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(Translation)

Thoughts on the Design of Hengqin Campus of the University of Macau

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1. Preamble

With a campus of merely 5.4 hectares and 8.2 square metres per student, the University of Macau (UM) has been hindered by a serious lack of space in its effort to pursue its educational ideals and long-term development. Over the past years, several campus development plans were proposed, however, none of them proved feasible due to the inexistence of an adequate and sufficiently large plot of land in Macao. In 2007, inspired by the potential joint development of Hengqin Island by Guangdong and Macao, the university began to contemplate the idea of a UM Hengqin campus and subsequently submitted a draft proposal to the Government in March 2008.

Since late January 2009, acquainted with the possibility of building a campus on Hengqin Island of Zhuhai City, the university has made various field trips to the island. Over the past three months, we have carried out many consultation sessions, visited several Mainland and overseas universities that have distinctive campus designs, and invited a team of experienced campus planners to give us their professional advice and set up guiding principles. Although the Hengqin campus request still awaits scrutiny and approval by the relevant authorities, the university has outlined its thoughts on the design of Hengqin campus on the basis of numerous comments gathered through consultation, hoping that the construction work can commence at the earliest possible time following the approval of the project proposal. This document is available to all staff and students for further consultation, and we trust our collective wisdom will help the university construct an ideal campus and turn its educational visions into reality.

2. General Situation of Hengqin

Situated to the west of the Pearl River estuary and the south of the centre of Zhuhai City, Hengqin borders Macao on the east through the Shizimen Channel, and is connected to Macao via the Lotus Bridge and the Lotus Customs. With easy accessibility between the two regions (200 metres at the closest point) and abundant green land, Hengqin offers an ideal site for a large scale campus expansion of UM.

Located to the south of the Tropic of Cancer, Hengqin has a typical sub-tropical maritime and oceanic monsoon climate, with an average annual temperature from 22°C to 24.5°C and a maximum temperature from 38°C to 39°C.

The island is characterized by a warm and humid climate, with frequent monsoons, clear sunlight and long sunny periods. Thanks to its smooth terrain, stable land structure, and low risk of geographical disasters, it is suitable for the construction of schools and large buildings.



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3. Guiding Principles and Concepts for Campus Designing

It is proposed that the new campus of the UM be located on the eastern coast of Hengqin Island overlooking Macao across a strip of water. With an ultimate goal of catering for 10,000 students, this campus will occupy between 1.0 to 1.4 square kilometres and have a floor area of 820,000 square metres. The campus design should observe the following principles:

3.1 People & education-oriented

The new campus does not aspire to a magnificent appearance. Instead, it should adhere to the people-oriented, user-friendly principle and help the university develop the whole-person education approach. The campus design must emphasise student-staff communication, interdisciplinary exchange and the enhancement of a sense of belonging among the university members. The space layout should highlight the individuality of each block of buildings and simultaneously provide convenient connections among them. We strive to create an environment that is pleasant for teaching, learning and research, and which is conducive to the improvement of education quality.

3.2 Eco-friendly Garden Campus

Environmental protection, harmonious co-existence between human beings and nature are the core notions underpinning the campus design. In planning the overall ecological environment and individual building groups, we aim to configure a multi-level landscape on an eco-friendly campus and let the environment exercise a positive influence on students' development. Our preference will be given to renewable energies and to layout models and construction materials that are environmentally friendly and beneficial for water and energy saving.

3.3 State-of-the-art Technologies

The UM should have a modern and highly efficient campus, equipped with state-of-the-art technologies. Information technology and network systems will be widely used in teaching, research, management and campus life. Whenever necessary, new technologies and new materials should be utilized to provide the staff and students with advanced equipment and facilities.

3.4 Modern and International Ambience with Local and Traditional Characteristics

Macao showcases an amalgamation of eastern and western cultures. A small territory located in South China that embraces global horizons, and a society with a strong cultural foundation, Macao is prospering as a modern metropolis. The campus of the University of Macau, a leading higher education institution and pioneer of cultural dissemination in the Macao SAR, should have an architectural style representing the uniqueness of bridging East and West while linking the past with the present.



