

**PHYSICAL LIVING ENVIRONMENT-
PERCEIVED WELL-BEING OF ADOLESCENT
OCCUPANTS: A POST-OCCUPANCY
EVALUATION (POE) ON JUVENILE
INSTITUTIONS IN MALAYSIA**

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UNIVERSITI SAINS MALAYSIA

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by

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**Thesis submitted in fulfilment of the requirements
for the degree of
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TABLE OF CONTENTS

ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	xiii
LIST OF APPENDICES	xiv
CHAPTER 1 INTRODUCTION	1
1.1 Research Background.....	1
1.1.1 Juvenile and Juvenile Institution.....	2
1.1.2 Built Environment-Occupants Relationship	4
1.1.3 Public Health and Well-being in the Malaysian Context.....	6
1.2 Problem Statement	7
1.3 Operational Definition	10
1.4 Research Questions	10
1.5 Research Aims & Objectives	11
1.6 Research Scope	12
1.7 Research Significance	13
1.8 Organisation of Thesis	15
CHAPTER 2 LITERATURE REVIEW	16
2.1 Malaysian Correctional System	16
2.2 Environmental Design and the Justice System	17
2.3 Understanding Correctional Facilities and the Design Contexts	18
2.3.1 Global Scenario.....	18
2.3.2 Design for Well-being.....	20

2.3.3	International Standards for Juvenile Buildings	22
2.4	Physical Living Environment and Occupants' Well-being	26
2.4.1	Human factors	26
2.4.2	Place factors	31
2.4.3	Summary of factors of environmental effects on the well-being of its occupants	37
2.5	Theoretical and Conceptual Framework	40
2.5.1	Ecological Systems Theory (EST)	41
2.5.2	Person-Environment Fit Theory (P-E fit)	44
2.5.3	User-Centered Design (UCD)	46
2.5.4	Post-Occupancy Evaluation (POE)	48
2.5.5	The Development of the Research Variables from Literature	56
2.6	Chapter Summary and Reflection	57
2.6.1	Research Gap	58
2.6.2	Conceptual Framework	59
CHAPTER 3	METHODOLOGY	61
3.1	Introduction	61
3.2	The Research Locale	63
3.3	Post-Occupancy Evaluation (POE) Fieldwork	64
3.3.1	POE Fieldwork Flowchart	65
3.3.2	Field Observation	67
3.3.3	End-users Survey	74
3.4	Data Analysis and Categorisation Criteria	81
3.4.1	Well-being Score and Categorisation of Building Well-being Scale (BWBS)	82
3.4.2	Categorisation of Satisfaction of Technical & Functional Elements of Performance for Juvenile Housing	84
3.5	Ethical Considerations	85

CHAPTER 4	RESULTS	86
4.1	Introduction	86
4.2	Background Profile of the Juvenile Institutions	87
4.2.1	Asrama Akhlak Paya Terubong (AAPT)	87
4.2.2	Sekolah Tunas Bakti Teluk Air Tawar (STBTAT)	89
4.2.3	Asrama Akhlak (P) Jitra (AAPJ)	91
4.2.4	Sekolah Tunas Bakti Taiping (STBT)	93
4.2.5	Sekolah Tunas Bakti Sungai Besi (STBSB)	94
4.2.6	Asrama Sentosa Kuala Lumpur (ASKL)	95
4.2.7	Asrama Bahagia Kuala Lumpur (ABKL)	96
4.2.8	Asrama Akhlak (L) Kempas (AALK)	98
4.2.9	Asrama Akhlak Bukit Baru Melaka (AABBM)	99
4.2.10	Sekolah Tunas Bakti (P) Sungai Lereh (STBPSL)	100
4.2.11	Sekolah Tunas Bakti Jerantut (STBJ)	102
4.2.12	Asrama Rusila Marang (ARM)	103
4.2.13	Sekolah Tunas Bakti (P) Marang (STBM)	105
4.3	Current Physical Living Environment of Juvenile Institutions in Malaysia	107
4.3.1	Asrama Akhlak Paya Terubong (AAPT)	107
4.3.2	Sekolah Tunas Bakti Teluk Air Tawar (STBTAT)	110
4.3.3	Asrama Akhlak (P) Jitra (AAPJ)	113
4.3.4	Sekolah Tunas Bakti Taiping (STBT)	115
4.3.5	Sekolah Tunas Bakti Sungai Besi (STBSB)	118
4.3.6	Asrama Sentosa Kuala Lumpur (ASKL)	121
4.3.7	Asrama Bahagia Kuala Lumpur (ABKL)	123
4.3.8	Asrama Akhlak (L) Kempas (AALK)	126
4.3.9	Asrama Akhlak Bukit Baru Melaka (AABBM)	129
4.3.10	Sekolah Tunas Bakti (P) Sungai Lereh (STBPSL)	132

