POLYU JOCKEY CLUB
OPERATION SOInno
理大賽馬會社創「騷‧In‧盧」

ONE FROM HUNDRED THOUSAND
「十萬分一」社創研討會

ACTION PROJECTS
社創行動項目

16

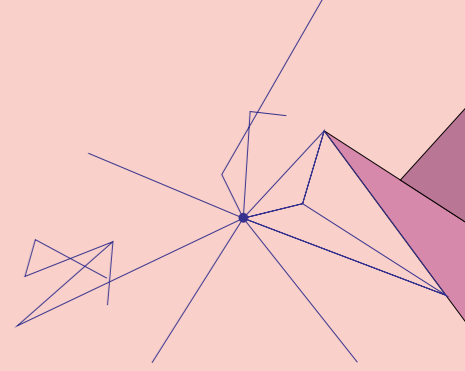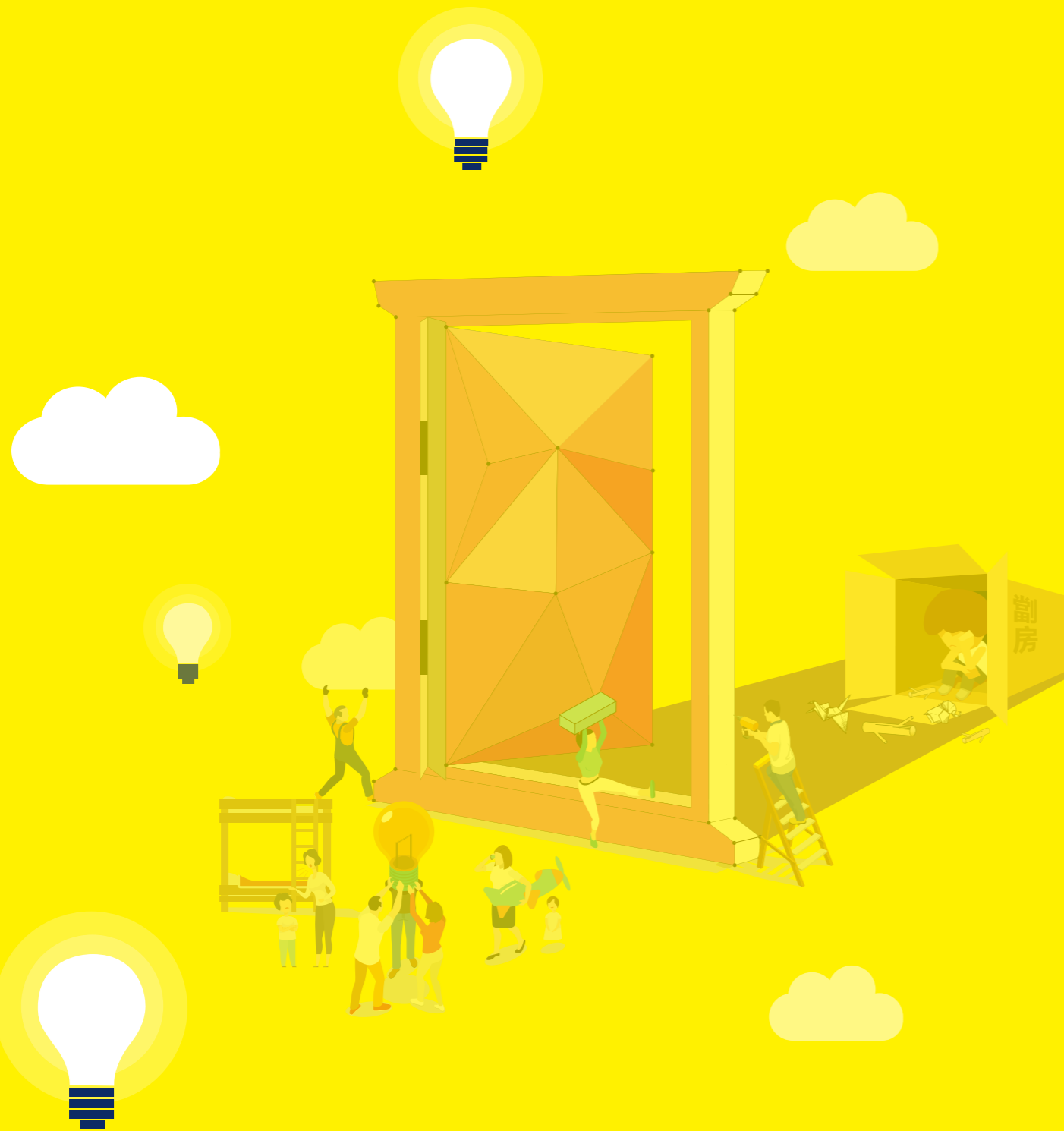# Season 9 : Children's Well-being in Subdivided Units - Summary and Action Project Report
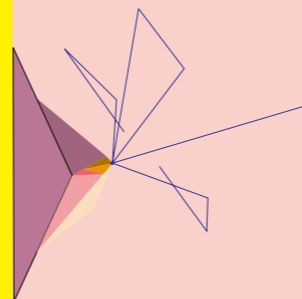
第九季：劏房戶兒童的身心健康 - 總結及行動項目報告

目錄 CONTENT

前言 Foreword

自二零二零年一月，香港理工大學賽馬會社會創新設計院（JCDISI）展開劏房議題的研究，不論是與社區組織進行的訪談邀請，或是共創工作坊和社創研討會的公開招募，均得到社區熱烈反應，反映社會不同人士都非常關注劏房議題和基層生活。

我們把理大賽馬會社創「騷•In•廬」之「十萬分一」社創研討會第九季的主題訂為劏房戶兒童的身心健康。主題方向為如何運用到現有的社會資源，去鞏固劏房戶的支援網絡，令社會服務界別、學術部門和其他專業領域都可以一同合作，期望為下一代的學習環境和身心健康略盡綿力。

本院過去亦有探討本地的房屋和空間問題，我們了解到不適切居所影響住戶的生活質素、生理健康、心理健康和社會流動。加上在老化的建築物中存在的大量劏房本身亦有危險性，如消防安全和石屎剝落；很多高齡樓宇都沒有升降機，對年長的家庭成員而言，出入不便；而室內廁所和廚房的衛生環境都會直接影響其健康。

跟據2021年政府統計處的調查，所有居於分間樓宇單位人士的平均人均居所樓面面積為6.0平方米，當一個家庭共居於劏房，各家庭成員都欠缺私隱空間。

在他們能搬遷至宜居住處之前，一些改善劏房戶環境的策略十分重要。我們都希望透過跨界別和跨學科的知識轉移，令社會上各界熱心人士可以創造更多途徑和方法幫助劏房戶的處境，接觸基層的服務對象和改善其住屋環境。而下一代的身心健康是一個有效的切入點，因為成年人都願意為下一代的福址作出改變，因而更有動機去改善生活質素。

在此，我衷心多謝救世軍、香港明愛、理大應用社會科學學系、生物醫學工程系、康復治療科學系、眼科視光學院、護理學院，以及社區參與中的各持份者和社區組織，為改善劏房問題的硬件及軟件措施提供了很多寶貴意見。

最後多謝第九季的共創團隊和兩大行動項目夥伴—理大設計學院及香港高等教育科技學院產品設計，我希望行動項目設計的適應性家具能在未來作大規模生產，讓劏房戶兒童從中直接受惠，擁有恰當的學習環境。

香港理工大學
賽馬會社會創新設計院總監
實務教授 (規劃)
凌嘉勤　銀紫荊勳賢

二零二二年十一月

The Jockey Club Design Institute for Social Innovation (JCDISI) of the Hong Kong Polytechnic University had been conducting research on the issue of subdivided units (SDUs) since January 2020. Whether it is through invitations to interviews with community organisations or open calls for co-creation workshops and social innovation symposium, there had been an overwhelming response from the community. This reflected that different sectors of the society are very concerned about the issue of subdivided units and low-income groups.

The theme "PolyU Jockey Club "Operation SoInno" Season 9 was how to use existing resources in the society to strengthen the network to support the subdivided units, so that the social service sector, academia and other professionals could work together to enhance the learning environment and physical and mental health of the future generations.

Having researched on local housing and spatial issues in the past, we were aware of the adverse impact of inadequate housing on the quality of life, physical and mental health and social mobility of the residents. In addition, sub-divided units in aging buildings have inherent danger, such as fire hazards and concrete spalling. Those old buildings generally do not have lifts, which is very inconvenient for elderlies living there; and the hygiene conditions of toilets and kitchens in those units can directly affect their health.

According to a survey conducted by the Census and Statistics Department in 2021, the average per capita floor area of accommodation for all persons living in SDUs was 6.0 sqm. That means all family members living in a cramped spatial condition are deprived of privacy at home.

Before they can be relocated to a more livable place, measures to improve the environment of subdivided units are very important. We all hope that through cross-sectoral and cross-disciplinary knowledge transfer, people from different sectors can co-create more ways to help subdivided households, reach out to the low-income groups and improve their home environment. Enhancing the well-being of the future generations would be an effective intervention, as adults are willing to make changes for the well-being of next generation and are more motivated to improve the quality of life.

I would like to thank The Salvation Army, Caritas Hong Kong, PolyU's Department of Applied Social Sciences, Department of Biomedical Engineering, Department of Rehabilitation Sciences, School of Optometry, School of Nursing, as well as stakeholders and community organisations for their valuable input on hardware and software measures to resolve the problems faced by the subdivided households.

Finally, I would like to thank the Season 9 co-creation team and our two Action Project Partners - PolyU School of Design and the Hong Kong Institute of Higher Education and Technology Product Design. I hope that the adaptive furniture pioneered by these action projects can be mass produced in the future, so that children living in sub-divided units can directly benefit from it and have a proper environment for their study.

Ling Kar-kan, SBS
Director, Jockey Club Design Institute for Social Innovation,
Professor of Practice (Planning),
The Hong Kong Polytechnic University

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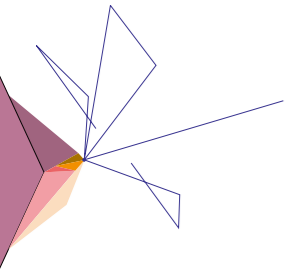
項目團隊 Project Team

李雅筠 空間項目經理　**Ms Karen Lee, Project Manager (I) - Project Lead**
劉妙君 項目協理　**Ms Micki Lau, Project Associate**
陳泳霖 項目助理　**Ms Winky Chan, Project Assistant**

項目流程 Project Timeline

概覽研究｜2020年1 – 5月
Landscape Study | Jan 2020 – May 2020

實地考察｜2020年5 – 7月
Site Visit | May 2020 – July 2020

共創工作坊｜2020年11月
Co-creation Workshop | Nov 2020

社創研討會｜2021年1月
Symposium | Jan 2021

行動項目｜2021年3 – 11月
Action Project | March 2021 – Nov 2021

背景和目標
BACKGROUND & OBJECTIVES

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劏房通常位於城市舊區中心的唐樓。大部分於二戰後的樓宇是為了應付高密度生活而建，容易忽略空氣、陽光及微氣候對住戶身心健康的影響。舊區如油尖旺、深水埗、觀塘和灣仔同樣擁有大多由唐樓改造而成的劏房。近年，新界舊樓的劏房數量也日漸上升。

然而，舊樓設計並非為了設立劏房而建。基於非彈性的間隔，房東往往不會根據窗戶的位置分間每個劏房單位，不少劏房因此而欠缺窗戶。在惡劣的衛生環境及缺乏樓宇管理的情況下，令劏房的住屋環境問題加劇，嚴重影響住戶的身心健康。

香港賽馬會慈善信託基金於2019年9月與賽馬會社會創新設計院(JCDISI)接洽，期望JCDISI以理大賽馬會社創「騷‧In‧廬」平台，聯同學術界、非政府組織、專業團體、社會人士、企業和政府，探索改善劏房住戶健康和福祉的潛在方案，攜手構建創新可行的方案。JCDISI 亦希望透過學術界與社會之間的知識傳播促進社會創新、跨界別合作夥伴關係及能力建設，鞏固社會支援網絡，進一步探索改善劏房戶兒童福祉的可行策略和未來方向。

Subdivided Units (SDU) are usually located in tenement buildings in the old urban core. Most of the post-war buildings were built to support high-density living, less consideration was given to the impact of air ventilation, sunlight, and microclimate on the physical and mental health and well-being of residents. Old districts such as Yau Tsim Mong, Sham Shui Po, Kwun Tong and Wan Chai have the highest concentration of tenement buildings units converted into SDUs. In recent years, the number of SDUs in old buildings in the New Territories has also been on the rise.

However, old buildings were not built for SDU conversions. In light of inflexible layout SDU landlords often do not abide by the Buildings Ordinance to have prescribed windows in each unit. Poor sanitation and the lack of building management further worsens the living environment of SDU tenants and brings negative impact on their physical and mental well-being.

The Hong Kong Jockey Club Charities Trust approached the Jockey Club Design Institute for Social Innovation (JCDISI) in September 2019 and invited JCDISI to utilise the PolyU Jockey Club Operation SoInno platform to start cross-sector deliberations and explore innovative, feasible solutions to improve the health and well-being of SDU tenants. JCDISI is also keen to promote social innovation, cross-sector partnerships and capacity building through academia-community knowledge dissemination, noting that lining up the stakeholders and social support networks

有別於其他社會福利方案，JCDISI「第九季：劏房戶兒童的身心健康 」的定位是為了制定早期介入的社創計劃，以改善兒童健康和福祉，原因如下：

‧ 劏房戶通常更願意投入時間和資源改善下一代福祉，幫助下一代擺脫跨代貧窮問題；

‧ 針對兒童的早期介入方案更有效提高意識，通過鼓勵兒童及其父母作出生活習慣改變，提升他們的生活水平，繼而產生長期影響；

‧ 前線社工察覺工作上較難接觸個別的劏房戶成年人，也許因為成年人較少主動求助和接受社工的幫忙去處理身心健康問題。因此，與整體家庭建立互信關係更能促進長遠的夥伴合作。

will help the community explore feasible strategies and set future directions for improving the well-being of children of SDUs households.

Departing from the general social welfare program model, JCDISI's Season 9: Children's Well-being in Subdivided Units is positioned to explore early intervention solutions through social innovation to improve SDU children's health and well-being. The reasons are as follows:

‧ SDU households tend to be more willing to invest time and resources to improve the well-being of the next generation and relieving them from intergenerational poverty.

‧ Early intervention programs targeting children are more likely to raise awareness and have a long-term impact by inducing behaviour change in children and their parents and improve their live.

‧ Frontline social workers noted that it is difficult to engage adults living in SDUs as they are less likely to seek and accept help from social workers to improve their health and well-being. Longer term partnerships are likely once rapport is established with families.

JCDISI亦期望通過「第九季：劏房戶兒童的身心健康」的主題來探討香港「雙老化」（即人口老化和樓宇老化）問題，為了：

· 改善劏房住戶的生活條件，特別針對這些家庭欠缺基礎設施及社會支援的情況

· 通過共創活動了解劏房戶面對的痛點，並制定「貼地」、可行及可擴展的解決方案，以提升他們的生活水平

· 利用不同學科知識促進跨部門合作，制定參數以評估改造房屋的需求及策略的可採取性，從而改善劏房居民的生活

· 結合理大的應用研究，以建立證據基礎了解劏房戶兒童的健康和福祉，並確認潛在的介入措施

· 承擔理大的社會責任，回饋本地社區

JCDISI also hopes to explore the issue of Hong Kong's Double Ageing, i.e. population ageing and building ageing, through the theme of 'Season 9: Children's Well-being in Subdivided Units so as to:

· Improve the living condition of SDU tenants, in particular when there is little infrastructure and social support for these households

· Understand the pain points of SDU tenants and formulate down-to-earth, feasible and scalable solutions through co-creation activities to improve their living standard

· Utilise multidisciplinary knowledge and trans-sector cooperation to develop parameters for assessing housing renovation needs and strategies that can be adopted to improve the lives of SDU tenants

· Embed PolyU's applied research in developing evidence base for understanding the health and well-being of children living in SDUs and to identify potential interventions

· Undertake PolyU's University Social Responsibility and give back to the local community

不適切居所中住戶面對的痛點
Pain Points of the Inadequately Housed SDU tenants

JCDISI與三間為劏房戶提供服務的非政府組織接觸，包括明愛社區發展服務、救世軍及香港社區組織協會，了解不適切居所中住戶面對的痛點，以及有阻他們改善健康和福祉的難處。社工和社區發展主任指出，有子女的劏房戶最希望有切實可行的方案，來解決他們生活上面對的五大痛點：

1. 空氣不流通

室內空氣不流通會對兒童健康產生重大影響。大廈老化問題，例如石屎剝落、天花板漏水、牆身滲水、甚至污水渠頻頻淤塞以致污水倒流入屋，這些問題均會令室內空氣質素更差，嚴重影響居住環境和住戶的身心健康。過度擁擠的居住環境也會導致通風不足，滋生細菌和真菌菌落；不少生活在劏房的兒童患有哮喘或出現其他呼吸道癥狀，劏房中的濕度和細菌含量偏高也可能引發濕疹。

由於劏房單位通常位於馬路旁邊或商店之上，社工指出劏房住戶即使家中有窗戶也未必會打開。較低層的住戶反映他們擔心有害蟲，尤其是老鼠，從窗戶進入他們的單位。垃圾或污水積聚在簷篷上或附近的室外區域，這些惡劣的衛生環境會使劏房室內空氣質素問題惡化。劏房戶可能更不願意打開窗戶，以隔絕商店或餐廳傳出的氣味，汽車排出的廢氣，及單位外的害蟲。這樣不但有礙通風，空氣污染物亦會被困於室內。

JCDISI approached three NGOs providing services to SDU families, namely, Caritas, The Salvation Army and Society for Community Organisation, to understand the pain points of SDU tenants living in a confined space and barriers to improving their health and wellbeing. Frontline social workers and community development officers noted that SDU tenants with children would most appreciate practical, feasible solutions to address five major pain points they face:

1. Poor Air Circulation

Poor air circulation can have a major impact on a child's health. Ageing buildings problems, such as spalling, water leak from ceiling, water seepage and frequent sewer blocks leading to backflow of sewage into the buildings, etc. will aggravate indoor air quality, which has a significant impact on the living environment and the physical and mental health and well-being of residents. Overcrowded living conditions can also restrict air circulation, which in turn, promotes the growth of bacterial and fungal colonies. Children living in SDUs are often reported to suffer from asthma and other respiratory symptoms, high humidity and high bacterial counts in SDU can also trigger eczema.

As SDUs are usually located next to roads or above shops social workers pointed out that tenants may not open windows even if they have one. Tenants living on lower floors have reported concerns about pests, especially rats, entering their units through windows. Poor sanitation, such as accumulation of garbage or sewage on canopies or other nearby outdoor areas, can exacerbate poor indoor air quality problems in SDUs. SDU tenants are more likely to block store or restaurant odors, car exhaust, and pests

室內溫度過高固然有損健康，劏房戶通常需打開大門來促進單位的空氣流通，即使劏房內安裝了空調，這些裝置通常是舊型號，缺乏保養維修、劏房戶亦往往不想花費更換空調隔塵網，這進一步降低空調的效率和調溫功能。由於電費成本很高，即使劏房戶需要開空調也不會使用很長時間。社工指出劏房戶可能會在睡覺前開空調以助入睡，而當孩子睡著了，便會關掉它。因此，劏房戶的睡眠質素欠佳，甚至可能失眠，這個情況在夏季特別嚴重。

2. 缺乏隱私和個人空間

不同年齡層的劏房戶也為缺乏個人空間和隱私的問題感到困擾。擁擠的環境加上不同的生活習慣，甚至鄰居之間和家庭成員都有機會出現衝突。劏房戶需要與多人共用空間，而且缺乏冷靜空間，進一步增加他們的無力感，社工和社區發展主任也反映指出，缺乏個人空間長遠會對家庭和諧做成壓力。父母欠缺隱私亦會為婚姻增添壓力，導致家庭中出現更多爭吵。

對兒童而言，社工指出劏房戶經常安排幼兒與母親一起睡在下層床，而父親則睡在地板上；上層床則通常用於儲物。配偶的關係緊張之餘，母親與孩子同眠的安排是難以持續的，父母亦需要為異性子女作出不同的睡床安排。另一個相似的日常問題是缺乏更衣的空間，當更衣時家人需要離開房間等候，非常不便，異性的家庭成員亦可能會感到尷尬。

out by keeping their window(s) closed. This is not only bad for air circulation, air pollutants will also be trapped indoors.

Poor thermal comfort will also bring adverse health impact on the tenants. SDU households usually have to keep their door open to help the air circulation. Even if the SDUs are equipped with air conditioners, these devices are usually old models and are rarely serviced. SDU households often do not want to invest in replacing the air conditioner filters, which further reduces its efficiency and its ability to keep the room cool. Nonetheless, costly electricity bills also deter SDU households from keeping the air conditioner on for a long time. Social workers pointed out that SDU households may switch on the air conditioner before going to bed to help them sleep, and will switch it off once the children have fallen asleep. Therefore, SDU households often suffer from poor sleep quality and may even suffer from insomnia. This is especially problematic in the summer.

