

孩子们的自然博物馆

——成都麓湖生态城云朵乐园

A NATURAL MUSEUM FOR CHILDREN: CLOUD PARADISE IN LUXELAKES ECO-CITY, CHENGDU



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1 项目概述

麓湖生态城位于成都市南部，是一处集产业、商业、居住功能为一体的新型城市片区，预计容纳人口30余万，包括常住人口和就业人口。该片区在10多年前还是一片丘陵，开发商在现状地形地貌的基础上筑坝，并引入都江堰的水源，通过生态治理形成了如今珊瑚状的清澈水域。自2014年起，湖水生态系统趋于稳定，水质常年达到国家Ⅱ类水质标准，适宜开展各类水上活动。

云朵乐园是麓湖生态城内介于市政道路与湖面之间的滨水带状绿地，占地约25 000m²，东西长约450m，南北宽约50m，相邻湖面常水位标高462.5m，场地最高处标高500.5m。为保留场地中的原有码头和消防通道，所有改造均在现有驳岸的基础上进行。

2 设计理念

水是地球生态系统中最为重要的元素之一，也是生命存在的根本要素。两千多年

<https://doi.org/10.15302/J-LAF-20170610>

收稿时间 RECEIVED DATE / 2017-10-18

中图分类号 / TU986.2

文献标识码 / B

摘要

云朵乐园位于成都市麓湖生态城——一处集产业、商业、居住功能为一体的新型城市片区。设计旨在为生态城中新入住的居民提供涵盖公园、游乐场等空间的休闲场地，同时引入自然教育功能，以加强人与自然的联系。该项目的一大特色在于设计与建造过程的相辅相成。此外，设计基于儿童的行为特征及发育规律选择多样化的游乐设施，同时鼓励良好亲子关系的建立。

《景观设计学》编辑部就云朵乐园项目对该项目负责人张东和唐子颖进行了采访。两位负责人就主题选择、设计理念、设计与建造的关系，以及景观评论之于设计的影响进行了详细阐释。

关键词

游乐场；互动装置；自然教育；建造；评论

ABSTRACT

The Cloud Paradise is located at the Luxelakes Eco-City, a new urban community in Chengdu that incorporates industrial, commercial, and residential functions. The design team aimed to provide a new park and playground for the neighborhood by creating a natural environment for people to connect with nature. The project is distinct for its efforts to facilitate construction as part of the design process. The recreational facilities at the park were designed in response to children's behavioral characteristics and development, and for the purpose of encouraging better parent-child relationships.

The editorial team of *Landscape Architecture Frontiers* interviewed Dong Zhang and Ziying Tang, designers of the Cloud Paradise to better understand their ideas on issues related to the theme, design concepts, the relationship between design and construction, and the influence of landscape criticism on the design process.

KEY WORDS

Playground; Interactive Facilities; Natural Education; Construction; Criticism

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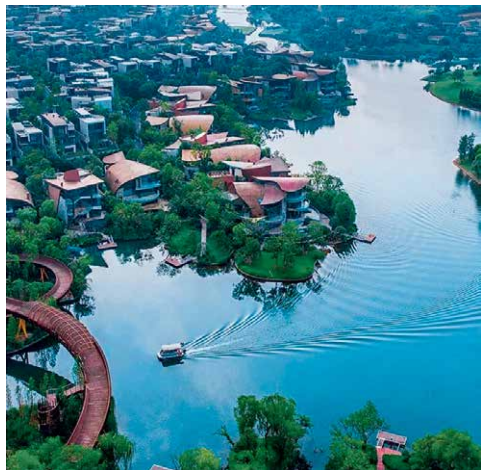
TRANSLATED BY Sara JACOBS Ying WANG Yanfeng HUANG

项目地址:
四川省成都市
项目面积:
2.5hm²
项目委托:
成都万华新城发展股份有限公司
景观设计:
上海张唐景观设计事务所
首席设计师:
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郑佳林、刘洪超、孙川、范炎杰、胡一昊
设计时间:
2016年5月~12月
建成时间:
2017年6月

LOCATION:
Chengdu City, Sichuan Province
AREA (SIZE):
2.5 hm²
CLIENT:
Chengdu Wanhua New Town Development Co., Ltd.
LANDSCAPE ARCHITECTURE:
Z+T Studio
CHIEF DESIGNERS:
Dong Zhang, Ziying Tang
PROJECT LEADER:
Qing Zhang
PROJECT TEAM:
Min Xu, Xiao Zhou, Yang Peng, Qi Xi, Xinjun Gu, Qi Wang,
Shaohao Bian, Jialin Zheng, Hongchao Liu, Chuan Sun,
Yanjie Fan, Yihao Hu
DESIGN PERIOD:
May ~ December, 2016
COMPLETION TIME:
June, 2017

1. 麓湖清澈的珊瑚状水域

1. The coralloid clean water space in Luxelakes



© 麓湖生态城
1

前，著名的水利工程都江堰使得成都成为了水旱从人、沃野千里的天府之国。在历史上，成都人民依水而居，与自然融洽共处。但是随着现代城市的建设，大量河道消失，人与水之间的联系被逐渐割裂，近年来城市中频发的内涝更加深了人们对水的负面印象。

麓湖生态城作为大都市郊区的新建社区，其主体大部分为新入住的居民，公园作为使用频率较高的主要社区公共空间，发挥着促进居民交流、形成和谐邻里关系，以及传播新社区文化的重要作用；同时，公园也是社区居民日常生活中少有的能够接触自然的地方，是重要的环境教育场所。

在了解了人水关系的发展历史及社区现状后，设计团队将场地定位为寓教于乐的儿童乐园——一处露天“自然博物馆”，即以水的各种形态和特征为灵感设计景观空间和节点，让人们更好地了解水之于生活的重要性，重塑人与自然的联系。

3 孩子们的自然博物馆

基于项目定位和场地实际条件，设计团队在公园内沿线性流线布置各个活动节点，将不同的活动功能和环境教育有机地结合在一起，形成一系列独特而有辨识度的景观。

3.1 冰之坚韧

受冰川峡谷形态的启发，设计对场地中原有的一处以挡土墙和树木为主的穿行空间加以调整，形成了由三角不锈钢镜面构成的两面能够反射天光的墙壁。墙壁底部配备有电子感应设备和音响，每当行人经过，感应设备便会触发音响，发出叮叮咚咚的滴水声，宛若峡谷中的回声。

除了冰川峡谷，一座满布“冰凌”（由镜面不锈钢管构成）的拱桥沿湖而立，既保障了湖岸流线的完整性，又满足了通航的需求。桥体内部暗藏LED灯和感应器，每至夜晚，灯光伴随行人的移动而变化。而在日光之下，“冰凌”桥身融入周围的环境中，与桥下湖面的倒影形成二次反射，光影粼粼，相得益彰。

此外，在原有山坡地形的基础上，设计构筑了一处由白色水磨石构筑的滑坡，并在其周边辅以环形走廊、旋转楼梯及沙坑等游乐设施。白皑皑的滑坡如同滑雪场一般，人们不必等到冬日，便可一享滑行的快感。