4.3.11	Sekolah Tunas Bakti Jerantut (STBJ)	135
4.3.12	Asrama Rusila Marang (ARM).....	137
4.3.13	Sekolah Tunas Bakti (P) Marang (STBM)	140
4.3.14	Similarities in The Physical Living Environments of Juvenile Institutions	143
4.4	Perceived Well-being of Adolescent Occupants Residing in Juvenile Institutions in Malaysia.	144
4.4.1	Sociodemographic Profile of Respondents	145
4.4.2	Building Well-being Scale (BWBS).....	148
4.4.3	Juvenile Environment and its Repercussions in Social Rehabilitation	150
4.4.4	Satisfaction of Technical & Functional Elements of Performance for Juvenile Housing	154
CHAPTER 5	DISCUSSION.....	165
5.1	Introduction.....	165
5.2	Positive Perceptions in the Current Physical Living Environment of Malaysian Juvenile Institution	165
5.3	Positive Well-being Among Adolescent Occupants Residing in Malaysian Juvenile Institutions	176
5.4	Implications of Findings with Theoretical Framework	180
CHAPTER 6	CONCLUSION AND RECOMMENDATIONS	186
REFERENCES.....		191
APPENDICES		

LIST OF TABLES

Table 1.0	Organization of Thesis	15
Table 2.0	Human and place factors of the physical living environment that affect the building occupants' well-being.....	37
Table 2.1	Summary of independent and dependent variables.....	57
Table 3.0	Data collection period for POE fieldwork	64
Table 3.1	Checklist of building performance elements	71
Table 3.2	Shortlisted instruments with brief descriptions.....	77
Table 3.3	Participants involved for member checking	78
Table 3.4	Adaptations made to Malaysian juvenile institutions context during member-checking	78
Table 3.5	Building Well-being Scale with scores allocated	82
Table 3.6	Satisfactory Categorisation	84
Table 4.1	Details of the Research Locale.....	86
Table 4.1.1	Checklist of building performance elements of AAPT.....	108
Table 4.1.2	Checklist of building performance elements of STBTAT	111
Table 4.1.3	Checklist of building performance elements of AAPJ	114
Table 4.1.4	Checklist of building performance elements of STBT	117
Table 4.1.5	Checklist of building performance elements of STBSB.....	119
Table 4.1.6	Checklist of building performance elements of ASKL.....	122
Table 4.1.7	Checklist of building performance elements of ABKL	125
Table 4.1.8	Checklist of building performance elements of AALK.....	128
Table 4.1.9	Checklist of building performance elements of AABBM	131
Table 4.1.10	Checklist of building performance elements of STBPSL.....	133
Table 4.1.11	Checklist of building performance elements of STBJ	136

Table 4.1.12	Checklist of building performance elements of ARM.....	139
Table 4.1.13	Checklist of building performance elements of STBM	142
Table 4.2	Number of Adolescent respondents from each institution.....	145
Table 4.3	Profile of the survey respondents.....	146
Table 4.4	States of Origin	147
Table 4.5	Urban-rural Status of Location of Origin.....	147
Table 4.6	Categorisation of Juvenile’s Well-being Status	148
Table 4.7	Juvenile Environment and its Repercussions in Social Rehabilitation (Percentages)	153
Table 4.8	Satisfaction of Technical & Functional Elements of Performance for Juvenile Housing	155
Table 4.9	Average satisfaction score ranking of all performance elements ...	164
Table 5.0	Item Ranking & Sum Score of Each Item.....	177

LIST OF FIGURES

Figure 2.0	IEQ parameters (Source: Mujeebu, 2019)	33
Figure 2.1	Bronfenbrenner’s ecological systems (1979) (Source: Yang & Sanborn, 2021)	42
Figure 2.2	Theories in Built Environment (Kalvelage & Dorneich, 2014).....	47
Figure 2.3	The performance concept in building delivery process (Source: Preiser, 1995)	49
Figure 2.4	Building Performance Evaluation (BPE) Process Model (Source: Preiser, 2005)	50
Figure 2.5	The conceptual framework.....	60
Figure 3.0	Research design and framework	62
Figure 3.1	POE fieldwork flowchart	66
Figure 3.2	Screenshot of end-user survey online Google form.....	81
Figure 4.1	Entrance of AAPT (Source: Google Maps)	88
Figure 4.1.1	Location plan of AAPT.....	88
Figure 4.1.2	Area of AAPT (Source: Google Maps)	89
Figure 4.2	Entrance of STBTAT (Source: Google Maps)	90
Figure 4.2.1	Location plan of STBTAT	90
Figure 4.2.2	Area of STBTAT (Source: Google Maps).....	91
Figure 4.2.3	RMAF located beside STBTAT (Source: Google Maps).....	91
Figure 4.3	Entrance of AAPJ (Source: Google Maps)	92
Figure 4.3.1	Area of AAPJ (Source: Google Maps)	92
Figure 4.4	Entrance of STBT (Source: Google Maps).....	93
Figure 4.4.1	Location plan of STBT	93
Figure 4.4.2	Area of STBT (Source: Google Maps)	94

