A MIDDLE SCHOOL CAMPUS DESIGN IN CHENGDU A DIALOGUE BETWEEN ARCHITECTURE AND URBAN ERGONOMICS



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With the new education concept being widely spread in China, the topics involving new campus design has been debated frequently. In the past three decades, Exam-Oriented Education prevailed, schools turned out to be education factories. As a result, education spaces think highly of efficiency, rather than the development of students.

As the direction of China's education reform, Quality-Oriented Education gradually replaces Exam-Oriented Education since 2010, so exploring spaces that can carry the new education spirit is an important topic nowadays. By taking an explorative case study in Chengdu, the thesis tries to explore a set of principles for new campus, based on the theory of Urban Ergonomics.

Firstly, the thesis identifies three design scales based on the theoretical frame and approach proposed by Urban Ergonomics, then studies the factors involving them, and finally comes up with the design principles. According to the design principles and the basic elements of the campus, the design goals are accomplished through three key points: openness, sharing and communication. The thesis aims to explore the possibility of a new campus through design interventions so that the campus can become a bridge between people and people, people and architecture, and people and urban spaces.

Keywords: Campus design; Urban ergonomics; Design intervention

ABSTRACT

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This chapter introduces the general framework of the thesis, explaining the social background of the project, the design objectives and the expected results. In particular, the last part of the chapter describes each chapter and the whole structure of the thesis.

INTRODUCTION

11 Premise

With the development of the economy, China has witnessed the largest urban transformation in its history. Indeed, after four decades of rapid development, China's living conditions have been greatly improved and the infrastructure can meet people's basic needs. However, this radical development model has brought about many drawbacks. Especially in terms of urban context, the potential problems brought by rapid urbanization are extremely obvious.

The aggressive urban expansion has led to a disconnection between the urban scale and the human scale. Under the operation of capital, cities are constantly breaking through their original boundaries, horizontally or vertically. The strict functional zoning prevents the potential for mixed functions. As a result, downtowns are crowded with people during busy times, but unvisited during their leisure time. Streets are not valued as an important element connecting people to the city, and in particular the importance of the pedestrian experience is neglected, resulting in the loss of street vitality.

Campuses have also been affected by rapid urbanization. In the past, campuses were seen as education factories, emphasizing too much on function and efficiency and ignoring the fact that campus space itself is part of education. At the urban level, campus buildings lack connection to the urban space. Campuses usually occupy a full block and are fenced off from the outside world, so they do not play an active role as part of the city. At the community level, the enclosed management model of the campus discourages communication with the community, and thus the campus buildings overemphasize the importance of learning spaces and neglect the role of the non-learning spaces such as activities and communication, so campus buildings have failed to promote the overall development of students.

These issues have begun to be discussed frequently in recent years, and some consensus has emerged. As education reform has been developing, people have gradually realized that new education concepts require new education spaces to correspond with them. First, the new campus needs to respond to the city, and as an important part of the city, it needs to increase its connectivity to the city. Secondly, the new campus has the responsibility to assume the obligations of the community and can open some public facilities to share with the community. Finally, the new campus needs to rethink the importance of non-learning spaces and activate the educational value of the space.

The Chengdu city government has an ambitious plan to establish a new campus

for the future in an attempt to explore a new campus paradigm. With this in mind, this thesis intends to explore a new picture of the new campus through design practice. The project aims to build a 54-class middle school with the main functions of teaching buildings, office buildings, service buildings, living rooms and sports fields. The site is located in a new city in the south of Chengdu, an area with a large number of residential buildings and amenities, and where the infrastructure is still being built, so there is a high potential for population growth. The site is roughly square in shape and is well connected by traffic, with major roads to the north and south, secondary roads to the east and west, and three subway stations within a one-kilometer radius.

1.2 Objectives and Expected Result

This thesis intends to explore a new picture of the new campus for the future in China, with the help of literature research and case study methodology, and design as a practical tool. The paper advocates the design of an urban-oriented open campus that activates the entire neighborhood through facility sharing and ultimately forms a community exchange platform. The specific interventions are realized through the following three points.

The campus with open borders. The campus faces the urban interface with an open attitude and integrates into the urban fabric. Through open borders it can promote potential dialogues inside and outside the site, facilitate accessibility and enhance the vitality of the site.

The campus with shared facilities. The campus plays an important role in the community by sharing public facilities to the public during after-school hours and weekends. By sharing facilities, the campus can promote the efficiency of the public resources, and at the same time take responsibility for the community. Communication-friendly campus. The campus focuses on designing tangible and intangible spaces for communication and promoting creativity and idea generation. By stimulating communication it is possible to respond to a new spirit of education and to increase positive connections between people.

The final result is presented in the form of a research-based design. The intention of this paper is to visualize the new campus as much as possible through visual expression, hoping to inject new inspiration to Chinese campuses.





5

IDENTIFY PROBLEMS

V

ANALYZE PROBLEMS



V

FEEDBACKS

BACKGROUND

This chapter presents the specific context of this project, including the vision of future school and the transformation of education models and campus paradigms in China. It describes existing campus buildings that no longer meet the demands for the future and the urgent need for a new paradigm to cater to the new education spirit.

The first section describes the exploration of future schools in China. The National Institute of Education Sciences in China has made efforts to do preliminary theoretical research.

The second section describes the comparison of the two education models and the process of education transformation, i.e. from examination-oriented education to quality-oriented education.

The third section describes the two campus paradigm characteristics corresponding to the education model and summarizes the key points to the new campus, i.e., openness, communication and sharing.



The Vision of School for Future in China

The New School is in demand

The development of society is urging education reform in China. Knowledge is iterating with an ever-increasing speed in the information age, and technology innovation is accelerating the development of society as well. The needs of society and individuals for education have also changed dramatically. In the meantime, education goals, the role of teachers, learning environments, learning content, and learning styles are undergoing unprecedented transformation. Most importantly, Chinese education is undergoing reform, and thus the new school plays a crucial role in the new education model.

The Future School Program in China

The National Institute of Education Sciences (NIES) officially launched the China Future Schools Program in 2013. 2016 saw the China Future Schools Conference in Shenzhen, led by NIES, presenting the latest research on China's future schools and, in particular, publishing the White Paper on China Future Schools. The white paper describes the vision and basic characteristics of future schools and provides theoretical support for the development of the China Future Schools Program.

Many positive responses have been received from across the country since the program was launched. Subsequently, the China Future Schools Alliance was established. Members of the alliance are entitled to participate in different types of research projects according to their needs. In addition to this, the National Academy of Educational Sciences has established the Future Schools Lab as a think tank to support the program.

The China Future Schools Program has the following capabilities, including research and development, integration of resources, and evaluation, and NIES has the ability to influence the development of future schools. For example, it can be involved in policy making, build collaboration platforms, provide theoretical quidance, etc.

