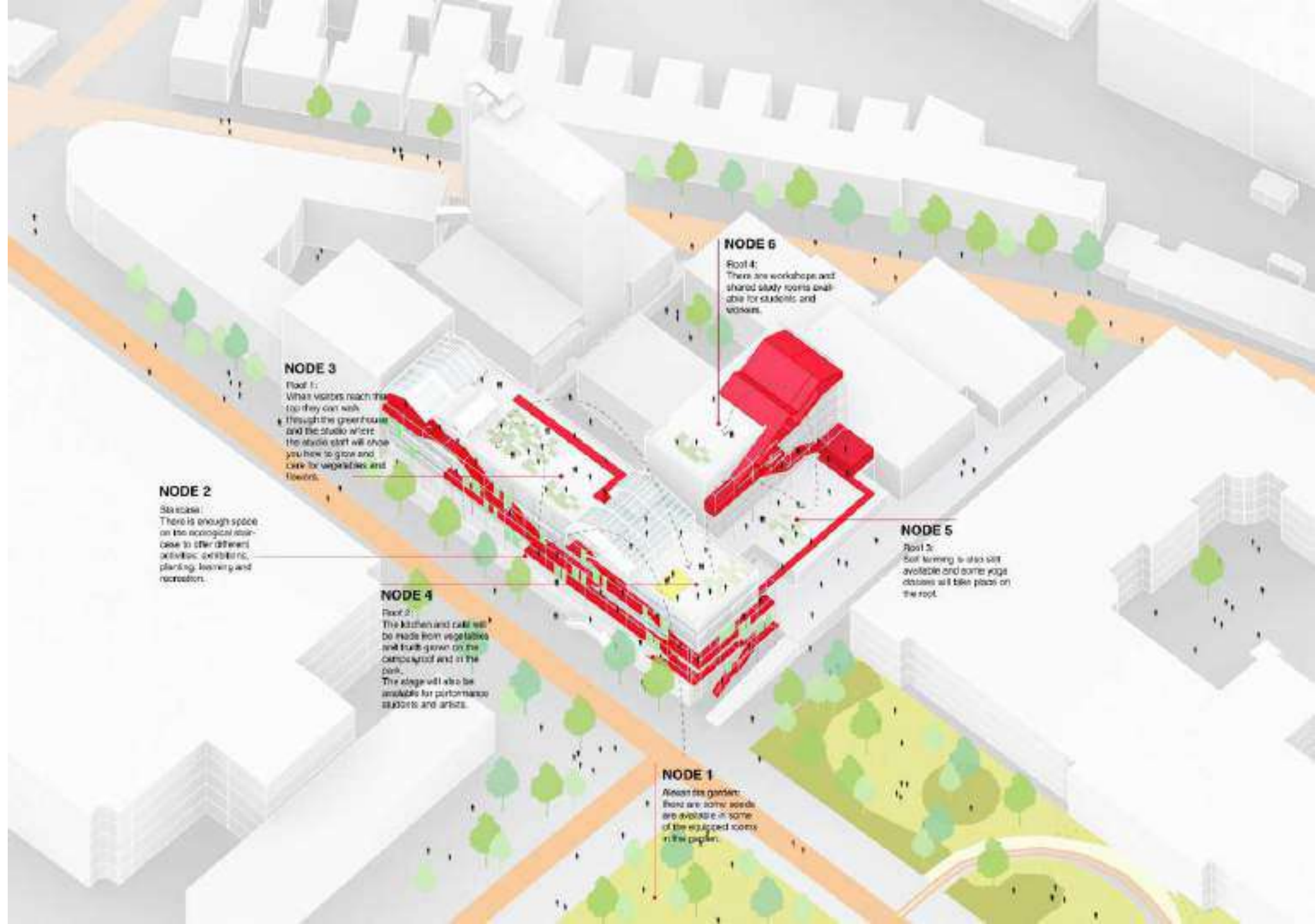


Yijing Zhuang

Biodiverse Campus

HEDQF

Ist Prize



Design Proposition for Campus

DIAGRAM

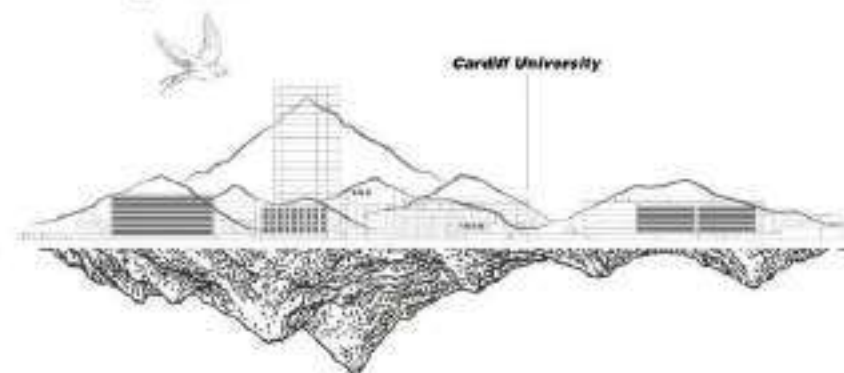
The proposition is to connect gardens, vertical green spaces, and green roofs like the flight path of a bird. When we are exploring where the birds stop during their flight, it is the location we are looking for that is suitable for these activities.



MOUNTAIN CONCEPT

Because birds see the city in three dimensions, for them the city is a mountain range. Garden are like flatland and the roof of building are hill.

Looking at Cardiff as a bird sees it



STRATEGY

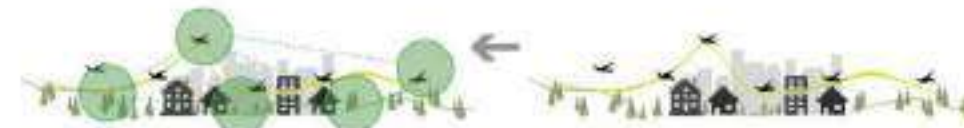
BEFORE



Green spaces and buildings in cities are often separate.

Birds are unable to rest, feed and breed on modern buildings.

AFTER

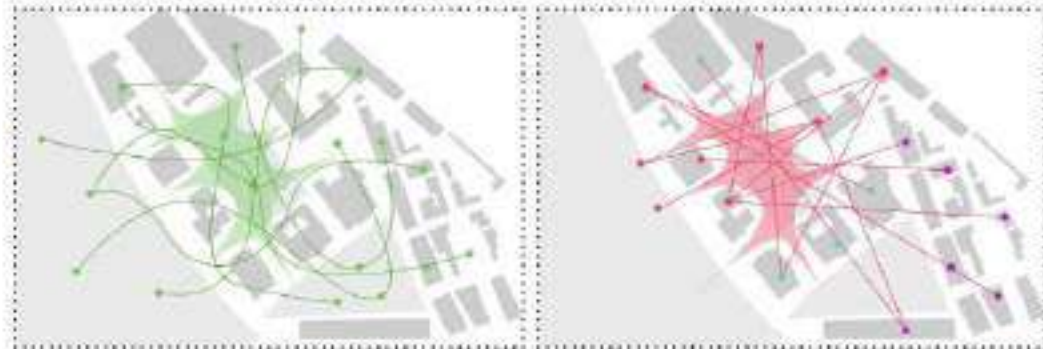


Finding gaps in the building through the stopovers of birds creates new green opportunities and brings greenery from the park into the building interior.

Breaking the independence of the existing building by opening up the building and incorporating green space in accordance with the habits and bird routes.

BIRD ROUTE

PEOPLE ROUTE



When studying the paths of man and bird there is an intersection between the paths of man and bird. And these intersections are the parts of the building that I think have the potential to break the seriousness of the building and allow for architectural interventions.

Analysis of Existing building

Chart of Analysis

Building	Use	Structure	Material	Form	Color	Texture	Volume	Mass	Scale	Detail	Function	Environment
1. Sir Martin Evans Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
2. Main Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
3. Bute Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
4. Glamorgan Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
5. Sir Martin Evans Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
6. Main Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
7. Bute Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban
8. Glamorgan Building	Teaching	Concrete	Brick	Rectangular	Red	Smooth	Large	High	Medium	Simple	Classroom	Urban

Axonometric view of the site



A study of the teaching building on the site was carried out. The study focuses on the people who use the building, the functions and limitations of its use. The analysis of the spaces that need to be upgraded and improved, and the architectural improvements that need to be made.

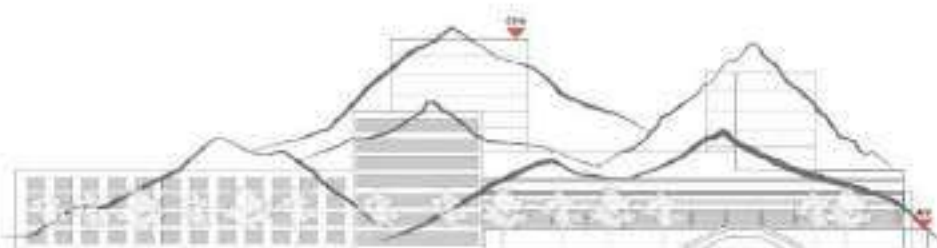


Analysis of Sir Martin Evans Building

After more research, I chose Sir Martin Evans Building as the first building to undergo development.