2. Lack of Privacy and Personal Space

Lack of personal space and privacy is an issue that bothers SDU tenants of all ages. Conflicts can arise both between neighbours and within families due to cramped living space and different living habits. A shared space environment and the lack of space for cooling down will increase the sense of helplessness of SDU households. Social workers and community development officers also reflect that the lack of personal space will put pressure on family relationships in the long run. Lack of privacy for couples also tend to increase marital stress and lead to more arguments in the family.

3. 攝取營養

劏房的室內環境不便於烹飪，通風不良可能導致氣味揮之不去，食物預備和儲存空間的限制也可能會引來昆蟲和害蟲。即使父母想準備有營養的飯菜，缺乏烹飪和冷藏空間令家長傾向做簡單便利的飯菜。此外，家長傾向以電飯煲煮食或製作十分速食的飯菜，以節省水和電費成本。正因如此，他們傾向做重複的飯菜，未必吸引孩子進食，兒童也經常購買高鹽和高糖量的速食或零食。社工指出，生活在劏房中的兒童通常體重不足或超重。

4. 洗滌衣服

劏房戶經常抱怨他們沒有空間洗滌衣服。由於重新添置洗衣機的費用昂貴，許多劏房戶會選擇手洗衣服以節省成本。

手洗衣服會產生滴水情況，造成困擾和家居安全問題，如滑倒和觸電。劏房通風不良及濕度偏高的環境也不利於晾乾衣服，容易導致房間及衣服發霉，並產生異味。尤其是夏天時，如果無法定期和徹底洗衣服，可能會積聚細菌，引起皮膚過敏和感染。

洗滌衣服是一個對有孩子的家庭特別難處理的問題。孩子們需要每天穿校服，這使洗滌過程更加困難。近年，投幣式自助洗衣店變得越來越流行。即使在自助洗衣店洗衣服也許更為不便、成本更高、更不衛生，許多劏房戶因不想穿著潮濕的衣服，仍然選用洗衣店洗衣服，以避免濕疹等皮膚問題惡化。雖然自助洗衣店比較能即

In terms of direct impact on children, social workers pointed out that SDU households often arrange for young children to sleep with mothers on the lower level of bunk beds, and fathers on the floor. The upper level of bunk beds are often used for storage. In addition to strained relationship between spouses, co-sleeping arrangements for mothers and children are unsustainable. Parents often need to make alternative sleeping arrangements for children of the opposite sex as well. A similar day-to-day problem is the lack of space for changing. Family members may find it very inconvenient and embarrassing to leave the room to wait in the common areas while others are changing.

3. Food and Nutrition

The indoor environment of a SDU is not conducive to cooking. Poor ventilation can lead to lingering odors, food preparation and storage restrictions can also attract insects and pests. Even if parents want to prepare nutritious meals, the lack of cooking and refrigeration space means they tend to cook simple meals. Parents may also be more inclined tend to cook with the rice cookers or prepare fast meals in order to save water and electricity. Because of this, they tend to cook repetitive meals, which oftentimes are not attractive to children. Children tend to buy fast food or snacks that are high in salt and sugar content. All of these contribute to social workers' observation that children living in SDUs tend to be either underweight or overweight.

4. Doing Laundry

SDU tenants often complain about the lack of space to do laundry. Due to the high one-off cost to purchase a washing machine, many SDU households will choose to do laundry by hand to save cost.

Dripping handwashed laundry can cause distress and

時應對缺乏空間和家裡通風不良等問題。但長遠而言，自助洗衣店洗衣服的費用相對較貴，劏房戶也不會長期使用服務。

5. 缺乏兒童學習和玩耍的適當區域

劏房戶通常無法為兒童提供適當的學習和玩耍空間，相比上述其他問題，兒童更清楚注意到這一點。缺乏兒童學習和玩耍的適當區域不但會對兒童的健康有負面影響，沒有一個特定的學習空間也會影響他們的學習動機。

由於空間狹窄，兒童的學習場所通常被安排在劏房的角落，例如在光線不足的角落或於下層床上。這個安排不僅會使兒童坐勢不良，影響他們的健康成長發展，使潛在脊柱不良發展問題惡化，周邊地方光線不足也會因而引起近視等眼部健康問題。社工也反映指出，不少劏房戶兒童具特殊學習需要，生活環境缺乏空間自如走動，加上自然光和新鮮空氣無法滲透家中，也會對他們的身心健康造成影響。

introduce home safety issues, such as slips and electric shocks. Coupled with poor ventilation, the highly humid SDU environment is not conducive to clothes drying, which can easily lead to mold and odour build up in the room and on the clothes themselves. If clothes are not washed regularly and thoroughly, especially in the summer, bacteria can build up, leading to skin irritations and infections.

Laundry is a particularly tricky problem for SDU households with children. Children need to wear school uniforms every day, which makes washing even more difficult. In recent years, laundromats have become more and more popular. Although doing laundry in a self-service laundromat is inconvenient, more expensive and dirtier than at home, many SDU households still choose to do so because wearing wet clothes may cause and worsen skin problems such as eczema. It would also help address immediate concerns such as lack of space to air laundry and poor ventilation in the unit. In the long run, however, the cost of self-service laundromats is high. SDU households will not use the service for long periods of time.

5. Space for Children to Study and Play

SDU family often struggle to set space aside for children to study and play, children also notice this inadequacy more clearly than the any other problems mentioned above.

Lack of appropriate space for children to study and play will not only negatively impact on children's health, it will also affect their motivation to learn. Due to the crowded environment, children's studying places are usually arranged in sub-optimal areas in SDUs, such as corners with insufficient light or in the lower level of bunk beds. This arrangement will not only worsen children's posture and affect their healthy growth and development, it may also have detrimental impact on children's spine development. Insufficient light in the study area will also cause and or

在劏房般的不適切居所中成長，從長遠來看，兒童不僅容易在身心健康方面產生負面影響，在學業成就、空間認知和未來機會方面也容易受到影響。

通過共創活動，JCDISI旨在以共創方式提出嶄新的解決方案，以「參與式共同設計」、知識轉移和協作方式，來加強劏房戶及社工在改善兒童福祉方面的能力，作為早期介入措施， 改善兒童身心健康。

worsen eye problems such as myopia. Social workers also reported that the number of SDU children with Special Educational Needs is relatively high. In addition to restrictive space for movement and no place to hide from triggers, natural lighting and fresh air cannot easily permeate their living space. This can further exacerbate the environmental stimuli's impact on their physical and mental health and well-being.

Growing up in inadequate housing such as SDUs does not only predispose children to negative long-term impacts on their physical and mental health and well-being, it may also have an impact on their academic achievement and spatial cognition ability and affect their future opportunities when they grow up.

Through participatory co-design activities, JCDISI aims to enhance the ability of SDU households and social workers to address children's well-being issues through participatory co-design, knowledge transfer and collaboration as new solutions and early intervention measures to improve children's physical and mental health well-being.

共創工作坊
CO-CREATION WORKSHOP

共創工作坊
CO-CREATION WORKSHOP
2020年11月21至22日 (21 – 22 Nov 2020)

此項目希望參照馬斯洛需求層次理論，從住戶身心健康基本需要出發，先著力探討住戶的生理需求和安全需求層次問題，並期望以跨界別合作和跨學科知識，循序漸進地為複雜議題中的受眾疏理最常遇到的生活難題。因此，共創工作坊中不同背景的參加者分為五組共創團隊，分別以設計思維手法為每個問題範疇提出新的方案。

第九季共創團隊成員來自17間機構，由環境建築、空間設計、醫療醫護、社區工作、學術等跨學科背景的專業及公眾人士組成。劏房的考察與活動由於新型冠狀病毒疫情關係而特別分開進行。

With reference to Maslow's Hierarchy of Needs theory, the project aims to prioritise the physical and safety needs of the households, starting with their basic physical and mental health needs. It was expected that through cross-sectoral collaboration and interdisciplinary knowledge transfer, the most common problems faced by those in this complex issue could be progressively addressed. As a result, the co-creation workshop was divided into five groups of participants from different backgrounds, each team came up with a new solution for each problem area using a design thinking approach.

The Season 9 co-creation members came from 17 organisations, composed of professionals and members of the public with inter-disciplinary backgrounds in environment, spatial design, healthcare, NGOs and academia. Due to the pandemic situation, site inspection and engagement with SDU tenants were conducted separately through a different process.

工作坊設計
Workshop Design

Discover	Design	Deliver
Understanding ends in insight	Creation ends in ideas	Delivery ends in reality
Empathy / Define	Ideate	Prototype / Test

第一天 Day 1
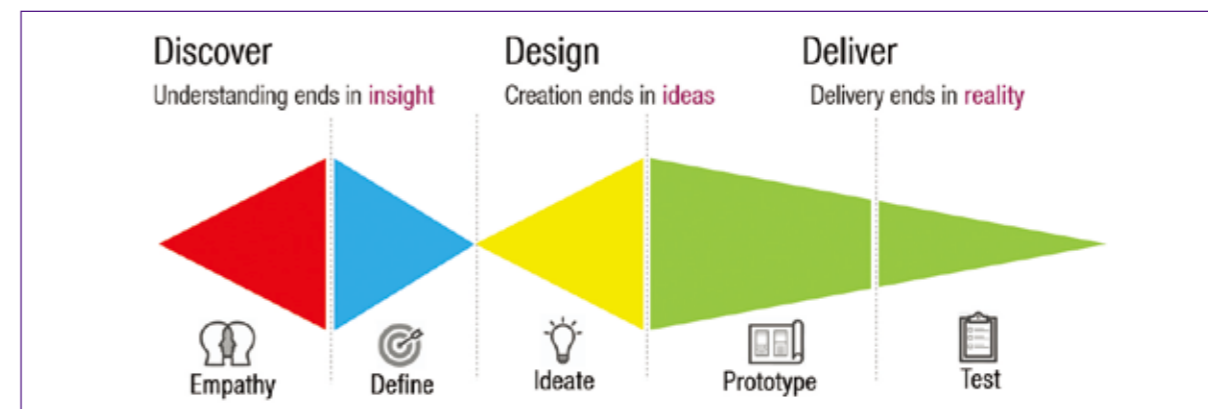
劏房模擬空間
SDU Simulation
工作坊設置了一間模擬劏房，讓參加者體驗於狹窄空間生活的感受，4–5名共創組員需同時在模擬空間內，完成獲分配的日常工作（煮食、晾衣服和溫習）。

A simulation room was set up in the workshop for the participants to get a glimpse of the life in a SDU. Participants in a group of 4-5 were assigned to complete a unique set of daily activities (cooking, clothes-hanging and studying) simultaneously within a simulated space.

同理心練習
Empathy Mapping
嘗試理解與捕捉劏房戶的日常生活、他們的所見所聞、想法與感受。

To identify and understand the daily life of the tenants, what they see, think and feel while living in a SDU.

我們可以如何？
How Might We?
利用「我們可以如何」界定要著手處理的問題焦點，轉化挑戰為機遇。
Using "How Might We" to frame the pain points gathered from the empathy exercise and turn the challenges into opportunities.
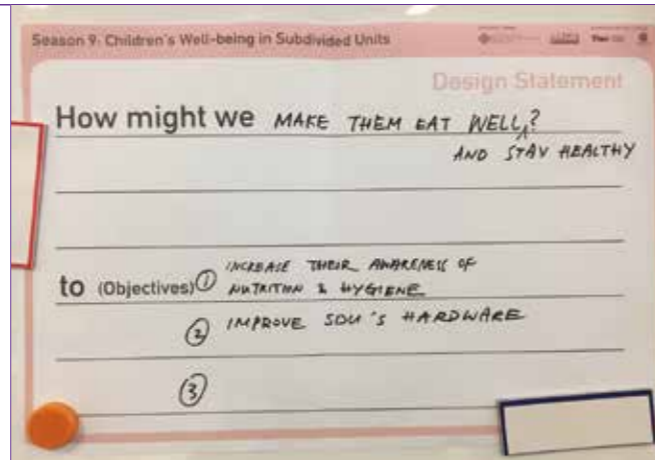
醫護時段
Clinic Session
來自康復治療科學系、設計學院、護理學院以及眼科視光學院等臨床導師及學者，從不同醫護角度指出劏房生活環境如何對兒童的健康與成長產生不利影響。
Healthcare practitioners and scholars from the Department of Rehabilitation Sciences, School of Design, School of Nursing and School of Optometry to highlight how the living environment of SDU can adversely affect the health and development of children.

落手落腳
Draw it Build it
在平面圖上呈現設計概念。
To visualise the proposed home modification strategies in a SDU floor plan.

第二天
Day 2

模型和原型製作
Model and Prototyping
將設計概念呈現於1：10的劏房模型中，測試所提出的家居改造策略。
To test the home modification strategies in the 1:10 model of a SDU.

主題：洗滌衣服
Topic: Laundry

我們可以如何：幫助劏房家庭在沒有私人廁所的情況下在家晾曬衣服？ How might we help SDU families to dry clothes at home without access to a private toilet?

主要受眾 **Key Target**	· 沒有洗衣機或獨立廁所的劏房戶 · 需經常手洗衣服的家庭 · Household that has no access to a washing machine or private toilet · Household that frequently hand-wash clothes
設計目標 **Design Objectives**	· 鼓勵所有家庭成員參與洗衣過程，分擔家務與責任 · 減少曬乾濕透衣物時四處滴水 · 增加洗衣和烘乾衣物的空間 · 加快洗衣與曬乾衣物的流程 · 可負擔的設計成本 · Encourage all members to share housework and responsibility by taking part in the laundry process · Reduce water dripping from drying wet clothes · Create more space for laundry and drying · Speed up the laundry process · Affordable design costs
痛點 **Pain Points**	空間 Spatial · 沒有空間晾曬衣物，衣服四處滴水的情況難以避免，房間發霉情況普遍 · 沒有獨立廁所或洗衣機，需在共用廁所清洗衣物。這降低了劏房戶每天恆常洗衣物的動力 · No space for drying clothes, so dripping water from wet clothes is unavoidable and create a mouldy environment · No seperate toilets or washing machines. This reduces motivation to wash clothes on a daily basis

社會經濟
Socio-economic
· 因手洗衣物對家庭主婦的體力勞動需求較高，一些家庭每週只清洗衣服一至兩次
· 洗衣服是家庭主婦的壓力來源
· 手洗的衣服更有可能產生褶皺，並需要額外的努力和時間來熨平
· 在共用廁所的手洗內衣可能會造成尷尬
· 穿著有皺紋的衣服往往會降低其自尊心
· Some families only wash their clothes once or twice a week because of the relatively high physical effort required by female caretakers to wash clothes by hand
· Laundry is a constant source of stress for the caretakers
· Hand-washed clothes are more likely to be creased and require extra effort and time to be ironed
· Hand washing underwear in shared toilets can cause embarrassment
· Wearing clothes with creases often lowers self-esteem

設計理念
Design Concept

	硬件方法 Hardware approach	生活習慣改變 Behavioural Change
洗衣 Washing	使用簡單的洗衣工具，如便攜式手洗機，以減輕體力負擔，激勵家庭每天清洗衣物，避免將未洗的衣服堆積數天 Use simple laundry gadgets, such as a portable hand-powered washer, to make it less physical-demanding chore, and encourage families to wash clothes every day to avoid piling up unwashed clothes for days.	·養成經常清洗衣服、床單和毛巾的習慣 ·Develop a good habit of washing clothes, bed sheets and towels regularly
乾衣 Drying	·使用特殊設計的衣架（如T型衣架），提供更大的空間乾衣，防止重疊衣服 ·善用垂直空間乾衣。將晾衣繩繫至上格床特定位置，讓空氣有額外的流動空間，並騰出地面位置，避免將濕衣服重疊 ·使用能提供擴展空間的晾衣架，如便攜式樹形晾衣架 ·Use special designed hangers (such as T-shape racks) to provide more space for drying clothes and prevent clothes from overlapping with each other. ·Make good use of vertical spaces to dry clothes. Tie a clothesline to a specific spot on the bunk bed to allow extra airflow, and free up floor spaces for more passageway, and avoid wet clothes from overlapping. ·Use drying rack that offers extended spaces for drying, such as portable tree-shape drying rack.	·在懸掛濕衣物前，先甩乾擰出多餘的水份，有助保持衣物平滑 ·挑選不易起皺的衣服/布料，減少熨燙工作 ·將濕衣服放在空調附近也有助於加強水分蒸發，從而降低室溫 ·保持空氣流通 ·Shake out excess water before hanging wet clothes to prevent wrinkling. ·Choose clothes/fabrics that do not wrinkle easily to minimise the need for ironing. ·Place wet clothes near the air conditioner also helps absorb more water vapours coming out of the wet clothes, thus reducing the room temperature. ·Keep proper ventilation
衣物儲存 Storage	·使用特殊設計的衣架（如T型衣架），提供更大的空間乾衣，防止重疊衣服 ·Use special designed hangers (such as T-shape racks) to provide more space for drying clothes and prevent clothes from overlapping with each other.	養成妥善收納衣物至儲物的習慣，而非堆積至上格床 Develop a good habit of properly storing clothes in the storage instead of stacking them on the upper bunk bed

主題：攝取營養
Topic: Access to Nutrition

<table>
<tr>
<td colspan="2">我們可以如何：提高劏房戶的營養和衛生意識，使他們能建立健康飲食習慣？
How might we improve the nutritional and hygiene awareness of
the SDU family so that they can have a healthy diet?</td>
</tr>
<tr>
<td>主要受眾
Key Target</td>
<td>· 廚廁合一的家庭
· 長時間食用罐裝食品與快餐的家庭
· 缺乏健康飲食習慣的家庭
· Households with combined toilet and kitchen facilities
· Households that consume canned food and fast food for long periods of time
· Families which keep diet</td>
</tr>
<tr>
<td>設計目標
Design Objectives</td>
<td>· 提高劏房戶的營養和衛生意識
· Improve the nutritional and hygiene awareness of SDU tenants</td>
</tr>
<tr>
<td>痛點
Pain Points</td>
<td>空間
Spatial
· 沒有獨立廚房，混合了煮食與洗手間功能的空間容易引致衛生問題
· 洗手間是單位內的唯一供水設施
· 廁板與凳子是唯一準備食物的空間
· 空間有限的烹飪環境，往往使劏房戶在烹飪時選擇只需最少準備工夫的食材或罐頭食品
· 劏房內沒有適當的家具與空間能讓家人一起用餐
· 狹窄的通道使劏房戶容易撞倒家具
· No seperate kitchen. Combing the bathroom and kitchen into a single room may lead to hygiene problems
· Washroom provides the only water supply in the unit
· Toilet lids and stools provide the only space for food preparation
· Limited space for cooking and storing kitchenware often leads to cooking with minimal preparation, or simply relying on canned food.
· No proper furniture and space for family meals
· Narrow passageways make occupants easy to hit the furniture</td>
</tr>
</table>

社會經濟
Socio-economic
· 家庭成員需攝取不同營養
· 習慣了在廁廚合一環境下煮食
· 劏房戶會首選便宜、易於存放的食物，如罐頭，但其營養價值亦相對較低。他們也會因便宜而購買不太新鮮的食材
· Household members require different levels of nutritional intake
· Habituated to cooking in an environment that combines the kitchen with the bathroom
· SDU households prefer cheaper and easier-to-store food such as canned food, but its nutritional value is relatively low. They may also buy leftover food or less fresh ingredients because they are cheaper

設計理念
Design Concept

	硬件方法 Hardware approach	生活習慣改變 Behavioural Change
烹調 Cooking	· 安裝可折疊和可延伸的桌子裝置，鼓勵父母準備更多種類的新鮮食物 · 安裝可拆卸的掛鈎和掛牆架放置廚具 · 以壁掛式櫥櫃取代獨立式櫥櫃，騰出地面空間，提高煮食枱的可移動性、令其便利和整潔 · Install foldable and extendable components on existing tables to encourage parents to prepare a wider variety of fresh meals · Install removable wall hooks and racks for kitchenware · Replace freestanding cabinets with wall-mounted cabinets to free up floor space and enhance moveability, accessibility and tidiness of the cooking station	· 整理及精簡烹飪台，例如：清空檯面，把廚具和食物放置在指定的空間，方便儲存和檢查庫存 · 保持室內空氣流通，保持空氣新鮮，減少烹飪時產生的油煙與氣味 · 養成良好的烹飪習慣，在煮食前先計劃烹調流程，例如：將生肉蔬菜分開，避免交叉污染 · 保持良好的廚房清潔習慣，例如：保持檯面無雜物，烹飪後將廚具和物品放回原處，定期清空垃圾袋以避免發出惡臭 · 避免囤積食物和調味品，在過期前使用和妥善處理 · Organise and streamline the cooking station, e.g. de-clutter the countertop, place kitchenware and food into desginated place for easy storage and inventory checking · Keep the room ventilated to allow air fresh and reduce cooking fumes and odours · Develop a good cooking practice and plan the cooking process in advance, e.g. seperate raw meat and vegetables to avoid cross-contamination · Maintain good kitchen cleaning, e.g. keep countertops clutter-free, return kitchenware and items to their original location, empty trash regularly to avoid bad odours · Avoid stockpiling food and condiments, use them before they expire and dispose of them properly
飲食 Dining		· 與現有的社區項目合作，為劏房家庭提供現成、有營養、新鮮的食品包 · Collaborate with existing community programs that provide ready-made, nutritious and fresh food packages to SDU families