The Characteristics about the Future Education Space in China

Formal education is combined with informal education, and the new education concept encourages positive interaction between the school and the community. School is no longer the only place to learn, school and community should collaborate together on education. On one hand, students can use community public resources to learn. On the other hand the public facilities of the school can be shared to the community. Therefore, it is very important for the future school to realize the openness and scientific management of the campus.

Learning from the real world. It is important to enable outdoor spaces to encourage students to get closer to nature. For example, green spaces are not only for the sake of aesthetics, but also to be integrated with the curriculum. That is to say, outdoor spaces are also part of the education resource where students have the opportunity to learn from nature.

Student-centered. A student-centered school focuses on student growth and promotes the overall development of students. Unlike traditional schools, future schools focus on experience, communication and experimentation. Therefore, when designing the school of the future, it needs to actively respond to new needs. This will enable the new school to have a positive effect on the new education spirit.

Diverse learning methods. The diversity of learning styles in schools of the future leads to a diversity of spaces, but school space is limited. In order to meet diverse learning demands, there is a requirement for more flexible spaces that can be changed according to requirements. For example, foldable partitions can be installed in the classroom, which helps to increase the compatibility of the space.

Learning group. A learning group consists of a series of classrooms and common spaces that form an educational unit. Generally, there are two types of learning groups. The first is to organize learning groups by grade level. This helps to increase the sense of belonging and identity among students and thus promotes friendship among them. This pattern is suitable for elementary schools. The second type is to organize learning groups by discipline. This facilitates the integration of resources in similar subjects and promotes deeper interaction between students of similar backgrounds. This pattern is suitable for middle schools, especially high schools.





Yichuan Middle School witnessed over 1,700 students taking exams at the same time on April 11, 2015.

The education system in China is undergoing an extraordinary transformation. The exam-oriented education model has been turned down and a new spirit of education is gradually being accepted. We must admit that exam-oriented education used to make an important contribution to economic development, cultivating a large number of skilled labourers. However, with the progress of society, the drawbacks of exam-oriented education have become increasingly obvious. In particularly, exam-oriented education focuses on standardisation and uniformity, a model that tends to eliminate personality and critical thinking, which prevents the development of creativity. In contrast, quality-oriented education aims at developing the overall development of the individuals. Thus, at the end of the last century, scholars began to seek a change at the level of education research. The government also played an important role, introducing policies to encourage the development of quality-oriented education and clarifying the new spirit of education as the direction of education reform.

Image Source:

https://baike.baidu.com/pic/4%C2%B711%E5%AE%9C%E5%B7%9D%E4%B8%AD%E5%AD%A6%E5%AD%A6%E7%94%9F% E6%93%8D%E5%9C%BA%E9%9C%B2%E5%A4%A9%E8%80%83%E8%AF%95%E4%BA%8B%E4%BB%B6/17193140/1/91ef 76c6a7efce1bf5f2ea63a151f3deb58f65b9?fr=lemma&fromModule=lemma_top-image&ct=single#aid=1&pic=91ef76c6a7 efce1bf5f2ea63a151f3deb58f65b9

2.2 Education in Transformation: School and Education





SCHOOL? FACTORY?

Image Source: http://en.people.cn/n3/2018/0605/c90000-9467748.html https://global.chinadaily.com.cn/a/202001/08/WS5e156cafa310cf3e3558336e.html https://www.bbc.com/news/world-asia-china-36410869 https://www.businessinsider.com/sample-questions-from-chinas-gaokao-one-of-worlds-toughest-tests-2018-6?r=US&IR=T

STUDENT? PRODUCT?

2.2 Education in Transformation: From Exam-Oriented Education to Quality-Oriented Education



---- (QUALITY-ORIENTED EDUCATION)

Exam-oriented education is an educational mode judging and selecting students mainly by exams according to the curriculum. Such an education model focuses on the acquisition of knowledge and the development of intelligence(Zhang 2018).

Starting Point

Same Syllabus

Schools became efficient labor-producing machines, and teachers and students became the tools and materials of production. To make teaching and learning standardized, the educational administration specified a uniform curriculum, textbooks and feedback system(Zhang 2018).

Unified Propositions

The Chinese education system is actually the largest state-run education system(Ponzini 2020). To guarantee equity in education, the education administration is responsible for developing exam papers. The advantages of this practice are reflected in the human resources management, facilities management and financial management, which save a lot of human and financial resources(Zhang 2018). Exams are designed to test learning and teaching



effectiveness.

Standard Answers

Since the curriculum, textbooks and exams are unified(Zhang 2018), the feedback mechanism is also unified. With standardized answers, the feedback mechanism becomes efficient, and scores are used to measure student quality.

Learning Process

Rote Learning

Exam-oriented education has always been strongly connected to Chinese society. In ancient times, government employees were selected through examinations, and such a system has been practiced for thousands of years. For exams, mechanical memorization and rote learning were the standard way of learning(Pepper 2000).

Endless Exams

In China, people face many exams in their lifetime(Qi 2004). Exams determine which college you go to. Exams can even influence life for decades. For example, admission, promotion, placement and graduation all depend on exams(Shohamy, Donitsa-



Schmidt, and Ferman 1996).

Teacher-centered

The teacher is the center of the learning process(Thøgersen 1990), which is deeply connected to traditional Chinese culture, which has always emphasized respect and obedience(Rozman 2002).

Higher Scores

Scores equal ability(Meng, Tang, and Wu 2021) because teachers, parents and society use scores as the unique criteria(Kirkpatrick and Zang 2011).

Dynamic Rankings

Rankings are updated in real time based on the results of each exam, and a steady and consistent rising curve is the final goal of the student years.

Talent Selection

The government uses the exam as a threshold for entry and is considered as one of the most effective means of quality control(Hill 2010). Only about half of them reach their goal(Qi 2004).



Final Objective

Education in Transformation: Quality-Oriented Education

Quality-oriented education is a mode of education that aims to improve the quality of students in all aspects and realize all-round development(Chen and Zou 2018). This educational mode values the comprehensive development of individuals. In the Chinese context, It is often used as a cure (Dellolacovo 2009) for excessive exam-oriented education.

Starting Point

Inclusive Syllabus

In the 1980s, the National Education Commission decided to reform the national curriculum to suit the specific needs of different regions. Publishers and education departments from different regions were authorized to participate in the production of textbooks and curriculum(Marton 2006).

Diverse Educational Paths

In addition to general education, the government has developed more options for education. For example, access to vocational and technical education and education such as arts and sports. The enrollment policy has been further improved to meet the needs of the job market. The government aims to adapt to the new educational needs through a variety of welldeveloped educational pathways.



Multi-Party Participation

Unlike the emphasis on school education, qualityoriented education focuses on the integration of school, family and society(Zhang 2018), so that students have a clear understanding of themselves, their families and society.

Learning Process

Self-directed Learning

Unlike passive listening, quality-oriented education encourages students to develop independent learning skills and fully activate their initiative(Chen and Zou 2018). This contributes to the development of lifelong learning habits.