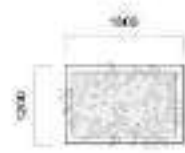
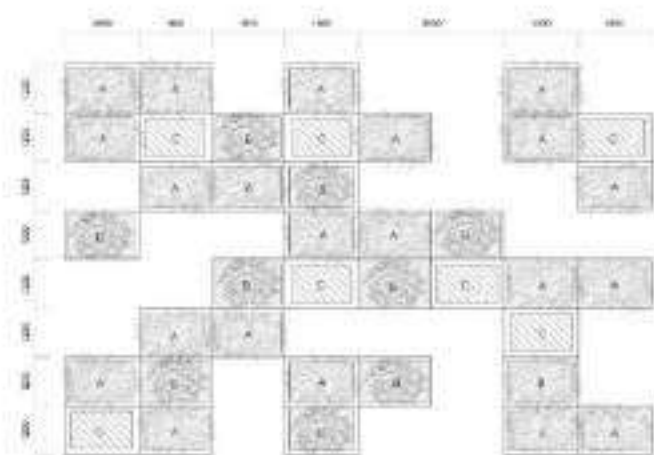


There are two main reasons for choosing this building as the first test building. The first is that the building is made up of many blocks, which are stacked like a mountain range, and that it has a maximum height of 42 m and a minimum height of 4 m. The second is that the building is also the place where students go to buy food from other buildings.



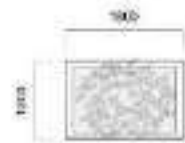
Garden on the Roof

self-farming Area



MODULE A1
Vegetable farming

The module offers everyone the opportunity to grow vegetables and these actions will be recorded through the app.



MODULE A2
Flower growing

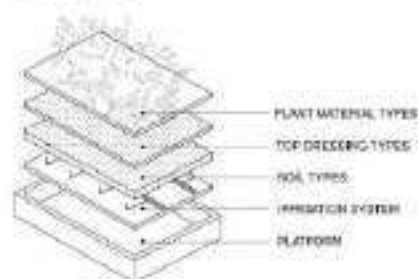
The module offers everyone the opportunity to plant flowers and these actions will be recorded through the app.



MODULE A3
Lighting system

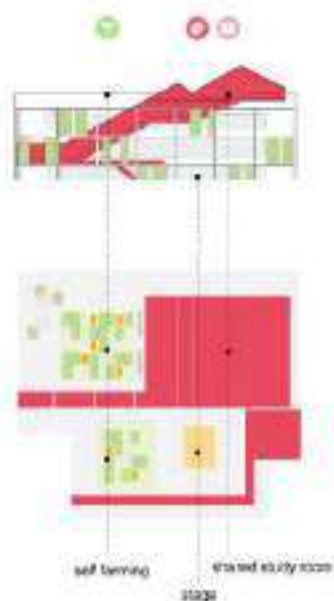
The module is the same plan size as the planting module and provides not only roof lighting, but also as a seating area for people.

MODULE A1 & A2



Leisure / Farm / Study Area

Elevation and Plan



Process Diagram



By planting seeds in the structure, visitors not only bring the pavilion to life, but also become the main designers and builders of the building. People wandering through the building, surrounded by natural greenery and 'home-grown' ingredients, gain a better understanding of the life cycle of plants and how to harvest the healthy ingredients we need on a daily basis. This is a strategy for ecological coexistence between nature, architecture and people.

Garden on the Roof

Rendering

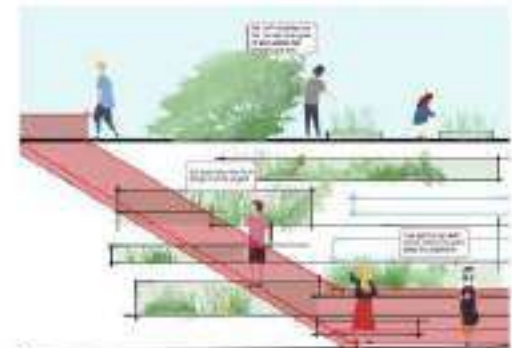
Cafe & Farming & Social area



Staircase with Landscape & Green house & Farming

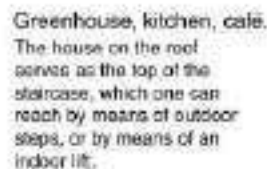


By multiplying the concepts of 'green roof' and 'shared garden', a new type of rooftop space is derived, which provides clues to solving practical problems. The rendering simulates an ideal rooftop garden with a kitchen, a café, a greenhouse and a farm. It can also function as an event space for the community and school, open to all.



Story sketch

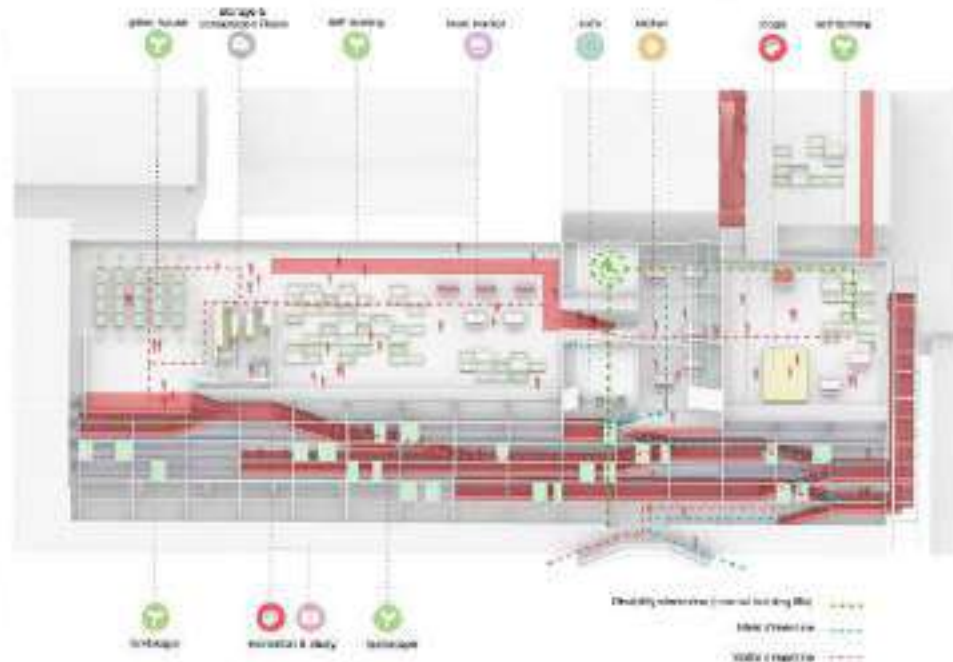
Exploded view



The staircase connects the interior and exterior spaces, as well as the ground to the roof and the roof to the roof.

The steel frame not only serves as a support for the staircase, but also as a space for plants to flourish and for birds and insects to live.

The stairs are more than just a pathway; they are a network of activity, like the green vines that surround the building's outside. Greenery will cover the walls of the building through these steps, bringing students closer to nature and giving birds and insects a new home.

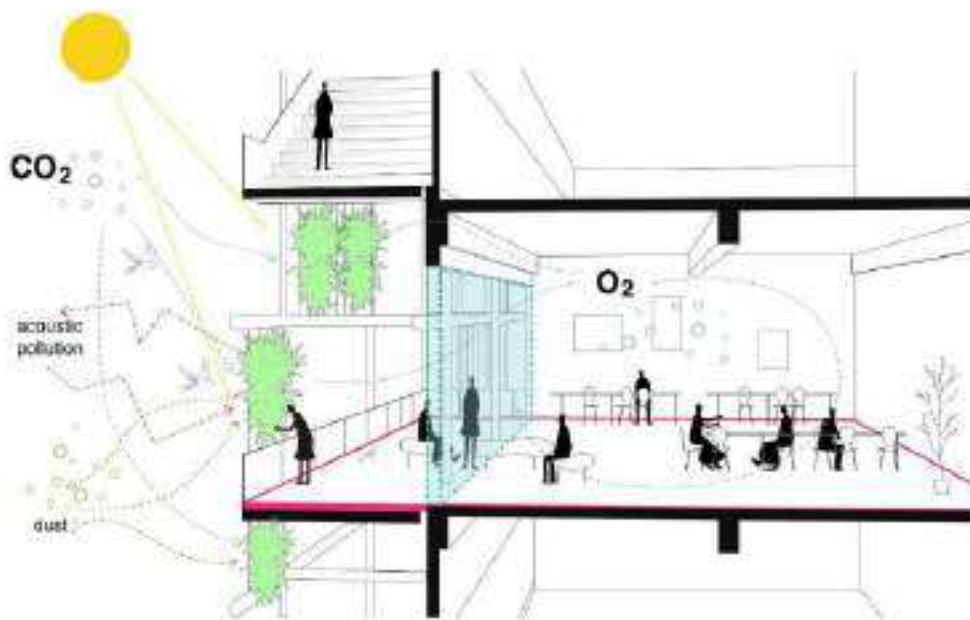


The Breathing Wall

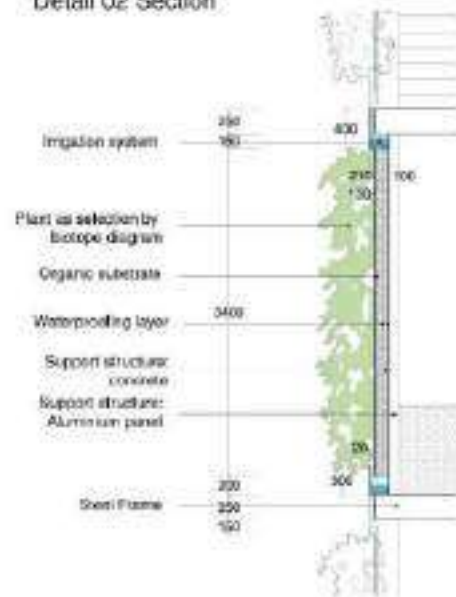
Facade Planting Systems

The façade system consists mainly of a steel frame, landscape and stairs. The steel frame acts as the main support structure and is expanded in modules with a spacing of 5.6m in width and 4m in height. It can be adjusted to the scale of the building.