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3.5 Sustainable Development

The UM Hengqin campus, as a century campus for the university, should follow an expandable and flexible planning approach. Attention should be paid to economic use of the land so as to reserve space for sustainable development in the future. A certain proportion of the land will be reserved in each functional zone so that the existing layout will not be affected by future campus growth.

4. Campus Design

After being informed about the possibility of obtaining a campus site in Hengqin, the university management has visited many universities on the Mainland and abroad, and has heard the opinions of campus planning experts and campus users. We discovered that many apparently magnificent campuses have the following shortcomings in common:

(1) Huge unoccupied space and axial symmetry

Seeking to build an enormous and impressive campus, many planners adopted a palace-designing approach that features a large central axis and a batch of landmark buildings to achieve a symmetric layout. This approach puts excessive emphasis on order, authority and hierarchy and is not consonant with the free, young, and inquisitive nature of a university.

(2) Lopsided division of functional zones

Some campuses feature a clear-cut division between the teaching zone (exclusively for classrooms), the faculty zone (exclusively for staff offices and laboratories), the library, the administrative zone and the living zone. The fact that each zone is heavily concentrated on one function renders contact between students from different faculties difficult and causes obstacles for student-staff communication. This is not conducive to academic exchange and interaction, nor is it beneficial to the cultivation of a sense of belonging among the staff and students.

(3) Increased transit distance due to campus planning

The university-wide division of functional zones increases the transit distance on campus. Students have to walk half an hour from the classroom to their dormitories, which is a major inconvenience. During rush hours in the morning, mid-day and late afternoon, there are crowds of people congested at the crossroads. In addition, the congestion of mixed flows of pedestrians and vehicles also causes many problems for the people on campus.



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(4) No on-campus residence for academic staff

Many Mainland universities have ceased to provide housing for academic staff, and very few newly built campuses have staff hostels. Therefore, the academics have to travel on a daily basis between the campus and the city centre. This is not only tiring, but also reduces academic's time spent on extracurricular activities with students.

(5) No living facilities in the teaching zone

In Mainland universities, all the campus living facilities are located in the residential zone. A teaching zone without these facilities is inconvenient for the users, lacks space for social contact for students, and seems cold, tedious and unfriendly.

In our campus planning, we should avoid the above-mentioned shortcomings.

4.1 Building Groups of Residential Colleges

Campus life is a crucial factor for the learning and development of undergraduate students. A campus in Hengqin will offer better conditions to cultivate a campus life atmosphere that is conducive to students' growth and whole-person education. We are planning to set up 10 residential colleges as a means of guidance and campus management for undergraduate students. This scheme is complementary to the faculty system for academic management and can help the university attain its objective of whole-person education.

In order to give sufficient attention to the students and to enhance their sense of belonging to the college, each college should not accommodate too many students. On the basis of a campus for 10,000 students, it is proposed that there will be approximately 7,000 undergraduate students. Our plan is to allocate second, third and fourth year students to different residential colleges regardless of their majors and years of study. Hence, each college will cater for around 500 students. The colleges should also provide offices and residences for their deans, wardens and student counsellors, as well as accommodation for some academics.

The college deans and students' associations will organize various kinds of regular activities, such as general education tutorials, weekly gatherings, elite talks, concerts, film screening, singing contests and sports competitions. In addition, collective dining will be an important activity in the colleges, through which students can become acquainted with people from all disciplines and years of study. The residential college system will help bring together academics and students from different origins and backgrounds to form a large family with several hundreds of members, thus creating a multi-cultural environment for the students. Living and interacting with peers and academics, students will learn to think independently, develop their determination and moral outlook, and broaden their global perspective. They also will have the opportunity to develop inter-personal skills and cultivate



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toleration and understanding of different cultures and ideologies. Hence, the residential colleges are of vital importance to the Hengqin campus.

4.2 Layout of Functional Zones

The new campus will be divided into the following functional zones (please see the appendix: Layout of Functional Zones on Campus):

(1) Campus Entrance and Ecological Centre

On the north side of the central area, stands the main entrance of the campus together with the landing point of the bridge or tunnel providing the link to Macao. The surrounding waters and a future artificial green island will constitute an ecological centre and the core landscape on campus, and the line of sight should bring views of Macao into the campus.