Overall Development

Rather than judging students by their scores, qualityoriented education values the development of the whole person(Chen and Zou 2018), emphasizing the cultivation and development of all aspects of students' qualities.

Student-centered

Unlike the teacher who is the leading person in the classroom, quality-oriented education emphasizes the leading role of students(Chen and Zou 2018)



and respects their personality more, thereby further stimulating their creativity.

Final Objective

Comprehensive Quality

The core of the quality-oriented education mode is aimed at improving the overall quality of students and promoting their comprehensive development. Students are encouraged to develop leadership skills and creativity through hands-on activities and extracurricular activities(Kipnis 2001).

Diversity Evaluation Mechanism

Unlike score-based philosophy, quality-oriented education balances the process and outcome, intellectual and non-intellectual factors, and focuses on developing students' comprehensive abilities and creative qualities (Meng, Tang, and Wu 2021).

Individual Development al. 2020).

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	Com
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Unlike elimination and selection, quality-oriented education focuses on the long-term development of students. And more respect for the personality and comprehensive development of individuals(Pang et



2.2 Education in Transformation: Chronology for Education Reform

1977-1984	Phase NO.2 1985-1990	Phase NO.3 1990-2003
~	~	~
 During this period, the country witnessed the re-establishment of the education system. People began to believe in the value of education again. 1977 College entrance exams restarted The whole country re-established the idea of respecting knowledge. 1978 Restarted sending international students overseas The country reconnects with other countries for educational collaboration 1980 The Ministry of Education has issued Interim Work Regulations on the Full-Time Primary School (Draft), Interim Work Regulations on the Full-Time Secondary School (Draft) and Interim Work Regulations on the Key Universities (Draft) The state has begun to pay more attention to the reasonable design of the school system 1983 The country has reached a consensus, the education and future construction 	 During this period, the country began the updating of its educational system to adapt to the social and economic development in the future. 1985 The Decision of the Central Committee of CPC on Education System Reform. Education is not serving politics anymore, it is serving the whole society. 1986 Compulsory Education Law of the People's Republic of China. The legislation established 9 years of compulsory education in China. 1987 The government issued the first building code for school design. The government released the first edition of building design codes for primary and secondary schools. 	 During this period, the country witnessed a radical development of education at all levels, but it also brought some new challenges. 1992 The government has released policies to accelerate the development of the education industry. As a result, the education industry has also witnessed unprecedented growth and brought many economic benefits. 1993 Outline of Education Reform and Development in China This document proposed a switch from exam-oriented education to education that improves the quality of the population. 1999 the Decision The country has officially issued a policy to promote the promotion of quality-oriented educations. 2001 The Basic Education Curriculum Reform Outline (trial) In order to implement quality-oriented education, the country started the largest curriculum reform in primary and secondary schools.

Source:

Zheng Ke. 2018. "From Uniformity to Variety: The Road of 40 Year Curriculum Reform in China" Global Education 47 (03): 3–18.

Phase NO.4 2003 - NOW

 $\mathbf{\vee}$

During this period, the country worked on implementing qualityoriented education, improving the education system and promoting equity in education.

2005 Government has established policies to address educational equity issues.

2006 Compulsory Education Law of the People's Republic of China(New)

The country has introduced a new version of the compulsory education law to remove the issues of exam-oriented education and the problems caused by the industrialization of education.

2010 The Outline of Medium and Long Term Planning of National Education Reform and Development 2010-2020

The legislation aims to control the direction of education reform development and promote qualityoriented education.

2014 The government has introduced the latest program for college entrance exams, where the way students are evaluated is no longer determined by a single exam. The policy aims to promote the implementation of quality-oriented education, emphasizing the development of a person's overall quality.





As a medium for education, the campus plays an important role. With the development of education reform, the need for change in educational space becomes urgent. The existing campus is no longer able to meet the needs of the future, and some teaching buildings even stand in opposition to the future direction of educational reform. There are many reasons for the current problems, most of which are related to the spirit of education in the past. In the last forty years, large numbers of people have moved into the cities, so there was a need for a large amount of education space to be built in a short period of time to curb the shortage of educational resources, and in consequence, many duplicable education buildings have emerged. These campuses have developed a unique paradigm with many commonalities: an overemphasis on functional zoning and a lack of flexibility that hinders student interaction; a completely closed campus that isolates itself from nature and society; An over-emphasis on efficiency that turns schools into knowledge factories and students into products, who lose the joy of learning.

Image Source: https://www.thepaper.cn/newsDetail_forward_14277922 https://www.sohu.com/a/256607164_650681 http://www.gzxhhs.net/item/1175.aspx https://www.sohu.com/a/531152447_121123830

2.3 Campus in Transformation: Towards the New Campus



--- (NEW CAMPUS)

Campus in Transformation: Contradictions between Existing Campuses and New Ones





between people is flat, and there is no difference in status between teachers and students.

In a new campus, public facilities could be shared with the community on non-working days as long as there is no negative impact on students

In a new campus, the campus should interact positively with its surroundings and have an open attitude towards environment.

Campus in Transformation: Key Points between Existing Campuses and New Ones

(EXISTING CAMPUS)

COMMUNICATION COMMUNICATION Standpoint: Standpoint: Encourage equal interaction and focus on Encourage top-down communication and focus on reaching a uniform concept. diversity of opinions. > Expected Phenomenon: Phenomenon: Different ideas should coexist. Agreement on things. Influence: Expected Influence: Intangible impact on the pluralistic exchange Expanding the width and depth of education. of information. SHARING SHARING Standpoint: Standpoint: Campus public facilities only belong to the The campus is part of the community. campus, not the community. **Expected Phenomenon**: > Schools provide public services to the Phenomenon: Public resources are unevenly allocated. community. Influence: Expected Influence: Campus public facilities are not fully utilized, The campus and the community share mutual benefits and social responsibility. resulting in waste.. **OPENNESS OPENNESS** Standpoint: Standpoint: The entire campus is an independent system. Weaken or eliminate borders. Phenomenon: **Expected Phenomenon**:

>

28

A large number of education islands have

Lack of positive connection between the

emerged in the city.

campus and the surroundings.

Influence:

campus and the surroundings.

Expected Influence:

(NEW CAMPUS)



3

THEORETICAL BASIS

This chapter introduces Urban Ergonomics as the theoretical basis of this thesis to explore the paradigm of the future campus in China, from the macro level to the micro level. Urban ergonomics is a cross-discipline combining Architecture and Ergonomics, trying to systematize design principles and requirements based on different scales, as a tool to fix the detachment of human and human, human and architecture, and human and urban space.

The first section describes the origin and development of Urban Ergonomics and describes the three scales in particular.

The second section describes the factors involved in urban ergonomics, including social, economic, planning and even physical environment elements.

The third section describes the key principles of design interventions responding to the key points of the future campus.