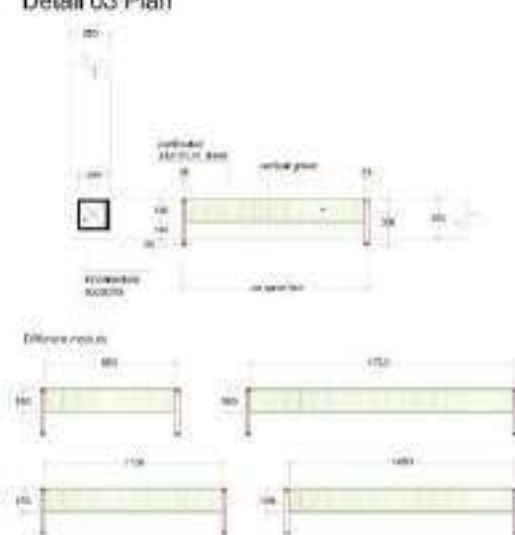
The landscape is made up of a vertical green system (From Singular green) with a hydroponic irrigation system and substrate on these support panels. The vertical green is also easy to maintain and replace and can be adapted to the local climate.



Detail 02 Section



Detail 03 Plan



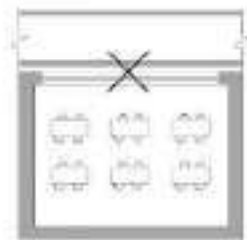
The slender breathing wall decorates the view from inside and outside the front façade and in summer it also dampens the harsh light. This barrier also eliminates the need for blinds or curtains on the front façade, and even allows the staircase to be made identical to the interior space by simply breaking the internal glass window structure.

This increases the usability of the function while increasing the interior space and allowing closer access to nature.

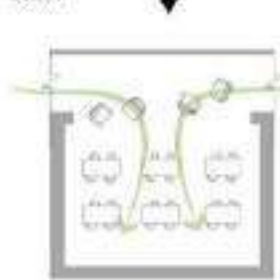


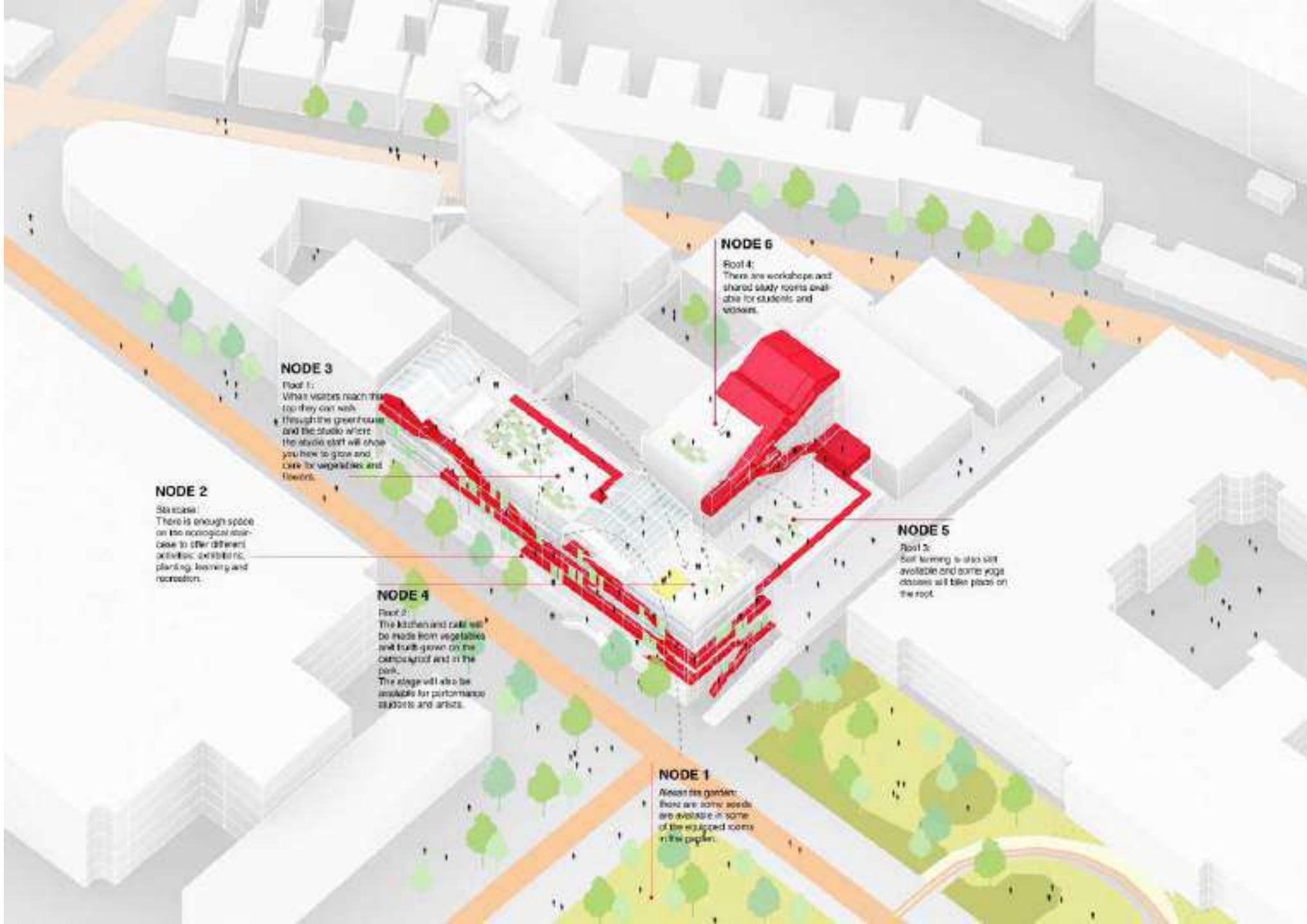
Wall and windows of existing buildings. The space can be opened up by removing some of the glazed windows.

Before



After





NODE 2

Staircase
There is enough space on the ecological staircase to offer different activities, planting, learning and recreation.

NODE 3

Roof 1:
When visitors reach the top they can walk through the greenhouse and the studio where the studio staff will show you how to grow and care for vegetables and flowers.

NODE 4

Roof 2:
The kitchen and cafe will be made from vegetables and fruit grown on the campus roof and in the park. The stage will also be available for performance students and artists.

NODE 6

Roof 4:
There are workshops and shared study rooms available for students and workers.

NODE 5

Roof 3:
Soil turning is also still available and some yoga classes will take place on the roof.

NODE 1

Around the garden:
There are some seeds available in some of the equipped rooms in the garden.

Le Ma

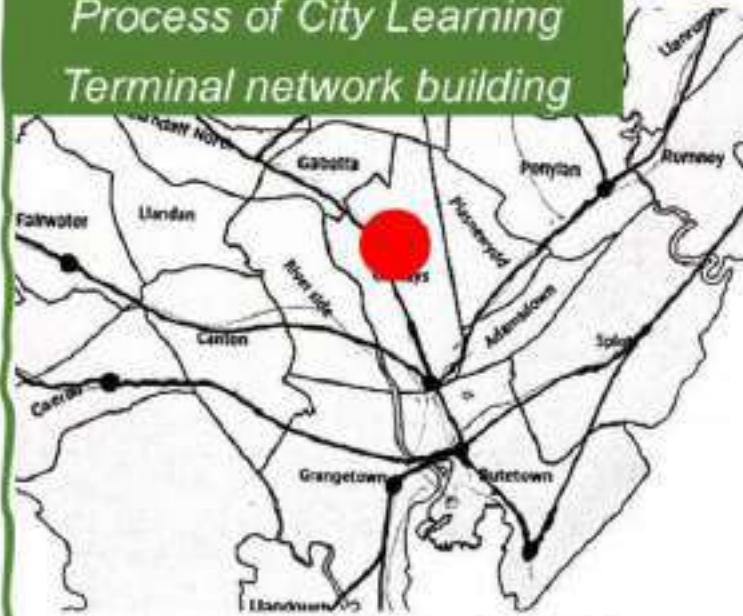
Learning
Terminals

HEDQF

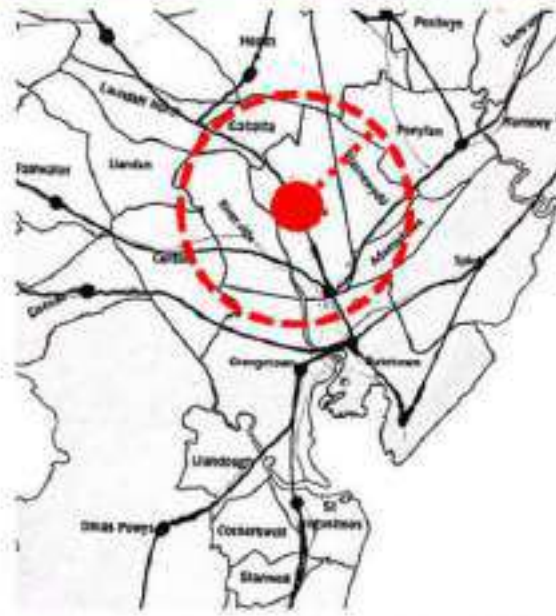
2nd Prize



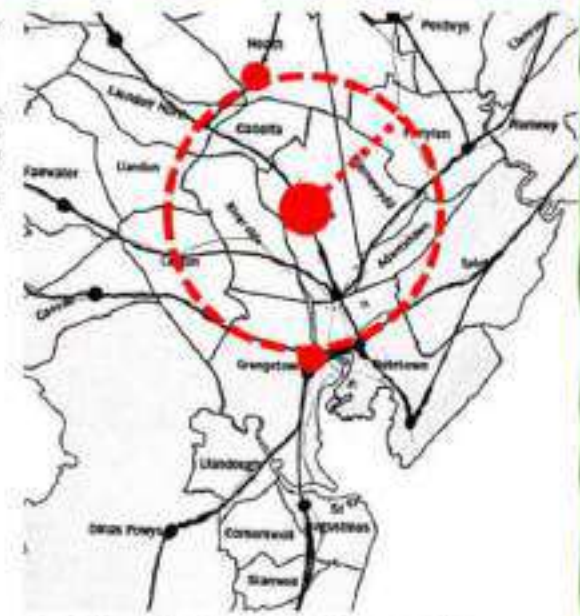
Process of City Learning Terminal network building