3.2 云之幻化

穿越冰雪世界之后，湖边小岛上的一朵巨大的“跳跳云”映入眼帘。孩子们可以在这个内部充气的巨大异形蹦床上体验腾云驾雾的感觉。为便于后期维护管理和人数控制，跳跳云被安置于小岛之上，唯有通过一座小桥才可到达。

3.3 水之灵动

以小水滴为灵感，设计师在临湖码头入口处构筑了一处具有雕塑感的“水滴剧场”。该构筑物由不锈钢异形管材加工而成，其内部水滴状坐凳由镜面不锈钢材料制成，底部弹簧基座使坐凳可以弹动，增添了趣味性。

不同于基于水的造型而设计的景观节点，旱喷广场真正让水的灵动触手可及。为消除人们乘兴而来，却由于物业未将喷泉设备打开，以致败兴而归的遗憾，设计在旱喷泉中引入了机械动力装置，当踩踏板时，喷泉喷射而出，孩子们便可在水流间嬉戏玩耍。人与人、人与自然的互动随之产生。

从旱喷泉中喷出的水汇聚在广场中央，沿地形流淌，自然形成一条蜿蜒曲折、可以充分接触体验的溪流，不仅营造了“曲溪流欢”之景，也可将场地用作消防通道。“曲溪流欢”形成的溪流在“山脚下”的平坦处汇集成一个浅水池，孩子们可以安全地进入其中玩耍。池塘中有7个小涌泉，分别对应不同的触控开关，开关集中设置在涌泉旁的大石台上，游玩者可自行控制涌泉的开和关。

为更全面地展现水的形态，项目还定制了以漩涡为灵感的游乐设施，包括爬网、激光阵、滚轴滑梯和树屋等。整个游乐设施取形于麓湖吉祥物“鹿之角”，孩子们在其中玩耍时会产生漩涡般的视觉感受。

湿地亦是不可或缺的水体验场所之一。



- | | | |
|-----------------------------|----------------------------------|-----------------------------------|
| 1 曲溪流欢 The Creek | 6 漩涡爬网 Climbing Ropes | 11 冰凌拱桥 Icicle-like Arched Bridge |
| 2 跳跳云 Cloud-like Trampoline | 7 水滴剧场 Droplet Theater | 12 世界之眼 Public Square |
| 3 旱喷广场 Dry Fountain Square | 8 湿地漫步 Wetland Garden | 13 寻麓咖啡 Café |
| 4 互动涌泉 Wading Pool | 9 巨浪飞渡 Wave-like Bridge | 14 小卖部 Kiosk |
| 5 冰雪滑梯 Snow-like Slides | 10 冰川峡谷 The Glaciers and Canyons | 15 码头 Piers |

0 10 20 50m



2 © 张唐景观

项目在现有水系的基础上增加了一处可以进入的湿地花园，可以近距离观察各种水生植物、蝌蚪、青蛙和鱼等，为人们提供了良好的自然教育机会。

4 设计参与建造

受甲方造价、施工技术难度、后期维护等因素的影响，项目无法按设计意图实施的情况时有发生。为应对这一问题，2014年，张唐景观成立了艺术工作室，该团队由艺术家、设计师、制造商、工程师和承包商共同组成，旨在探索设计师如何能够深度参与建造过程，以主动控制和降低造价、提高设计执行度和建造质量，并在设计和建造初期即

充分考虑后期维护效果。下文将以云朵乐园项目的几个节点为例，阐述其独特设计的实现过程。

4.1 冰川峡谷

“冰川峡谷”节点中的两面墙壁表面覆盖着凹凸的镜面折板，可反射出层层延伸的影像。设计借助参数化设计软件Rhino+Grasshopper建立模型，在墙面内随机布点，并在垂直于墙面的方向上随机设置一定的位移，将这些经位移后得到的点作为镜面折板的凹凸顶点。在三个相邻顶点围合而成的三角形上覆盖一张镜面折板，并依次拼合出墙面的表皮轮廓。同时，可以借助计算机软件自动测算出成本范围内三角折板的最

2. 云朵乐园总平面图
3. 在保留原场地元素的基础上嵌入以水为设计灵感的景观空间和节点

2. Site plan of the Cloud Paradise
3. Space and nodes inspired by various forms and features of water were embedded into the existing site

大边长与高度。

RhinoNest排料插件可通过程序运算自动将编号后的三角折板插空编排到矩形板材上，最大限度地降低了材料损耗，同时也大大提高了建造效率。材料加工环节全部采用激光切割的方式以缩减人工成本。考虑到加工后的成品需要从上海长途运送至成都，长度近17m的整面墙壁被拆分成三段，最后在现场拼接完成。这类互动性的艺术装置不属于传统意义上的雕塑，如果由雕塑设计师主导设计，其报价会远远高于实际所需费用，因而这种由艺术工作室所主导的设计更容易为委托方所接受。

4.2 冰凌拱桥

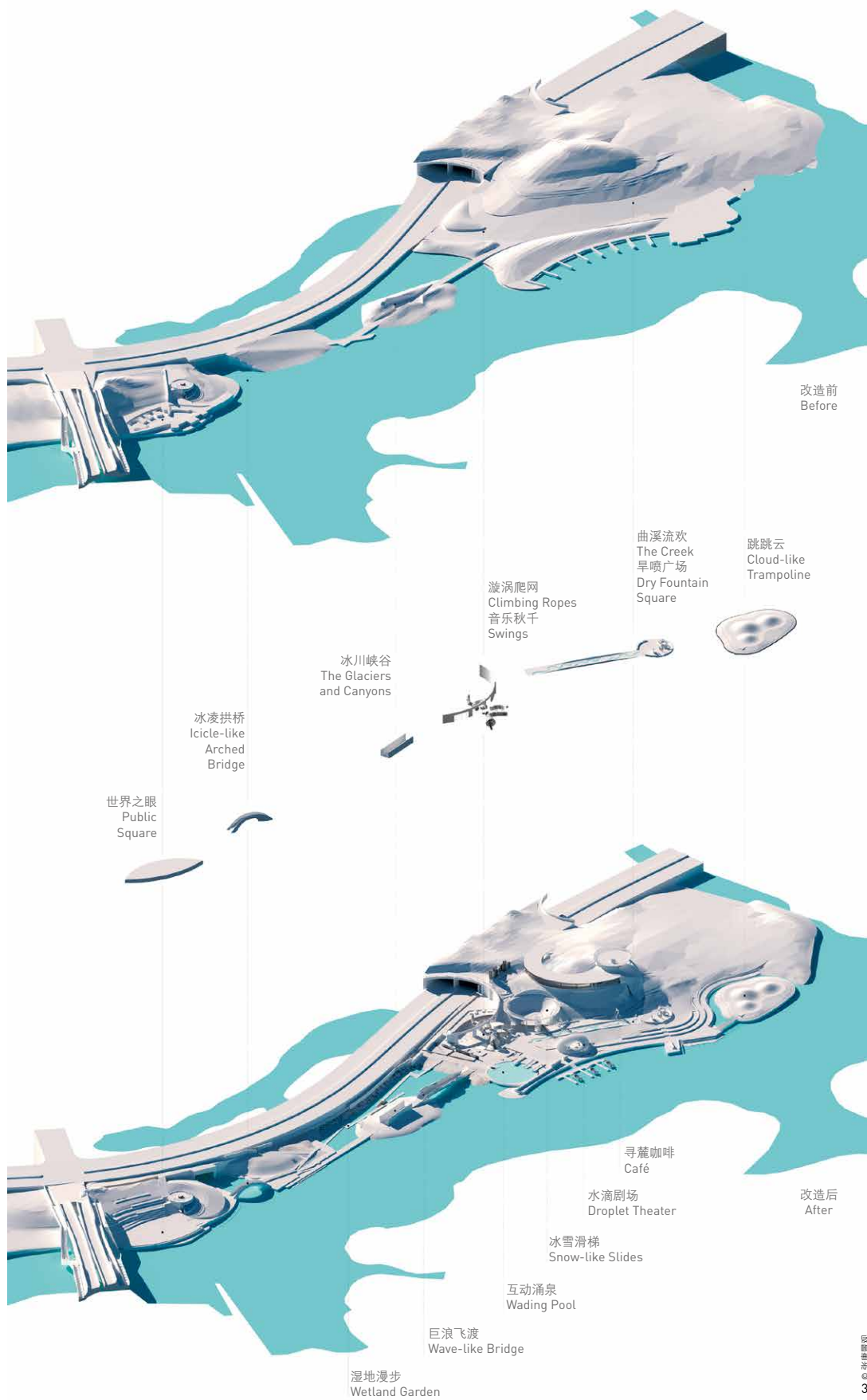
拱桥的设计考虑在传统拱桥的基础上，利用镜面的排列组合增强弯拱的弧度感。设计的首要难点在于如何在结构师提供的主龙骨桁架基础上设计副龙骨。原始的主结构是由多组三角支撑构成的龙骨桁架，难以与设计中所要采用的双曲面表皮紧密贴合，因此需要根据表皮走向设计副龙骨。其次，如何对镜面表皮进行固定也是一大挑战。双曲面的空间造型难以通过简单的平、立、剖面图纸来表达和深化，因而设计团队借助参数化软件设计推敲，并最终确定整体表皮材料的尺寸、数量以及变化趋势，为施工提供参考。尽管不锈钢镜面在自然环境中每隔几年就需要重新进行抛光处理，但相较于实木材料，其维护成本已有所降低。