CAL BASIS

3.1 Theoretical Source - Urban Ergonomics

Urban Ergonomics, a new discipline integrating Architecture and Ergonomics

With the development of urbanization, the importance of human factor is gradually recognized by the public, especially in the process of built environment design. Over the past 40 years, both urban and rural areas have experienced dramatic changes in China, where efficiency-oriented buildings have been built in large amounts, resulting in a disharmonious relationship between people, architecture and the environment. Nowadays, there are a large number of such "detached" spaces(Bonino, Mancini, and Deng 2021), and these buildings are unable to establish a positive connection with people and the environment, or to face the challenges of the future on their own. Urban ergonomics, an emerging cross-discipline, offers a new way of thinking about architecture, introducing a human-centered approach to the study and consideration of architecture and urban space, emphasizing the creation of positive connections between human beings, architecture and the environment.

Ergonomics (Human Factor) is an interdisciplinary discipline based on physiology, psychology, and biology that optimizes human well-being and overall system performance("What Is Ergonomics? | The International Ergonomics Association Is a Global Federation of Human Factors/Ergonomics Societies, Registered as a Nonprofit Organization in Geneva, Switzerland." n.d.) by harmonizing the relationship between humans, the environment, and machines. Ergonomics can be traced back to the late 19th century when Frederick Winslow Taylor experimentally studied the relationship between people, tools and productivity(Taylor 1911). The term human factor first appeared in Ross McFarland's book, Human Factors in Air Transport Design(Chapanis 1947), and the term Ergonomics is often used in Europe. Human factors and ergonomics are interchangeable. As the discipline developed, the International Ergonomics Association was founded in 1959, and since the 1990s, human factors engineering has been widely used in the design field. In the 21st century, the concept of urban ergonomics has gradually become tangible, and the Urban Ergonomics Lab was established in 2021 by Politecnico di Torino and Tsinghua University("POLIFLASH MAGAZINE - Urban Ergonomics: Creare Infrastrutture per Il Benessere Nella Vita Urbana" n.d.), which has played an important role in the development of the discipline.

As a cross-discipline between Architecture and Ergonomics, Urban Ergonomics is oriented to human needs, leading to a positive dialogue between human, architecture and urban space, to enhance the quality of urban space through design interventions at different scales. Professor Zhang Li of Tsinghua University summarized five scales, i. e. Marco, Far, Medium, Near and Micro (Zhang et al. 2022). Based on the above five scales, this thesis proposes three commonly used scales for campus design, i. e. Macro, Meso and Micro.







behavior.

15-minute walking circle, which is 5-minute walking circle, which is 1-minute walking circle, which is a radius of 1.2 Km. This is a scale a radius of 400m. This is a scale about 50 meters, and it is measured about the spatial interface between about the relationship between the as the distance at which human people and the environment. spatial interface between people eyes can clearly recognize another If the human scale is brought and architecture. When the human person's face. This is a kind of scale into the Macro Scale, the valid scale is brought into the Meso Scale, about the spatial interface between information presented by people is the valid information presented by people. When the human scale is a linear movement path. This scale people is clusters. The urban spaces brought into the Micro Scale, the corresponds to urban spaces such corresponding to this scale include information presented by a person as streets and plazas. At this scale, pocket parks and community public is very complete, including facial the focus is on the guidance and spaces, etc. At this scale, the point is information and body language, motivation of urban space for human to guide and change the clusters of etc. At that scale, the point is the human flow.

The Macro Scale corresponds to a The Meso Scale corresponds to a The Micro Scale corresponds to a promotion of the spatial interface for human-human interaction.



Image Source

Zhang, Li, Huishu Deng, Xiaohan Mei, Lingbo Pang, Qixu Xie, and Yang Ye. 2022. "Urban Ergonomics: A design science on spatial experience quality." Chinese Science Bulletin-Chinese 67 (16): 1744-56. https://doi.org/10.1360/TB-2021-1241.

Theoretical Source - Cases of the Scales



Copenhagen Bicycle Infrastructure Dora Park Renovation in Turin Community Center in Qinhuagndao

Copenhagen is known worldwide Parco Dora in Turin is a successful The ramped space is a major human scale to the urban interface.

as a bicycle-friendly city. The project for the transformation feature of the building. The project infrastructure has been developed of an industrial heritage. The uses a continuous ramp to create 2 over decades to form a closed- designers redefined five theme courtyards, the one near the outside loop system that covers the entire parks by organizing the existing is more open and the one near the city. Cyclists have dedicated steel framework, water, connecting inside is guieter. The ramp creates paths, complete facilities such as elements and vegetation. The different experiences and activities signals and signage, making for industrial heritage renovation project by varying the slope and width. The a great cycling experience. It is a connects the human scale with the project is a perfect illustration of the good example of the Marco Scale natural surface, perfectly illustrating Meso Scale intervention strategy by intervention strategy by linking the the Macro Scale intervention strategy. linking human scale to architecture.



Image Source:

Copenhagen Bicycle Infrastructure: https://www.bikechaser.com.au/news/can-australia-learn-denmarks-cycling-culture/ Dora Park: https://www.gooood.cn/parco-dora-turin-by-latz-partner.htm Community Center: https://www.archiposition.com/items/ad87e9d940

3.2 Factors involving Urban Ergonomics

In the Macro Scale, urban ergonomics is mainly reflected in land use, transportation and open space. If there is a concentration of single-function lots in the city, then residents will rely on motor vehicles to get around and will be less likely to walk. In the long run, the vitality of the streets in the area will be lost and the connections between people will be fragmented. Transportation is a part of people's daily lives, and taking public transportation not only reduces pollution, but also increases opportunities for outdoor exercise, which improves health. Studies have found that every 1% increase in public transportation use increases the level of good health of residents by 0.0003% (Alireza et al. 2017). Some studies have shown that good urban open spaces promote human socialization and activity, which can improve residents' physical fitness, reduce mental stress and improve cognitive performance (Hazer et al. 2018).

In the Meso Scale, urban ergonomics is mainly reflected in guiding people to healthy lifestyles and walking travel habits. Walk-friendly neighborhoods increase the probability of walking, improve people's physical fitness level and reduce the risk of chronic diseases such as obesity. In addition, increasing land mix also creates conditions for walking. According to research studies by Japanese scholars, residents in neighborhoods with a high degree of land use mix are more likely to travel on foot(Inoue et al. 2010). Mixed land use will provide residents with a diversity of needs within a shorter commuting distance, reduce traffic congestion, reduce energy consumption, and increase residents' interaction activities. Mixed land use also helps build vigorous community centers and good neighborhoods.

In the Micro Scale, urban ergonomics is mainly reflected in the subtle space creation and human health(Tian, Li, and Ou 2021). It is possible to optimize the habitat environment and improve human physical and mental health through active design. Some studies have shown that delaying the speed of elevators and optimizing the environment of stairwells to attract people to use stairs has a significant effect on reducing obesity index(Garland et al. 2018). People spend eight hours a day in the workplace, and a good workplace has a direct impact on people's physical and mental health. For example, by setting up height-adjustable desks, users can easily switch between standing positions(Zhu et al. 2019). Improve the environment of stairwells and public spaces to attract people to use stairs and increase communication opportunities.