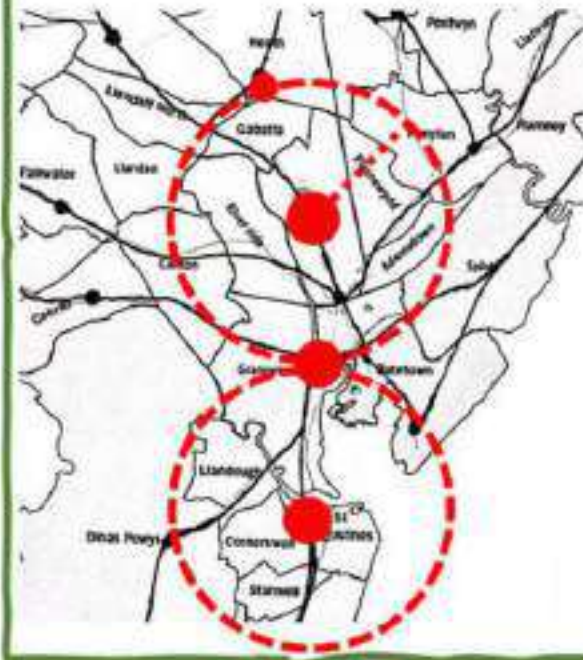
1. Centred on Cathays railway station



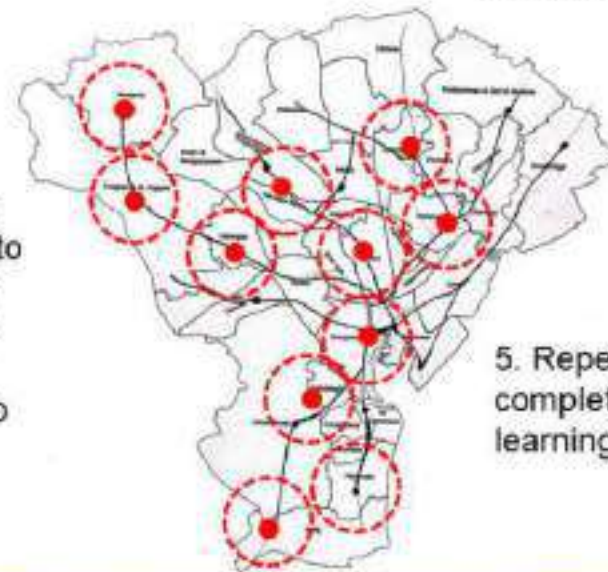
2. Draw a circle with a radius of 15 minutes from the train



3. Find the train station on the edge line and identify the city of the next learning terminal

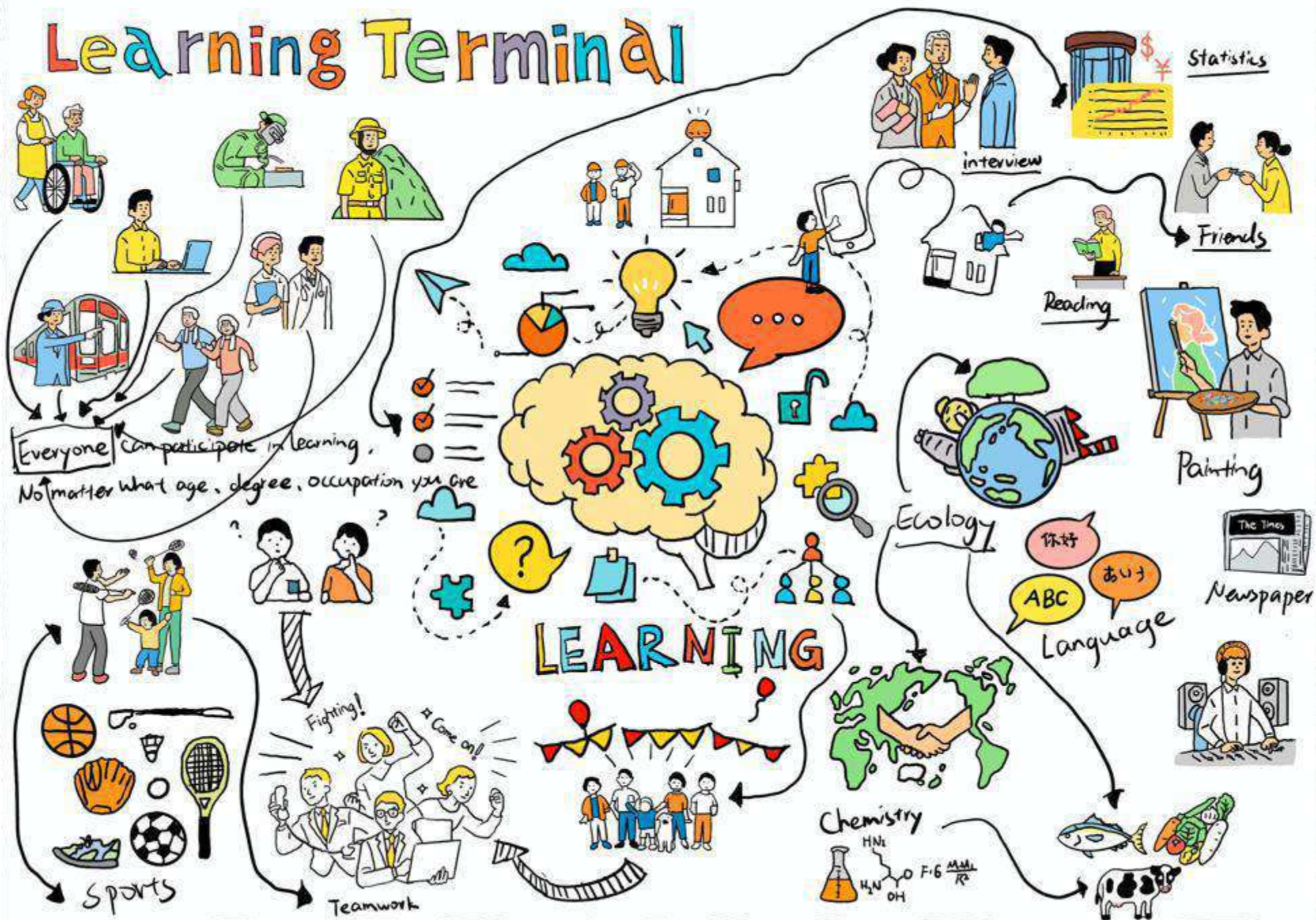


4. Continue drawing the circle according to this station and look for stations that can be in or near the centre of the circle to determine the next learning terminal



5. Repeat steps 2, 3 and 4 to complete the city network of learning terminal.

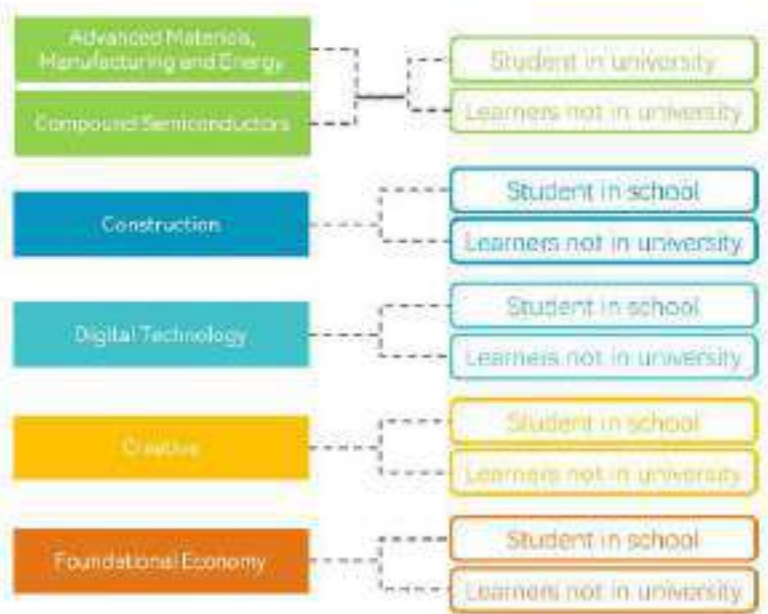
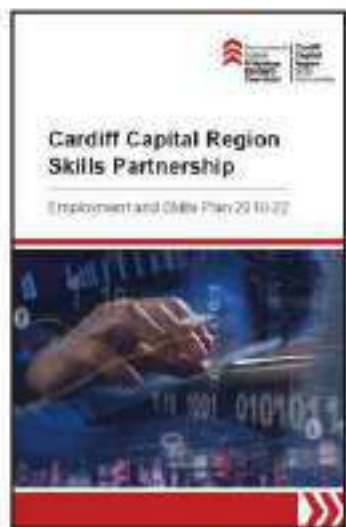
Learning Terminal



User Engagement

The Cardiff Capital Region Skills Partnership has been established to bring people together to promote strategic and collaborative decision making. Representatives from business, further and higher education, training providers and government join together to share their knowledge and understanding of the sectors they represent to ensure the region is truly able to respond to a demand led approach to developing skills and talent.