(2) Library and Information Centre

The Library and Information Centre should be located in the centre of the campus, to facilitate frequent use by staff and students. These buildings close to the ecological centre share a beautiful view and can constitute an important architectural highlight of the campus. The Library should have a reading area for 30% of the student population and contain an exhibition hall, research rooms, auditoriums for academic conferences, as well as cafes and logistics rooms. The Information Centre should have sufficient space for ten computer rooms for teaching and studying, as well as computer servers, network equipment and large storage devices.

(3) Central Teaching Zone

The Central Teaching Zone should also be located in the central area of the campus, south of the Library and Information Centre. A multi-level and stair-shaped layout will be adopted to save land and reserve room for future development. Facing a fluvial channel and the Macao skyline, this facility is another important landmark building on campus. The central teaching zone aims primarily to provide classrooms for first year students and general education courses, in addition to large lecture halls (with 100 to 200 seats) for large classes and seminars. It will also house some independent academic units and teaching support units (for instance, the Language Centre and the Educational Resources Centre). In this zone, there will be space for staff-student interaction as well as catering and logistic facilities.

(4) Faculty Zone

The 8 faculties will be placed along the central axis. Each faculty will occupy a block of buildings, which include classrooms for postgraduate students and second year through to fourth year undergraduate students, as well as faculty offices, laboratories, meeting rooms and lounges for staff and student gatherings. Different faculties will



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be connected by corridors to facilitate interdisciplinary teaching and research and to promote academic exchanges and creativity.

(5) Residential College Zone

Located in the centre by the west of the campus, the Residential College Zone comprises 10 residential colleges catering for second year through to fourth year undergraduate students. In addition to the residential facilities, each college should have study rooms, small tutorial rooms, dining halls, sports facilities and a space for gathering and recreation for up to 100 people. Different colleges will be separated by green areas and water systems, while within each college the buildings will be interconnected, forming a relatively independent courtyard, a layout that will help nurture among the students a sense of belonging to the college. Through multi-level platforms and corridors, one can walk from a college to a faculty; the maximum distance between the colleges and the central facilities or the faculties should normally be a 15-minute walk.

(6) Central Residential Zone

Located on the south of the campus, this zone provides residence for first year undergraduate students as well as Master's degree and Ph.D. students and is equipped with small indoor and outdoor stadiums, study rooms and activity rooms. A residence management area inside this zone should provide offices and accommodation for student counsellors and rooms for logistics facilities. Some units should be provided for married students in the postgraduate residence.

(7) Student Activity Centre

The student activity centre will lie between the central teaching zone and the central residential zone. It will consist of student association offices, activity rooms, small conference halls, meeting rooms, convenience shops and bookstores.

(8) Staff Residential Zone

Situated at the southwest end of the campus, this zone provides accommodation for the Rector, Vice Rectors, 70% of the academic staff, 20% of the administrative staff and some logistic staff. It also holds a limited number of guest rooms, basic catering facilities and a staff club.

(9) Central Living and Business District

This district will be located between the central residential zone and the staff residential zone. Dining and service facilities are provided for the staff and students for their basic necessities and social life, including clinics, gift shops, cafes, banks, hairdressers, post-office, and convenience stores. There will also be a security centre or even a police station.



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(10) Central Administrative Building

In order to facilitate internal and external liaison, this building will be located to the north of the ecological centre and close to the main entrance. It will contain offices for the university management and various administrative units, as well as small meeting rooms and VIP reception rooms.

(11) Cultural and Conference Centre

The centre is located on the north of the campus and adjacent to the administrative centre. It will include a 2,000-seat theatre and two small theatres/auditoriums, apart from several small and medium-sized conference rooms. Within the centre, or in the neighbouring area, there should be a quality restaurant included. These facilities are close to the main entrance, in order to provide easy access for the general public.

(12) Sports Facilities

The sports facilities should be conveniently located for the staff and students. In addition to the standard facilities, such as a main outdoor stadium, indoor sports pavilion and swimming centre, which are located near the main entrance (also to facilitate use by the general public), there should be some small indoor and outdoor sports facilities distributed across the residential areas for easy access by the university members.