FACTORS OF URBAN ERGONOMICS

•	
SCALES	
	Economics, Educ
	The Change Of La
	Traffic Condition
	Distribution Of Pu
Macro Scale	Green Space And
	The Quality Of Air
	The Management
	The Accessibility
	Land-Use Intensit
Meso Scale	The Number Of D
	Human-Centered
	Commercial Activ
	Crime Rate
	Living Quality
	Physical Environn
Micro Scale	Smell And Noise
	Humidity
	Furniture Design
•	-

Chart Source:

Tian Li, Li Jingwei, and OuyangWei. 2021. "Urban Planning and Ergonomics from the Perspective of Public Health." World Architecture, no. 03: 58-61+125. https://doi.org/10.16414/j.wa.2021.03.013.

FACTORS
ication, Health And Welfare Conditions
Land Properties
n
Public Facilities
nd Open Space
air, Water and Soil
nt Of City
y Of Public Facilities And Activity Space
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Chart Source: Tian Li, Li Jingwei, and OuyangWei. 2021. "Urban Planning and Ergonomics from the Perspective of Public Health." World Architecture, no. 03: 58-61+125. https://doi.org/10.16414/j.wa.2021.03.013.

Control Plot Ratio Reduce Industrial Land Penetration Avoid Potential Pollution Industry Increase Accessibility Of Street Increase The Mix Ratio Of Land Increase The Walkability Of The Street Encourage Transit-Oriented Development to Decrease Pollution Pedestrian System Separated From The Vehicle System Improve The Accessibility Of Slow Traffic Increase The Walkability Of Slow Traffic System Ensure Enough Green Area And Reasonable Distribution Appropriate Distribution of Trees ,Shrubs And Roof Planting Ensure Enough Piazza Per Capita Increase Accessibility Of Green Space Enhance The Connection Of Open Space Ensure Enough Green Space In The Residential Area Guarantee The Comfort Of The Physical Environment Good Ventilation And Lighting Good Facilities For Activities Good Communication Space For Family Members Good Communication Space For Workers

Scales Points of Interest **Expected Results** > > Connection between Macro-Scale Openness Humans and Urban Space ____ Connection between Meso-Scale Sharing Humans and Architecture Connection between Micro-Scale Communication Humans and Humans

Intervention Principals

>

Eliminate physical boundaries and maintain an open attitude towards the urban interface Use a small grid system to divide the site to increase accessibility Create walk-friendly pedestrian

spaces

 Provide shared facilities to the community
 Activate public space such as green space as a venue for public

participation 3. Create a rational space organization to ensure a balance between public and private

 Increase the mix ratio of functions to create a composite function
 Activate circulation space and attract people to use
 Create informal learning spaces to provide a place for creativity

CASE STUDY

This chapter introduces three case studies to look into the big picture of the future campus in China. Faced with a huge population and rapid urbanization causes, architects are exploring campuses that correspond to the new spirit of education. The three cases respond to the trend of future campuses from different perspectives.

The first case describes the campus in an urban way, i.e. MAT Campus. This idea explores a flat campus paradigm.

The second case describes the campus in a vertical way, i.e. Vertical Campus. This idea explores a high-density urban campus.

The third case describes the campus in a village way, i.e., the Settlement Campus. This idea explores unique ways to balance nature and man-made, by abstracting the configuration of the village.





Decentralization and Low-Rise

This is a solution that designs campus by using urban design methodology. The scheme has clear circulation and function layout, and each center has its own recreation space, just like a small community.

Qingyijiang School

Category : Primary School Capacity : 54 Classrooms Area : 29943 m² Year : 2022 Studio : TAO Architecture Office Location : Deyang, China



High-Density and Vertical Layout

This is a solution that uses a vertical layout to organize a campus. Due to the limitation of land size, functions are put over different layers to make full use of space.

Hongling School

Category : Primary School Capacity : 36 Classrooms Area : 33721 m² Year : 2019 Studio : O-office Architects Location : Shenzhen.China



Village Campus and Small Volume

This is a solution that uses the idea of a village to compose a campus. Such a scheme makes the students closer to nature and built environment by establishing imitate scale in the site.

Category : Kindergarten, Primary and Secondary School Capacity: 24(Kindergarten)+30(Primary School)+24(Secondary School) Area : 66000 m² Year : 2020 Studio : OPEN Architecture Location : Shanghai, China







Image Source:

Qingyijiang School: https://www.archdaily.com/982152/qingyijiang-road-elementary-school-tao-trace-architecture-office Hongling School: https://www.archdaily.com/926560/hongling-experimental-primary-school-office-architects Pinghe School: https://www.archdaily.com/962982/shanghai-gingpu-pinghe-international-school-open-architecture?ad_source=search&ad_medium=projects_tab

Pinghe School





Human-Human Relationship \sim (MICRO-SCALE) (Education Unit) As a formal educational space, this section focuses on analyzing the architects' efforts to transform learning and teaching through (Public Space) As an informal educational space, this section focuses on the architects' active approach to leading students to develop









Because the project occupies the entire block, the boundary of the building is the roads. The architects have set back a large space to the urban interface. The space reserved can contribute to the improvement of the street quality. The space on the long side of the building can be transformed into a green belt, which can both isolate noise and enhance the greenery ratio. The space on the street corners has a great potential to be transformed into squares or parks to provide activities for citizens.



HONGLING SCHOOL

The site is located in a high-density area of the city, with all four interfaces facing the street. The architects used ground floor elevation and setbacks to give back a portion of the space to the street, although the site is very constrained. On one side of the entrance, the boundaries are set back to create a soft slope that not only provides green space, but also allows the difference in height of the slope to bring light and wind into the courtyard on the underground level.



PINGHE SCHOOL

The building covers the entire block, with streets on all four sides. The four urban interfaces are all quite negative, with only the west side facing the river. Therefore, the architects set up a waterfront buffer on the west side and a related waterfront sports program site. The northern side of the site is set back to form a continuous green belt to reduce the noise influence, because the buildings on the northern side are more crowded. At the same time, the east and south sides of the site are partially set back for the public street.







Image Source:





In the project of Qingyijiang Road School, the architects adopt a flat spatial strategy, where all spaces are fully expanded on the horizontal plane to form a mat-like building. The entire complex consists of two parts, the lower plinth part (Served Space) and the upper classroom part (Served Space). The 54 classrooms are divided into 6 clusters, each with a courtyard as a social and activity hub. Each cluster is connected by a corridor, creating a homogeneous grid structure where students can move freely between the clusters.