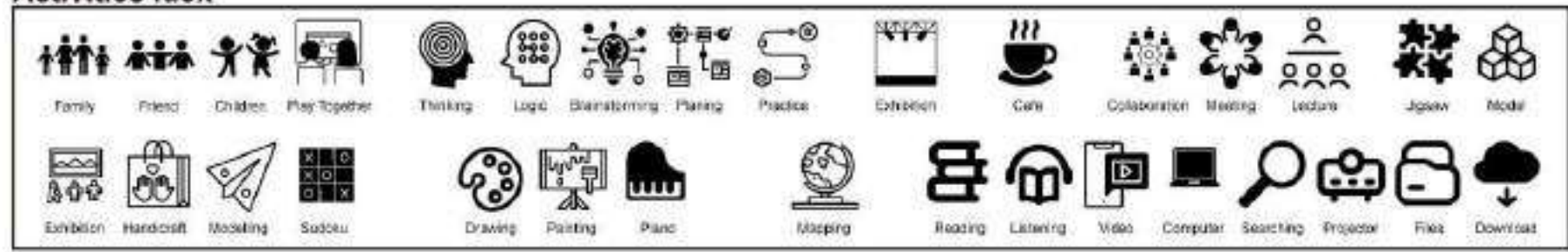
This report divides the existing development sectors of Cardiff into six sections: Advanced Materials, Manufacturing and Energy, Compound Semiconductors, Construction, Digital Technology, Creative, Foundational Economy. The author divides the six sectors into five sections, each divided into student in university and learners not in university, and uses interviews and web searches to outline the personas of each sector. The different personas have different needs for learning spaces, which provide a large number of valid samples for the next architectural spaces.



Persona



Activities Index



Learning campaign

When a new idea appears, the biggest publicity is the best way.

Learning campaign occupies a large number of billboards, radio and television, banners, etc. through eye-catching slogans, it tells people that an era of learning has come, our city is ready, and all learners are involved!!!

The illustration on the right shows the slogan of learning displayed over the city, as an invitation to everyone to tell people that the time for learning has come.



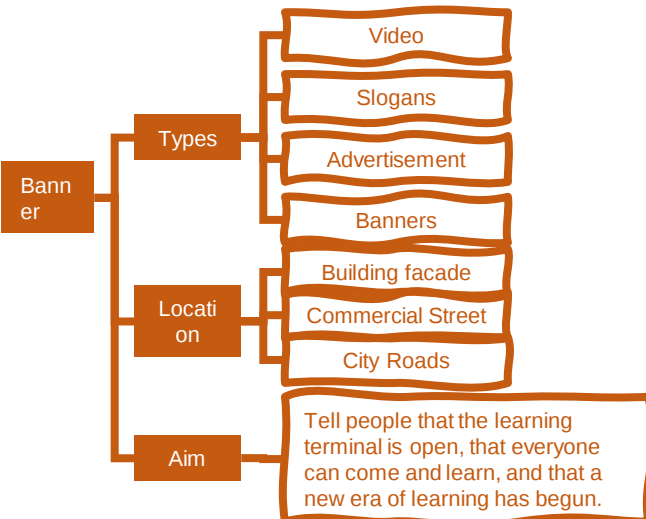
Illustrations of Learning Campaign



Banners on Building facade



Video on Queen Street



Banners On City Sky



Fangyi Ke

House of
Cards

HEDQF
3rd Prize



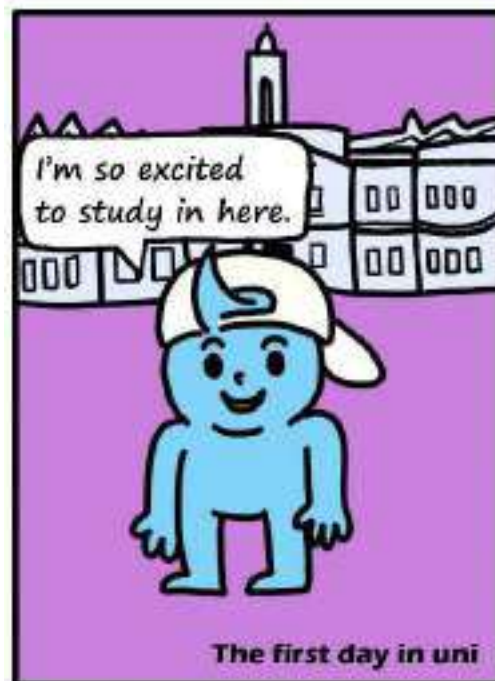
Social Learning Campus

Hi, Everyone!
Welcome to Cardiff University!
I'm Jimmy.
Let me show everyone my campus life!



STUDENT INFORMATION	
NAME:	Jimmy
AGE:	18
MAJOR:	Architectural Design
DE:	First year Drawing.. Music

I am looking forward to what will happen here, but I also have some worries...



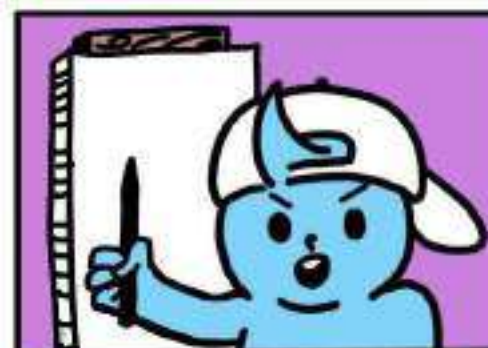
I'm so excited to study in here.

The first day in uni



What should I do now?

one week later



I'm afraid of social.
But I love drawing since I was a child.
Every time when I am drawing, I feel like I communicate with myself.



What if I making friends by using art?

Strengths and weaknesses of the existing campus situation

Identifying problems
Background

Site



Figure 3



Figure 4 Welsh School of Pharmacy



Figure 5 National Archives Cardiff

Most of the college buildings in the current Cathy Campus are historical buildings.



Cardiff School of Biosciences, Sir Martin Evans Building



Welsh School of Pharmacy and Pharmaceutical Sciences

What if I revisit the campus in this way?



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



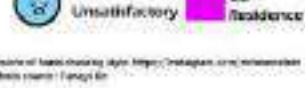
Online facilities in steady state



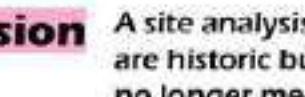
Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



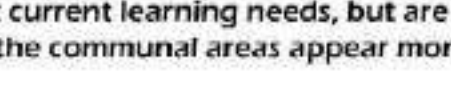
Online facilities in steady state



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Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