4.3 曲溪流欢

该处节点在原有消防通道的基础上利用约5%的坡度，将高处旱喷广场上的水汇聚成一条小溪，流入低处戏水池中。设计通过概念草图和CAD平面断面图绘制、计算机模型模拟、1:20实体模型塑造，以及设计师现场指导施工等环节，在重重模拟与确认之后达到了最贴近最初设想的实际效果。

5 使用后评价

在云朵乐园正式开放前，管理方邀请



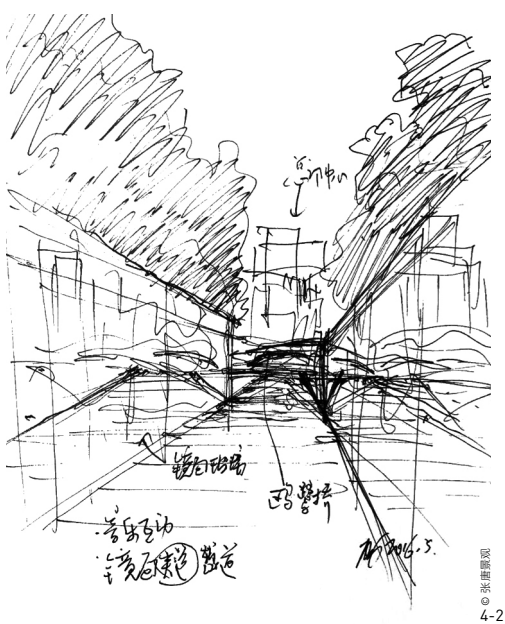


4-1
© 存在建筑

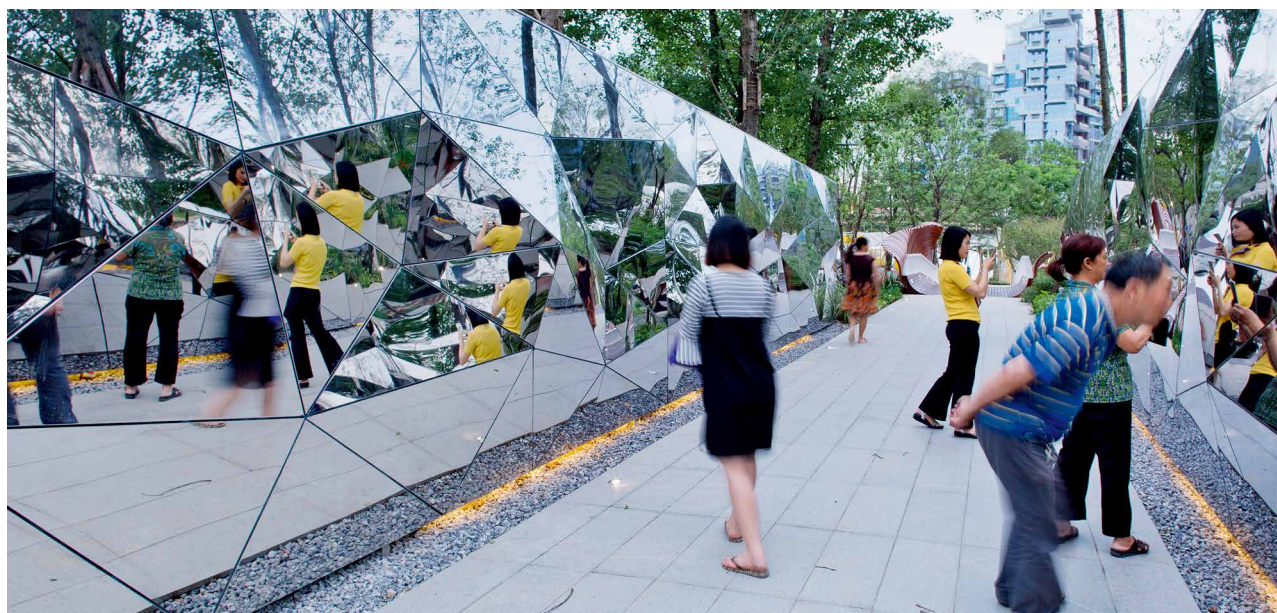
了14个家庭进行体验并征集其评价和建议（表1），以据此做出适当调整。正式开放后，为保障安全，管理方将园区容量控制在2000人/天，且必须通过预约才能进入。通过观察、了解项目的使用情况，设计团队认为其基本达到了设计初期对于该社区儿童乐园的定位，具体可总结为如下三点。

5.1 在玩耍中成长

在儿童成长的过程中，身体的健康发育至关重要，而玩耍对于他们而言则是不断探索和锻炼身体机能的过程。不论是低龄阶段的爬、走，还是逐渐成熟时的跑、跳、滚、攀、转等行为，对于儿童的身体发育都十分有益。云朵乐园中的游乐设施所对应的运动强度适中，且具有趣味性，可起到鼓励儿童运动的作用。其次，与他人的交流、交往也同样重要。在云朵乐园中，排队玩滑梯、合作玩跷跷板、交换荡秋千等活动既可教会孩子们如何与他人交流，又可帮助他们更加深刻地理解分享、合作、交换、妥协，以及帮助他人和自我保护等过程。再者，与自然的接触亦不可或缺。美国作家、记者理查德·洛



4-2
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4-3
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- 4-1. “冰川峡谷”节点。阳光在镜面不锈钢的反射作用下显现出梦幻的效果。
- 4-2. “冰川峡谷”手绘设计草图
- 4-3. 穿过“冰川峡谷”的游人
- 5. “冰凌”拱桥映射出了周围的日光、湖水与植被。

- 4-1. The node of "The Glaciers and Canyons." Mirror walls made of stainless steel reflect the sunlight and the surrounding.
- 4-2. Freehand sketching of the mirror walls imitating the shape of glaciers and canyons
- 4-3. Visitors experiencing the mirror walls
- 5. Railings of the icicle-like arched bridge mirror the surrounding sunlight, lake, and plants.