之前 Before

之後 After

主題：私隱
Topic: Privacy

我們可以如何：整理不同的生活空間以改善私隱和空間利用？ How might we organise different living spaces to improve privacy and spatial utilisation?	
主要受眾 Key Target	・子女正處於青春期的劏房家庭 ・SDU families with children going through puberty and adolescence
設計目標 Design Objectives	・通過間隔設計上加強私隱度 ・Increase privacy via unit re-zoning
痛點 Pain Points	空間 Spatial ・家居環境缺乏空間規劃，所有空間也被用作公用空間。除洗手間外甚少有牆身或隔板分隔單位內的生活空間，容易觸發衝突 ・發生家庭糾紛後，成員缺少緩衝空間有效地處理情緒和管理身心健康 ・兒童缺乏私人空間放置個人物品 ・在同一區域內洗澡、學習和烹調 ・Poor spatial planning, and all the spaces are turned into communal space. No walls or partitions to separate the living space in the unit except for the bathroom, which can easily lead to conflicts ・There is no space for family members to manage their emotions, physical and mental health, especially after a family dispute ・Children lacking private space for personal belongings ・Bathing, studying and cooking in the same area 社會經濟 Socio-economic ・家人在更衣時，其他成員不得不先離開居所 ・男女有別，尤其對正值青春期的青少年，在欠缺分隔的空間內換衣服會產生尷尬感 ・正值青春期的青少年情緒起伏較大，需要較多私人空間梳理情緒 ・兒童在成長過程中，若其住宿環境欠佳，或會降低其自尊心，長遠影響心理健康 ・Family members have to leave the house while someone is changing ・Men and women are different, especially for adolescents, and it is embarrassing to change clothes in a space that is not separated ・Adolescents have more emotional ups and downs and need more private space to sort out their emotions ・The poor housing conditions may lower their self-esteem and affect the mental health of children during their formative years

設計理念
Design Concept

	硬件方法 Hardware approach	生活習慣改變 Behavioural Change
重新佈局 Layout Rezoning	・優先將視野良好的地方設為兒童學習區，將靠近窗戶的碌架床改為學習書桌 ・運用非掛牆式隔板等小工具製造非入侵性的分隔空間，令家人有更私密的空間更換衣物，或在發生家庭衝突後作為冷靜區 ・為孩子營造專屬空間，建立自我意識和家的感覺 ・Turn the bunk bed near the window into a study desk; prioritise areas with good natural lighting as the study area ・Use non-wall partitions and other gadgets to create non-intrusive private spaces, so that families can have more privacy to change clothes, or as a calming zone after a family conflict ・Create a space for children to build self-consciousness and a sense of home	・讓父母了解兒童的心理發展，特別是進入青春期的兒童，尊重他們對私隱的需求 ・改善家庭的作息日程，簡化工作流程，減少因公共空間引致的衝突 ・保持一個相互尊重的家庭環境，培養健康關係，加強家庭聯繫 ・培養孩子對自己的物品和空間的自主權 ・培養孩子的自理能力，養成收拾的習慣 ・Keep parents aware of children's psychological development, especially as they enter adolescene. Respect their needs for privacy ・Optimise family schedule, streamline workflow, and reduce conflicts over shared space ・Maintain a respectful home environment to foster healthy relationships and strengthen family bonding ・Foster children's autonomy over their own belongings and space ・Cultivate children's self-care skills and clean-up habits
優化家具的功能性及使用 Enhance the functionality and usage of furniture	・改用可折疊和可調整的學習桌子 ・採用掛牆式的儲物系統，上層空間用作儲物，騰出地面空間用於日常活動 ・將額外的碌架床轉為子母床，騰出更多空間 ・Use foldable & adjustable study desk ・Use wall-mounted storage system, allocate upper spaces for storage, leaving floor space for daily activities. ・Turn the extra bunk bed into a trundle bed to free up more space	・定期移除實用性低或破損的家具 ・Regularly remove non-functional or damaged furniture

之前 Before

之後 After

主題：室內空氣質素
Topic: Indoor Air Quality

我們可以如何：提高劏房家庭的衛生意識？ How might we help SDU families to raise their hygiene awareness?	
主要受眾 Key Target	· 具收集與儲物習慣的家庭主婦 · 長居家中的學童 · Housewives with a habit of hoarding · Children whose daily activities tend to be restricted within the subdivided units
設計目標 Design Objectives	· （軟件方法）灌輸良好的家務習慣，支持母親更好地整理單位內的物品 · （硬件方法）重置單位內的家具，提供更多的工作和存物空間 · （硬件方法）引入合適的科技，加強單位內的空氣流通 · (Software approach) Instill good housekeeping practice to support mothers to better organise the contents of their units · (Hardware approach) Relocate the furniture in the flat to provide more space for work and storage · (Hardware approach) Introduce appropriate technology to enhance air circulation in the unit
痛點 Pain Points	空間 Spatial · 雜物放置在單位的不同地方，其中一些物品嚴重阻塞了主要的通道和風道 · 一些雜物可能是從街上收集來的，在單位內產生強烈的氣味 · 單位有窗戶，是引入新鮮空氣和自然光的唯一途徑 · 兩張碌架床的空間被母親收集的雜物佔據 · 單位維護不善，缺乏適當油漆工程，無法營造舒適的居住環境 · The flat is full of clutter, some of which block the main passageways and proper air circulation · Some of the items may have been collected from the street, creating strong odours in the unit · The unit has a window, which is the only means to bring in fresh air and natural light to the unit · The space between the two bunk beds was full of stuff collected by the mother · The unit is poorly maintained and has no proper paint work to create a comfortable living environment

社會經濟
Socio-economic
· 由於考慮到電費開支，即使已經配備了空調，居住者亦很少使用
· 沒有執拾物品，大大減少了該單位的可用空間
· 因住戶在搬離單位時需要恢復原狀，不建議使用對牆壁和天花板造成損壞的永久性裝置
· Due to the cost of electricity, occupants of the units rarely use the air-conditioning even if it is already equipped
· Hoarding significantly reduce the available space in this unit
· Permanent fixtures that cause damage to the walls and ceilings are not recommended because of the need to restore the unit to its original condition when the occupants move out

設計理念
Design Concept

	硬件方法 Hardware approach	生活習慣改變 Behavioural Change
短期 （能力建設） **Short-Term (Capacity Building)**	· 為劏房戶提供簡單圖像，以圖像化形式呈現妥善儲物管理所帶來的變化 · Provide a simple illustration to the tenants to graphically present the possible changes brought to the unit by proper storage management	· 為母親提供適當的輔導，使她能夠理解單位內空間規劃的重要性 · 支援母親採取適當行動來管理家庭成員的物品和物件，尤其為兒子創造更多生活和工作空間 · Provide counselling to the mother so that she can understand the importance of spatial planning in the unit · Support mothers to take appropriate actions to manage the belongings and items of their family members, especially to create more living and working space for their sons
中期 （空間重塑） **Medium-Term (Re-arrangement of Space)**	· 為母親提供模塊化家具，以便恰當儲存物品 · 設計和建造小桌子，使兒子能有自己的活動空間，供玩耍和做功課之用 · 設計及建造形狀細小、可收納於碌架床下的折疊床，。當婆婆決定過夜時，可將折疊床拉出來使用 · Provide modular furniture for the mothers to store items properly · Design and build a small table so that the son can have his own space to play and do homework · Design and build a rollaway bed that can be hidden under the bunk bed. When grandma decides to spend the night, she can pull out the bed and use it	· 協助家人採取行動整理物品 · 對單位進行重新分區，將閱讀、學習和玩耍等常規活動放在靠近窗戶的位置，盡量增強日光滲透和空氣流通 · 重新為單位牆面上色，營造家的感覺 · Assist family members in taking action to organise their belongings · Re-zone the unit to place regular activities such as reading, studying and playing closer to the windows to maximise daylight and air circulation. · Re-paint the walls of the unit to create a sense of home

長期 （技術應用） **Long- Term(Application of Advanced Technology)**	· 引入噴射風扇系統／空氣感應裝置，通過空氣流動將氣流引向單位不同部分，特別是遠離窗戶的空間 · 引入傳感器技術，檢測空氣污染物和勒克斯水平 · Introduce jet fan system/air sensor to direct air flow through different parts of the unit, especially areas that are far away from the window · Introduce sensor technology to detect air pollutants and lux levels	· 訂閱現有的智能家居平台，在空氣污染物過多和低照度時向居住者發出警告 · Subscribe to existing smart home platform that notifies occupants of excessive air pollutants and low lux levels

之前 Before

之後 After

主題：缺乏學習和玩樂空間
Topic: Lack of space to play and study

	我們如何可以：改造目前的劏房佈局，優化孩子的遊戲空間，以促進兒童成長？ How might we transform the current layout to optimise the play space for children's growth?
主要受眾 Key Target	· 適合孩子處於發育期的家庭 · For families whose children are in their developmental period
設計目標 Design Objectives	· 區分玩樂和睡覺的空間 · Differentiate spaces for playing and sleeping
痛點 Pain Points	· 現有的家具擺設為追求方便，將電視與睡眠空間並列，此舉變相鼓勵小朋友長期在床上進行學習及睡覺等活動，對小朋友的眼部、身體及骨骼生長造成不良的影響 · 窗戶被碌架床阻擋，使自然光難以穿透入屋 · 使用率低的家具佔據了主要行走空間 · 上格床被物品佔據，物品四處散落 · The existing furniture is arranged for convenience rather than for health, with the TV and sleeping space side by side, children are encouraged to study and sleep in bed for a prolonged period, causing adverse effects to their eyes, bodies and bones · Windows are blocked by bunk beds, making it difficult for natural light to penetrate · Low-use furniture occupies the main walking space. The upper bunk bed is occupied by items; belongings are spread around in the unit

設計理念
Design Concept

	硬件方法 Hardware approach	生活習慣改變 Behavioural Change
創建獨有分區 Create Distinctive Zones	· 優先劃分有自然光照的區域作為兒童學習的角落 · 為不同活動目的劃分區域，支持兒童的發展需要 · 在情況許可下建立運動空間，開展與年齡相適應的活動，鼓勵運動、移動或打鬧玩樂（Rough–and–Tumble play）的遊戲。例如：在地板上放置可折疊的遊戲墊，鼓勵2歲以下的幼兒爬行和行走；在地板上放置有吸引力的網格，鼓勵兒童跳躍；在牆上張貼海報或目標，促進不同年齡的兒童投擲和拋擲物體 · Prioritise area with good natural light as children's learning corner · Designate areas for different activity purposes to support children's developmental needs · Create movement spaces, where possible, for age-appropriate activities that encourage physical activity, movement, or Rough-and-Tumble play. For example, placing foldable play mats on the floor to encourage toddles aged below 2 to crawl and walk; placing attractive grids on the floor to facilitate jumping for children; post posters or targets on wall to promote throwing and tossing object for children of all ages	· 保持活動區整潔無雜物 · 以個性化的元素營造家的感覺 · 鼓勵孩子們在遊戲後，收拾屬於自己的東西 · 向劏房家長提供有關兒童發展需要的教育和活動建議 · Keep the activity zones clutter-free · Foster a sense of home with personalised elements · Encourage children to take responsibility by tidying up after play · Provide parents of subdivided units with educational and activity advices on the developmental needs of their children
兒童安全 Children Safety	· 安裝可伸縮的床欄，防止兒童摔倒 · 在遊戲空間內鋪設可折疊地墊 · 考慮使用多用途家具，例如可因應兒童成長調節高度的架子和桌子；可折疊的床欄作幼兒扶手 · 邀請物理治療師設計與年齡相符及空間相容的遊戲設備/玩具 · 以簡單的生活用品如海綿，紙巾作為基礎，添加創意並轉化為「靈活鬆散物資」（loose parts），作為玩具	· 提高家長對家庭安全的認識 · 將插座放在較高位置，避免電線懸空，減少家庭風險 · Raise parents' awareness on home safety · Place electrical outlets at higher locations to avoid overhanging power cords and reduce household risks

	· Install retractable bed rails to prevent children from falling · Use foldable floor mats in play space · Consider using multipurpose furniture, such as height-adjustable shelves and tables, to accommodate children's growth; foldable bedrails as toddlers' handrails · Invite physiotherapists to design age-appropriate and space-compatible play equipment/ toys · Use simple household items such as sponges, paper towels as the basis and add creativity to make loose part toys for children	
善用壁側位置 **Better Utilisation of Side Walls**	· 以牆櫃／折疊桌取代獨立櫃，騰出地面空間，前提是住戶搬走時能恢復牆身，或其業主同意安裝 · 以鞋袋和門後掛鉤代替鞋櫃 · Replace stand-alone cabinets with wall cabinets / foldable tables to free up floor space, provided that the walls can be restored when the tenants move out, or the owners agree to install them · Replace shoe cabinets with shoe bags and door hooks	· 定期清潔和整理生活空間。例如，清理過時的和不經常需要的物品 · Clean and organise the living space regularly. For example, clean out outdated and infrequently used items

「十萬分一」社創研討會
"ONE FROM HUNDRED THOUSAND"
SOCIAL INNOVATION SYMPOSIUM
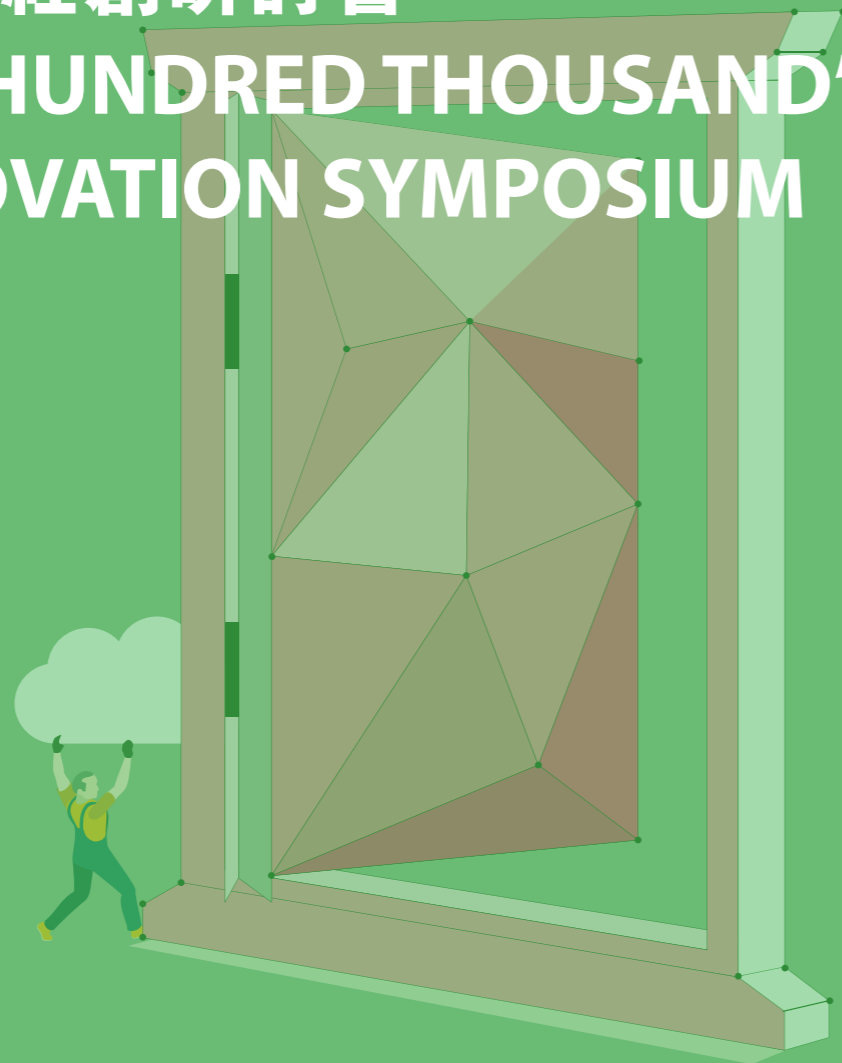
「十萬分一」社創研討會
"ONE FROM HUNDRED THOUSAND" SOCIAL INNOVATION SYMPOSIUM

透過2021年1月23日的「十萬分一」社創研討會，JCDISI藉著通過加強學術界和社區之間的知識傳播，鞏固劏房的社會服務支援網絡。當中的討論交流，期望能收集社會各界在劏房上的創新方案，推動其發展，以進一步探索改善劏房家庭成員的身心健康的可行策略及未來方向。

Through the "One from Hundred Thousand" Social Innovation Symposium in 23rd Jan 2021, JCDISI continues to strengthen the social support network for SDU community by enhancing knowledge dissemination between the academia and the community. The ideas exchanged will help to boost and effectuate the development of innovative solutions for SDUs, exploring strategies and directions to improve the physical and mental health of the SDU families.

理大學術夥伴聯合專題分享及研討會連結
The Joint Thematic Sharing from PolyU Academic Partners and Link to Symposium

主題演講
Keynote Speeches

經濟劣勢對兒童和青少年成長發展的影響：理論和經驗上的考慮
The Impact of Economic Disadvantage on the Development of Children and Adolescents: Theoretical and Empirical Considerations

石丹理教授
香港理工大學應用社會科學系講座教授
暫任副校長（研究及創新）
協理副校長（本科生課程）

Prof. Daniel SHEK Tan-lei
Chair Professor, Department of Applied Social Sciences
Interim Vice President (Research and Innovation)
Associate Vice President (Undergraduate Programme)
The Hong Kong Polytechnic University

應用研究分享
Application Sharing

劏房戶兒童坐姿管理和傢俬設計
Posture Management and Furniture Design for SDU Children

黃文生博士
香港理工大學生物工程系
副教授

Dr M.S. WONG
Associate Professor
Department of Biomedical Engineering
The Hong Kong Polytechnic University

何仲豪先生
救世軍油麻地青少年綜合服務
高級主任

Mr HO Chung-ho
Service Supervisor
The Salvation Army Yaumatei Integrated Service for Young People

劏房戶兒童的視覺衛生：學童眼睛健康與居住環境的關係
Effect of Living Environment on Refractive Error in School-aged Children and Possible Community Interventions

蔡啟業先生
香港理工大學眼科視光學院
視光師及副研究員

Mr CHOI Kai-yip
Optometrist and Research Associate
School of Optometry
The Hong Kong Polytechnic University

黃小慧女士
明愛社區發展服務
高級督導主任

Ms WONG Siu-wai
Senior Social Work Supervisor
Caritas Hong Kong Community Development Service

討論環節
Panel Discussion

大眾該如何善用現有社會資源來幫助兒童及劏房戶社群？
How can the society leverage existing community resources to help children and the SDU community?

祁宜臻博士
香港高等教育科技學院
環境及設計學院設計學系副教授

Dr Tris KEE Yee-chun
Associate Professor
Department of Design
Faculty of Design and Environment
Technological and Higher Education Institute of Hong Kong

陳浩龍博士
香港理工大學
眼科視光學院教授

Prof. Henry CHAN Ho-lung
Professor
School of Optometry
The Hong Kong Polytechnic University

徐佩恩女士
香港社區組織協會
社區組織幹事

Ms Jennie CHUI
Community Organizer
Society for Community Organization

林之鴻女士
社企民間高峰會
籌備委員會代表

Ms Dorothy LAM
Alternate of Organising Committees
Social Enterprise Summit

主持：
李雅筠女士
香港理工大學
賽馬會社會創新設計院
空間項目經理

Moderator:
Ms Karen LEE
Project Manager
Jockey Club Design Institute for Social Innovation,
PolyU

行動項目
ACTION PROJECT

行動項目
ACTION PROJECT

延續第9季共創工作坊與研討會的討論，JCDISI繼續聯同理大設計學院及THEi產品設計等共創團隊合作。藉不同團體豐富的社區設計經驗和持份者網絡，行動項目按劏房兒童需要及民間共創提議，探索適應性家具設計，以改善劏房的空間使用和學習環境。

Leveraging on the ideas generated from the workshops and symposium, JCDISI continues to collaborate with the Season 9 co-creation teams from PolyU School of Design and the THEi Product Design. The Action Project explored the adaptable furniture design that can improve the use of space and study environment of children residing in subdivided units. The co-created design concepts and children's needs informed the prototyping process that was supported by an extensive stakeholder network with rich community design experience.