Online facilities in steady state



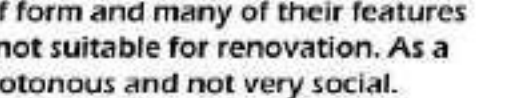
Online facilities in steady state



Online facilities in steady state



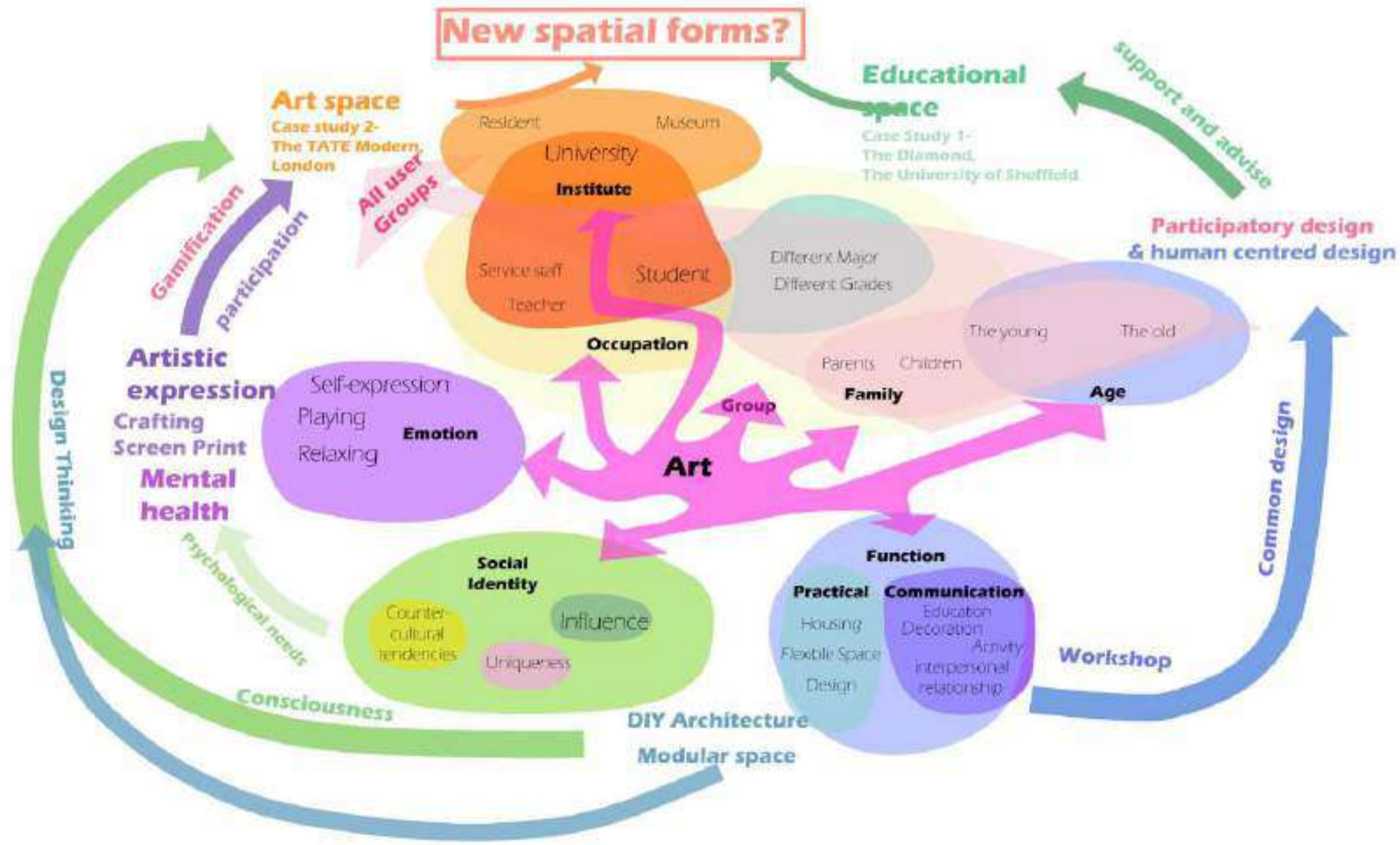
Online facilities in steady state



Online facilities in steady state

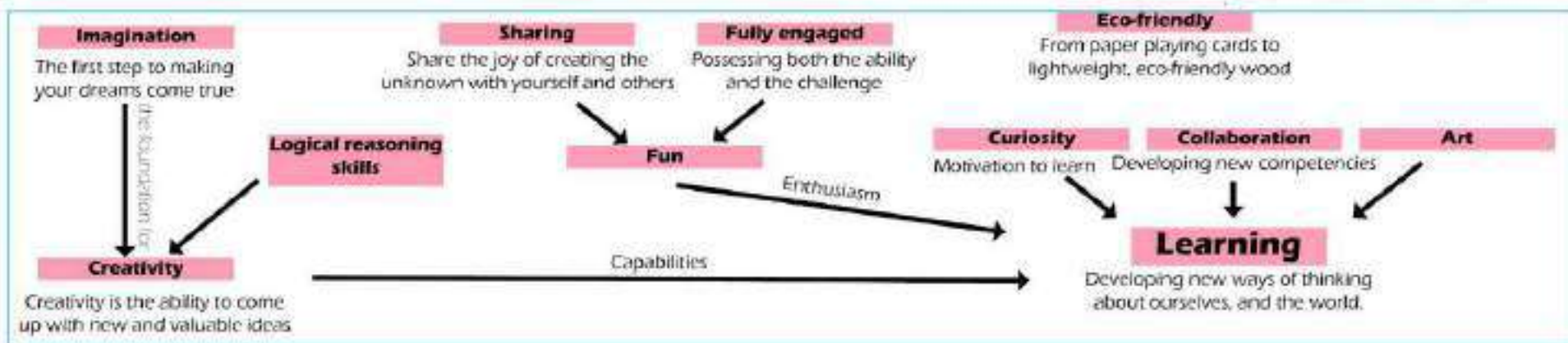
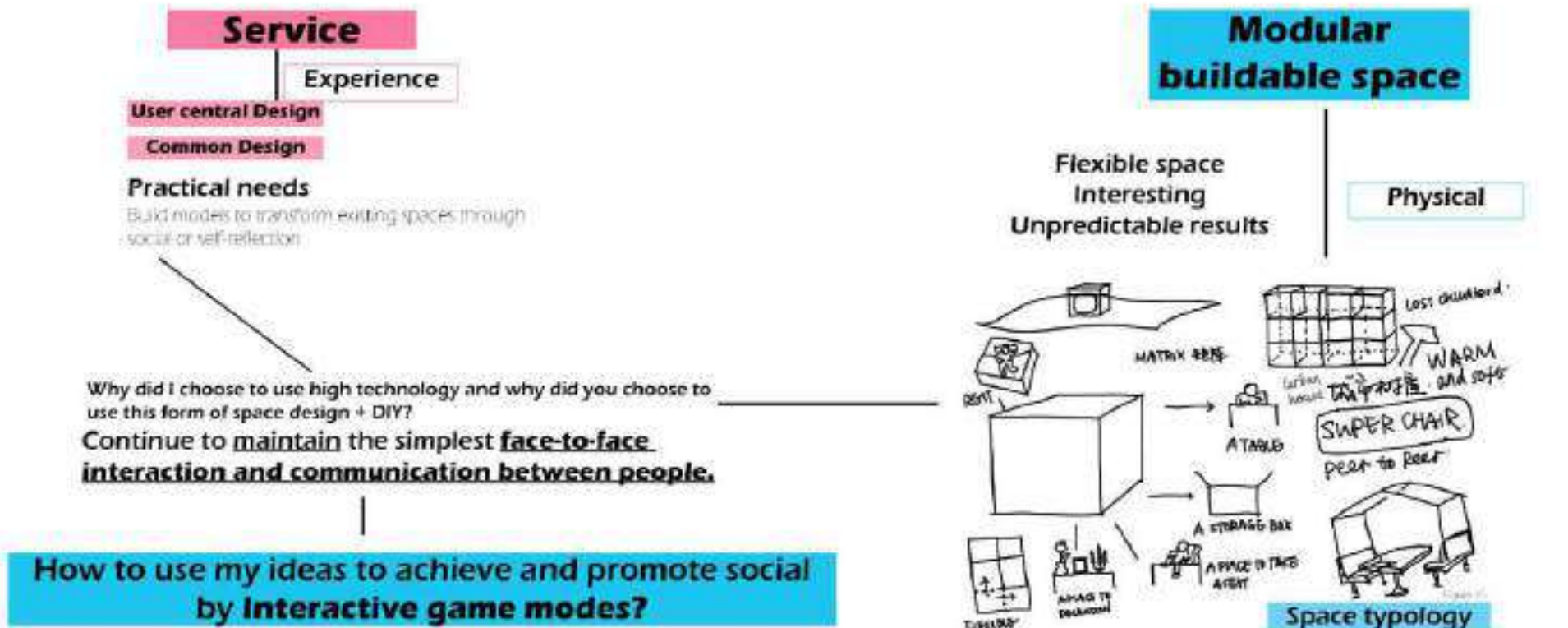
Conclusion

A site analysis through snap shots revealed that the majority of the Cathy Campus are historic buildings that have a strong sense of form and many of their features no longer meet current learning needs, but are not suitable for renovation. As a result many of the communal areas appear monotonous and not very social.



Convince the university to accept my "product"

This is something that is divided into two parts, one is the service category (co-design process).
The other part is, the spatial product (the spatial module)



The cards can be used as planes at different scales, and when combined they can be used as spaces at different scales, representing furniture, personal space, and display space respectively.

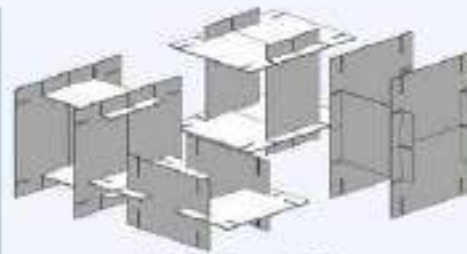
Three types of base plane cutting

Original size of the card

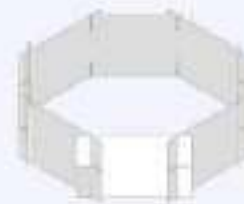
54mm*84mm
(1:1 boards)



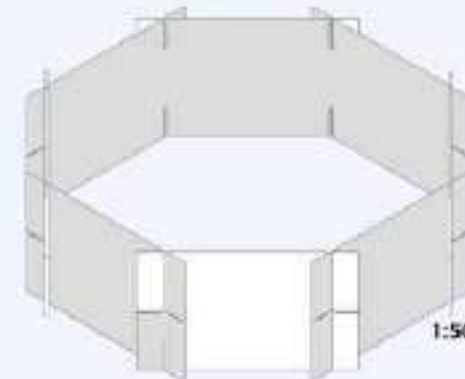
Combination of planes



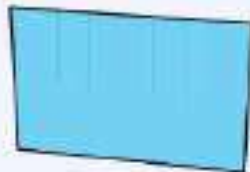
1:50 1060mm*1680mm
(1:20 boards)



1:50 1060mm*1680mm
(1:20 boards)



1:50 2700mm*4200mm
(1:50 boards)



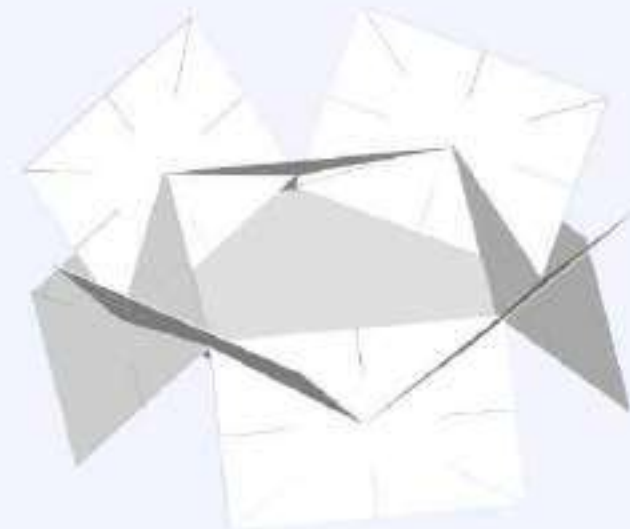
270mm*400mm
(1:5 boards)



1:50 1060mm*1680mm
(1:20 boards)



1:50 1060mm*1680mm
(1:20 boards)



1:50 2700mm*4200mm
(1:50 boards)

Functional Classification



Personal space

Students can use printmaking to create art on the boards and leave their work on the boards. After creating with different sized plates, they can be assembled to create different spatial scales that can be offered for functional use by different numbers of people and for different purposes.