5-1
© 存在建筑



5-2
© 米海

夫于2005年提出了“自然缺乏症”^[1]概念，即在现代社会中，由于自然环境的缺失、电子产品的盛行和可供玩耍的户外安全场地的缺乏，孩子们在自然中度过的时间越来越少，从而导致了一系列行为和心理学上的问题，如感觉迟钝、对周围事物的观察和欣赏能力减弱、注意力不集中，甚至容易产生抑郁、悲观的情绪等。云朵乐园的设计大多以

自然元素为原形，孩子们通过观察和体验，建立了与自然的情感连接，弥补了传统教育中对智力的片面强调。

5.2 在玩耍中学习

就广义的学习而言，儿童在玩耍中学习到的知识从某种意义上来说比在课堂中学到的知识更直观、更真切，且体会更深刻。看

似无用的玩耍其实在提升儿童的自我认知、感知力、创造力等方面都具有重要意义。在提升自我认知能力方面，云朵乐园中的冰雪滑梯、跳跳云、爬网等设施最初可能会让孩子们产生恐惧的心理，而一旦体验之后，其恐惧心理便会逐渐消失。因此，具有一定挑战性但又能确保安全的游乐项目可使孩子们更加深入地了解自身的潜力。

人的第一直觉来自感官，而非大脑，孩子们的心性一旦被过多的理性信息掩盖，其感受能力就会越来越弱。云朵乐园的场地和设施中运用了不同的材料、声音、色彩、质感和形状等，可帮助孩子们在玩耍过程中锻炼视觉、触觉和听觉等感知能力。除了儿童活动场地，云朵乐园里丰富的自然环境也可完善孩子们感知自然世界的途径。

好奇心是人类创造力的驱动因素，但中国现代教育普遍被认为磨灭了孩子们的创造力，这或许可以归咎于中国文化不太鼓励对未知世界的探索。云朵乐园以自然博物馆为主题，设计放大的水滴、白云、溪流、漩涡等节点，激发了孩子们探索未知世界的好奇心，加深了他们对日常所见事物的了解和学习兴趣。

5.3 鼓励亲子互动

在云朵乐园里，互动自行车、互动涌泉等装置均意在鼓励父母与孩子之间的互动。父母不再被动地站在场地旁进行安全监护，而能够更积极地参与到亲子游乐当中，和孩子一起荡秋千、玩滑梯，或在跳跳云上蹦蹦跳跳，分享孩子的欢乐。

6 结语

地球不需要人类的保护，人类需要保护的是自己。景观设计并非单纯为了恢复生态系统，也并非为了满足人们寻求刺激和消磨时间的需求而营造场所，其核心应在于重塑人与自然的联系。云朵乐园的生态策略、互动设施和环境教育均旨在增进人和水、人和自然的联系。期盼在云朵乐园中长大的孩子，未来会更加懂得如何与自然和谐相处。

云朵乐园项目为什么选择以“自然博物馆”为主题？在景观设计中，主题的选择是必要的吗？

张东（以下简称张）：一个设计可以有双重含意，不同的人也会有不同的解读。我们试图在设计中进行多重叙事，激发多种解读的可能性。

在云朵乐园中，我们主要从三个层面进行考虑。首先，它是具备常规功能的公园，因而包含拱桥、亭台、休憩处等景观元素，以提供不同的景观体验，同时兼顾空间的收放转折等。其次，它是一个服务于周边社区的儿童活动公园，需要配备各种符合儿童行为的游乐设施。最后是文化层面，基于场地背景、对自然的理解以及寓教于乐的观念，我们最终选择以“自然博物馆”为主题，希望它能够发挥自然教育的功能。

云朵乐园首先要完成对湖边零散场地的改造，因而受到诸多限制，包括现状地形、植被和驳岸线。其设计如同填空一般，需要在不同的地块上依据场地的尺度植入适宜的小功能块。我们用主题将这些功能块串连起来，使其成为一个完整的公园。云朵乐园中的儿童游乐设施是基于对儿童行为的理解而专门设计的，满足了儿童的基本行为需求，如蹦、跳、跑、滑、爬等。同时这些设施亦根据主题而进行特殊设计，因而具有独特性和可识别性。

每个设计都会有主题或主要概念。设计师或许可以分为两类，一类偏理性，另一类偏感性。偏理性的设计师所设计的项目通常逻辑非常清晰，且往往基于最能够解决问题的方案。相较于更具说服力的理性设计，感性的设计一般需要辅以主题或故事来突显逻辑或打动他人。设置主题或主要概念的另一个益处在于，在漫长的设计和建造过程中，即使面临多个决策方向，都会有一个明确的依据帮助我们做出选择。以冰雪滑梯（白色水磨石滑梯）为例，最初甲方希望把它做成七彩色或便于后期维护的深色。但当我们阐述了场地主题是模拟自然冰雪滑梯后，他们认同了我们的选择，双方的沟通变得更加顺

畅。艺术作品往往拒绝讲故事，因为艺术家认为激发思考比其本身的故事性更重要。或许这就是设计与艺术的差别所在，设计从根本上而言是为了有效地解决问题。

云朵乐园中的“曲溪”元素也曾被应用于张唐景观的其他庭院或广场项目中，比如苏州樾园庭院，这是否成为了张唐景观的风格？

张：“曲溪”意象在张唐景观的项目中确实出现过几次，但不是一种简单的重复或再造，也不会成为我们的“风格”。正如唐代画家张璪所言，“外师造化，中得心源”。景观设计师总会从个人对自然的经验或经历得到启发来进行设计。比如日本的枯山水受当地自然地理特征中海洋和礁石的影响；哈普林的设计也受到其对于加州席尔拉

山山间溪流研究的影响。然而不论基于何种场地调查或文化背景分析，设计的核心仍然在于设计师自身的价值取向。

“曲溪”在云朵乐园中的出现与我个人的自然经验有关。我小时候在乡下长大，雨后的山路上由于雨水流动，会形成深深浅浅、蜿蜒曲折的小溪流。上学路上，我们便会赤脚在溪流中戏水。这些美好的经历深深根植于我的记忆中，会有意无意地影响我现在的設計。

苏州樾园的建筑设计灵感来源于太湖石，这种石材是由石灰岩在水中或土壤中经过几百万年的冲刷或腐蚀而成。我们在设计庭院中的溪流节点时受此启发，把雨水在几百万年里流经地面，冲刷出蜿蜒曲折的河道这一过程进行提炼。项目建成后，为便于大家理解，工作人员在庭院中附以文字，阐释该设计来源于兰亭雅集的“曲水流觞”典