目標
Objectives

· 研發實用、節省空間、符合人體工程學、以循證設計為本的書桌原型，改善劏房兒童的學習習慣及身心健康

· 促進跨學科的知識傳播與研究合作，運用理大生物醫學工程和眼科視光學院的應用研究和專業知識改善家具設計，促進社會創新

· 以參與式共同設計平台集結第九季共創團隊的設計師、社區組織和研究團隊，參與開發及改良家具原型，以期望家具原型能達致輕巧、可調整、易於收藏、實用和支援兒童發展等功能

· Develop a practical, space-saving, ergonomically-designed, evidence-based workstation prototype to improve the learning habits and physical and mental health of children living in SDUs

· Enable dissemination and collaboration of cross-disciplinary research, infuse applied research and specialist knowledge from PolyU Department of Biomedical Engineering and School of Optometry in furniture design to foster social innovation

· Create a participatory co-design platform to bring together designers, community organisations and research teams of the Season 9 co-creation workshop to develop and refine furniture prototypes that are lightweight, adjustable, easy-to-store, functional and supportive of children's development

· 促進原型設計及「前測與後測」研究，評估擬議措施對改善劏房兒童的空間意識、學習環境和身心健康的有效性

· Facilitate prototyping, pre-and-post-intervention studies to evaluate the effectiveness of the proposed interventions in improving spatial awareness, studying environment and physical and mental health of children residing in the SDUs

總結第九季共創團隊在的設計概念，並參考民間提議，以下列表為劏房家具設計考量。本季行動項目邀請理大設計學院及THEi產品設計院校，按設計考量呈交學習書桌設計，以供未來劏房家居改造和家具設計參考

The following list summarised the implementable design considerations on SDU furniture generated from the Season 9 co-creation teams. The action project of Season 9 invited PolyU School of Design and THEi Product Design to submit a workstation design prototype based on the given design considerations, this will serve as references for home modifications and furniture design for SDU families

劏房家具設計考慮　*Design Considerations on SDU furniture*

經濟實惠 **Affordable**	合適大規模生產，相宜生產成本 An affordable cost for mass production
可調節性 **Adjustable**	設計能適應不同的學習和閱讀模式 The design should be able to accommodate different modes of learning and reading
模塊化 **Modular**	設計應由易於安裝和拆卸的部件組成，適應各種類型和尺寸的劏房 The design should consist of components that can be easily installed and disassembled to accommodate various types and sizes of SDUs
可移動性 **Movability**	設計要輕巧，易於搬運 The design should be lightweight and easy to move around
安全性 **Safety**	設計應盡量減少危險情況，意外或非預期行為而引致的不良後果 The design should minimise hazards and adverse impact of accidental or unintended actions
可持續性 **Sustainable**	設計應耐用，易於維修保養 The design should be durable and easy to maintain

劏房戶兒童家具適應性設計
行動項目報告（香港理工大學設計學院）

ADAPTIVE DESIGN AND
CHILD-FRIENDLY FURNITURE
IN SUBDIVIDED UNITS
ACTION PROJECT REPORT
(SCHOOL OF DESIGN, POLYU)

行動項目概覽
ACTION PROJECT OVERVIEW

本行動項目源於理大賽馬會社創「騷‧In‧廬」在2021年1月舉辦的第九季「劏房戶兒童的身心健康」社創研討會，並由香港理工大學（理大）賽馬會社會創新設計院（JCDISI）委託開展及得到香港賽馬會慈善信託基金捐助。

作為該計劃的一部分，理大亞洲生活形態設計研究室致力設計及測試解決方案，以改善劏房戶兒童的生活環境。本行動項目借鑒了理大不同院系的知識，包括康復治療系、護理學院、眼科視光學院、生物醫學工程系以及設計學院。這些部門與基層組織合作，為居住在劏房的家庭提供前線服務，通過設計方案改善其居住環境，進而幫助改善兒童的身心健康。

This Action Project is commissioned by Jockey Club Design Institute for Social Innovation (JCDISI), funded by The Hong Kong Jockey Club Charities Trust, and originated from the Season 9 "Children's Well-being in Subdivided Units" Social Innovation Symposium conducted in January 2021 under PolyU Jockey Club "Operation SoInno".

As part of the operation, PolyU Design Asian Lifestyle Design Lab aims to design and test solutions to improve the living conditions of SDU for children. The Action Project incorporates knowledge from different disciplines, including various PolyU departments - Department of Rehabilitation Sciences, School of Nursing, School of Optometry, Department of Biomedical Engineering, and School of Design. These departments collaborated with grassroot organizations that are service providers for SDU families to develop design solutions that improve the living environment of SDUs, hence the well-being of their young tenants.

目標受眾
Target Audience

居住在劏房（或其他擠迫住屋環境）中的6至12歲兒童及其家人。

Children aged 6-12 living in SDUs (or other compact housing environment) and their families.

設計目標
Design Objectives

· 著重空間意識、改善兒童的學習環境、糾正和管理坐姿、保持眼睛健康和盡量減少近視加深，及其狹窄生活環境引發的相關健康問題

· 通過家居改造方案（硬件）和相應的策略（軟件），旨在讓社區大眾參與設計過程和測試解決方案，攜手改善生活條件

· 該解決方案應是可規模化的，並且能夠進行小批量複製

除了硬件和軟件解決方案，行動項目亦應用了理大其他學系，如生物醫學工程學系和眼科視光學院的研究成果，促進跨部門和跨學科的討論與合作，強調知識傳遞和社區參與，加強研究與行動之間的聯繫

· Focus on spatial awareness, improving children's study environment, correcting and managing posture disorders, maintaining eyecare, and minimising myopia progression and other health issues related to their compact living conditions

· Engage the community to design and test solutions to improve living conditions collaboratively, through home intervention solutions (hardware) and corresponding strategies (software)

· The solutions should be scalable and replicable in small batches

Apart from hardware and software solutions, the Action Project should also utilise research findings from other PolyU departments such as Department of Biomedical Engineering and School of Optometry to facilitate cross-sector, multidisciplinary discussions and collaborations and emphasise knowledge transfer and community engagement, hence connecting the research to action

項目團隊
Project Team

Tulio Maximo 博士
香港理工大學亞洲生活形態設計研究室
項目總監

盧智恒博士
香港理工大學設計學院
項目經理

陳思晉
香港理工大學設計學院
研究助理

詹雯
香港理工大學設計學院
研究助理

Dr Tulio Maximo
Project Leader
PolyU Design Asian Lifestyle Design Lab

Dr Paul Lo
Project Manager
PolyU School of Design

Jin Chan
Research Assistant
PolyU School of Design

Wen Zhan
Research Assistant
PolyU School of Design

實地及個案研究
Field Research and Case Studies

設計團隊與救世軍合作，邀請了三個劏房戶家庭進行實地研究，以了解他們的居住習慣和家具使用需求，探討住戶因生活環境所面臨的問題，並獲取住戶對該行動項目的寶貴意見以及對適應性家具設計的要求。

實地研究包括對住戶單位進行測量，例如量度住屋尺寸、照明水平和空氣流通的情況。其後，研究團隊向劏房戶家庭進行採訪，更深入地了解各個家庭中社會及空間的複雜性，並收集了年齡、職業、家庭生活和孩子的學習習慣等資料，以了解用戶的行為、痛點和偏好。

Collaborated with The Salvation Army, the team invited three families living in SDUs to participate in the research. The field research aims to understand their family routines, usage of and needs for furniture, and thus gain valuable insights into the problems and cater the needs for adaptive furniture use in compact living environment.

Components of this field research include taking measurements, such as the dimension, illumination level and air circulation of the flats. The follow-up interviews with the SDU families enabled the research team to uncover and examine each household in a wider socio-spatial complexity, and collect information such as age, occupation, family routine and children's study pattern to understand the behavior, pain points and preferences of the users.

調研家庭甲
Family A

總面積　　：約 180 平方呎
可使用面積：約 74.5 平方呎
家庭成員資料：
父（50歲）　　：全職爸爸
母（49歲）　　：全職僱員
大女兒（18歲）：就讀中六
小女兒（9歲）　：就讀小三 身高134釐米

關於家庭甲：
小女兒在客廳裡使用一張折疊桌子來學習，這桌子同時也被其他家庭成員

Total Area　　　　: approx. 180 ft^2
Usable Floor Area : approx. 74.5 ft^2
Household member Information:
Dad(Aged 50)　　　　　: househusband
Mum(Aged 49)　　　　　: full-time worker
Elder Daughter (Aged 18)　: Secondary 6
Younger Daughter (Aged 9): Primary 3　Height 134cm

About family A:
The younger daughter used a foldable desk for studying in the living room, which was also shared among other

用作餐桌。由於房間既長又窄，自然光難以照亮房間深處，空氣也不太流通，以致他們在白天亦需要開燈。根據我們的測量，即使在開燈的情況下，天花的燈光照明程度仍不能夠滿足女兒寫作看書的需要。當小女兒模擬平時使用桌子學習的情況時，團隊更觀察到其影子會投射於桌面上。

family members as a dining table. Since the room was long and narrow with poor natural light and ventilation, the family had to turn on the light even during daytime. However, even with the ceiling lights on, according to our measurements, the desk was still poorly illuminated for studying. When the younger daughter was asked to simulate her daily study routine, it was observed that her shadow cast over the working table.

Floor Plan of Family A
Scale 1:20

Floor Plan of Family A
Scale 1:20

家庭甲的平面圖；家庭甲的燈光分佈圖
Floor plan of family A; Light plan of family A

調研家庭乙
Family B

總面積　　　：約 90 平方呎
可使用面積：約 38 平方呎
家庭成員資料：
父（42歲）　：兼職僱員
母（39歲）　：家庭主婦
女兒（8歲）：就讀小二 身高132釐米
兒子（7歲）：就讀小一 身高125.5釐米

關於家庭乙：

兩個孩子共用一張矮小的折疊桌，常常坐在地板上玩玩具；更大的折疊桌則供兩個孩子學習和全家人用餐。到了晚上，他們把所有的桌椅折疊起來並放在走廊，原本放置桌椅的空間則變成爸爸的睡眠位置。

自疫情爆發至今，兩名孩子已經在網上學習一年多。孩子們模擬日常學習時，我們觀察到他們很難將平板電腦和手機固定在合適的位置，也沒有足夠空間放置教科書。由於桌椅太高，他們坐在椅子上雙腳無法觸及地面，只好借助折疊桌底下的橫杆來墊腳。

Total Area　　　　: approx. 90 ft^2
Usable Floor Area : approx. 38 ft^2
Household member Information:
Dad(Aged 42)　　　: part-time worker
Mum(Aged 39)　　: housewife
Daughter (Aged 8) : Primary 2　Height 132cm
Son (Aged 7)　　　: Primary 1　Height 125.5cm

About family B:

The two children shared one small and low foldable table and usually sit on the floor to play with their toys. The bigger foldable table was used for the two children's studying and for the entire family to dine. At night, all the tables and chairs were folded and placed in the hallway so that the space can be transformed into be their dad's sleeping area.

Both children had been studying online for over a year during the COVID-19 pandemic. When the children were asked to simulate their daily study routine, it was observed that they struggle to keep their iPad and phone in place and there was not enough space to put their textbooks. Since the desk and the chairs were too high, both were unable to reach the floor while sitting. Instead, they used the reinforcing bar on the foldable desk as a footrest.

Floor Plan of Family B
Scale 1:20

Floor Plan of Family B
Scale 1:20

家庭乙的平面圖；家庭乙的燈光分佈圖
Floor plan of family B; Light plan of family B

調研家庭丙
Family C

總面積　　　：約 107.24 平方呎
可使用面積：約 44 平方呎
家庭成員資料：
母（50歲）　：家庭主婦
兒子（9歲）：就讀小三

關於家庭丙：
兒子使用一張折疊書桌和小凳子來學習。他有駝背，在閱讀課本或使用平板電腦時，視線距離很近。他習慣了花大部分時間在床上看書和使用平板電腦，以緩解因不良坐姿引起的背痛。即使在床上，他也慣性地把頭向前伸，長遠來看只會使駝背情況惡化。

另外，媽媽說兒子性格活躍，很容易分心。該孩子不能長時間坐在座位上專心學習，因此通常需要很長時間才能完成作業。

Total Area　　　　: approx. 107.24 ft^2
Usable Floor Area : approx. 44 ft^2
Household member Information:
Mum(Aged 50)　　: housewife
Son (Aged 9)　　　: Primary 3

About family C:
The son used a foldable desk and a stool to study. He had a hunched back and was always staring closely at his textbooks and the iPad. He had developed a habit of spending most of his time on reading and using iPad on bed, so as to relieve back pain caused by his poor sitting posture. As he also maintained a forward head posture while in bed, it was estimated that the situation could only worsen.

Besides, the mum mentioned her son could be very active and very easily distracted. The kid had trouble concentrating on study for a long time, thus usually it took quite a long time for him to finish the assigned homework.

Floor Plan of Family C
Scale 1:20

1054 Lux　455 Lux

175 Lux
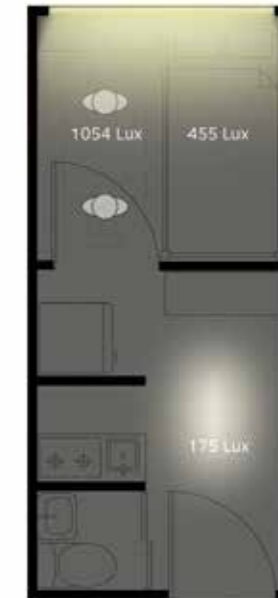
Floor Plan of Family C
Scale 1:20

家庭丙的平面圖；家庭的燈光分佈圖
Floor plan of family C; Light plan of family C

痛點
Pain Points

1

不良姿勢：成人尺寸的桌椅對兒童而言缺乏背部和腳部支撐，容易令他們養成不良坐姿。由於疫情關係，孩子需要在家學習，每天使用平板電腦平均長達六小時以上，再加上平板電腦的位置過低，會加劇不適。兒童使用不合適的桌椅會引致不良姿勢，也造成不利學習的空間環境。

Poor Postures: It is observed that the children have developed poor postures due to frequent use of adult-sized desks and chairs, which offer no support for their back and feet. Due to the COVID-19 pandemic, the children need to study online at home. They spend more than six hours to learn with iPads every day, however, the iPads are placed uncomfortably low. Using unfit furniture not only leads to poor postures, but also creates an unfavourable study environment.

2

照明欠佳：由於缺乏自然光和工作照明、加上室內光線昏暗或書桌上有陰影，學習環境欠缺充足的光線。這會導致眼睛不適，甚至加劇近視。

Poor lighting: Study environment is badly illuminated due to a lack of natural lighting and task lighting, dim indoor lighting or shadows casting on the desk. This can lead to eye discomfort and even worsen children's eyesight.

3

安全問題：折疊家具可能會導致手指夾傷，對年幼的孩子造成傷害。雖然沒有受訪家庭提到現有家具會造成安全事故，但未來的設計應考慮避免手指夾傷，從而鼓勵孩子獨自調整和使用家具。

Safety issues: Foldable furniture may lead to finger traps, potentially causing injury to young children. Although none of the visited families have reported any accidents while using the current furniture , future design interventions should consider features that avoid finger traps, hence encourage children to adjust and use furniture independently.

4

分心和干擾：孩子長時間呆在狹小狹窄的空間，尤其是在疫情受限的情況下，可能會導致負面心理影響。活躍的兒童很容易被他們凌亂的家庭環境影響，難以集中注意力。由於許多孩子需與兄弟姐妹共用一個狹小的工作空間，這也可能會分散他們的注意力。

Distraction and disturbance: Staying in a small and cramped space for a long time might be psychologically unhealthy to children, especially under the COVID-19 restrictions. Hyperactive children can easily be distracted by their messy home environment. Sharing a small working space with their siblings can also be distracting.

實地調研結果初步印證了之前的研究，生活在劏房的兒童更容易患近視（Choy et al., 2019, Choi et al, 2017; Yeo, 2020）、脊柱疾病、具低自尊心和易有皮膚過敏（Children Chiropractic Foundation, 2019）。擁擠的生活環境導致室內空氣質素欠佳、缺乏私隱、營養不良以及學習和玩耍空間不足等問題。（Children Chiropractic Foundation, 2019, Yeo, 2020）

The findings corroborated with previous studies that the children living in SDUs are more likely to develop myopia (Choy et al., 2019, Choi et al., 2017 ; Yeo, 2020), spinal disorders, lower self-esteem and skin allergies (Children Chiropractic Foundation, 2019). The deprived living conditions include poor indoor air quality, lack of privacy, poor access to nutrition and insufficient space for studying and playing (Children Chiropractic Foundation, 2019; Yeo, 2020).

共創工作坊
Co-creation Workshop

日　期	：	2021年3月27日
時　間	：	10:00AM – 12:00PM
地　點	：	香港理工大學賽馬會創新樓12樓
主辦單位	：	賽馬會社會創新設計院及理大亞洲生活形態設計研究室
參加者	：	共14名來自不同專業背景的參加者，包括救世軍和明愛（社區發展）的社工，及來自理大康復治療學系、護理學院、設計學院和嶺南大學的專家

概 括 ：

共創工作坊旨在為協助不同專業背景的參加者，通過同理心工具和評估工具構思、討論和檢視方案，以解決問題。在本次研討會中，團隊首先介紹四組劏房戶的角色、場景和其生活環境的比例模型。這引發了參加者之間的討論，讓他們為劏房戶兒童家具構思想法。之後，參加者們使用蜘蛛圖（根據先前實地調研以及關於劏房的學術研究得出的評價工具）來嘗試評估和改進有潛力的設計方案。

Date	:	27 March 2021
Time	:	10:00AM – 12:00PM
Venue	:	12/F Jockey Club Innovation Tower, PolyU
Organiser	:	Jockey Club Design Institute for Social Innovation (JCDISI) and PolyU Asian Lifestyle Design Lab
Attendees	:	14 participants in total, including social workers from The Salvation Army and Caritas (Community Development Service) ; experts from PolyU Department of Rehabilitation Science, School of Nursing, School of Design and Lingnan University

Summary:

The co-creation workshop aimed at equipping the interdisciplinary group of stakeholders with empathy tools and evaluation tools to generate, discuss, and review solutions to the captioned problem. During the workshop, a set of persona, scenario and spatial models were introduced based on the families living in SDUs. These tools prompted discussions amongst participants to brainstorm ideas for the SDU children's furniture. Next, participants were encouraged to evaluate and improve the designs by using a spider graph based on field research findings and previous research on SDUs.

工作坊的觀點
Insights from the workshop

1

家庭成員共用家具：參加者提出可能有兩個孩子會共用一張桌子，這張桌子也許對一個孩子來說太高，而對另一個孩子來說則太低。由於空間有限，而且桌子可能用作餐桌，幾乎不可能再放置兩張可以調整的小桌子，並同時配合兩個孩子不同的身高。因此，參加者提出保留相同的桌子高度和大小，並轉而提供不同高度的座位。也有參加者提議使用腳踏凳 。

Furniture shared among family members: Participants mentioned a scenario that the table may be shared by both children at the same time, which can be too high for one and too low for the other. With limited space and the scenario that the table may be used for dining, it is almost impossible to put two small tables that are adjustable to suit both children' heights. Alternatively, participants suggested to keep the same table height and size but provide seats with different heights. Some participants added that a footrest should also be provided.

2

安全：參加者特別強調安全對不同年齡人士的重要性。雖然家具是為6至12歲兒童而設計，但如果桌子傾倒的話可能會使嬰兒受傷，也可能會障礙老年人走動。

Safety: Participants emphasised the safety concerns, especially for different age groups. Although the furniture is designed for children aged between 6 and 12 , it can still be dangerous for toddler if it falls down, or it may become an obstacle for the elderly.

3

照明：曾與劏房戶有合作經驗的一些參加者對在桌子上加燈的提議有所顧慮，因為並非所有家庭都能保證燈可以插電，因此他們建議使用可攜電源或充電燈。此外，學習環境不僅要夠明亮，照明質素也很重要，包括燈光顏色、均勻光照和避免眩光直射。

Lighting: Some participants with experience of working with SDU families had concerns about the idea of adding lights to their table as not all households could guarantee a stable electricity supply. A power bank or a portable lamp is recommended. The studying environment needs sufficient lighting and the quality of lighting is also vital , in terms of light colour, even illumination, and avoidance of direct glare.

4

分心和干擾：參加者討論了孩子們可能會因為雜亂的家庭環境而分心或被兄弟姐妹打擾，他們提出了幾種可能的解決方案，包括在桌子中間用一塊白板作為分隔，利用可調節角度的照明燈，以強調各自的空間並彌補隔板遮擋的燈光，並使用收納盒存放學習用品，保持學習環境整潔。此外，有參加者提出，對於某些家庭來說，白板筆可能會造成額外支出，他們可以用磁鐵把紙張貼在白板上來畫畫。

Distraction and disturbance: Participants discussed the possibility of children being distracted or disturbed by their siblings due to the cluttered home environment and therefore suggested several possible solutions, including the use of a whiteboard as a partition between the table; the use of angle-adjustable lighting to emphasise their space and compensate for the light blocked by the partition; the use of storage boxes for study materials to keep the studying environment tidy. In addition, some participants raised that for some families, whiteboard pens might be an additional expense, and that they could use magnets to stick scrap paper to the whiteboard to draw on instead.