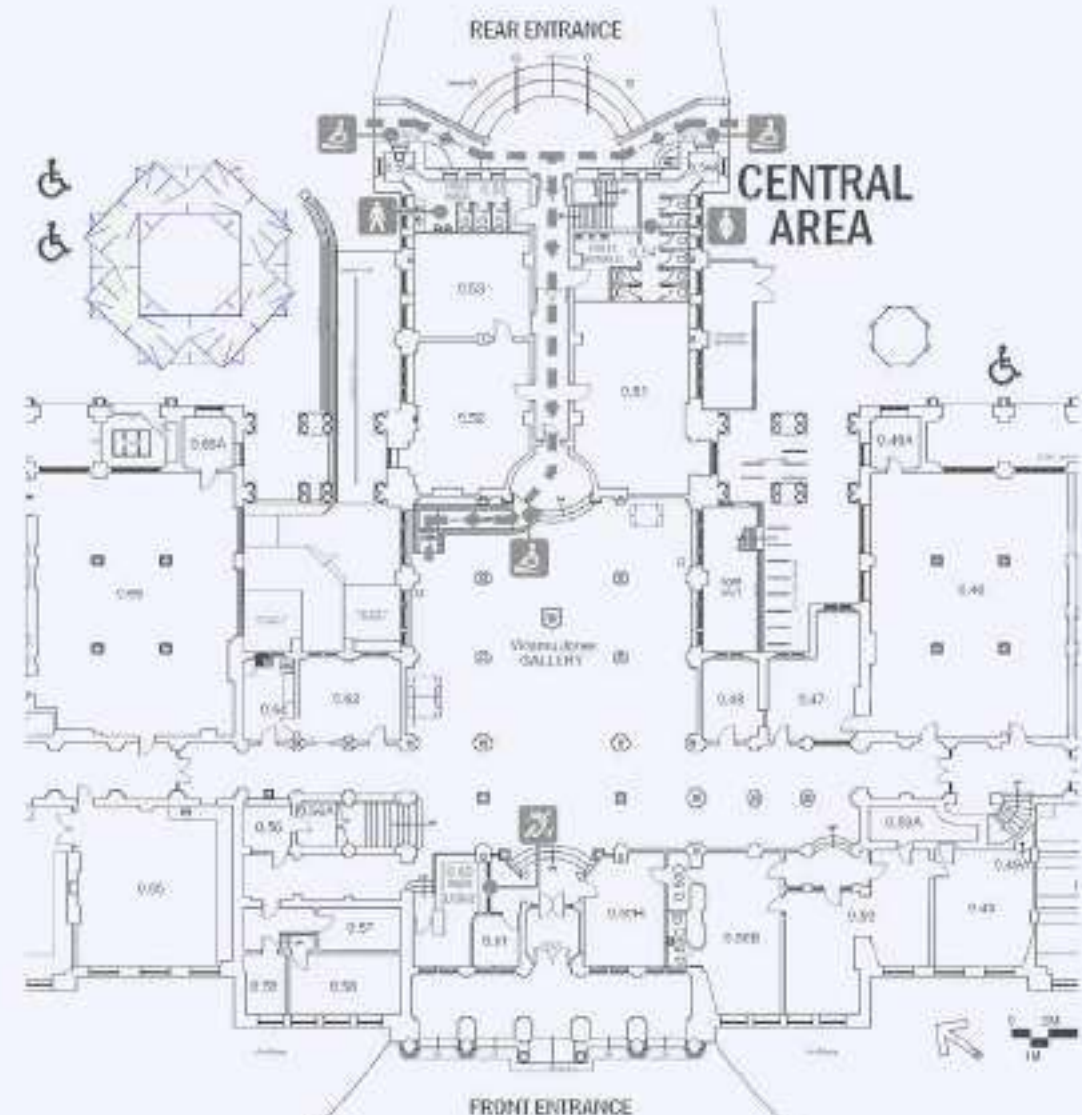


Group space



Exhibition space

General plan 1:200



Renderings



20:1 Card scale using



1:1 Card scale using



10:1 Card scale using



10:1 House of cards

50:1 House of cards



20:1 House of cards

Xinyue Hong

**Imagination
Campus**

HEDQF

4th Prize



01. Isolation



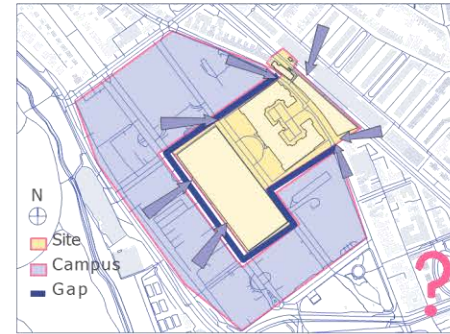
The link between these buildings is disconnected.

02. Connective Area



The demand of the users make the buildings in this area to be connected.

03. Opportunity



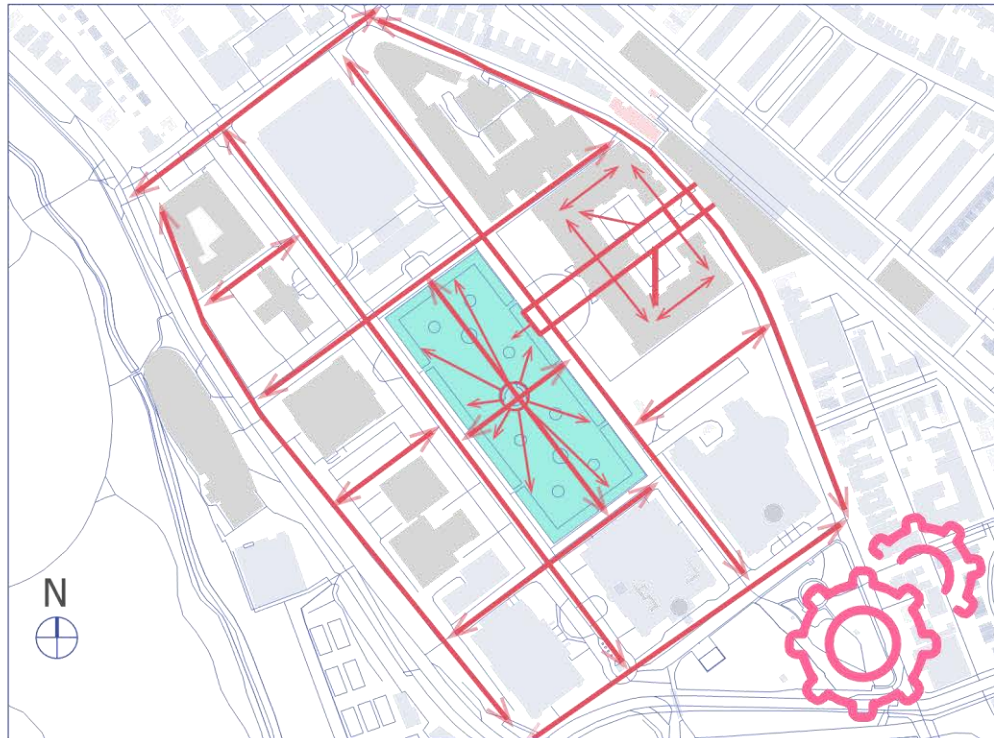
Gap exists between two parts of the campus.

04. Existing Route



The existing route around the campus works well, but does not lead people to have activities.

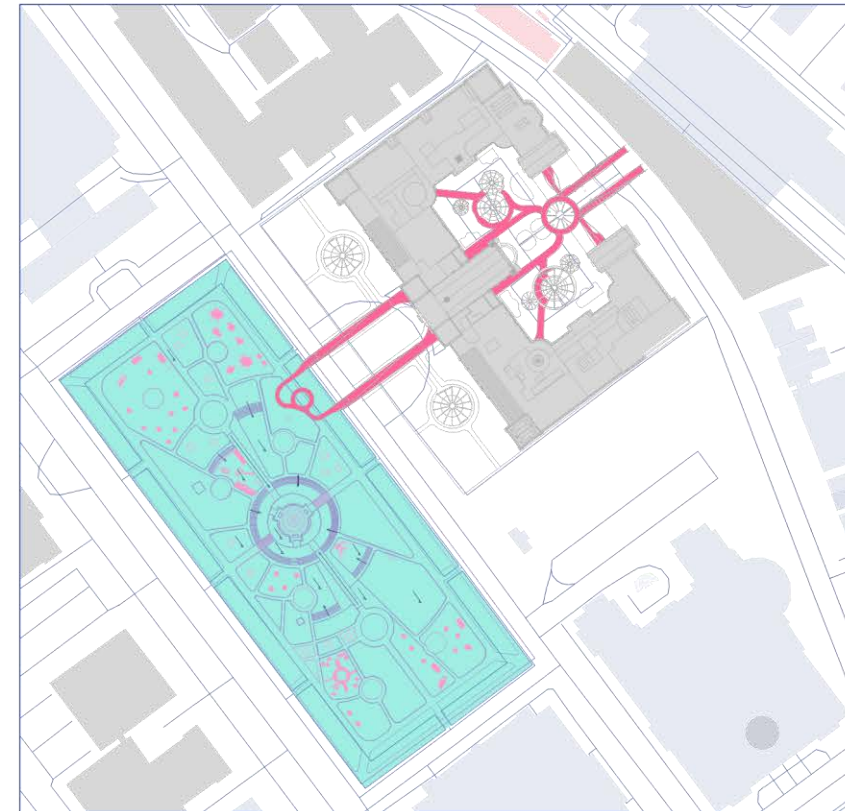
05. New Walking System



The area is linked together by creating a new pedestrian system that acts as a pivot to drive activities across the campus.

Make the experience of moving between formal and informal learning space more interesting.

06. Proposal

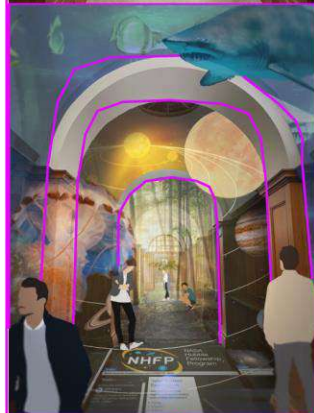


Build platform to make the cohesion of the site.