张颖
7-1

- | | |
|---------------------|--|
| 6. 在“冰雪滑梯”享受滑梯乐趣的游人 | 6. Visitors playing on the snow-like slide |
| 7-1. 在“跳跳云”上玩耍的孩子们 | 7-1. Children jumping on the cloud-like trampoline |
| 7-2. 远看湖边小岛上的“跳跳云” | 7-2. View to the cloud-like trampoline located on a small island |

故。但事实上，樾园中的“曲溪”也是基于对自然的理解，而非为了记录历史故事或形成某种风格。

设计建造一体化是否是未来景观行业的发展方向？

张：对景观设计师而言，设计的终点是项目的建成。图纸是实现这一目标的手段之一，因而在设计绘图时需要确保图纸的可实施性，尤其是施工图。以石材小品为例，唯有深入了解石材材料特性、制作工艺、安装技术和后期维护要求，才能制作合理、可实现的施工图。设计建造一体化实际上是一个深度设计的过程，其目的是保证设计的最终呈现与最初设想之间的延续性。这同样是一个学习的过程，会加深我们对材料和工艺的了解，继而可能反向影响设计概念的提出。不过，我并不认为设计建造一体化将成为行

业发展的方向。大多数景观设计会采用常规和经得住时间考验的材料和建造方式，并不需要设计建造一体化。相反，行业的进一步分工才是需要重点关注的发展方向，甚至施工本身也会进一步细分成各种专业类别。

在您看来，使用者或他人的评论是否对项目的改进有所裨益？

张：评论或多或少会促进我们对某些东西的深度思考。我很喜欢的日本作家村上春树曾说，每当别人对他的文章提出建议时，他心里都会勃然大怒，但过后又会反思——既然他人提出建议，就说明自己的写作有需要调整之处。但这种调整并不一定遵从他人的建议，有时候甚至可能恰恰相反。我对于别人的建议经常有类似的感觉。

唐子颖（以下简称唐）：不久前我写过



张颖
7-2

一篇有关玖著里项目的文章，写作的起因是一位朋友的留言式评论：张唐景观的项目为什么这么受欢迎，可能是迎合了中国新兴中产阶级的审美品位。我觉得这是很有意思的一个说法，从而引发了自己对这个项目的反思。

评论 (criticism) 和评价 (judgement) 在概念上是有区别的，西方文化不推崇评判 (judge) 他人，而在我们的文化中，这两个概念时常会被混淆，对于批判性思考的重视程度也远远不够。如何辩证地评论一个事物，而不夹带任何主观的评判色彩，不议论事物的好坏，这在我们的教育中是缺失的。在我看来，具有启发性的评论一般来源于非同行，这是非常值得期待的一种文化与氛围。对于一线设计师而言，如果缺少了这种氛围，一味地阐述自我，便失去了评论最本质的互动性。

詹姆斯·科纳曾写过一篇文章《亨特的流连之所：高线公园设计之历史、认知和评论观》^[2]，使我深受启发。文中记录了景观历史学家约翰·迪克森·亨特与科纳就高线公园所进行的讨论。亨特曾表示，为什么景观设计始终上升不到艺术的层面？纵观世界范围内的景观设计，真正能够引发人联想的作品少之又少。而为什么文学作品能够激发人的思考？因为文字没有限定的形式来束缚人的想象。为此，亨特提出了三点建议：其一，设计应不受限于形式，以激发人的联想；其二，设计者需引导受众体会设计的意图和方向；其三，持续性——在景观中自然增长的体验及含意是否可以经得住时间的考验。这种从艺术、文化、历史等其他视角引发的思考对于景观设计而言是非常有益的，能够促进景观行业的反思。真正提笔做设计的人之间反而很少会出现这样的评论，一方面大家彼此理解设计过程中的艰难，往往会因为共同感受而惺惺相惜，另一方面学科的相似性也会带来局限，阻碍启发性的观点产生。

评论应该被归入理论研究的范畴。当前国内的教育在景观评论方面尚待进一步发展。在美国，有一种类似于讨论课 (seminar)

的课程，大家会就某本书或者阅读材料进行讨论并在课程一开始设置讨论规则，例如不使用攻击性语言、在限定的时间内进行阐述等。从这层意义上讲，学生可从课程中学习客观、理性的评论方法。其次，这种课程亦能培养学生更广阔、客观的视角，从而引导学生从社会、文化、经济等多方面看待问题。

您有意愿成为景观行业中的专业评论者吗？

唐：不会。与设计一样，进行专业评论也需要极大的专注，需要深入了解设计、设计师、项目的甲方、场地背景等，同时进行有广度的社会性思考，唯有在景观行业中扎根较深，且充分了解行业大环境，才能辩证地进行评论。这是另一个专业。我只是设计师，并且始终觉得做设计更有趣。LAF

8. 水滴形状的户外剧场和内部的小水滴坐凳
9. 踩踏互动自行车就可以开启旱喷
8. The Droplet Theater and drop-like stools inspired by the shape of water droplets
9. People-powered stationary bicycles causing water to spout from the fountain



1 Background

Luxelakes Eco-City is a new urban community located in south Chengdu City. It has incorporated industrial, commercial, and residential functions to accommodate more than 300,000 residents, including permanent residents and an additional working population. With the efforts of constructing revetments along the original site with hilly landscape, diverting water from the Dujiangyan irrigation system, and ecological management for over a decade, a coralloid clean water space was created. Since 2014, a diversity of public activities has been provided due to the stabilizing aquatic ecosystems and high water quality.

Cloud Paradise is located along the linear green riverfront of Luxelakes Eco-City, and covers an area of 25,000 square meters. It is 450 meters in length from east to west and 50 meters in width from north to south. The highest elevation of the site is 500.5 meters, compared to the ordinary water level of 462.5 meters. To preserve the existing piers and fire lane, Cloud Paradise's design was organized around the existing revetments.

2 Design Concept

Water is the fundamental and most significant element for living organisms in the ecosystem. People living on the Chengdu Plain have benefited from the Dujiangyan irrigation system in the past because the system helps reduce flooding and drought emergencies, provides fertile land for a better living, and establishes a harmonious human-nature relationship. However, as water courses disappear due to rapid urban construction, people are increasingly separated from water. This separation has led to more negative impression of urban water.

Most of the residents are new to the Luxelakes Eco-City area, and therefore public space is necessary not only to foster neighborhood relationship, but also to provide opportunities for people to enjoy living with nature and to have access to environmental education.

Thus, a playground with the theme of "natural museum" was developed to respond to the needs of residents and the history of the site. The playground included space and nodes which were inspired by various forms and features of water, with the aim to connect and reestablish the relationship between human, water, and nature.

3 A Natural Museum for Children

A series of distinct landscape nodes were created along the linear lakefront to support a variety of activities and educational opportunities based on the proposed project theme and the site condition.