Figure 4.5	Entrance of STBSB (Source: Google Maps)	94
Figure 4.5.1	Area of STBSB (Source: Google Maps).....	95
Figure 4.6	Entrance of ASKL (Source: Google Maps)	95
Figure 4.6.1	Area of ASKL (Source: Google Maps)	96
Figure 4.7	Entrance of ABKL (Source: Google Maps).....	97
Figure 4.7.1	Floorplan of ABKL	97
Figure 4.7.2	Area of ABKL (Source: Google Maps)	98
Figure 4.7.3	MRT Station nearby ABKL (Source: Google Maps)	98
Figure 4.8	Entrance of AALK (Source: Google Maps)	99
Figure 4.8.1	Area of AALK (Source: Google Maps).....	99
Figure 4.9	Entrance of AABBM (Source: Google Maps).....	100
Figure 4.9.1	Area of AABBM (Source: Google Maps)	100
Figure 4.10	Entrance of STBPSL (Source: Google Maps)	101
Figure 4.10.1	Floorplan of STBPSL	101
Figure 4.10.2	Area of STBPSL (Source: Google Maps).....	102
Figure 4.11	Entrance of STBJ (Source: Google Maps).....	103
Figure 4.11.1	Area of STBJ (Source: Google Maps)	103
Figure 4.12	Entrance of ARM (Source: Google Maps)	104
Figure 4.12.1	Location plan of ARM	104
Figure 4.12.2	Floor plan of ARM.....	105
Figure 4.12.3	Area of ARM (Source: Google Maps).....	105
Figure 4.13	Entrance of STBM (Source: Google Maps).....	106
Figure 4.13.1	Floorplan of STBM.....	106
Figure 4.13.2	Area of ARM (Source: Google Maps).....	107
Figure 4.14	Exterior and interior environment of AAPT	108
Figure 4.15	Exterior and interior environment of STBTAT	111

Figure 4.16	Exterior and interior environment of AAPJ.....	114
Figure 4.17	Exterior and interior environment of STBT.....	116
Figure 4.18	Exterior and interior environment of STBSB	119
Figure 4.19	Exterior and interior environment of ASKL	122
Figure 4.20	Exterior and interior environment of ABKL	125
Figure 4.21	Exterior and interior environment of AALK	128
Figure 4.22	Exterior and interior environment of AABBM.....	130
Figure 4.23	Exterior and interior environment of STBPSL	133
Figure 4.24	Exterior and interior environment of STBJ	136
Figure 4.25	Exterior and interior environment of ARM	139
Figure 4.26	Exterior and interior environment of STBM	142
Figure 4.27	Well-being Status of Adolescent Occupants in Malaysian Juvenile Institutions.....	149
Figure 4.28	Juvenile Environment and its Repercussions in Social Rehabilitation	150
Figure 5.1.1a	Dormitory of STBTAT	166
Figure 5.1.1b	Dormitory of AAPJ.....	166
Figure 5.1.2a	Fans that make noises	167
Figure 5.1.2b	Lighting fixtures that make noises	167
Figure 5.1.3a	Natural lighting in the dormitory	167
Figure 5.1.3b	Artificial lighting is provided.....	167
Figure 5.1.3c	Dormitory of STBT.....	168
Figure 5.1.4a	Window openings of STBT	169
Figure 5.1.4b	Window openings of ABKL	169
Figure 5.1.5a	Fire extinguisher of ABKL	170
Figure 5.1.5b	Fire alarm STBPSL.....	170
Figure 5.1.6a	Dormitory of AABBM.....	171

Figure 5.1.6b	Dormitory of ARM	171
Figure 5.1.6c	Dormitory of STBPM	171
Figure 5.1.6d	Interior finishes of ASKL	171
Figure 5.1.7a	Locker of STBJ	172
Figure 5.1.7b	Locker of STBPM.....	172
Figure 5.1.8a	Bathroom of AAPJ.....	173
Figure 5.1.8b	Bathroom of AABBM.....	173
Figure 5.1.9a	Building layout of STBT	174
Figure 5.1.9b	Building layout of STBPM	174