(13) Research Centre

The research centre will be situated at the far north extremity of the campus. The relatively independent location will help create a tranquil environment for research. Simultaneously, a position near the major entrances of the campus can meet the need for contact and exchange with other institutions.

(14) International Affiliated School

Located at the south end of the campus, the school comprises a kindergarten, a primary school and a secondary school, for a total of 800 students. It has independent teaching buildings, offices, sports and residential facilities.

4.3 Architectural Style

4.3.1 General Style and Layout

Macao has several centuries' history of cultural exchange between the East and the West. Today, the historical monuments of Macao that are officially listed as World Heritage feature both western residential buildings and churches and Chinese courtyards and temples. Hence, based on the Southern Europe and South China architectural styles, the new campus should reflect Macao's uniqueness of blending Eastern and Western cultures and its distinctive historical and cultural tradition. On the other hand, as the leading higher education institution in an international city, the



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University of Macao should have a modern campus of international standard, where new technologies and advanced equipment will be employed. To integrate East and West and bridge the past with the present, is a huge challenge for campus planning. As the Hengqin campus should encourage both independent thinking and interpersonal communication, it should be designed with places for meditation and locations for public gatherings. Seats near a pond, corridors and pathways, plazas and courtyards are all ideal places for dialogues and debates between academics and students after classes, occasions which may inspire new ideas and lead to the creation of new knowledge.

4.3.2 Uniqueness of Individual Building Groups

With a consistent general style, distinctive and personalized designs will be allowed for individual blocks of buildings to showcase the cultural and regional identity as well as the modern and international features of Macao. For instance, the administrative buildings may follow the theme of rigor and magnanimity, the central teaching zone may represent a modern lifestyle, and the college buildings may be integrated into the landscape and the surrounding environment, to name just a few possibilities. This can help project a multi-level, multi-faced and harmonious campus atmosphere.

4.3.3 Landmark Buildings

The campus should contain one or two landmark buildings/locations that are memorable for visitors, parents and students and convenient for photography. These buildings or locations will constitute symbols triggering the collective memory of the university members. The Library and Information Centre, located in the central area close to the main entrance and frequently used by students for self-study or group discussions, is an important building that witnesses the growth of the students and triggers their enduring positive memories. Therefore, it can be considered as a possible landmark building on campus. The nearby Central Teaching Building has the same attributes and could be another choice for a landmark building.

4.4 Ecological Landscaping and Gardening Design

In order to create a pleasant human environment, it is suggested that a multi-level gardening and greening model be adopted to organize the space and landscape on campus. This environment should have eminent features of a pleasant and serene ambience and a pronounced cultural and artistic atmosphere.

As there are bodies of water and marshlands in Hengqin, flowing water can be brought into the campus and gathered to form lakes. The soil excavated in order to create rivers and lakes can be accumulated to form small hills. This picturesque environment will be an inexhaustible source of inspiration for our staff and students, a scene as gracefully described by a preeminent scholar Zhu Xi:



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There lies a glassy oblong pool,
Where light and shade pursue their course.
How can it be so clear and cool?
For water fresh comes from its source.
(The Book by Zhu Xi, translated by Prof. Xu Yuanzhong)

The fertile soil and abundant sunlight on Hengqin Island are suitable for planting evergreen trees, flowers and fruit trees. We should also consider creating a small orchard or farmland for students and staff to enjoy a natural lifestyle.

The campus landscape gardening will adopt a multi-level format, with the various levels of landscape connecting, penetrating and corresponding one to another.

(1) The First Garden Level

This level is an ecological park primarily composed of flowing water. Natural elements such as bodies of water, a green area, and hills are utilized to compose the first level of gardening space.

(2) The Second Garden Level

Ecological corridors that radiate from the Central Ecological Centre provide a form of segregation and stand as natural ecological parks between different functional zones and groups of buildings.

(3) The Third Garden Level

Each group of buildings will form an independent courtyard and meanwhile be connected with another group of buildings by ecological corridors. Details such as a pavilion and a corridor will be used to create garden space, where students and staff can spend their leisure time.