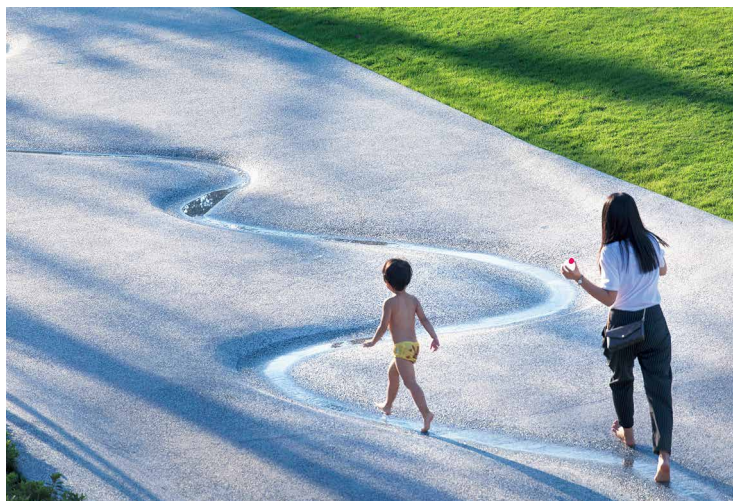
3.1 Ice-like Structures

Two mirror walls inspired by the shape of glaciers and canyons and made of triangular stainless steel were arranged along the original revetments path. Electronic sensing devices and loudspeakers were equipped at the bottom of the walls. Recordings of dripping water are played through loudspeakers to create a feeling of exploring along the canyons.

An arched bridge along the lake was designed with icicle-like stainless steel railings, providing space for boats to pass through. The railings integrate the river location through LED lights and sensors installed inside the tubes which create changes in light and shadow when pedestrians pass by the bridge in the evening. In daylight, the railings mirror the surrounding sunlight, lake, and plants.

A ramp for sliding was constructed





© 存在建筑
10-2



© 陈海
10-3

in white terrazzo to merge with the already hilly topography. It is situated next to other playful features such as round corridors, spiral staircases, and a sand pit. The snow-like slide references a ski field and allows residents to enjoy the pleasure of snow.

3.2 Cloud-like Trampoline

After passing through references to ice and snow, a cloud-like trampoline comes into view. The trampoline is only accessible by crossing a bridge, and its location ensures proper maintenance and safety.

3.3 Facilities Imitating Various Types of Water

Inspired by the shape of water droplets, a small “Droplet Theater” is located near the pier. The theater is made of stainless-steel special-shaped pipes and interesting drop-like stools with springs installed under them.

Similarly, the Dry Fountain Square seeks to make water accessible and educational for the residents. People-powered stationary bicycles cause water to spout from the fountain, providing an opportunity for people to interact with each other and with nature.

Water from the dry fountain travels to the center of the square where it creates a series of flowing creeks that ravel to a shallow children’s wading pool. Seven small spouts in the pool allow children to play with and control the flow of water.

Climbing ropes, slides, and a tree house in a whirlpool pattern populate the playground with other opportunities for play and water education. The whole shape of these facilities was inspired by the horn of deer, with the aim to create a whirlpool-like visual sensation for children.

The wetland is also an indispensable



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- 10-1. “曲溪流欢” 手绘设计草图
- 10-2. 在“曲溪流欢” 踩水玩耍的游人
- 10-3. 在浅水池中戏水的孩子们
- 11. “鹿角” 大型互动游乐设施
- 12. 具有教育功能的湿地花园

- 10-1. Freehand sketching of the Creek node
- 10-2. Visitors playing with the Creek
- 10-3. Children playing in the wading pool
- 11. Interactive recreational facilities with its shape inspired by the horn of deer
- 12. The educational wetland garden

place for residents to connect with water. Constructed on an existing water system, the accessible wetland garden has become habitat for a variety of aquatic plants and animals. Visitors can observe tadpoles, frogs and fish, providing another opportunity for natural education.

4 Integrated Design and Construction

Due to limited budgets, complex construction techniques and difficulties in maintenance, the construction process might be inconsistent with the original design plans. In response to this issue, Z+T Studio founded the Art Workshop in 2014 to explore the possibility of designers participating in the construction process. The team of artists, designers, manufacturers, engineers and

contractors works to control and reduce costs, improve construction quality in accordance with design plans, and consider maintenance requirements in advance. The specific implementation processes employed by Z+T Studio will be elaborated through Cloud Paradise examples.

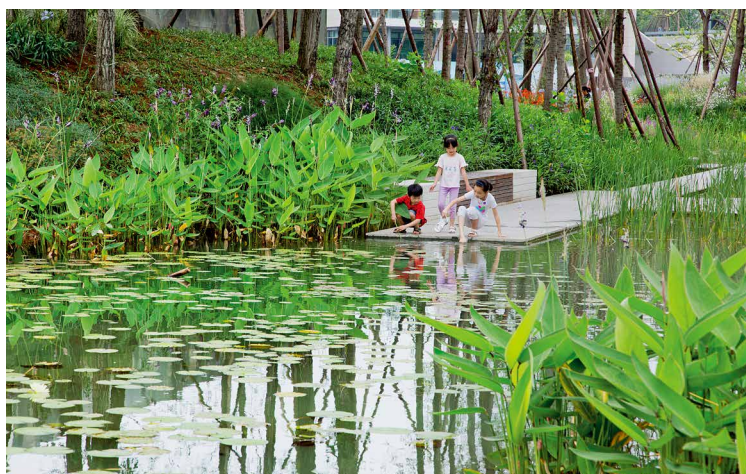
4.1 The Glaciers and Canyons

The two walls in the shape of glaciers and canyons were covered with concave-convex mirror plates to form continuous reflecting images. With the assistance of Rhino and Grasshopper modeling programs, the three vertexes of the triangular mirror plates were set at random, two fixed on the wall and one fixed above the wall. The mirrored plates, whose maximum length and height were calculated by computer software, could be precisely located to save costs.

The construction of the mirror walls helped to save costs and increase efficiency by using software such as RhinoNest to minimize material waste, and utilized laser cutting to reduce hand operations. To protect the walls from being broken in transit, each of the whole mirror walls was divided into three sections. The design and construction of the Art Workshop installation avoided sculpture designer to further reduce the estimated cost.

4.2 The Arched Bridge

To better represent the curved arch of the bridge, a mirrored surface was applied to the basic structure of the conventional arched bridge. The design and construction teams overcame two major difficulties. First, furring channels that were necessary to be designed based on the main channels were provided by structure engineers so that the main structure of multiple triangular supports could fit over the double-curved surface



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of the bridge. Second, parametric software developed elevation and section drawings to explore how the double curved design could optimize the size, number, and variation of the mirror materials. Although the stainless-steel mirror surface requires periodic polishing, its maintenance costs are less than if wood materials had been used.

4.3 The Creek

Utilizing the existing fire lane slope of five percent, a path was created for water from the Dry Fountain Plaza to converge into a wading pool. Experiments and modelling, supported by conceptual sketches, computer-aided plans and sections, computer models, entity models (1:20), and cooperation between the designers and the constructor helped the design plan to be constructed.

5 Post-occupancy Evaluation

The Cloud Paradise opened to fourteen families prior to its public opening. Their

comments and feedback were collected (Table 1), and appropriate adjustments to the design and construction were made. When the Cloud Paradise officially opened, it welcomed 2,000 visitors per day by appointment only. Based on post-occupancy evaluation, the Cloud Paradise has been successful in its role as a natural museum for children, which could be summarized by three achievements.