HONGLING SCHOOL

In the project of Qingvijiang Road School, the architects adopt a flat spatial strategy, where all spaces are fully expanded on the horizontal plane to form a mat-like building. The entire complex consists of two parts, the lower plinth part (Served Space) and the upper classroom part (Served Space). The 54 classrooms are divided into 6 clusters, each with a courtyard as a social and activity hub. Each cluster is connected by a corridor, creating a homogeneous grid structure where students can move freely between the clusters.



In the Pinghe School project, the architects adopted a strategy of breaking up the whole into pieces and combining them with intimate buildings to form a village. Unlike the whole, the fragmented parts have stronger differentiation, and all parts equally co-exist in the site. The individual buildings imply function through their shape. The service facilities such as cafeteria, dormitory and stadium are arranged along the edge of the site, the main academic groups are distributed aside, and the sports field is placed in the center of the site.







Image Source:

Qingyijiang School: https://www.archdaily.com/982152/qingyijiang-road-elementary-school-tao-trace-architecture-office Hongling School: https://www.archdaily.com/926560/hongling-experimental-primary-school-o-office-architects Pinghe School: https://www.archdaily.com/962982/shanghai-gingpu-pinghe-international-school-open-architecture?ad_source=search&ad_medium=projects_tab

PINGHE SCHOOL





Unlike traditional academic buildings, a decentralized planar grid is used in this project. Vertical and horizontal corridors are organized into a grid system in which classrooms, courtyards, and platforms are weaved into the system, eliminating boundaries and promoting the penetration of buildings and courtyards into each other. Each three classrooms form a unit, and each three units form a cluster, each cluster has its own common activity platform and courtyard. The entire teaching building is characterized by equality and openness.



HONGLING SCHOOL

Unlike traditional teaching buildings, this project presents a large amount of flexibility and diversity. The academic building is almost filled with buildable sites. The western zone uses the distance between classroom units to create courtyard spaces, and in addition, the first floor of the building is overhead and creates a height difference to gain natural light and ventilation for the sports area on the first floor. Each two classrooms form a unit, and each two units form a cluster, with shared teaching resources between the clusters.



PINGHE SCHOOL

Unlike traditional school buildings, this project abandoned the concept of planning axes and aimed to organize the group in a self-organizing way. 7 cubic volumes are randomly distributed in the center of the site to form clusters of academic buildings. Each floor consists of four classrooms distributed in a pinwheel pattern. As the proverb says, it takes a whole village to raise a child. The village formed by these small-scale buildings is an ideal educational place.







Image Source:





In this project, the site has enough space to accommodate a standard 400-meter sports field. The architects placed the sports field between two groups of buildings and used the height difference of the platforms of the academic cluster to build the audience seats of the sports field, which improved the efficiency of space utilization. The sports field is arranged in a north-south direction to avoid the impact of solar glare on the athletes. It is also an ideal place for outdoor evacuation.



HONGLING SCHOOL

The project was built on a constrained site, so the architects strategically moved the sports field up to three levels and arranged the auditorium and other large-span spaces in the lower part of the building, while overhead the ground floor and arranged a small sports field. This vertically divided spatial organization strategy dramatically improves the efficiency of space utilization. In addition, the project provides a new paradigm for the design of high-density campuses.



PINGHE SCHOOL

In the Pinghe School project, the architects deconstructed the 400-meter standard playground, i.e., the runway and the field are arranged separately. The architects set up a standard 200-meter runway for PE classes and a non-standard runway through the campus for informal exercise. This practice not only enhances the vitality of the campus, but also increases communication opportunities.





Image Source:





The classroom is the space where students spend the most time for the school, so light is important for the quality of the space. In this project, all classrooms are located on the top floor and have the possibility to introduce sky light through a special roof design. The architects designed six types of roofs, corresponding to different grade levels, and different roofs create different spatial experiences with different atmospheres, activating the educational purpose of the space itself.



HONGLING SCHOOL

The project is characterized by flexibility and freedom in the design of the classrooms. Firstly, based on the hot and humid climate of Shenzhen, the architects designed the teaching units with drum-shaped planes to avoid blocking ventilation. Secondly, each two classrooms form a unit with variable partitions in the middle of each unit to meet the requirements of separate and combined classes, and also to meet the diverse teaching modes.

PINGHE SCHOOL

In contrast to traditional classrooms that emphasize order, the classroom units in this project are distributed in a pinwheel shape, creating a non-hierarchical spatial order. The classroom spaces surround the public space, and the space is used with high efficiency. Buffer spaces between classrooms serve as storage spaces and and potential activity spaces. Classroom units of different grades can be distinguished by their shapes.







Image Source:







The project adopts a decentralized floor plan organization, with each cluster having its own activity space to have equal access to the nature. Considering the need for strong connectivity between classrooms and outdoor spaces during the 10-minute break between lessons, the architects designed distinctive courtyards and rooftop platforms for each cluster, giving students plenty of opportunities to interact with people and nature.



HONGLING SCHOOL

In this project, the architects arranged the activity spaces vertically, including a ground floor overhead multifunctional courtyard, a linear corridor connecting the classrooms and a rooftop farm. The ground floor multi-purpose courtyard accommodates a variety of activity spaces, such as sports, art and club spaces. Linear corridors on each level are the nearest activity space for students. The rooftop farm is also ideal for activities in contact with nature.



PINGHE SCHOOL

As the background of the building, the public space is organically organized by the architects. The architects make full use of the natural landscape to fill the background, such as gardens, wetlands, forests and hills. This approach gives the campus a village atmosphere and creates an ecosystem that responds to the concept of a teaching village. The buildings and public spaces interact with each other to create a physical environment that changes over time.





Image Source:
5

DESIGN PROPOSAL

This chapter introduces a series of design interventions in a middle school in Chengdu city, as a outcome of the previous chapters, making tangible the idea of a campus for the future that encourages openness, values communication and emphasizes sharing.

The first section describes the background information of the project, the design requirements and the questionnaire findings.

The second section describes the preliminary analysis of the site, including location, land use and accessibility.

The third section describes the intervention strategies based on the three scales of Urban Ergonomics.

The fourth section describes the concept and its development process to implement the intervention strategy through active design.

The rest of the sections describe additional information about the project, such as floor plans, elevations and sections.

5.1 Project Information

PROJECT CONDITIONS

The goal of the project is to build a campus for the future, and to explore a new paradigm of the new campus through design practice, taking into account the new spirit of education. Located in Tianfu New City in Chengdu, Sichuan Province, the project is surrounded by more than six large residential areas with a current population of over 65,000 people and a large number of residential and commercial services to be built in the future, so the potential for future population growth is huge. In addition to educational facilities, the neighborhood is well served by amenities. Therefore, the construction of a new campus based on a high-density community is a priority for this project. As a result, the local government decided to build a new campus for the future as a response to the new educational spirit. Unlike past campus design paradigms, this campus design encourages innovation and the breaking of stereotypes. With the new spirit of education, the campus design needs to be in line with the spirit of the times, making the campus itself educational.