5

健康意識：參加者們建議把一些關於坐姿健康，眼睛放鬆，定時飲水和恆常運動的訊息圖表放置、打印或雕刻在家具上，以提高兒童的健康意識。

Health Awareness: Participants suggested some infographic images promoting correct sitting postures, eye relaxation, timely hydration and regular exercise can be placed/printed/engraved on furniture to raise children's awareness.

討論角色、情景和比例模型;用手提電話燈增加照明
Discussing personas, scenario and scale models; Stimulating lighting with mobile phones

分享想法;使用蜘蛛圖評估想法
Sharing ideas; Evaluating ideas using spider graph

構思及原型設計
Ideation & Prototyping

團隊內進行了多輪構思和評估，輔以草圖、比例模型、電腦建模和實體原型。使用多樣化的設計方法有助於簡化大型複雜的問題，同時降低疫情期間的安全風險並避免參與人員不必要的社區接觸。

第一階段包括利用電腦三維建模（3D CAD）來重建實地調研的劏房室內構造。理大生物醫學工程學系、眼科視光學院以及賽馬會社會創新設計院共享該三維模型文件，以幫助他們作出行動前規劃和進行現場可用性研究。

通過三維電腦模型構建，團隊考慮專家小組和其他持份者於工作坊產生的想法，配合團隊對項目的構思，就之前到訪過的劏房單位模型進行測試，也為之前的研討會和探索性研究結果得出的不同方案進行數位測試。其後，團隊向專家小組及劏房家庭的參加者分享研究結果，以進一步完善當中細節，再建造實體原型。

Several rounds of ideation and evaluation were carried out by the team, supplemented by sketches, scale models, computer-aided design (CAD) modelling and full-scale physical prototypes. The use of a diverse design approach helped to simplify complex issues, while minimising safety risks during the pandemic and avoiding unnecessary social contact for those involved.

The first phase involved the use of three -dimension Computer-Aided Design (3D CAD) to reconstruct the interior of the SDU flats in the field survey. The 3D CAD files were shared among JCDISI and PolyU's Departments of Biomedical Engineering and School of Optometry to facilitate their contribution to the pre-intervention planning and usability study on the field.

Secondly, the ideas generated from previous workshops with the expert panel and other stakeholders, together with the ideas generated from the project team working on the project, were tested with 3D CAD to reconstruct the SDU flats the team had visited. Different scenarios based on previous workshops and the exploratory research findings were tested digitally. The results were shared with the expert panel and SDU family participants through the Focus Group in order to further refine the details before producing physical prototype interventions.

以真實劏房單位重建的三維劏房模型概念測試實例
Example of concepts tested on 3D CAD reconstruction of real SDU apartments

初步原型以測試物料和結構
Initial working prototypes to test materials and structure

與兒童進行初步的組略原型測試
Initial rough prototype testing with children

此外，團隊還以不同的試驗材料製作原型，以研究某些想法的可行性。椅子的原型用於受控環境下的初期場景試驗，以測試其結構、重量、海綿密度、尺寸和潛在風險。

In addition, the team produced prototypes with different tested materials to investigate the feasibility of certain ideas. The prototype chairs were used in initial scenario testing in a controlled environment to test the structure, weight, foam density, size of possible materials, as well as potential risks to the subjects.

初期原型，以測試材料的強度和功能
Initial prototypes to test the strength and functionality of the materials

紙皮腳踏凳和書架原型用於受控環境下的初期測試，並測試材料厚度、結構、強度、重量、尺寸和潛在風險。

The cardboard footrest and bookstand prototypes are used for initial testing in a controlled environment and to test the thickness, structure, strength, weight and dimensions of the materials, as well as potential risks to subjects.

社區參與－控制環境測試
Community Engagement - Test Under Controlled Environment

日 期	：	2021年6月16日
時 間	：	3:00PM – 5:30PM
地 點	：	救世軍油麻地青少年服務中心
主辦單位	：	救世軍及理大亞洲生活形態設計研究室
參加者	：	三戶自願參加的劏房家庭以及救世軍的工作人員們

概 括：

團隊與劏房住戶家庭及救世軍的工作人員一起進行另一項社區參與活動。活動目的是為了展示設計團隊的想法和概念，收集用家的反饋，並與真實用家測試原型的功能。第二次原型測試在受控環境下進行。團隊首先向三戶劏房家庭介紹了家具的兩個設計方向，一個方向著重家具使用時的靈活性，另一方向著重家具的儲物功能。然後團隊採訪了家屬和工作人員，了解他們對這些概念的意見、偏好或建議。緊接著團隊邀請了三個家庭的孩子們參加原型測試，目的是為了得到用家的意見，同時評估該概念的可用性、舒適性以及安全性，以推動設計的後期改進。

在原型測試中，我們觀察到參加者在使用初步的家具原型時，坐姿變得更端正，駝背情況也有所改善。然而，儘管使用了新的設計，我們也觀察到孩子們在使用新家具時依舊維持不良坐姿習慣。例如：因為孩子們慣性地使用成人尺寸的家具，他們會坐在座椅的邊緣，以便雙腳觸及地面。在測試中，使用新設計的家具時，孩子們仍舊坐在座椅邊緣，腰部因而無法得到足夠支撐。這意味著該項目的解決方案不能只停留在產品層面，更應該包含服務設計元素或者其他的解決方案，以糾正用家的坐姿和護眼習慣。

參加者的意見：

每個家庭的喜好在很大程度上取決於他們各自的需求。由於救世軍的工作人員曾與許多劏房戶合作，他們提出的建議能應用於大多數家庭。

大多數孩子都希望有儲物空間的解決方案，以便他們有空間放置玩具、書籍和其他個人物品，但由於空間限制，他們選擇了更靈活且可折疊的解決方案。考慮到他們的家庭情況，家長們則選擇了更靈活的解決方案，以便在不使用家具時有更多可活動空間。救世軍工作人員證實，靈活的解決方案更適合大多數劏房家庭及其居住格局。

此外，這些家庭表達了他們對家具安全性和耐用性的疑慮，特別對設計的折疊原理和材料重量表示關注。

觀 點：

座椅模式：其中一名孩子覺得坐墊有點硬。另一名孩子馬上就知道座位向前傾時是用作寫字，躺椅則是用作看書，並認為向後傾的姿勢很舒適。另一位喜歡座椅可放在地板上使用的概念，因為他喜歡在地板上玩耍。團隊未來可考慮較軟的坐墊以改進設計，但須避免選用太軟的坐墊，否則長時間使用的話，會影響用家的舒適度和坐姿。

Summary:

Another community engagement was conducted with families living in SDU and staff members from The Salvation Army. The aim was to present concepts, gather insights and test specific design features. A second test under a controlled environment was conducted with three volunteer families living in SDU. The project team introduced two design directions. One of the directions emphasised on the flexibility of the furniture whereas the other focused on their storage function. Afterwards, the families and staff members shared their opinions, preferences and suggestions on the concepts. Later, children from the families were invited to conduct prototype testing and give feedbacks to the project team so as to evaluate the usability, comfort and usage scenarios of the concept, which would be valuable for the design at later stages.

It is observed that the participants adopted a better posture with the initial prototypes. However, we also noticed that the children replicated their poor sitting postures to the new design. As the children were used to resting on adult-sized furniture, they remained sitting on the edge of the seat in order to reach on the floor even when using the new design. This indicates that the solution should go beyond product design, and to include service design elements or alternative solutions to educate users about correct sitting postures and eyecare.

Suggestions from the Participants:

The preference of each family mainly depends on their needs respectively. Having worked with many SDU families, the Salvation Army team's suggestions seem applicable to most households.

Most of the children welcomed the storage feature of one of the solutions as they would like to have more space to store their toys, books and other personal belongings. However, due to space limitation, they opted for the flexible concept which allows the furniture to be folded when the object is not in use. The parents also opted for this flexible solution with consideration of their family situation. Staff members from The Salvation Army confirmed that the flexible solution is more suitable for most SDU families and the layout of SDU flats.

In addition, the families expressed their concern about the safety and durability of the furniture, especially towards their folding mechanism and material weight.

Insights:

Seating modes: A child mentioned that the cushion was rather hard. Another child immediately noted that the forward tilting seat was for writing and the recliner was for reading. She also found the reclined position more comfortable. One of them liked the idea of placing the seat on the floor while playing. For the design modification, the team should consider a cushioned seat with moderate softness. Otherwise, it will affect the users' comfortness and sitting posture over time.

膝蓋和凳子高度：團隊觀察到兩種不同座位姿勢導致膝蓋高度差異。450毫米高的凳子底座即使對於成年人來說亦為過高。團隊未來決定凳子高度時，應考慮6–12歲兒童和成人的膝後窩高度差異。

座位安排：考慮到兩個小孩一起使用書桌的情況，我們測試了面對面和並排坐兩種不同的座位安排情況。其中兩個家庭的家長認為孩子們面對面相對並排坐著更適合他們家的空間安排情況。經過測試後，證實500mm寬的桌子可滿足兩個用戶同時面對面坐著的情況。未來該設計的改進應該考慮避免桌子側面結構阻擋擱腿空間。為了保證兩個用戶可以並排坐的使用情況，團隊需要進一步在三維模型裏測試桌子長度是否充足。

照明：團隊在桌子上觀察到一些陰影，主要由於光源被放在隔板之間。由於暫用於測試的磁吸枱燈沒有燈罩或是反光板，燈光因此較為刺眼。未來該設計的改進應該減少其在桌面上的陰影並避免眩光。

Knee and stool height: The team observed that the forward and reclining seating positions resulted in different knee heights. The 450mm high stool is too high even for adults. The team shall take into account of the difference between the popliteal height of children aged 6-12 years and adults for future design modification in order to determine the height of the stool.

Seating arrangement: Considering the fact that two children were using the desk together, two different seating arrangements were tested, including facing each other and sitting side by side. Parents from both families felt that the children sitting face to face was more suitable for the space arrangement in their homes. The width of the table, 500mm, was tested to be sufficient for two users to sit face to face at the same time, but not side by side. For future design modification, the team shall take into account of the situation that the side structure of the table may block one's feet. In order to ensure that two users can sit side by side, the length of the table needs to be increased and further usability testing is required in the 3D model.

Flexibility: The children preferred the tilt board to be movable instead of integrating it to the table. They liked the flexibility and wanted to move the paper around when they were writing and drawing. However, the movable tilt board encouraged the child from Family C to sit with unleveled shoulders. Although the additional separate tilt board was a solution agreed upon by various stakeholders for feasibility and flexibility purposes (see Expert Consultation 2 section), the issue with unleveled needs to be further resolved.

Lighting: The team observed some shadows on the table, mainly because the light source was placed between the partition board. As the magnetic desk lamp that had been temporarily used for testing did not have a lampshade or reflector, the light was rather strong. Further modifications to the design should reduce the shadows on the table and avoid glare.

討論三維重建中的家具概念
Discussing furniture concepts in 3D reconstruction

測試粗糙原型的尺寸和材料
Testing dimension and material of the rough prototype

測試兩種座位安排
Testing two seating arrangements

現場考察和原型測試期間的坐姿比較
Comparison of posture during site visit and prototype testing

專家諮詢 - 理大的跨學科團隊
Expert Consultation I - Cross-disciplinary Team in PolyU

日 期　　：2021年5月19日

時 間　　：10:00AM – 12:00PM

專家組成員：

黃文生博士
香港理工大學生物醫學工程學系
副教授

陳浩龍博士
香港理工大學眼科視光學院
副教授

李雅筠女士
賽馬會社會創新設計院
項目經理

Tulio Maximo 博士
香港理工大學設計學院
助理教授

概 要：

該團隊就照明、座椅設置、可拆卸座椅、傾斜板和凳子等方面諮詢了專家小組。此外，該小組還討論及計劃了干預前和干預後研究的數據收集，這將在報告的較後部分作出介紹。

參加者的意見：

專家小組成員認為傾斜版應該是與桌子分開的一部分。將傾斜版整合到桌子結構上，即桌板本身可調傾斜角度，會帶來許多問題，如機制複雜、可行性低、因笨重而需要成人幫助調整，而減低孩子獨立使用的機會。另外，孩子需要經常就閱讀、寫作和繪畫等不同的學習模式調整桌子的傾斜度，單獨的傾斜版會更加輕巧以及方

Date　　：19 May 2021

Time　　：10:00AM – 12:00PM

Expert Panel Members:

Dr. M.S. Wong
Associate Professor
PolyU Department of Biomedical Engineering

Dr. Henry Chan
Associate Professor
PolyU School of Optometry

Ms. Karen Lee
Project Manager
Jockey Club Design Institute for Social Innovation

Dr. Tulio Maximo
Assistant Professor
PolyU School of Design

Summary:

The team consulted with the expert panel on lighting, seating set-up, including detachable seats, tilt panels and stools. In addition, the panel discussed and planned data collection for the pre- and post- intervention studies, which will be covered in the upcomg sections of this report.

Suggestions from the Expert Panel:

The expert panel agreed that the tilting board should be a separate part of the table. The integration of the tilting board into the table structure poses a number of problems, such as complicated mechanisms, low feasibility, and the need for adult assistance with adjustments , which reduces the child's independence. In addition, as frequent adjustments are required to adpot different learning modes such as reading, writing and drawing, a table tilt that is separated from the tilting board would be more

便時常調整。相比於可傾斜的桌面，單獨的傾斜板在不使用時可能會佔據更多空間，即便如此，專家組成員仍認為獨立的傾斜板是更為適合的解決方案。

此外，專家組擔心座椅下方的儲物箱，會阻礙攔腳空間，可能會令孩子難以站立。

convenient and easily adjustable. A separate tilting board may take up more space when it is not in use, however, the expert panel still agreed that it is a better solution.

In addition, the expert panel is concerned that the storage box placed under the seat is in the way of the feet and the child may not be able to stand up easily.

專家諮詢 - 家具生產商
Expert Consultation II - Furniture Manufacturer

日 期　　：2021年6月4日及2021年6月25日

時 間　　：10:00AM – 12:00PM

參加者：形諾家具有限公司的員工

概 要：

團隊與形諾家具有限公司，本地一家提供可度身訂造家具並生產整套功能原型的公司討論該概念的可行性。團隊分享了項目目標和設計規範。形諾家具有限公司的員工就兒童家具的某些機制和安全要求的實際解決方案提出了專業意見。

家具生產商的意見：

討論主要圍繞設計批量製造的可行性，包括整體結構、產品結構鏈接、安全性、材料選擇和成本估算。會議期間，家具製造商就桌子的折疊功能建議使用現成的部件取代重新設計楷模生產。他們還提出了將座椅連接到凳子上的可行方案，以及對現有設

Date　　：4 June 2021 and 25 June 2021

Time　　：10:00AM – 12:00PM

Attendees：Staff members from Innomobel and furniture manufacturer

Summary:

The team discussed the feasibility of the concept with the staff members from Innomobel, a local company that provides customisable furniture solutions and create functional prototypes. The team shared the project objectives and design specifications with the company. Staff members from Innomobel offered professional advice on practical solutions for certain mechanisms and safety requirements for children's furniture.

Suggestions from the furniture manufacturer:

Discussion focused on the feasibility of designing for prototyping and mass production, including overall structure, mechanisms, safety, material selection and cost estimates. During the meeting, the furniture manufacturer suggested the use of off-the-shelf components for the folding function of the table prototype. They also

計的修改，以增強桌子的穩定性和強度。就桌面相關需求，他們亦推薦了耐用、堅固且重量合適的材料。由於受小批量生產和模具價格的限制，他們建議用鋼材製作鋁製椅子和凳子。然而，此舉亦會令初期測試模型的重量相對增加，孩子們或會更難自己移動座椅。

suggested possible options for linking the seat to the stool and modifications to existing designs to increase the stability and strength of the table. They also recommended durable, solid, weight-appropriate and affordable materials for the table top. Limited by its production scale and the price of moulding, the company recommended the use of steel for the aluminium chairs and stools. This also caused some inconveniences, resulting in the initial test models being potentially heavier and more difficult for children to move the seats by themselves.

# 干預前的真實場景用戶測試
Pre-intervention study on the field

測試目的 Objective

干預前用戶測試是在用戶使用設計產品之前進行的測試，可以為干預後用戶測試提供基準，以方便作比較。干預前和干預後研究為測試效率提供可計量的證據，同時能夠引導未來的干預設計和學術研究方向。它可以幫助設計團隊找出產品的痛點，例如潛在危險和用戶行為。干預前和干預後用戶測試中參加者均有使用桌子（他們原有的家具和干預的家具）來完成學校作業。

三個劏房家庭參加是次研究，每個家庭至少被訪問了三次。第一次訪問是為了進行干預前研究，第二次訪問是為了培訓家庭如何使用適應性家具原型，第三次訪問是在原型使用兩周後進行的干預後研究。

The pre-intervention study on the field evaluated the SDU families before receiving the prototype interventions, in order to provide a benchmark to compare with the post-intervention study. Pre- and post- intervention studies offered measurable evidence of the effectiveness of an intervention and can guide future interventions and academic research. Hence, it can help identify pain points such as potential hazards and user behaviours under controlled environment. Both the pre- and post-intervention studies were conducted while participants were using the tables (their original furniture and the intervention furniture) to complete their homework.

Three SDU families participated in the study and was visited at least three times each. The first visit was to conduct the pre-intervention study; the second visit was to train the family how to use the adaptive furniture prototype, and the third visit was conducted two weeks after using the prototype so as to conduct the post intervention study.
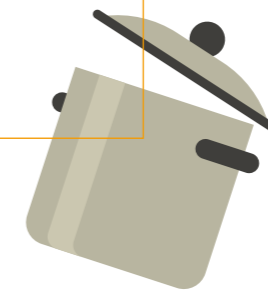
測試內容 Assessment Method

測試評估了參加者的姿勢、眼部健康和原型設計。

During the test, participants' posture, visual health and prototype design were all assessed.

| 項目 Component	家具使用 Furniture Usage			姿勢健康 Postural Health		眼部健康 Visual Health		
測試方面 Assessed Area	安全性 Safety	滿意程度 Satisfaction	行為 Behaviour	脊柱曲度 Spinal Curvature	脊柱姿勢 Spinal Posture	照度水準 Lux level	閱讀距離 Reading Distance	學習環境的整潔程度 Clutterness of the near-work environment
測試方法 Methodology	風險評估 Risk assessment	提問和訪談 Contextual inquiry and structured interview	觀察和訪談 Structured observation and contextual inquiry	評估參加者脊柱曲率；利用影像記錄，觀察參加者在使用原型之前和期間的坐姿和坐姿隨時間的變化。 Assessment of the participants' spinal curvature. Visual assessment of sitting profile and change of posture while using the current furniture and intervention prototype.		評估參加者的眼睛狀況；持續測量在使用原型之前和期間的眼睛照度水平以及眼睛與書本間的距離。 Assessment of participants' eye conditions, continuous assessment of the light level coming into the eyes and distance from objects to participants' eyes while using current furniture and the intervention prototype.		

干預前和干預後測試對照
Pre-intervention and Post Intervention comparison

在干預前和干預後，對寫作活動進行姿勢評估
Posture assessment for writing activities during pre- and post- interventions
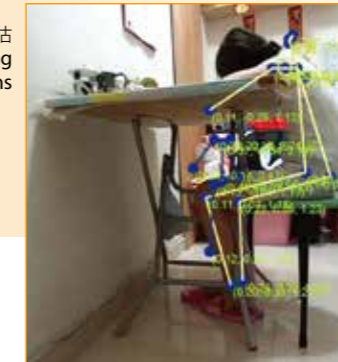
在干預前和干預後，對閱讀活動進行姿勢評估
Posture assessment for reading activities during pre- and post- interventions
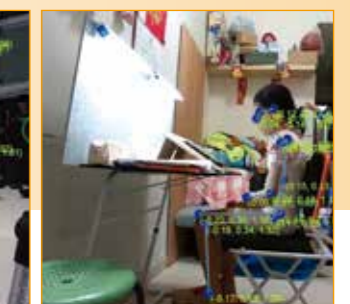
在干預前和干預後，對坐在床上的活動進行姿勢評估
Posture assessment for sitting on the bed activities during pre- and post- interventions

情 況 Condition	日 期 Date	時 間 Time	距 離 Distance	照 明 Illumination
原型基線數據 Baseline With prototype	20/7/2021 9/8/2021	10:30 - 11:30 14:30 - 15:30	54.6 ± 37.0 49.5 ± 29.7	25.2 ± 7.0 54.1 ± 29.0
(Sister 姐姐) 原型基線數據 Baseline With prototype	26/7/2021 20/8/2021	11:00 - 12:00 14:30 - 15:30	35.7 ± 27.3 24.6 ± 27.5	88.3 ± 64.4 204.6 ± 98.9
(Brother 弟弟) 原型基線數據 Baseline With prototype	26/7/2021 20/8/2021	11:00 - 12:00 15:00 - 16:00	55.7 ± 36.6 51.7 ± 32.5	91.9 ± 71.1 113.6 ± 110.3

干預前和干預後研究總結
Summary of pre- and post- interventions

安全性：
總體而言，本方案的整套家具安全性高，使用期間沒有發生任何事故。在測試之前和期間，前後搖動桌子和座椅都不會導致任何傾倒危險。儘管如此，大多數用戶覺得折疊桌子不夠穩固，不太放心在把身體重心放在桌子上或是在上面用餐。未來的改進方案應該考慮更穩固的可摺疊結構。

Safety:
Overall, the adaptive furniture set was safe to use, and no accidents were reported. Before and during the test, the table and seat were shaken back and forth without any risk of tipping. Nevertheless, most users mentioned that they felt that the folding table was not stable enough and did not feel comfortable resting their weight on the table or eating on it. Future modifications to the design should consider stronger foldable structures and mechanism.