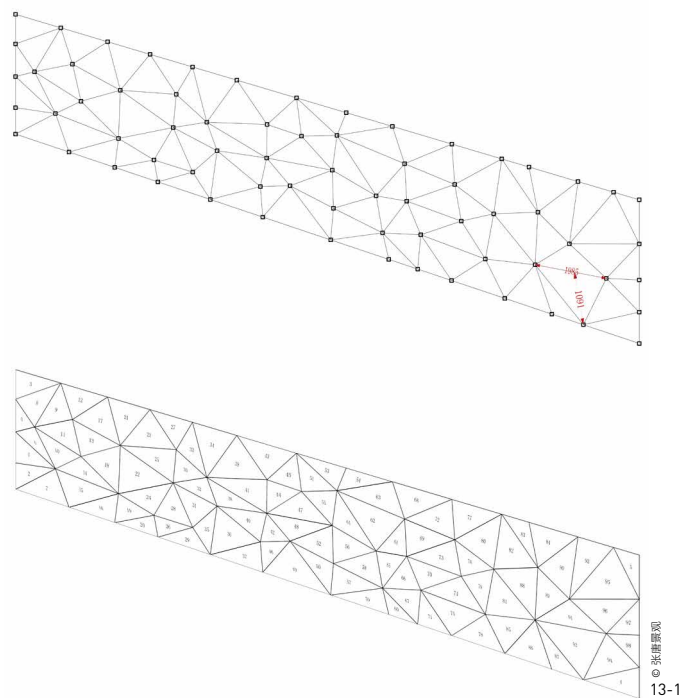
5.1 Growing up with Play

Healthy development is crucial to children. During this time they explore the world through play. Crawling and walking, running, jumping, rolling, and climbing are all conducive to their physical development. The facilities at the Cloud Paradise are moderate and attractive for these activities. Second, interaction with others is also important to children. Activities such as waiting in line for the slide, sharing the seesaw, taking turns on the swings,

enhance children's social competence and help them better understand sharing, cooperation, exchange, and compromise. Third, the opportunity to be connected to nature is also critical for children. Nature-deficit disorder^[1] is cited by Richard Louv, an American author and journalist, as leading to problems of insensitivity, attention deficit and depression when children are kept indoors on electronic devices. The shortage of natural and safe playgrounds may exacerbate these problems. The design of the Cloud Paradise intends to provide an opportunity for children to connect with the natural world.

5.2 Learning through Play

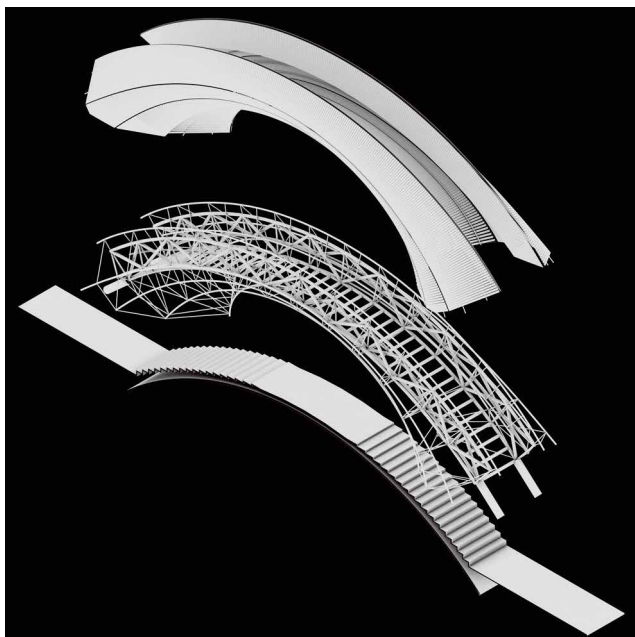
Skills learnt through play can be more intuitive, vivid, and profound than that learned in the classroom. Play promotes a child's capacity for self-awareness and creativity. Often, a child's fear on the playground of specific



13-1



13-2



14-1



14-2

- 13-1. “冰川峡谷”节点中三角折板的设计过程
- 13-2. 三角折板的制作过程
- 14-1. “冰凌”拱桥结构分析示意图
- 14-2. “冰凌”拱桥施工中
- 15. “曲溪流欢”实体模型推敲

- 13-1. The design process of the triangular mirror plates for the Glaciers and Canyons node
- 13-2. Fabrication of the triangular mirror plates
- 14-1. Structural diagrams of the icicle-like arched bridge
- 14-2. The icicle-like arched bridge under construction
- 15. Modelling of the Creek node

spaces, such as the slide, trampoline, or climbing ropes, will vanish once they feel safe. Self-awareness on the playground could be enhanced with more challenging but safe activities.

Human instinct as to what is fun or playful is often weakened when there is a flood of excessive rational information. The materials, sounds, colors, textures and shapes used at the Cloud Paradise site are meant to facilitate visual, tactile and auditory development. The rich natural environment also provides children with a greater appreciation for the natural world.

Curiosity drives creativity. China's modern education system has been criticized for killing creativity, in part because the conventional culture discourages children to explore the unknown. Alternatively, the Cloud Paradise, with its natural museum and water droplets, clouds, creeks, and whirlpool spaces, helps children to explore more than human world and to

better understand everyday life.

5.3 Parent-Child Interaction

Interactive bicycles, fountains and other facilities at the Cloud Paradise were designed to encourage parent-child interaction. The parents, instead of playing the role of guardians, can actively participate in games and play with their children.

6 Conclusion

The purpose of landscape design is not simply to restore an ecosystem, or to create a place only for enjoyment. Landscape design should be aimed at reestablishing the relationship between human and nature. Thus, ecological strategies, interactive facilities and environmental education strategies were applied in the Cloud Paradise design to enhance human-nature relationships. We wish for a better future for the children playing and enjoying the Cloud Paradise.



15

Why is the Cloud Paradise conceived as a Natural Museum? Is this necessary in landscape design?

Dong ZHANG (ZHANG hereafter):

There are always a thousand ways to view a project. In every design we do our best to provide a variety of interpretations for visitors.

The design of the Cloud Paradise is centered on three core functions. Its primary function is as a public park that includes an arched bridge, pavilions, and seating. Second, it is a recreational facility for children and a playground for neighborhood residents. The final theme is its cultural function. The natural museum concept emphasizes the location, experiences in nature, education through play, and outdoor education.

In response to restrictions because of existing topography, plants, and revetments, the design of Cloud Paradise aimed to transform the fragmented site into an integrated park. The different pieces were essential to fulfilling this approach. In addition, recognizable recreational facilities were specially designed not only to provide opportunities for children to jump, run, slide, and crawl, but also to highlight its function as a natural museum.

I think that design work should be conducted with a driving concept or a big idea. Designers can be easily influenced by both rationality and sensibility. Projects designed by rationally-driven designers usually have a problem-oriented solution stemming from a clear logic. Concepts help ground sensibility-driven designs, making them more logical and impressive, and help with decision making during the design and construction process. In the Cloud Paradise project, for example, the theme of a natural museum helped

our negotiations with the client to select colors for the slides. Landscape design focuses on solving problems and telling stories, making design concepts effective for guiding solutions.