SITE STATUS

The elementary school and kindergarten are on the eastern side of the site, while the rest of the interface is occupied by large residential and amenity facilities. There are three subway stations and one bus stop within a 15-minute walking distance, and two major north-south roads leading to the city center, making the site easily accessible to the outside world. The site is currently a flat open space with level topography, municipal facilities infrastructure and excellent construction conditions. But the site also has some problems. The current population of the area is large, but its educational facilities are relatively limited, and the road grid scale is relatively large, the difference between urban and human scale is huge, the urban interface is relatively closed, and there is a lack of accessible public open space.





RESIDENTIAL BUILDING



Project: Middle school Capacity: 2700 students(54 classes) Area: Approx. 37,000m² Location: Tianfu,Chendu,Sichuan,China

SALLA.

ELEMENTARY SCHOOL

KINDERGARTEN

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PLANNING REQUIREMENTS

Net Land for Planned Construction	Area: 44,249.96 m ²
Scale of School	2,700 students (54 classes)
Aboveground Total Construction Area	Approx. 37,000 m ²
Building Area Included in Plot Ratio	To be determined in consideration of the design scheme reasonability; no upper limit requirement for plot ratio.
Building Density	To be determined in consideration of the design scheme reasonability
Greening Rate	More than 30%
Building Height	To be determined in consideration of the design scheme reasonability; the requirements of regional urban design shall be met

MAIN ECONOMIC AND TECHNICAL INDICATORS

ZONING	CONTENT	CONSTRUCTION AREA OR OTHER REQUIREMENTS
	Teaching and Auxiliary Room	27108 ㎡
School Buildings	Office	4000 m ²
	Living and Service Room	6152 m ²
Basement	Equipment Room	To be determined by needs

Data Source:

Park City Construction Bureau of Sichuan Tianfu New Area Chengdu Management Committee https://share.weiyun.com/rDccrERC



FUNCTIONS AND DIMENSIONS

5.1 Project Information - Questionnaire



HIGH FREQUENCY TOPICS FROM QUESTIONNAIRE

There were 19,200 questionnaires in total, and the respondent group included students, teachers and parents. The results showed that most of the respondents had different opinions on the following issues. Parents focused on the traffic problem of the entrance space of the campus, students focused on the activity space, and teachers valued the reasonable distribution of office space. In short, most respondents want to extend the classroom to natural and community spaces, making learning integrated into life and vibrant.

Data Source: Park City Construction Bureau of Sichuan Tianfu New Area Chengdu Management Committee https://share.weiyun.com/rDccrERC



STUDENTS' CONCERNS ABOUT LEARNING SPACE, ACTIVITY SPACE AND OUTDOOR ACTIVITY

According to the feedback from the questionnaire, students' concerns are in the library and outdoor space. For learning spaces, students would like the library to have sufficient area, age-graded reading space and craft creation area. For activity spaces, students would like to see more outdoor activity spaces, with more experiential facilities and accessible green spaces where possible. For activity types, students preferred sports, adventure, and reading.

5.2 Preliminary Analysis - Location



SICHUAN PROVINCE

METROPOLITAN CITY OF CHENGDU

CHENGDU CITY

The project is situated in Tianfu. Located in Sichuan province, Tianfu is one of the most important new districts at national level. The city was approved for establishment by the Chinese Central Government in 2014, in order to explore a new model of economic development, by introducing high-end industries and bringing in talents, etc. After several years of development, the city's GDP has surpassed 300 billion RMB(\Re and $rac{1}{2}$ 2020) in 2019. Meanwhile, Tianfu has witnessed explosive population growth. According to data from China's seventh census, Tianfu's downtown area has increased by 406,211($\vec{\alpha}$ 2021) people in the last 10 years, with the current population standing at around 870,000($\vec{\alpha}$ 2021). Most of the new immigrants are young and highly educated.



TIANFU

5.2 Preliminary Analysis - Timeline of the Site





March 2015

The Real Estate had been intensively developed since 2014 because Tianfu was officially issued as a state-level city. The population had also witnessed a huge increase. Up to now, the area has been developed into a **highdensity community** with services such as schools, hospitals, shopping malls and the metro in the neighborhood.

February 2008

The Agricultural Landscape have been the collective memory of the plots of land before 2008. The site was going to face a dramatic change in the coming years.

Image Source: Google Earth



August 2022

5.2 Preliminary Analysis - Surroundings



The site is surrounded by high-rise residential buildings on three sides, with an elementary school and kindergarten to the east.

5.2 Preliminary Analysis - Landuse



More than 50% of the buildings around the site are high-rise residential buildings; to be precise, this is a large community with a capacity of 65,000 people. In addition to the residential buildings, the rest of the buildings are the relative service facilities, including education, commercial, etc.

- M Metro Stop
- O Office
- Education
- ▲ Transportation
- ▲ Underdeveloped
- Commercial
- **O** Recreation
- ← Public Purpose
- Green
- O To be develop

5.2 Preliminary Analysis - Accessibility





By introducing the spatial syntax, the integration factor around the site can be evaluated. As shown in the figure, the warmer color indicates the higher accessibility and the cooler color vice versa. The road on the south side of the site has the highest accessibility, and the rest of the roads are approximately the same.

Image Source: By the Author



5.2 Preliminary Analysis - Population Aggregation



This graph shows the population aggregation at 8:30 am on June 15, 2022. The busy areas are residential communities or main road crossings. The neighborhoods on the west side of the site are the busiest areas closest to the site, especially at the north and south entrances.

Source: 15/06/2022 8:30 am - Real-time from Heat Map of BaiduMap for Mobilephone









Open Border

This campus will be designed with open borders. The specific design strategies are as follows:

- 1. No physical boundaries, a welcoming gesture to the city interface
- 2. Bring the crowd inside the site through active design, rather than keeping them at the edge



Small Grid System

This campus will use a small grid system to divide the site. The specific design strategy is as follows:

- 1. The use of small grids are able to enhance accessibility of the site by subdivision
- 2. The use of small grids can also improve the traffic efficiency of the surrounding neighborhoods



Walk-Friendly Space

This campus will pay more attention to walk-friendly space. The specific design strategies are as follows:

1.Pedestrian space combined with landscape design to improve its quality

 The site adopts the way of separating pedestrian and vehicle traffic to improve the safety of walking space
 Return the original boundary space to the city street and enhance its walking experience





Shared Facilities

This campus will provide public facilities to the community. The specific design strategies are as follows:

1. Open public facilities to the community, such as sports facilities, canteens, libraries and learning centers, etc.

2. Public facilities are generally open to the public after school hours, on weekends and during holidays.



Green Space

Green space will play an important role in sharing. The specific design strategies are as follows:

1. Open the green space to the public, and use a scientific management model to maintain the green space in a positive way.

2. Introduce public participation to further activate the site, such as introducing urban farming to encourage people to take part in.