(4) The Fourth Garden Level

This refers to the interior design of the buildings. Taking as its reference the norms of South China gardening style, the interior space will be decorated with atriums, central yards, interior greening, hanging gardens and connecting platforms, thus achieving a perfect match between the garden and building.

4.5 Eco-friendly and Efficient Campus

4.5.1 Green Campus

Energy efficiency and environmental protection are key considerations in campus planning. In designing the overall layout and individual buildings, we should make good use of the abundant sunlight and strong wind in Hengqin to reduce energy



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consumption for illumination and air-conditioning. Renewable energies such as solar power and wind power should be considered. To mitigate negative impact on the environment, we should pay attention to reuse of water resources and there should be adequate facilities and venues for solid waste and sewage recycling and treatment on campus.

(1) Energy saving

Hengqin has hot weather and strong sunshine. Methods such as shading facilities, roof greening, double thermal isolation glass walls and natural illumination may be employed to reduce energy consumption for illumination and air-conditioning and achieve low carbon emission in campus operation.

(2) Use of renewable energies

Located to the south of the Tropic of Cancer, Hengqin presents a typical sub-tropical maritime and oceanic monsoon climate, with long sunny periods and good light and heat conditions. Therefore, it is suggested that a solar energy system be employed for producing hot water in dining halls and shower rooms as well as electricity for road lighting on campus. Additionally, with frequent monsoons, the island has an area of more than 20 square kilometres exploitable for wind power production. It is suggested that the use of wind power facilities to provide supplementary energy for road illuminations also be considered.

(3) Use of reclaimed water and sea water

A reclaimed water recycling system can be considered for the Hengqin campus. After a 3-step treatment procedure, the reclaimed water can be used for landscaping, irrigation for the gardens, road spray, car washing and toilet flushing. Furthermore, sea water toilet flushing technology has been successfully applied in some countries, a possibility that can be considered for the new campus as well.

4.5.2 Intelligent Campus

We should continue to capitalize on the existing advanced e-campus technology in order to build an intelligent campus in Hengqin. A cable and wireless computer network and various kinds of education technologies should be widely used in teaching, research, management and campus life. Sufficient space should be reserved for cables and equipment rooms.

4.6 On-campus Road Traffic System

The new campus aims to become a quiet, low carbon emission and barrier-free campus where walking and less use of vehicles are encouraged. The key issues in planning the road traffic system are as follows:



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- Separation of pedestrians and vehicles

Pedestrians and vehicles should be separated whenever possible, and walking and cycling should be the major means of transit on campus. Therefore, it is hoped that the distance between the staff/student hostels and the classroom, laboratory or office should normally be within a 15-minute walk.

- Encourage walking

The tropical maritime climate on Hengqin Island produces long hot and rainy days. Thus, the campus needs to provide sufficient shaded walkways. There should be indoor walkways connecting all buildings within the same zone, as well as corridors linking different zones.

- Barrier-free campus

As a leading institution advocating a humanitarian spirit and providing equal opportunities for disabled persons, the UM should provide various kinds of assistance facilities for such persons on campus.

Regarding various aspects of the traffic system, we have the following thoughts:

(1) Traffic at the entrance and exit

Considering the situation of land use, the bridge approach or the tunnel connecting with Macao on the east of the campus should be the main entrance, where transfer stations of various models of public transport can be located. Large parking lots can also be placed near the entrance. Some emergency exits should be reserved on the north or south of the campus.

(2) Vehicles

Major ring roads on the outer periphery of the campus will provide efficient connections to the different functional zones. Motor vehicles are not allowed to enter pedestrian zones. People and vehicles are separated to prevent disturbances caused by traffic and ensure a safe and quiet living and working environment.

(3) Pedestrians

A comprehensive pedestrian system will be formed by comfortable, fluent, and multi-level walking routes in the teaching zone and residential zone, whether indoor, outdoor or semi-outdoor. This system is supplemented by walkways in service areas as well as landscaped garden and greening spaces.

(4) Parking

The parking space should have a maximum capacity for 1,000 cars. Large parking lots can also be placed on the periphery of the campus to minimize the influence on the campus. It is



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suggested that open floors in the buildings be used for on-ground or underground parking lots. Parking spaces for bicycles are to be distributed around the campus.