The creek at the Cloud Paradise project has also been used as part of other courtyard and square projects by Z+T Studio. The Yue-yuan Courtyard in Suzhou is one example. Has this become the design style of Z+T Studio?

ZHANG: Although the creek does appear in some of the landscape projects of Z+T Studio, it is not being repeated, and it is not intended to become our style. The core of design is inspiration from nature. Zao Zhang, a painter in the Tang Dynasty believed in this, and it is the same in landscape architecture. Japanese rock gardens imitate oceans and reefs, the landscape designer Lawrence Halprin was influenced by the mountain streams of the Cascades. Regardless of site investigation, the core of design ultimately lies in the designer's own values.

The landscape nodes of the Creek designed by Z+T Studio may stem from my own experiences with nature. I lived in the country as a child. There were winding streams of water running down the mountain paths. This became our playground on the way to school. These childhood experiences of play in nature continue to inspire my approach to landscape design.

The Yueyuan Courtyard project was inspired by the architecture designed with Taihu Lake stone, a unique limestone that has been shaped by millions of years of erosion. The courtyard's creek water was created to demonstrate how the natural processes of a river carve away the landscape over millions of years. Although the

water feature is introduced with the famous gathering of Chinese literati at the Orchid Pavilion (353 CE) for visitors' better understanding, the creek at the Yueyuan Courtyard was meant to duplicate nature rather than record a historical event or generate certain design style.

Do you think the design and construction processes are to be integrated in the landscape industry?

ZHANG: The goal of many landscape designs is to have a completed, built project. Designs should be implementable from construction drawings, but often the material choices complicate this interpretation. For example, when creating a stone landscape, we can only understand the properties of the materials after fabrication and installation trials, and after post-maintenance requirements are clarified. Then, we need to go back and update the construction drawings accordingly. The integration of design and construction will probably not become standard in landscape architecture. Although it helps us understand different materials and promote design concepts, and helps with more effective detailing, it will not become a trend. One reason is the preference of ordinary materials and way of construction applied in most projects. Thus, specialization, on the contrary, will be better received, especially in the construction process.

Do you think criticism is beneficial to improving landscape design?

ZHANG: Criticism encourages us to think deeply about our designs. It is said that Haruki Murakami, one of my favorite Japanese writers, would be angry whenever someone made a

16. 游乐设施体验反馈雷达图

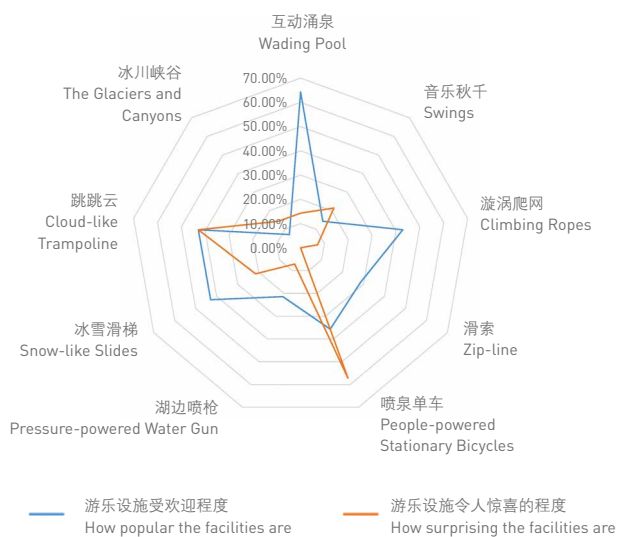
16. Radar chart indicating users' feedback of different recreational facilities

表1: 云朵乐园意见反馈
Table 1: Feedback by Visitors to the Cloud Paradise

建议 Questions	细项 Options	百分比 Percentages
建议体验时长 How long would you prefer to stay there?	2小时以内 Within 2 hours	35.17%
	2-4小时 2-4 hours	64.29%
	4小时以上 Over 4 hours	0
	安全提示 Safety sign	78.57%
	卫生间指引 Toilet sign	28.57%
建议改善之处 Which aspects can be improved?	环境音乐 Ambient music	14.29%
	设施说明 Facility instruction	78.57%
	互动涌泉 Wading pool	28.57%
	音乐秋千 Swings	14.29%
	漩涡爬网 Climbing ropes	14.29%
待加强安全提示的设施 Which facilities are to be improved to keep safer?	滑索 Zip-line	7.14%
	喷泉单车 People-powered stationary bicycles	21.43%
	冰雪滑梯 Snow-like slides	71.43%
	跳跳云 Cloud-like trampoline	42.86%
	冰川峡谷 The glaciers and canyons	0
	手机充电服务 Mobile phone charging service	21.43%
	停车场 Parking lot	7.14%
	餐饮服务 Food store and restaurant	21.43%
	烘干吹风 Clothes dryer	35.71%
	卫生服务点 Health center	14.29%

注: 云朵乐园于2017年6月25日进行首批内测活动, 共14组家庭接受回访调查。

Note: The Cloud Paradise opened to 14 families on June 25, 2017 prior to its public opening. Their feedback is shown in the table.



suggestion to his article. Afterwards, he would find it useful, even if he did not agree with the suggestion. I often feel the same way about receiving advice from others.

Ziying TANG (TANG hereafter):

I wrote an article on our Jiuzhuli Courtyard project in response to a friend's inquiry into why Z+T Studio's projects are so popular. He stated that our designs catered to the aesthetic tastes of the emerging middle class. This was interesting to me, and encouraged me to reflect more on this topic.

In Chinese, the similarities between criticism and judgement mean that we often confuse the two. This leads to a de-emphasis on critical thinking. However, the words criticism and judgement are conceptually different. Judgement is less encouraged in the western culture. It is necessary to learn how to criticize an object, rather than judging it to be good or bad. From my perspective, the inspiring criticism usually comes from non-peers. Without this kind of criticism, designers are less able to get feedback from others.

I was deeply inspired by Hunt's *Haunts: History, Reception, and Criticism on the Design of the High Line*, an essay written by James Corner about conversations with John Dixon Hunt on the High Line. From Hunt's point, gardens or places can become landscape only when they are inspiring and elusive, which is a fundamental of all art^[2]. Hunt elaborates on this idea in three ways. First, the specificity of site, which encourages a historical reading prior to design; second, room for interpretation; and third, the long duration — how the experience and meaning of the landscape can last for a long time. This type of critical thinking, from art, culture and history,

and landscape, benefits all of landscape design. Criticism is seldom made between landscape architects and their peers. The similarities in thinking might hinder criticism.

Criticism is part of theoretical research. However, education in landscape criticism could be further developed in China. In the U.S., there are seminars offered in landscape criticism which require students to do research and discuss reading materials, with rules of order set before discussion, including no offensive statement and a limited time for presentation. In these types of classes, students can not only grasp the core of objective and rational criticism, but also learn to analyze problems from broader social, cultural and economic perspectives.

Are you inclined to become a landscape critic?

TANG: No. Landscape criticism, like the profession of landscape architecture, requires concentrated and in-depth investigation on the project's background, history, design plan, designers, and clients. A comprehensive understanding of the entire field is also necessary to do proper criticism. For me, it is another profession. I am a landscape architect and I will always find it more interesting to do design. **LAF**

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