可行性：
生產一套包括桌、座、凳、靠墊和燈飾的成本預估為港幣1,500元，這並未包括廠商利潤和運費。考慮到當前市場上針對狹窄空間的兒童家具大多數是定製形式，以及已有與本方案有類似可調節性的家具（在高度、深度、和折疊功能方面）進行批量生產中。因此，本方案可適用於大規模生產之中。

Feasibility:
The estimated cost of producing a set of furniture including table, seat, stool, cushion and light fittings is HK$1,500, given manufacturer's profit and delivery costs are out of the equation. Considering that most of the children's furniture designed for cramped spaces that are currently available on the market, which are custom made and adaptable to this solution (in terms of height, depth and folding function) are already being largely produced, it is therefore feasible to use this solution for mass production.

坐姿習慣：
團隊觀察到大多數參加者在使用新的家具時維持舊有的不良坐姿習慣。用家經常坐在座位邊緣，沒有使用腳踏凳，試圖用腳尖接觸地板。未來的改進方案應側重於培養正確姿勢的意識，並可能需要更長期的產品/服務來該問題帶來更積極、有效和長久的改變。

Sitting behavior:
The team observed that most participants habitually carried over their improper sitting behaviors to use the new furnitures. Users often sat on the edge of their seats, ignored the footrests and tried to touch the floor with their toes. Future interventions should focus on developing awareness of correct postures and may require long-term products/services to create a more positive, effective and long-term change to this issue.

姿勢改善：
目前的設計幫助用家保持良好的坐姿，在不同的學習模式和使用場景中均可分

Posture support:
The current design helps users to maintain a good sitting posture, distributes body pressure and provides

散身體壓力，提供舒適的倚靠。然而，據觀察，參加者不會主動調轉坐墊方向來改變向前和向後傾斜的兩種坐位模式。此外，撇除一個習慣坐在地板上的家庭之外，其他參加者極少在地板上或床上使用該座椅。原因之一可能是凳子和座椅之間的鎖合結構沒有完全對齊，以致它難以組裝和拆卸。同時，團隊觀察到在床上使用座椅時，採用盤腿坐姿會比直腿坐姿更有助於姿勢支撐。未來的改進方案應該讓用家可以更容易地在不同使用模式之間切換，並將姿勢意識結合到其策略中。

comfortable seating in different learning modes and usage scenarios. However, it is observed that the participants did not actively re-orient the cushion to switch between the two seating patterns, forward and backward tilt. In addition, with the exception of one family which frequently sat on the floor, participants rarely used the seat on the floor or in bed. The reason may be that the locking structure between the stool and the seat is not fully aligned, making it difficult to assemble and disassemble. The team also observed that sitting in a cross-legged position provided better postural support than sitting in a straight-legged position when using the chair in bed. Future modifications to the design should be made to make it easier for users to switch between different modes of use and incorporate them into a posture awareness strategy.

照明改善：
Illumination support:

從三名參加者來看，閱讀距離似乎沒有因使用不同的家具而改變。原因可能是在干預之前，參加者為了靠近課本而彎腰駝背，其次是參加者不經常使用桌子傾斜板。另外，儘管沒有達到統計上的顯著變化，光照的確變得充足，亦並未在桌面產生任何陰影或眩光。然而，所有家庭都說在獨自使用過程中沒有使用燈，而在觀察期間，他們也沒有在可拆卸燈充電裝置。未來的改進方案應該要提高人們對健康護眼習慣的認識，以及多鼓勵使用充電燈和桌子傾斜板。

Reading distance did not appear to change for the three participants while using different furniture. This could be attributed to the fact that prior to the intervention, participants were hunched over in order to get closer to their textbooks, and it is reported that participants rarely used the table tilt board. Also, although statistically significant changes were not achieved, there was adequate lighting and no shadow or glare on the table. However, all reported that the lamp was not used - only one person was using the table and that the detachable lamp was not charged during the period of observation. Future improvements include raising awareness of eyecare and the importance of frequent use of rechargeable lamps and table tilting boards.

收納：
Storage:

總體而言，參加者們認為本方案的家具套裝易於儲存，且不會佔用太多空間。儘管團隊示範了如何最妥善地存放家具以減少空間佔用，但參加者們也自行創造了符合日常習慣的存放方式。

Overall, the participants found the adaptive furniture sets easy to store and did not take up much space. Although the team demonstrated the most optimal storage option, participants created their own storage options to suit their daily habits.

當前原型需要改進的地方
Improvements for the current prototype

1. 未來原型的改進應該考慮更結實的折疊方法。

   Future modifications should consider a more rigid folding mechanism.

2. 未來原型的改進應該讓用家可以更容易的在不同的坐姿模式之間切換，並將姿勢意識結合到其策略中。

   Future modifications should be made to be easier to switch between sitting modes and be integrated to posture awareness strategies.

3. 未來原型的改進應考慮培養用家對正確坐姿的意識，並鼓勵用家時常改變坐姿。

   Future modifications should be integrated with posture awareness and encourage change in sitting postures.

進一步干預的建議
Recommendation for further interventions

4. 進一步的干預措施應側重於培養姿勢意識，並且可能需要結合產品與服務組合模式，以便為該問題帶來更有效及長久的改變。

   Further interventions should focus on posture awareness and may require to adopt a mix of product and service engagement models in long term to bring to bring more effective changes to the captioned problem.

5. 進一步的干預措施應提高用家們對眼睛健康的意識，讓用家意識到多使用充電燈和桌子傾斜板的重要性。

   Future solutions should raise awareness on eyecare and the importance of using the recharging lamp and the table tilt more frequently .

最終提案和設計注意事項：
Final Proposal and Design Considerations:

可調節的面板上有充電燈
Adjustable panel with rechargeable lights

用紙板製成的傾斜板
Open-source tilt board made of cardboard

可調節／可移動的靠背墊
Adjustable / removable backrest cushion

可折疊和高度可調的桌子
Foldable and height adjustable table

用紙板製成的腳踏凳
Open-source footrest made of cardboard

休閒／閱讀時的座墊
Seat cushion on chill / reading configuration

地板／床上坐椅配置
Floor / bed seat configuration

可摺疊凳子
Foldable stool

- 可拆卸的座椅
  Detachable seat
- 靈活的坐姿模式，適合不同的坐姿
  Flexible seating mode for different sitting postures
- 可定製的背部支撐，適合不同用戶的尺寸
  Customisable back support for different user sizes
- 可調節的桌子高度
  Adjustable table height

- 可充電的枱燈
  Rechargeable desk lamp
- 腳踏板和桌子傾斜裝置
  Open-source footrest and table tilt
- 可調節的桌子傾斜角度
  Adjustable table tilt angle
- 可折疊／易於存放的解決方案
  Foldable/easy-to-store solution

設計特徵
Key Features

1. 舒適的坐姿 Posture comfort

該套方案的家具尺寸根據6–12歲兒童的現有人體測量學數據所設計（Cheng et al.，2019; Pheasant and Haslegrave，2005）；墊子的柔軟度均經過用戶測試，腰部和背部的海綿具有不同的柔軟性來提供不同的支撐。（Pheasant and Haslegrave，2005）

The dimensions of the furniture in this set are based on existing anthropometric data for children aged 6-12 years (Cheng et al.; 2019; Pheasant and Haslegrave, 2005); the softness of the cushions has been tested by users, and the lumbar and back foams have different softnesses to provide suitable support. (Pheasant and Haslegrave, 2005)

2. 舒適的照明環境 Visual comfort

可充電且可拆卸的枱燈為桌面上的活動提供充足的照明，並配備了柔光罩來弱化強光。

The rechargeable and detachable desk lamp provides enough illumination for activities on the desk and is equipped with a diffuser to reduce glare.

3. 可調節適應不同兒童大小 Adjustability to suit different child sizes

桌子的高度、腳踏凳高度、背部支撐高度和座椅深度均可根據不同兒童的高度調節調整。

The table height, footrest height, back support height and seat depth can all be adjusted to suit different child heights.

為6歲和12歲兒童而設計的可調校枱凳組合
Adjustable furniture set for children aged 6 and 12 years old respectively

三種尺寸的靠背坐墊組，可定製從兒童到成人的座椅深度和背部支撐高度
Backrest cushion sets in 3 sizes. The seat depth and back support height are customisable to suit the needs from child to adult
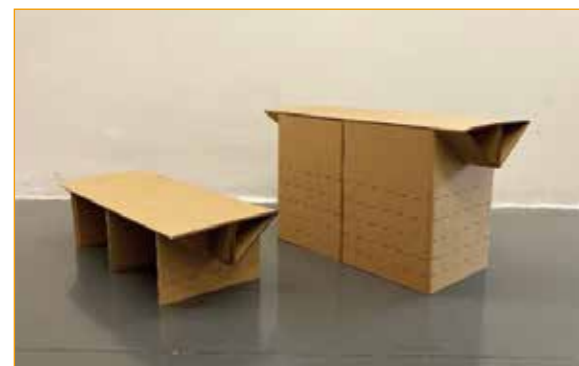
腳踏凳用瓦通紙板製成，方便使用者自行切割，以調整高度
The footrest made from corrugated cardboard can be cut by the user to adjust the height

4. 可適應不同的學習模式 Adjustability for different learning modes

用家可通過將傾斜板轉換為15至30度或調轉座椅墊以切換至不同的學習模式，包括向前傾的寫作坐姿，及向後的讀書坐姿。

By converting the tilt board to 15 to 30 degrees and adjusting the seat cushion, it can be used for different learning modes, such as writing (leaning forward) and reading (laying backwards).

5. 可適應不同家庭、用戶和空間需求 Adaptability to different families, users and space requirements

適用於不同的場景：包括有一個或兩個孩子的家庭、學習或用餐的場景、在床上或地上使用的場景、小孩或是成年人使用的情況。

Suitable for different scenarios: for the families with one or two children; when studying or eating; when using in bed or on the floor; when used by children or adults.

兩組不同的設置
Two different set-ups

6. 安全 Safety

該方案避免兒童手指夾傷，同時確保桌子和椅子的重心穩固。

The design prevents children's finger traps and the centre of gravity of the table and chair ensures that they would not fall over.
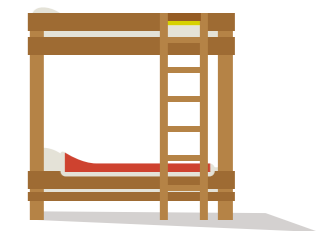

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測試桌子、隔板、座椅、凳子、傾斜板和腳踏板
Testing the desk, partition, seat, stool, tilt board and footrest

測試兩個孩子共用桌子的情況
Testing with two children sharing the desk

桌子在不使用時可以摺疊存放
The desk is folded and stored when it is not in use

目前兒童做功課時使用的家具
Current furniture used by children for homework

使用延時攝影機研究坐姿隨時間的變化
Using time-lapse camera to study the change in postures over time

在床上的兩種坐姿：直腿和盤腿
Two types of sitting postures in bed: straight and crossed legs

劏房戶兒童家具適應性設計
行動項目報告（香港高等教育科技學院 - 產品設計）

ADAPTIVE DESIGN AND
CHILD-FRIENDLY FURNITURE
IN SUBDIVIDED UNITS
ACTION PROJECT REPORT
(PRODUCT DESIGN, THEi)

項目團隊
PROJECT TEAM

香港高等教育科技學院 - 產品設計
Product Design, Technological and Higher Education Institute of Hong Kong

Dr Tris Kee   Assoicate Professor
Mr Andy Lai   Lecturer
Ms Karen Lam   Research Assistant

明愛香港仔社區中心
Caritas Community Centre - Aberdeen
Caritas Youth and Community Service

香港傢俬裝飾廠商總會
The Hong Kong Furniture and Decoration Trade Association (HKF&DA)
Ms May Leung
Mr Gary Lui
Ms Jane Tong
Mr Allen Kwong
Mr Patrick Tin
Miss Sonia Lui

香港建築中心
Hong Kong Architecture Centre
Mr HC Chan

One Bite Design Studio
Ms Venus Cheung
Mr Garrick Chan

Young's Creation Co. Limited
Mr Stewart Young

設計團隊
Design Partners
DOSHA Woodcraft
Ms Dina Yu
Ms Oliver Kan
Ms Sammi Chan
Mr Herry Ma
Ms Ava Jiang

學生義工
Student Volunteers
香港高等教育科技學院
Technological and Higher Education Institute of Hong Kong
Miss Audrey Cheung
Mr Kelvin Leung

感謝所有參與的社區成員，特別是劏房租戶。
Special thanks to all participating community members, especially the SDU tenants.

項目概述和過程
PROJECT OVERVIEW AND PROCESS

設計目的
設計目的是要開發一套符合人體工學的桌椅，以改善居住於劏房的兒童的學習空間。

Design Objectives
The design aims to develop a set of ergonomic desks and chairs to enhance children's learning space in subdivided units (SDUs).

共創設計流程
設計過程分三個階段進行:

階段一：背景研究
於2021年3月，設計團隊探訪並訪問了三戶不同背景的劏房家庭。這些個案研究為有關劏房家庭的生活條件及日常生活習慣提供了更全面的資料。此外，團隊還研究了於劏房中常用的家具和固定裝置。在這個階段，團隊辨識可能影響兒童學習表現的環境及行為因素，從而探討兒童友善家具設計的關鍵元素。

階段二：社區參與工作坊
於2021年4月，為探討在劏房環境限制兒童友善家具設計的關鍵標準，項目舉行了一個共同設計工作坊，參加者包括設計師、社工、家具製造商、學生和當區成員。工作坊匯集了參與者的專業知識和創造力，他們就家具設計交流意見，並攜手創造改善劏房兒童學習空間的解決方案。參加者之間的交流為制定適合劏房戶需要的家具

The Process of Co-design
The design process is divided into 3 phases:

Phase 1: Background Research
In March 2021, the design team visited and interviewed three SDU households with different backgrounds. These case studies provided comprehensive information on the living conditions and the daily habits of the families. In addition, the team also studied the furniture and fixtures commonly used in these subdivided flats. During this phase, the team explored key elements of child-friendly furniture design by identifying environmental and behavioural factors that might affect children's learning performance.

Phase 2: Community Engagement Workshop
In April 2021, a co-design workshop was held with designers, social workers, furniture manufacturers, students and local members to collectively explore the key criterias for adapting child-friendly furniture to the constraints of the SDU environment. The workshop was injected with creativity and expertise as the participants exchanged ideas on furniture design and co-created solutions to improve the learning environment for children in SDU households. The exchange of ideas among

設計提供很多具啓發的設計元素。

participants provided inspirational design elements for developing furniture designs to suit the needs of the SDU tenants.

階段三：原型設計及測試

設計團隊按社區參與工作坊中取得的意見修改設計方案。於2021年7月，團隊製作了三套1:1家具原型，然後陸續為已登記參與測試的劏房家庭進行安裝。同年8月，三戶家庭對原型進行了為期兩週的測試。原型測試的目標是要辨識相關用途問題，並確定需要進一步修改的範疇。

Phase 3: Prototyping and Testing

The design team revised the design based on the feedback from the community engagement workshop. In July 2021, the team produced three sets of 1:1 prototype furniture, which were then installed for the SDU households. In August, the prototypes were tested by the three families for two weeks. The goal of the prototype testing was to identify all usability issues and areas for further modification.
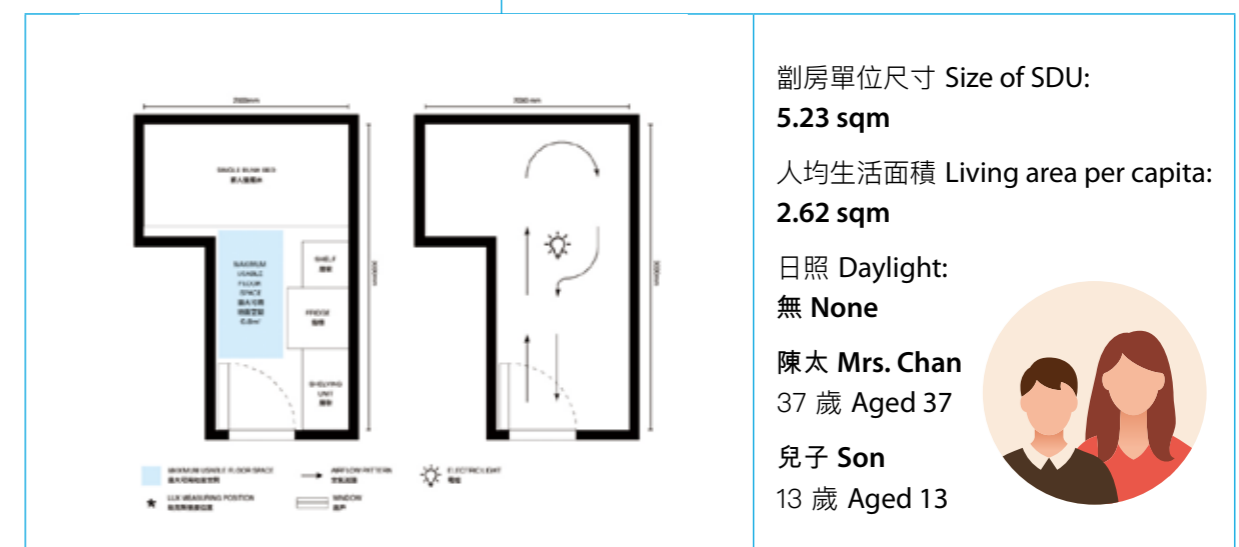
階段一：個案研究
PHASE 1: CASE STUDY

個案研究簡介
Case Studies Overview

為了設計一套可適用於不同劏房戶的家具，設計團隊與明愛香港仔社區中心合作，邀請了三戶劏房家庭進行個案研究。

設計團隊向居住在南區的三個劏房家庭進行了個案研究。他們的居住環境條件各有不同。通過反思劏房的居住環境和場地限制，以及了解兒童們的日常生活和學習習慣，團隊希望發展一個可被大多數劏房戶孩子採用的設計方案。

In order to design a set of furniture that can be adapted to different SDUs, the design team collaborated with Caritas Community Centre - Aberdeen and invited three families living in SDUs to conduct a case study.

The design team conducted a case study with three families living in SDUs in Southern District. Their living conditions were different from one another. By reflecting on the living environment and site constraints of subdivided flats, and realising the children's daily routines and learning habits, the design team hoped to develop a design solution that could be used by most children in SDUs.

劏房單位尺寸 Size of SDU:
5.23 sqm

人均生活面積 Living area per capita:
2.62 sqm

日照 Daylight:
無 None

陳太 Mrs. Chan
37 歲 Aged 37

兒子 Son
13 歲 Aged 13

劏房單位尺寸 Size of SDU:
9.87 sqm

人均生活面積 Living area per capita:
3.29 sqm

日照 Daylight:
尚可 Fair

盧先生 Mr. Lo
43 歲 Aged 43

盧太太 Mrs. Lo
35 歲 Aged 35

女兒 Daughter
9 歲 Aged 9

劏房單位尺寸 Size of SDU:
11 sqm

人均生活面積 Living area per capita:
2.75 sqm

日照 Daylight:
阻擋 Penetration partially blocked

吳先生 Mr. Ng
44 歲 Aged 44

吳太 Mrs. Ng
39 歲 Aged 39

兒子 Son
11 歲 Aged 11

女兒 Daughter
3 歲 Aged 3

實地考察總結
Summary of Site Visits

單位結構

團隊到訪的三個劏房面積介乎 5.2 平方米至11平方米。雖然這些劏房大小不同，但建築結構相似。單位中大部份的非結構牆都已被拆除，並豎立了木隔板將單位分成多個細小的劏房。三個受訪劏房戶中有兩戶安裝了私人廁所，餘下面積最小的一戶則需要與其他租戶共用一個廁所。雖然根據《建築物（規劃）條例》，每戶可居住的房間都應設有適當面積的窗戶作自然採光和通風，但該面積最小的劏房並無連接住宅外部的窗戶。

儘管一些劏房能連接到可用作建造獨立廁所的部份結構牆或混凝土牆身，但全部受訪單位的房東都禁止租戶在牆上鑽孔，因此限制了可供安裝的家具裝置。

家具佈局

設計團隊觀察到，碌架床和摺枱是最受劏房戶歡迎的家具。由於碌架床佔據了單位大部分空間，住戶通常會先安排其位置，此後他們才會設置其他獨立的家具，例如層架、抽屜櫃和櫥櫃等。由於使用摺枱、摺凳及矮凳時通常會霸佔了劏房內的進出路徑，為了方便住戶在劏房狹窄的環境中使用家具，其設計應該考慮住戶在家中走動的情況。

室內照明

三個劏房單位各裝有一至兩個照明裝置，但普遍來說，室內照明並不足

Unit Structure

The sizes of the three SDUs visited by the team are in the range of 5.2 sqm to 11 sqm. Although their sizes are different, the structures are similar. Most of the original non-structural walls have been removed and the units have been divided into small SDUs by wooden partitions. Two out of the three SDUs have private toilets, while the smallest unit has to share a toilet with other tenants. The smallest SDU does not have a window connecting to the outdoor environment, although according to the Building (Planning) Regulations Ordinance, each habitable room should be provided with appropriate windows for natural lighting and ventilation.