Playful Campus Environment

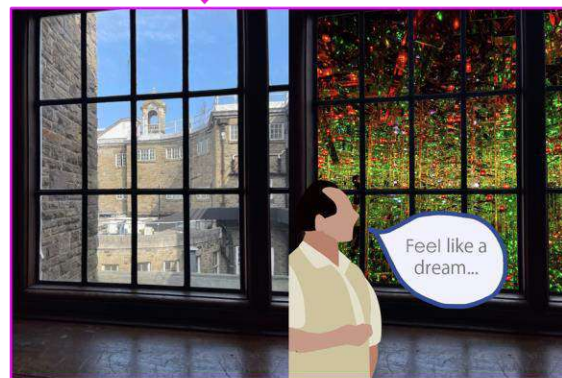
- Social Cohesion





D. Corridor

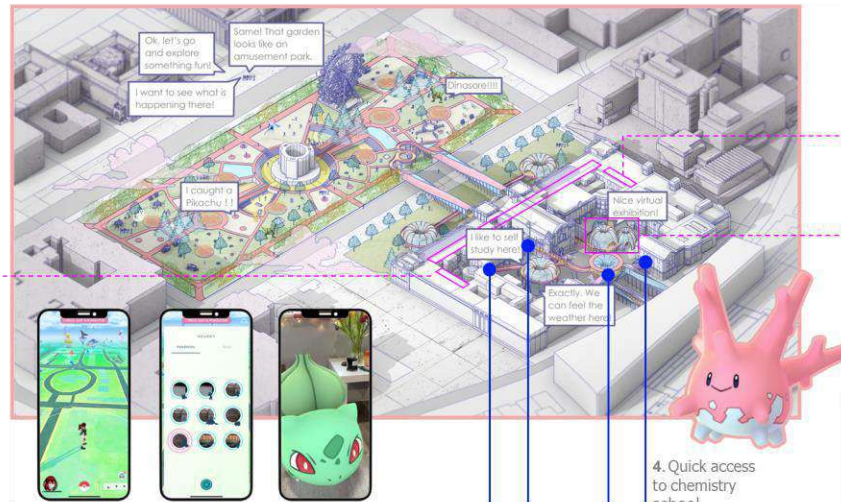
E. Corridor



C2. Bubble



B. Courtyard



4 Entrances

1. Experimental route

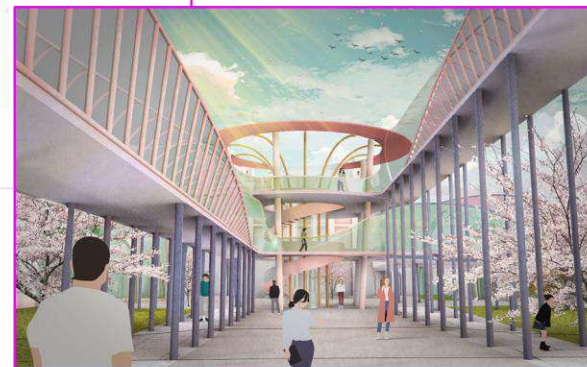
2. Quick access to the library

3. Get down to the ground

4. Quick access to chemistry school



C1. Corridor - wing side

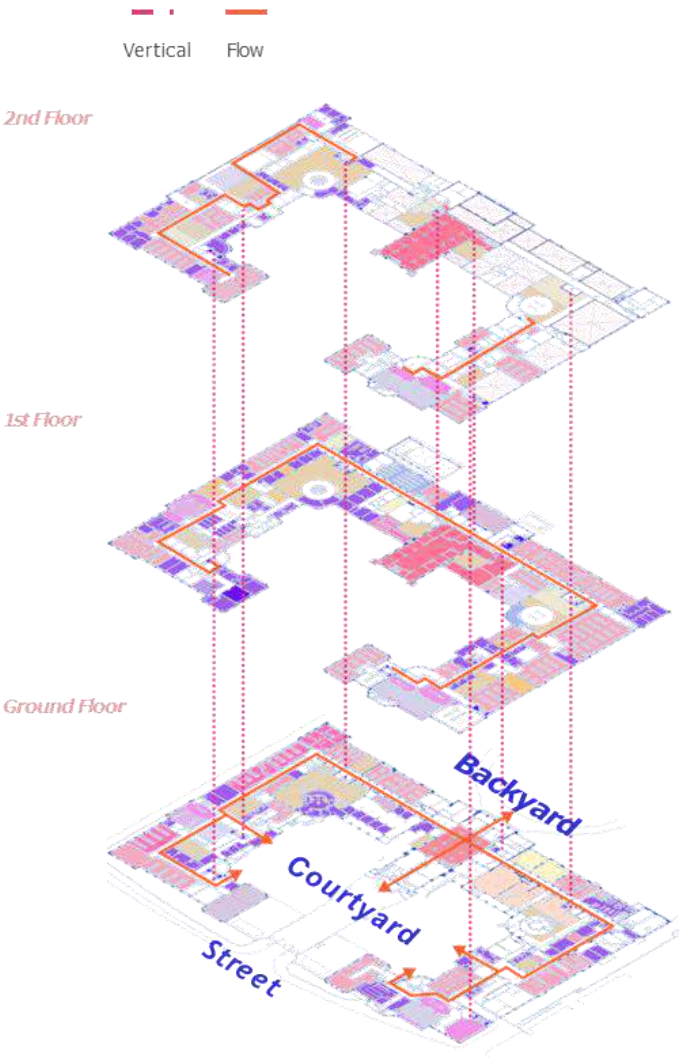


A. Entrance

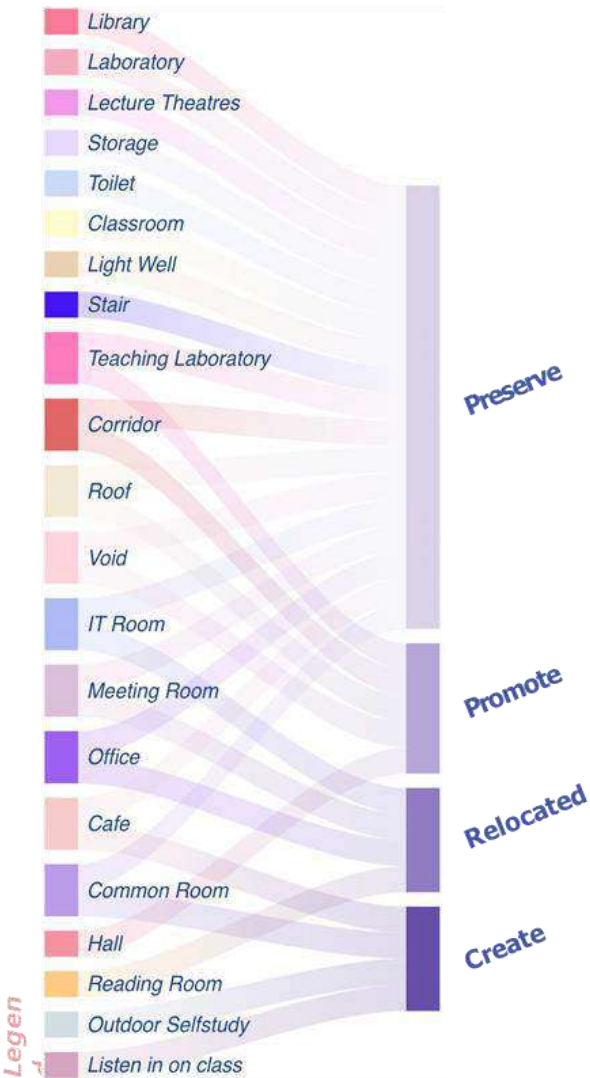
The Space in Main Building

Before

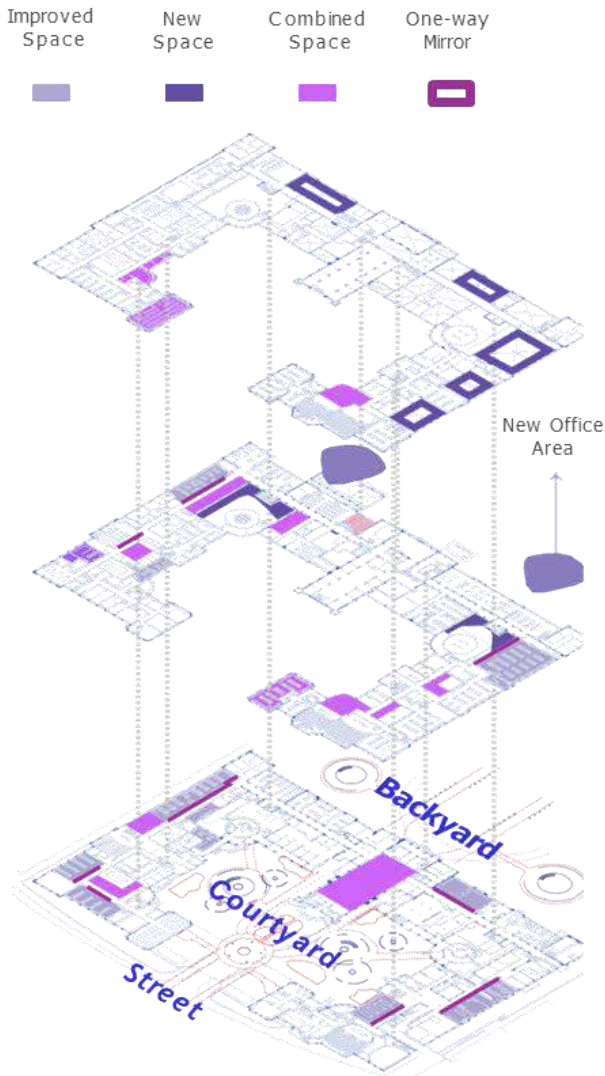
Although the main building has a wide variety of activity spaces, most of them are enclosed, which is not conducive to communication between students and teachers, resulting in a rather dull learning atmosphere inside.



Renovation



After





Reflections from students



Higher Education Design Quality Forum

www.hedqf.org

www.futurelearningenvironments.org



Thank you