Space Organization

This campus will focus on the space organization. The specific design strategies are as follows:

 Divide the building functions according to a reasonable manner based on public, semi-public and private to avoid the negative impact of shared facilities on students.
 Focus on space division vertically, placing public facilities on the lower level, semi-public space on the middle level, and educational space on the upper level.





Mixed Use

This campus will focus on the mixed functions and function reorganization to improve the efficiency of function usage. The specific design strategies are as follows:

1. A mixed approach is used to form function clusters and increase the frequency of communication.

2. There are comprehensive functions within the cluster to meet users' needs and this would promote solid connections between people.



Circulation Space

This campus will focus on enhancing the vitality of the circulation space. The specific design strategies are as follows:

 Integrate circulation space into public space, increase its vitality, and this would increase the potential communication opportunities.
 Design stairs and corridors in an interesting way that encourages people to use them instead of elevators, thus increasing the chance of encounters and stay duration.



Informal Learning Area

The campus will emphasize the design of informal learning spaces. The specific design strategies are as follows:

 Convert some public spaces into informal learning spaces to provide places for potential networking opportunities.
 Circulation spaces can also become high-quality informal learning spaces that promote creativity and inspiration.







Landscape









Remove the borders to open to the public

Subdivide the site to allow easier access







Bring the agriculture landscape back to recall the collective memory

Generate building volumes









Turning parts into whole

Bottom overhead and add shared facilities





5.5 Masterplan - Bring Collective Memory Back





February 2008

The Agricultural Landscape is a distinctive feature at this site. There were only some villages beside the fields before 2008.







5 Masterplan - Common Resource Management



·····>





REGULAR MODE

 \checkmark





WORKING DAYS









OPEN MODE



WEEKENDS







Setback to return more space to street









Increase walking experience in the site



EDUCATION	I ROOMS	EDUCA	TION AUXI	LIARY R	ROOMS		SER	ICE ROON	۸S
~			~					~	
Classroom Liberal Arts Lab Fin	e Art Meeting room Activity Room	Library	Teacher's Offic	ce Admin I	Multi-Function	Canteen	Auditorium	Training Cente	er Sports

Zhu, Tao. 2020. "Break Through, Within Boundary: The Design Explorations of futian New Campus Action Plan-8+ 1 Joint Architecture Exhibition In Shenzhen'." Time + Architecture.











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Standard Classroom)
······ Classroom-Liberal Arts	D
Classroom-Laboratory	
Classroom-Fine Art	
Meeting Room	
Activity Room	
····· Teachers'Office	

····· Sports Fields

•••••{	Library)
•••••	Multi-Function)
•••••	Canteen)
•••••	Exhibition)
•••••	Training Center	
•••••	Administration)
•••••	Auditorium)
• • • • •	Stadium)

5.6 Architecture Programme - Education Units



5.6 Architecture Programme - Education Units





	SERVED SPACE	
SERVANT SPACE	SERVANT SPACE	SERVANT SPACE

SPECIAL EDUCATION UNIT

STANDARD EDUCATION UNIT

5.6 Architecture Programme - Basic Education Unit





LOCKER





CLASSROOM

MINI LIBRARY



EXHIBITION



GROUP WORK





MINUS ONE FLOOR

- Stadium
 Dressing Room for Men
 Dressing Room for Women
 Auditorium

5M	10 M

20M







FIRST FLOOR

1 Exhibition

- 2 Administration
- 3 Library
- 4 Terrace 5 Canteen
- 6 Multi-funtion Room

20M

7 Technical Room

5M 10M





SECOND & FOURTH FLOOR

- 1 Standard Classroom
- 2 Teachers' Office
- 3 Meeting Room
- 4 Activity Room
- 5 Double Height Space
- 6 Special Classroom for Laboratory
- 7 Special Classroom for Liberal Art
- 8 Special Classroom for Fine Art

5M

10 M



THIRD & FIFTH FLOOR

- 1 Standard Classroom
- 2 Teachers' Office
- 3 Meeting Room
- 4 Activity Room
- 5 Double Height Space
- 6 Special Classroom for Laboratory
- 7 Special Classroom for Liberal Art
- 8 Special Classroom for Fine Art

5M

10 M



ROOFTOP

5M 10M 20M

7 Relax Area



2 Exibition



4 Running Track



6 Open-air Classroom

K

8 Recreation Area








North Facade





East Facade





West Facade























5.13 Details

1 Elo

Flooring Lightweight Screed Vapor Membrane Acoustic and Impact Insulation Screed Rockwool Insulation Vapor Membrane Reinforced Hood with Electric Welding Mesh Igloo Ventilated Floor Lean Concrete Layer Gravel Layer Rammed Earth

2

Flooring Lightweight Screed Vapor Membrane Acoustic and Impact Insulation Corrugated Sheet with Casting Concrete Steel Beam Acoustic Insulation Gypsum Board Ceiling

3

Vegetation Growing Medium(Earth) Filter Fabric Drainage Layer(Water Reservoir) Root Barrier Waterproof Membrane Slope Layer Lightweight Screed Vapor Membrane Thermal Insulation Corrugated Sheet with Casting Concrete Steel Beam Acoustic Insulation Gypsum Board Ceiling

4 Gravel Edge Channel 5 Drainage Channel 6 H Beam - 700mmx300mm 7 Roller Blind 8 Full Height Sliding Window 9 Parapet 10 Double Glazing Window

11

Finish Layer Thermal Insulation Thermal Insulation Cavity Layer with Acoustic Insulation

12 Rainwater Drainage Channel 13 Foldable Sunshade(Perforated Panel)







CONCLUSION





Introducing Urban Ergonomics to campus design is an explorative experiment, especially in China's urbanization context. The campus in China tends to occupy a neighborhood in size, like a small town, with its own independent system. If designers only focus on the design of the campus itself, the campus may become an isolated island, that is to say the detached space(Bonino, Mancini, and Deng 2021). However, the campus would be different if Urban Ergonomics were considered in advance and Macro, Meso and Micro Scale concepts were integrated into the interventions.

In the Macro Scale, the new campus could focus on the positive dialogue between people and urban space. The campus should be part of the city, not an isolated individual, and should be considered as a link to the neighborhood. Therefore, the new campus should be open so that it can contribute to the public. For example, remove physical boundaries, return boundary spaces to the city, and enhance the walking experience of the streets.

In the Meso Scale, the new campus could promote a positive dialogue between people and architecture. The campus space itself has social attributes and should be considered as a bridge connecting students to the community. Therefore, the new campus should be shared with the public so that the role of the campus in the community can be activated. Public facilities can make a difference, such as the stadium, library and cafeteria.

In the Micro Scale, the new campus could value positive dialogue between people. Students spend one of the most important stages of their lives on campus, and campuses hold many wonderful memories about their student years. Therefore, the new campus could be a place where students are motivated to actively interact, generate ideas and build friendships. For example, expand informal educational spaces and create spaces for positive activities, etc.





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