Although some SDUs are connected to partial structural walls or concrete walls that could be used to build individual toilets, landlords in all interviewed units prohibited tenants from drilling holes in the walls, thus limiting the amount of furniture fixtures that could be installed.

Furniture Arrangement

The design team observed that bunk beds and folding tables are the most popular furniture for SDU households. Since the bunk bed occupies most of the space in the unit, the residents usually fix its location before arranging other standalone furnitures such as shelves, drawers and cabinets. As they usually occupy the access paths with folding tables, folding chairs and small stools in the SDUs. Therefore, a set of furniture should be designed to facilitate their use in the cramped environment and consider the situation that they move around at home.

Interior Lighting

The three SDUs are each equipped with one or two lighting fixtures, but in general the lighting are inadequate. In the

夠。最惡劣的個案，因為單位無相連室外環境的窗戶，所以完全沒有自然光。而那些有窗戶的劏房中的，光線通常會被家具和雜物所阻礙，無法穿透空間。總體而言，孩子們下午放學回家時，單靠室外自然光不足夠讓他們可以做功課和溫習。

除了缺乏自然光外，疫情期間的網上學安排使問題變得更複雜，因為學童必須整天留在家中上課、完成功課和溫習。充足的光線對於健康的學習環境至關重要，不過，團隊觀察到劏房家庭一般都沒有使用枱燈。

worst case, there was no natural light at all because the unit has no windows connecting to the outdoor environment. In addition, light penetration is usually blocked by the furniture and clutter. In general, when children come back to home from school in the afternoon, natural light is inadequate for them to do their homework and study. Therefore, the team designed the solutions based on the premises that there is not enough light in the SDUs for learning.

Besides the lack of natural light, online studying during the COVID-19 pandemic further complicated the problem, as children had to stay at home all day to attend online classes as well as do homework and revision. Adequate lighting is essential for a healthy learning environment. However, it is observed that the families in SDUs generally do not use table lamps.

空氣流通

劏房單位的通風一般很差。當單位沒有安裝窗戶或冷氣機時，室內空氣流通尤其會受到限制。一些家庭會打開窗戶和門促進空氣對流，但亦有住戶選擇緊閉所有窗戶以隔絕來自周圍繁忙街道的噪音和灰塵。

Air Ventilation

Ventilation in SDUs is generally very poor. Indoor ventilation is especially limited when the unit is not equipped with windows or air conditioners. Some households open windows and doors to help cross-ventilation, but others prefer to keep all windows closed to keep out the noise and dust from busy streets around them.

兒童的學習姿勢和生活習慣行為

團隊訪問了家庭中兒童的起居生活和習慣，並邀請兒童展示他們在家中如何進行網上課程和做功課。

所有受訪家庭的兒童都使用摺枱配上膠凳或摺凳在家中上網課或做功課。在如此擁擠的環境中，他們很難保持良好的學習姿勢。此外，他們不能根據身體發育情況調整學習時使用的家具。父母偶爾會提到他們的孩子在學習時喜歡趴在桌上。他們擔心子女如無法長期保持健康的學習姿勢，可

Children's postures for learning, habits and behaviors

The design team interviewed families about the daily routines and habits of their children. Team members invited children to demonstrate how they conduct online classes and do homework at home.

All of the children in the families interviewed use folding tables with plastic stools or folding stools to conduct online classes and to do homework. In such crowded environment, it is difficult for them to maintain a good posture while studying. Besides, the furniture they use for studying cannot be adjusted to accommodate the physical

能會導致駝背問題或造成其他不良的影響。無論家長或兒童都表示如有足夠空間，他們更喜歡有靠背的座椅，因為更舒適及能為腰部提供更好的支撐。

由於環境欠佳，租戶認為他們的家居環境並不適合學習。當中一戶子女每天都有參加補習班以完成功課，至於其他兒童則嘗試在社區中心的自修室或附近親戚的家中完成作業和溫習。

自疫情開始以來，學校斷斷續續地停課；公共設施服務也受到嚴重干擾。因此在疫情期間，大多數兒童只能留在家中網上上課。儘管大部份兒童都不喜歡使人費神的網課，但他們還是會花大量的閒暇時間在網上娛樂。因此，家具設計必須考慮到兒童們頻繁使用電子設備的現象，並設法讓他們能以符合人體工學健康的方法使用手機、平板電腦和筆記型電腦。

growth of children. Parents occasionally mentioned that their children like to lie on their tables while studying. They were concerned that their child's inability to maintain a healthy learning posture over time may lead to kyphosis or other problems. Both parents and children expressed that they prefer chairs with backrests if space allows because of comfortness and better lumbar support.

None of the tenants consider their cramped home a suitable space for learning. One of the children has to attend tutorial classes every weekday to finish homework, while the others try to finish their homework and revision in a study room at the community centre or at a relative's home nearby.

Schools have suspended in-person classes intermittently since the outbreak began, and public facilities and services have been severely disrupted. As a result, most children have been forced to stay home and to attend online classes during the COVID-19 outbreak. Even though most children dislike the mentally draining online classes, they still spend a lot of their free time entertaining themselves on their electronic devices. Therefore, furniture design must take into account the prolonged use of electronic gadgets by children and implement ergonomic solutions focusing on improving posture while using mobile phones, tablets, PCs and laptops.

這位孩子使用折疊桌學習時不自然地彎曲了雙腳，因為桌子高度對她來說太低了
A child had to bend her legs because the folding table she used for studying was too low for her

階段二：社區參與工作坊
STAGE 2: COMMUNITY ENGAGEMENT WORKSHOP

社區參與工作坊概述和目標
Community Engagement Workshop Overview and Objectives

於2021年4月，本項目舉辦了名為「劏房空間的適應性設計：共創兒童友善家具工作坊」的社區參與工作坊，活動收集來自40名不同背景參加者對家具設計的意見。他們當中包括劏房住戶、社工、設計師、香港傢俬裝飾廠商總會會員、學生及其他當區住戶。通過鼓勵和支持社區參與，工作坊旨在將劏房居民的聲音帶入家具設計的決策過程。它還創造了平台，讓社區人士、設計師和不同界別的專業人士交流知識和觀點，而來自不同背景的參加者使工作坊的互動別具意義。

共創設計工作坊的目標是整合用戶和專業人士的知識，以發展可行的家具設計概念。參與式設計有助了解用戶的需求、體驗和行為，並於初期將這些與人息息相關的因素納入產品設計考慮。工作坊參考設計思維過程，讓持份者和用戶參與設計過程，一起構思、開發、評估和完善兒童家具原型生產的設計方案。

In April 2021, a community engagement workshop named: "Adaptive Design in Subdivided Unit: Co-designing Child-friendly Furniture Workshop" was held in order to collect the views of 40 participants from different backgrounds on furniture design. They included tenants of SDUs, social workers, designers, members of the Hong Kong Furniture and Decoration Trade Association (HKFDTA), students and other residents of the district. By encouraging and supporting community participation, the workshop aims to bring the voices of SDUs residents into the decision-making process of furniture design. It also creates a platform for knowledge exchange among the community, designers, and professionals from different sectors. The interaction among participants from different backgrounds was what made the discussion extra meaningful to one another.

The goal of the co-creation workshop is to integrate the knowledge of users and professionals to develop viable furniture design concepts. Participatory design helps reveal the needs, experiences, and behaviours of users, and incorporates these human factors into product design at the earliest stage possible. The workshop draws on a design thinking process, involving stakeholders and users in the design process to ideate, develop, evaluate and refine design solutions for the production of children's furniture prototypes.

參與式設計的本質是要將用戶的聲音帶入設計過程的決策中
The essence of participatory design is to bring the voices of users into the decision making of the design process

香港傢俬裝飾廠商總會主席梁勵女士總結工作坊中大家對劏房家具設計的見解
Ms May Leung, Chairlady of the Hong Kong Furniture and Decoration Association (HKF&DA), summarised the participants' insights on furniture design

## 研究及社區參與工作坊的啟發
Case Studies Overview

社區參與是參與式設計的核心。工作坊鼓勵參與者分享他們對兒童家具的理解，並通過對設計概念的反覆討論和評估來探索他們的個人需求。社區成員攜手合作，透過原型製作將他們的創意具體化。模型的創建和展示有助於收集具建設性的意見，並進一步促進設計過程。

家具設計的複雜性在於需平衡及兼容各種要求。通過分析工作坊期間參與者的對話和他們的問卷回覆，設計團隊更加了解用戶的願望和潛在需要，並通過融合不同設計，滿足用戶需求。

以下是從文獻研究、案例探討和工作坊交流中獲得的啟發的摘要。為方便參考，以下意見雖被歸納成不同組

Community engagement is the core of participatory design. The workshop encouraged participants to share their different interpretations of children's furniture and explore their individual needs through interative discussions and evaluation of design concepts. Community members worked together to make their ideas tangible through prototyping. The creation and presentation of models helped gather constructive feedback and further facilitate the design process.

The complexity of the furniture design stems from a number of incompatible requirements. By analysing the conversations of the participants during the workshop and their questionnaire responses, the design team gained a better understanding of the users' desires and potential needs, assimilated these different considerations, and integrated them into a design that best met the users' needs.
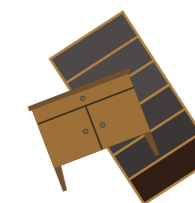
別，但當中的考慮及其對應的解決方案在整體設計中仍然環環相扣，亦是決定產品最終可用性的基準。

The following is a summary of insights gained from desktop research, case studies and the workshop. Although these insights are grouped into different categories for the ease of reference, the considerations and their corresponding solutions are intertwined in the overall design and will remain as the determinant of the product's ultimate usability.

空間利用
Space utilization

材料適用性
Material suitability

功能性
Functionality

可用性
Usability

人體工學
Ergonomic

安全性
Safety

1. 空間善用

劏房家庭面對最普遍的問題是空間不足，可以放置新家具的面積有限（案例研究中的家庭為0.8平方米至1.8平方米不等）。因此，為劏房兒童設計的家具應著重減少體積，並採用折疊結構以節省儲存空間。設計應該讓用戶能夠輕鬆地打開和收起，以便快速為其他家庭成員騰出通道。

2. 功能性

家具設計應該能全面支援兒童進行日常學習活動，包括閱讀、寫字及網上上課等。早期研究證明，於教室中引入新設計的家具後，學童進行與學習相關活動時的表現顯著改善（Knight & Noyes 1999）。由此可見，家具是影響兒童學習表現的因素之一。團隊參考這些學童家具的功能及設計特點，以滿足兒童學習方面的需求。

儘管桌子和座椅的設計概念只供兒童學習使用，許多參加工作坊的家長都希望桌子可以有雙重用途，令書枱搖身一變成為餐桌。此外，參加者亦有建議為家具增添功能，例如增設小儲物抽屜和可繪白板。設計師平衡這些意見，透過了解設計在不同層面的表現，再進行設計調整。

3. 安全性

安全是家具設計的首要考慮。大家一致地認為兒童家具不應有危險的邊緣，否則可能會在意外碰撞中導致孩

1. Space utilisation

The most common problem faced by the families living in SDUs is the lack of space and the limited floor space available for new furniture (ranging from 0.8 sqm to 1.8 sqm in the case studies). Therefore, study furniture designed for children in SDUs should be compact with foldable function for the sake of saving storage space. Such design should be easily manoeuvrable because of the need to quickly make way for other family members when needed.

2. Functionality

Furniture should be designed to fully support children's daily learning activities, including reading, writing, and online classes. Early research has demonstrated that the introduction of newly designed classroom furniture significantly improves children's performance in a range of learning-related activities (Knight & Noyes 1999). It is clear that furniture is one of the factors that has an impact on children's learning performance. By taking into account the functions of these school furniture, the team is able to identify child-friendly design features to meet children's learning needs.

Although the tables and chairs were conceptually designed to facilitate children's learning, many parents who attended the workshop hoped that the table can perform multiple functions, both as a study table and as a dining table. Participants also suggested making the furniture more multi-functional, such as equipping them with small storage drawers and paintable whiteboards. Necessary modifications were made after balancing these competing needs and understanding how the design would perform at different levels.

3. Safety

Safety is the primary consideration in furniture design. There is a consensus that children's furniture should not have sharp edges that could cause serious injuries to

子嚴重受傷。工作坊的參加者就安全要求表達了不同的意見—劏房住戶最擔心家具的金屬接頭或可以調校的部件會否對年幼兒童構成危險，例如夾傷或卡住手指。為了解決他們的擔憂，家具製造商推薦安裝幾種可以降低風險的安全裝置，例如油壓零件減少夾傷。家具製造商更關注設計的結構平衡。考慮到家具在使用過程中會因受力而改變重心，他們建議桌腳長度不得少於桌面三分之二。

4. 人體工學健康

家具的人體工學設計需要顧及用家的身體比例。雖然有關香港人口的人體測量數據有限，但香港學齡兒童的早期人體測量案例研究（Chan 1972、Evans、Courtney & Fok 1988 和 Chung & Wong 2007）顯示多年來香港學齡兒童的體型一直有增長趨勢。下表列出了供小五至六年級學生使用的學校家具的尺寸建議（Chung & Wong 2007）。

設計團隊參考以下數據和實地考察數據，計算出配合劏房兒童需要的家具尺寸。

children in any accidental collision. Participants of the workshop showed different understandings of safety requirements - SDU households are most concerned about whether metal joints or adjustable parts of funiture would cause accidental injuries to young children, such as fingers pinching or jaming. To address their concerns, furniture manufacturers recommended several new safety devices that can reduce the risk, such as hydraulic press joints to reduce pinching. Furniture manufacturers are more concerned about the structural balance of the design than parents are. Considering that furniture changes its centre of gravity when it is in use, they recommended that the minimum length of the table legs should be no less than two-thirds of that of the desktop.

4. Ergonomic Health

The ergonomic design of furniture requires a realistic understanding of the intended users' body dimensions. However, there are limited ergometric data on the Hong Kong population. Early anthropometric case studies of school-age children in Hong Kong (Chan 1972, Evans, Courtney & Fok 1988 and Chung & Wong 2007) showed a long-term trend of increasing body size in school-age children in Hong Kong over the years. As a reference, the following table shows the recommended sizes of school furniture for Primary 5 to 6 students (Chung & Wong 2007). The design team took into account the following data, as well as the data obtained from site visits, to calculate the appropriate furniture size for children living in the SDUs.

建議尺寸 Suggested Measurements	女童 Girls	男童 Boys
座椅高度 Seat height	337.7 - 364.4 毫米 mm	316.2 - 375.5 毫米 mm
座深 Seat depth	336.6 - 399.7 毫米 mm	316.2 - 375.5 毫米 mm
膝蓋高度與辦公桌的最小間隙 Minimum knee height and desk clearance	473.7 毫米 mm	477.4 毫米 mm
可接受的最大桌子高度 Maximum acceptable desk height	554.3 - 581.2 毫米 mm	543.5 - 570.3 毫米 mm

在設計過程中需考慮桌椅各自的尺寸，桌椅高度應該互相配合，才能發揮出理想的人體工學表現。所以，要為不同身型並持續成長的學齡兒童提供通用的家具，最可行的做法是在設計中加入可調節元素，賦予家具更大的靈活性，以便適應不同用戶和使用情況。

不合適的書桌及座椅設計會令學童難以保持良好的坐姿，在書寫及學習時，身體壓力無法平均分佈，使部份肌肉，關節和韌帶承受過多壓力。不良的坐姿會增加身體的壓力，做成頸背、手臂、手部肌肉疲勞甚至疼痛，更會影響學童專注力，減低其書寫耐性，長遠影響其學習表現及身體發育（Castellucci, Arezes, Molenbroek, de Bruin, & Viviani, 2017）。

家長則更著重評估新座椅的人體工學性能，尤其關注脊柱健康問題。他們希望新設計的座椅可以幫助改善兒童坐姿。在工作坊中，有靠背的椅子設計最受家長們歡迎，因大部分市面上的人體工學椅子體積比較大，他們期望椅子的設計能簡單有效地改善腰部支撐，從而減輕孩子患上駝背等脊椎變形疾病的風險。有研究建議，在學校供兒童使用的座椅最佳靠背角度為 95 到 100 度之間，而座板則可設計成向後傾斜 4 度(Evans, Courtney & Fok, 1988)。

保護視力健康先要保證充足、均勻且穩定的光線。有研究發現生活在狹窄環境中的孩子會更容易患上近視（Choi et al., 2017）。因此，家具設計應避免使用過鮮艷顏色和高對比度的圖案，並考慮使用啞光材料來製造桌面。除設計之外，還應盡量減少桌

The respective sizes of tables and chairs should be considered in the design process, integrating the heights of tables and chairs to match each other and achieve the ideal ergonomic performance. Therefore, to provide furniture suitable for school-age children of different sizes and growth phases, the most feasible approach is to add adjustable elements in the design to provide different users and environments with extra flexibility and adaptability.

Poor designs make it difficult for school children to maintain good sitting postures and even pressure distribution, thus create pressure on their muscles, joints and ligaments. Poor sitting posture increases stress on the body, causing fatigue or pain in the muscles of the neck, back, arms, and hands, while it also affects children's concentration and causes writing stamina, which can create long-term and detrimental effects on their learning performance and physical development (Castellucci, Arezes, Molenbroek, de Bruin, & Viviani, 2017).

Parents, on the other hand, expressed concerns towards the ergonomics of the new seats, and how it can help alleviate children's spinal health problem. They hoped that the new chair designs would help improve children's sitting posture. In the workshop, chair designs with backrests were the most popular among parents, as most ergonomic chairs on the market are large and they seek simpler improvements, such as better lumbar support to reduce the risk of hunchback or other forms of spinal deformation. Previous research has suggested that the optimal backrest angle for children's seats in schools is between 95 and 100 degrees, and that the seat plate can be designed to tilt back for 4 degrees (Evans, Courtney & Fok, 1988).

Protecting vision health begins with ensuring an adequate, even, and stable light source. One study found that children living in a cramped living environment are more likely to develop myopia (Choi et al., 2017). Therefore, irritating colours and high-contrast patterns should be avoided, whereas non-reflective materials should be considered

面上放置的物品數量，同時也可以使用障礙物或窗簾遮擋附近的雜物，以避免視覺混亂和眼睛疲勞。

最後，兒童本身的閱讀習慣對其視力健康有很大影響，協助他們維持良好的閱讀姿勢、保持合適的閱讀距離及定時休息，都是能有效保護視力健康的方法。

5. 材料適用性

設計中採用的材料和塗層必須滿足功能性、堅固性、輕便性和耐用性等特定要求，並需考慮家具的使用對象、地點和使用方式。現今，材料科學的進步讓設計師有了更多的材料選擇。在工作坊期間，一所家具製造商展示了一種新型塗料，可以將普通的桌面變成磁性、可書寫和可繪製的白板。此示例展示了新式材料如何協助增加產品的功能性。此外，材料的選擇也影響裝飾面的紋理和可用顏色，從而決定它的外觀感。

6. 成本

家具的設計和製造需遵循一系列標準和成本限制。一件可批量生產的理想家具必須在設計初期便已將製造方法納入考量。易於製造的家具設計有助於控制其生產成本。總括來說，設計師或需根據成本因素分析作出妥協，在合理的預算內選擇能夠滿足設計需求的材料和零件。

for the desktop design. In addition, the number of objects placed on the desk should be minimized, and obstructions or curtains can be used to cover the clutter near the reading and writing space to reduce visual clutter and fatigue.

Finally, children's reading habits are vital to their visual health. Maintain a good reading posture, keeping a proper reading distance, and taking regular breaks are all effective ways to protect their visual health.

5. Material Suitability

The materials and coatings used in the design must meet specific requirements for functionality, strength, lightness and durability, taking into account who, where and how the furniture will be used. Today, advancement in material science have given designers more material options. In the workshop, a furniture manufacturer introduced a new coating that can turn an ordinary table top into a magnetic, writable and drawable whiteboard. This example showcases how new materials can help to increase functionality of a product. In addition, the choice of materials plays a decisive role in the aesthetic value of the furniture, as it signifies the texture of the decoration and the colors available.

6. Cost

The design and manufacture of furniture follows a series of standards and cost constraints. A good mass-produced furniture design needs to consider the manufacturability of the product in the early design process. Furniture designs that are easy to manufacture help control their production costs. In general, designers often have to compromise based on cost factor analysis to select materials and components that meet the design requirements within a reasonable budget.

專家諮詢
Expert Consultation

設計團隊在社區工作坊後一直與香港傢俬裝飾廠商總會保持聯繫，進行了三次深入的家具設計討論，以及獲取家具生產的技術意見及成本控制建議。

After the community workshop, the design team kept in touch with the Hong Kong Furniture and Decoration Manufacturers Association and had three in-depth discussions with them on furniture design, as well as obtaining technical advice on furniture production and cost control.

31 May 2021 & 4 June 2021
討論折疊結構及成本
Discussion on foldable structure and cost

23 June 2021
五金測試及扶手可能性
Joint test and armrest possibility

13 July 2021
設定五金及結構設計參數
Set out the structure and design parameter

啟發

日期：2021年5月31日及6月4日

設計團隊與傢俬廠商就產品生產過程進行深入討論，探討減低成本及增加生產效率的方案。

椅子方面：

製作椅子可考慮使用多角度金屬鉸，從而達到多角度及可平放的特點。在製作椅子的結構時，會使用金屬作為內在結構，再加上填充物。填充物有不同特性，棉花較便宜但較不耐用且容易凹陷。記憶海綿如需製作特定非幾何形狀，則需要製作倒模，價格十分高昂。折衷方案是在外層靠近人體

Insights

Date: 31 May 2021 & 4 June 2021

The design team held in-depth discussions with furniture manufacturers on the production process to explore solutions to reduce costs and increase production efficiency.

Chair:

The use of multi-angle metal hinges can be considered for the manufacturing of chairs so that they can be adjustable at multiple angles or even flattened. When creating the structure of the chair, metal is used as the inner structure, and then padding is added. The filler has different characteristics, cotton is cheaper but less durable and easy to dent; memory foam is costly and it needs to be made into a specific inverted mold. A possible solution

的部分用記憶海綿，中間則用普通海綿填充。

在結構方面，椅子如需附有可拆洗的扶手，同時兼容可折疊及攤平的特性，在製作生產上不但非常複雜，成本亦十分高昂。專家建議根據需求取捨，在狹小空間，折疊需求大於扶手，故建議去除扶手，從而讓設計維持在可控成本內。

is to use memory foam for the outer part that is closer to the human body, and fill the midle part with regular foam.

In terms of structure, if a chair should have detachable armrests and at the same time be foldable and flattenable, it would be very complicated and costly to manufacture. Experts suggest making trade-offs according to users' needs - in SDUs, folding needs are more important than armrests, so it is recommended to remove the armrests, so that the design can be kept within a controlled cost.

桌子方面：

在材料方面，專家建議以鐵或鋁作為金屬結構較為符合成本及堅固，但鐵則可能受潮生鏽，需加上漆油保護而更耐用。桌面則使用較容易製造的的木板，並加上表面保護防水。

在結構方面，桌面長度比桌腳長度短，或是兩者相同，都可使桌子更穩固，否則要注意桌腳長度不能少於桌面長度三分之二。在折疊方面，團隊注意到兒童可能會被夾傷，建議使用附有安全鎖的油壓裝置，在關閉時需要按壓才能解鎖收摺桌面。由於其關閉速度緩慢，可避免對兒童造成傷害。

Table:

For the metal structure, iron and aluminium are recommended for their durability and cost-effectiveness . However, iron may rust due to humidity and needs to be coated. Wooden boards are recommended for tabletops because they are easier to manufacture in large quantities, and can be protected with a water-proof coating on the surface.

In terms of structure, to make the table more steady, the length of the tabletop should be shorter than the legs, or of the same length as the legs; otherwise the length of the legs should not be less than two-thirds of that of the tabletop. In terms of folding, the team is aware of the possibility of children's hands getting caught or entrapped. It is recommended to use a safety lock with hydraulic device, which requires pressing the handle before closing the table. Folding speed will be slowed down, thus hand traps can be successfully prevented.

階段三：原型設計及測試
Phase 3: PROTOTYPE DESIGN AND TESTING

設計考量
## Design Considerations

設計團隊嘗試將社區參與工作坊、實地考察、觀察及文獻參考整合，得出以下的設計考慮因素，包括空間、功能性、安全性、人體工學、成本及材料。並將原則與意見列出如下：

The design team consolidated feedback from the community workshop, site visits, observations, and literature references to come up with the following design considerations, including: space, functionality, safety, ergonomics, cost, and materials. The principles and key recommendations and suggestions are listed below.

考量因素 Considerations	具體原則 Principles	想法 / 建議 Ideas / Recommendations
1. 空間 Space	• 可以單獨或整套使用 Can be used as individually or as a set • 配合原有家具 Match with existing furniture arrangement • 節省空間 Space saving • 方便搬運 Easy to move	• 可重新配置為兩個獨立的模組，方便在床上和地面使用 Can be reconfigured as two separate modules for using on bed and on the floor • 配合雙層床高度 Match with height of the bunk bed • 可折疊結構的桌椅 Foldable tables and chair • 體積小易於運送，可在家輕鬆組裝 Small in volume, easy to deliver and assemble at home

2. 功能性 Functionality	• 可調節以適應兒童身體成長 Adjustable to accommodate children's physical growth • 支援線上教學 Support online learning • 可劃分兒童專屬區域 Able to distinguish children's area • 容易使用 Easy to use	• 可調較高度 Adjustable height • 可調較椅背傾斜角度 Adjustable backrest tilt • 較大面積的桌面放電腦及功課 Large desktop area for computers and homework • 增加白板或塗鴉位置 Add whiteboard or doodle area • 容易使用的簡單結構 Structure that is simple and easy to use • 在桌子上加上凹槽為平板電腦支架置 Add a notch on the table for a tablet stand
3. 安全性 Safety	• 最大限度地減少家庭安全隱患 Minimise home safety hazards • 碰撞時避免擦傷 Avoid abrasion during collision • 使用時不易滑動或翻倒 Not easy to slip or fall over when using • 避免夾傷 Protection from pinching	• 桌子折疊增安全鎖裝置 Install additional safety lock device • 圓弧邊角的桌椅外型 Rounded edges and corners of table and chairs • 桌腳加防滑底層 Table legs with anti-slip mats • 桌子折疊使用油壓鉸 Install hydraulic hinge
4. 人體工學 Ergonomics	• 提供腰部支撐 Provide lumbar support • 讓孩子的髖部、膝蓋和腳踝能保持90度 Keep the child's hips, knees and ankles at 90 degrees • 支援視力保護 Support visual health	• 使用記憶海棉製作椅子置 Use of memory foam for chairs • 椅背的角度: 95 – 100度 Chair backrest angle: 95 - 100 degrees • 桌子的高度配合雙層床 Matching the height of the table to that of the bunk bed • 不反光的桌面 Tabletop with anti-glare coating • 桌面提醒貼紙 Reminder sticker on the desktop • 增加照明，如添置枱燈 Additional lighting such as table lamps

5. 材料 Material	• 耐用 Durable • 方便清潔 Easy to clean	• 抗潮濕物料 Moisture-resistant materials • 明亮但耐污的色彩 Bright but stain-resistant colour • 容易清潔的物料 Easy-to-clean materials
6. 成本 Cost	• 容易生產 Easy to manufacture • 良好的性能和成本平衡 Good balance between performance and cost	• 易於大量生產，避免工藝要求高的設計 Easy mass production; avoid highly technical designs • 減少使用不必要的物料 Avoid unnecessary materials • 設計應避免生產時出現不必要的材料損耗 The design should avoid unnecessary material loss during production
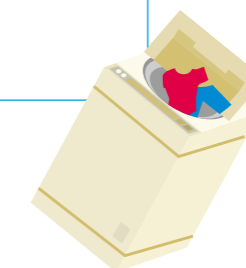
設計定案
Design Finalised

新桌椅使用概念圖
Design concept of new table and chair

可調整折疊床邊桌及可折疊床上椅
Adjustable folding bedside table and Folding bed chair

椅子設計特點
Chair Design Features

家具規格 Dimension: 430 x 470 x 470 mm
材料 Materials: PU, 記憶海綿 Memory Foam, 鐵架 Iron Structure

材料 Materials	安全性 Safety
• 椅套以人造皮革製，容易清潔 Chair cover is made with artificial leather; easy to clean	• 邊緣柔軟圓形設計，增加舒適度，並避免擦傷 Soft rounded edges for added comfort and to avoid scuffing

空間利用 Space Utilisation

• 扁平設計，減少儲存空間及運輸難度
Flat design to reduce storage space and transportation difficulties

• 亮麗的黃色帶來快樂的氣氛
The vibrant yellow colour brings a happy atmosphere

人體工學 Ergonomics

5-angle adjustable preview

• 以能符合人體線條的記憶海綿作填充物，增加舒適度和承托力
Padded with memory foam that conforms to the body's contours, providing maximum comfort and support

• 五種不同傾斜角度的可調節靠背，為不同場合提供腰部支撐
Adjustable backrest with five different tilt angles to provide lumbar support for different occasions

• 無扶手設計，適合不同體型用戶
No armrests, suitable for different user sizes

桌子設計特點
Table Design Features

家具規格 Dimension: 430 x 470 x 470 mm
材料 Materials: PU, 記憶海綿 Memory Foam, 鐵架 Iron Structure

功能性 Functionality

- 桌面上的凹槽作為智能手機或平板電腦支架
  Notch on the table as a smartphone or tablet holder
- 增加可塗鴉的白板
  Add a whiteboard for graffiti

- 可重用的白板讓孩子發揮創造力
  Erasable whiteboard as a tool for children to express their creativity
- 帶有圖形和文字的教育貼紙，提醒孩子們保持良好的姿勢和注意眼睛健康
  Educational stickers with infographics to remind children of good posture and eye safety

空間利用 Space Utilisation

- 可方便放置在床底下的纖細 L 形桌腳
  Slim L-shaped table legs that can be easily placed under the bed

人體工學 Ergonomics

- 三種不同高度的可調節桌腳，滿足用戶在不同場境下的人體工學需求
  Height-adjustable table that comes with three levels of height to meet the ergonomic needs of users in different situations

安全性 Safety

- 自動油壓鉸可保護用戶避免夾傷
  Automatic hydraulic hinges to protect users from pinching
- 過度折疊會削弱桌子的承重結構，而且折疊結構大大提升生產複雜度及生產成本。團隊刪去折疊桌腳的部分，改用固定的桌腳
  Excessive folding will weaken the weight-bearing structure of the table, and folding structure greatly increases the complexity and production costs. The team removed the folding table legs and used fixed legs instead

桌子設計特點
Table Design Features

為了令設計更加完善，團隊邀請劏房居民（陳家、盧家和吳家）於2021年8月至9月為新桌椅進行測試。

To improve the design, three SDU families, including Chan's family, Lo's family and Ng's family, were invited to test the new tables and chairs from August to September 2021.

三戶居民，於8月21日至9月9日期間，在香港仔劏房試用新設計的桌椅
Three households tried out the newly designed tables and chairs in their SDUs in Aberdeen from 21 August to 9 September

三戶住戶在試用期間的意見包括：
Comments from the three households during the trial period included:.

- 桌面可以分為兩個，小桌面固定不動，只有大桌面可收摺
  The desktop can be divided into two, with the small one fixed and immobile, and the large one foldable

- 刪去白板部分，改為置物空間
  Replace the whiteboard with a storage space

- 桌子邊緣應增加圍欄或凹槽，可以防止小物件掉落
  The edge of a table should be equipped with fences or a notch to prevent small objects from falling

- 固定的桌腳增加搬運難度，但現階段未有解決方案
  The fixed table legs are a bit difficult to move, but there is no solution at this stage

陳家中的測試
Test in Chan's home
21/08/2021-03/09/2021

吳家中的測試
Test in Ng's home
21/08/2021-03/09/2021

盧家中的測試
Test in Lo's home
27/08/2021-09/09/2021

透過原型測試，住戶對新家具感到開心，大部分用戶都認為在家中使用家具十分方便，折合桌面為劏房家庭提供靈活的平面空間，尤其部分家庭的桌子可能長期擺放雜物，會影響兒童的專注力，而專屬兒童的學習桌，的確有效增加兒童學習的動力。他們因為喜愛新設計故而更常使用桌子做功課，這屬於測試中的正面回應。

雖然在使用上取得大部分正面回應，設計團隊在測試時遇上兩項困難，包括運輸及家具配合。

Through the prototype testing, the households are happy with the new furniture. Most of the users found the furniture very easy to use at home, and the foldable tabletops allow for more flexible use of floor space in SDUs, especially for some families where the table might be placed with miscellaneous objects for a long time, which would affect children's concentration. The study tables designed specifically for children clearly enhance their motivation to learn. They use the tables more often for doing homework because they like the new design, which is a positive response in the test.

Despite the mostly positive feedback on the use of the table, the design team encountered difficulties in transportation and in furniture arrangement during the testing.

運輸困難在於部分劏房的門口有家具或雜物，無法完整通過，導致桌子放進屋內時有可能有困難，所以在組裝桌腳方面仍須嘗試更多的可變性。

Transportation difficulties are due to the fact that some SDUs' doorways are occupied by furniture or miscellaneous items, which make the new furniture difficult to pass through. Therefore, more varieties of table leg designs has to be taken into consideration for ease of installation.

就家具的配合而言，桌子的設計可以搭配一張雙層床或有底下空間的床。但這種設計與木製雙層床的配合較差，因為有些木製雙層床底下有抽屜，桌腳未必能夠放置床下。

In terms of furniture arrangement, the table design can be matched with a bunk bed or a bed with space underneath. However, this design is less compatible with a wooden bunk bed because such beds usually have drawers underneath, which therefore makes it impossible to put the legs of the table under the bed.

關於理大賽馬會社創「騷・In・廬」
About PolyU Jockey Club "Operation SoInno"

由香港理工大學（理大）賽馬會社會創新設計院主辦及香港賽馬會慈善信託基金捐助，於2018年8月1日正式開展，計劃為期三年，以期匯集社會各方，以創新理念和務實可行的社會創新方案，應對多項社會挑戰，共同改善香港的生活。以應對香港「雙老化」〔即人口老化及住屋老化〕的複合效應為工作的策略焦點，聯合學術界、非政府組織、專業團體、熱心的社會人士、企業和政府，攜手構建創新方案，並按此制訂建議的實際行動。

Organised by the Jockey Club Design Institute for Social Innovation (JCDISI) at The Hong Kong Polytechnic University (PolyU) and funded by The Hong Kong Jockey Club Charities Trust, the 3-year social innovation project commenced in 2018 aims to innovate solutions, in collaboration with a wide spectrum of stakeholders, to respond to social challenges with a view to improving life in Hong Kong. JCDISI puts its strategic focus on tackling the combined impact of "Double Ageing" (ageing of people and building) in Hong Kong, the programme would engage the trans-disciplinary forces of academia, non-governmental organisations, professional bodies, members of the public, corporations and the Government to generate innovative ideas and practical actions.

項目四大範疇
The Four Pillars Of The Project

「十萬分一」社創研討會 – JCDISI相信，假若每十萬人之中有一人，即香港七百多萬人口當中的七十多名市民，能貢獻時間、熱誠、知識與創意，攜手合作，定能為特定的社會議題帶來創新的解決方案。透過一系列的參與式研討會及工作坊，收集市民對社會議題的意見、促進討論，並共同設計務實和創新的方案。

"One from Hundred Thousand" — to organise a series of participatory symposia and workshops open to the public to collect views on social issues, facilitate discussion and co-create solutions. JCDISI names the platform based on the belief that if one person from every 100,000 people (i.e. 70+ persons from the 7 million+ population of Hong Kong) can sit together and contribute their time, passion, knowledge and creativity, they can innovate solutions for a specific problem.

社創行動項目 – 聯合非政府組織、專業團體和學術界，把「十萬分一」社創研討會上衍生出來的創新理念，轉化成可以執行的設計及專案原型。

"SoInno Action Projects" — to collaborate with non-government organisations, professional bodies and academia for developing innovative ideas generated at "One from Hundred Thousand" into designs or prototypes.

啟迪創新習作 – 將社會創新和設計思維引入中學課程，培育青年成為社會創新推動者，內容包括為中學師生開設社會創新工作坊、製作多媒體互動教材等等。

"SoInno Design Education" — to introduce social innovation and design thinking into the curriculum of secondary school education to nurture students as social innovators. Social innovation workshops will be organised for students and teachers and multimedia interactive teaching kits will be developed in this regard.

社創知識平台 – 以不同形式（如學術論文、短片、設計與指引、個案報告、工作坊、地區及國際會議、展覽等），記錄是項計畫的各環節，包括社會創新過程、創造的方案與知識等等，並公開予公眾參考應用。

"SoInno Knowledge Platform" — to document and disseminate for public use the social innovation experience and knowledge generated from the programme through various formats, including academic papers, videos, design and practice guidelines, case study reports, workshops, regional and international conferences and exhibitions.

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工作坊主持人 Workshop Lead and Moderator

Karen Lee	JCDISI
Dr Tris Kee	THEi
Andy Lai	THEi

工作坊夥伴 Workshop Partners

Dina Yu	DOSHA
Oliver Kan	DOSHA
Sammi Chan	DOSHA
Herry Ma	DOSHA
Ava Jiang	DOSHA

Group 1

Helen ip	UCL
Chan Wun Han, Jannel	Hong Kong Metropolitan University
Chan Lok Man	Kwun Tong Methodist Social Service
Tsang Tsz Lun	Geometric Interior Design Co.
Ho Chung Ho	Salvation Army
Brian Fok	Comma
Wyane Mak	Comma

Group 2

Megumi Harker	Habitat for Humanity Hong Kong
Grat To	DIGnDRAG Studio
Aloysius Wilfred RajArokiaraj	Lingnan University
Siu Wai Wong	Caritas
Dr Grace Seo	PolyU Department of Applied Social Sciences
Dr Tulio Maximo	PolyU School of Design

Group 3

Marvin Lam	The Hong Kong Jockey Club Charities Trust
Tim Lo	BEAM Society
Candis Poon	Chanxpoon
Gloria Chan Mei Ha	The Salvation Army
Johnny Lam	PolyU Department of Rehabilitation Sciences
Ada Chan	PolyU School of Design

Group 4

Michael Ho	Retired (from Hospital Authority)
Yu Kai Yin	Playright Children's Play Association
Terri Chu	Hong Kong Red Cross
Minako Wong	Independent
Rachel Tse	Otherland

Group 5

Christine Wong;	The Salvation Army
Leung Chui Yi	The Salvation Army
Wong Wo Ping	HKCSS
Jacqueline Au-Yeung	PolyU Department of Rehabilitation Sciences
Stanley Wu	Independent
William Chung	Hong Kong Institute of Planners

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Seasonal Symposium

策略夥伴 Strategic Partners

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2. 理大設計學院 School of Design, PolyU
3. 救世軍 The Salvation Army

支持機構 Supporting Organisations

1. 亞洲生活型態設計研究室 Asian Lifestyle Design Lab
2. 香港仁人家園 Habitat for Humanity Hong Kong
3. 香港社會服務聯會 Hong Kong Council of Social Service
4. 未來城市研究所 Institute of Future Cities
5. 香港社區組織協會 Society for Community Organisation
6. 社企民間高峰會 Social Enterprise Summit
7. 城市生態設計研究室 Urban Ecologies Design Lab

理大學術夥伴單位 PolyU Academic Partners

1. 專業及持續教育學院 College of Professional and Continuing Education
2. 生物醫學工程學系 Department of Biomedical Engineering
3. 建築及房地產學系 Department of Building and Real Estate
4. 康復治療科學系 Department of Rehabilitation Sciences
5. 護理學院 School of Nursing
6. 眼科視光學院 School of Optometry

工作坊夥伴 Workshop Partners

1. 香港高等教育科技學院 設計學系 Department of Design, THEi
2. DOSHA Woodcraft

行動項目
Action Project

行動項目策略夥伴 Partners of Action Project

1. 理大設計學院 School of Design, PolyU
2. 香港高等教育科技學院 產品設計 Product Design, THEi

支持機構 Supporting Organizations

1. 明愛香港仔社區中心 Caritas Community Centre - Aberdeen
2. 救世軍油麻地青少年綜合服務 The Salvation Army Yaumatei Integrated Service for Young People
3. 香港傢俬裝飾廠商總會 Hong Kong Furniture and Decoration Trade Association
4. 香港建築中心 Hong Kong Architecture Centre

理大學術夥伴單位 PolyU Academic Partners

1. 生物醫學工程學系 Department of Biomedical Engineering
2. 眼科視光學院 School of Optometry

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查詢 Enquiry

賽馬會社會創新設計院
Jockey Club Design Institute for Social Innovation

香港九龍紅磡香港理工大學賽馬會創新樓V1218
V1218, Jockey Club Innovation Tower, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

(852) 3400 3433 / 3400 3435   disi.enquiry@polyu.edu.hk

www.polyujcsoinno.hk   JCDISI