LIST OF ABBREVIATIONS

AA	Asrama Akhlak (Probation Hostel)
ACA	American Correctional Association
BJMP	Bureau of Jail Management and Penology
CPTED	Crime Prevention through Environmental Design
EST	Ecological Systems Theory
FGD	Focus Group Discussion
IAQ	Indoor Air Quality
IEQ	Indoor Environmental Quality
JKM	Jabatan Kebajikan Masyarakat (Malaysian Social Welfare Department)
JKR	Jabatan Kerja Raya (Malaysian Public Works Department)
NIC	National Institute of Corrections
NIST	National Institute of Standards and Technology
P-E fit	Person-Environment Fit Theory
POE	Post-Occupancy Evaluation
SBS	Sick Building Syndrome
SDGs	Sustainable Development Goals
SPV	Shared Prosperity Vision
STB	Sekolah Tunas Bakti (Approved School)
UCD	User-Centered Design
UN	United Nations
US	United States
USM	Universiti Sains Malaysia
WPB	World Prison Brief

LIST OF APPENDICES

- | | |
|------------|--|
| Appendix 1 | The Building Wellbeing Scale (Malaysian Juvenile Institution version) |
| Appendix 2 | Prison Environment and its Repercussions in Social Rehabilitation (PERS Index)
(Malaysian Juvenile Institution version) |
| Appendix 3 | Satisfaction of Technical & Functional Elements of Performance for Juvenile Institutions
(Malaysian Juvenile Institution version) |
| Appendix 4 | Borang “Assent” Responden |
| Appendix 5 | Latar Belakang Responden |
| Appendix 6 | Skala Kesejahteraan Bangunan |
| Appendix 7 | Persekitaran Institusi Juvana dan Kesannya terhadap Pemulihan Social |
| Appendix 8 | Kepuasan terhadap Prestasi Elemen Teknikal dan Fungsi Penempatan Juvana |

**KESEJAHTERAAN PENGHUNI REMAJA DENGAN ALAM SEKITAR
FIZIKAL: PENILAIAN PASCA MENDUDUKI (POE) PADA INSTITUSI
JUVANA DI MALAYSIA**

ABSTRAK

Persatuan Bangsa-Bangsa Bersatu mengiktirafkan kesihatan yang baik dan kesejahteraan sebagai kriteria utama bagi Matlamat Pembangunan Mampan, yang merangkumi semua individu tanpa mengira umur dan jantina. Walau bagaimanapun, penghuni remaja di institusi pemulihan remaja sering diabaikan, dan kesejahteraan mereka di kemudahan ini masih dipersoalkan. Memandangkan scenario ini, tesis ini meneroka hubungan antara kesejahteraan yang dirasakan oleh pengguna akhir bangunan dan reka bentuk persekitaran hidup fizikal di 13 institusi pemulihan remaja di semenanjung Malaysia. Objektif penyelidikan ini adalah dua: (1) untuk meneliti keadaan persekitaran fizikal tempat tinggal di institusi pemulihan remaja di Malaysia, dan (2) untuk menilai kesejahteraan dan kepuasan yang dirasakan oleh penghuni remaja yang tinggal di institusi pemulihan remaja di Malaysia berkenaan dengan persekitaran hidup fizikal mereka yang ada sekarang. Kajian ini menggunakan reka bentuk penyelidikan pelbagai kaedah yang dijalankan dalam bentuk Penilaian Pasca Penghuni di 7 Asrama Akhlak (AA) dan 6 Sekolah Tunas Bakti (STB). Pemerhatian berjalan dan soal selidik pengguna akhir telah dijalankan untuk menilai keadaan persekitaran hidup fizikal di institusi pemulihan remaja dan mengumpul kesejahteraan yang dirasakan oleh penghuni remaja. Tindakbalas soal selidik kemudian dianalisis menggunakan statistik deskriptik sementara hasil pemerhatian berjalan digunakan untuk mengesahkan silang tindakbalas soal selidik tersebut. Didapati bahawa walaupun

majoriti penghuni remaja melaporkan kesejahteraan yang positif atau neutral, masih terdapat sebahagian besar (25.53%) yang tidak berpuas hati dengan persekitaran fizikal tempat tinggal mereka. Penemuan menunjukkan bahawa penghuni remaja secara umumnya berasa puas tetapi mempunyai perasaan bercampur-baur tentang persekitaran fizikal tempat tinggal mereka di institusi tersebut. Mereka berpuas hati dengan kualiti pencahayaan, kedekatan dengan kemudahan penting, kemudahan dan perkhidmatan sokongan yang tersedia. Namun, mereka mempunyai kebimbangan tentang privasi, ruang peribadi dan keberkesanan langkah keselamatan kebakaran. Dengan menunjukkan bagaimana aspek-aspek persekitaran hidup fizikal tersebut secara langsung mempengaruhi kesejahteraan yang dirasakan oleh penghuni remaja, kajian ini menawarkan pandangan kepada pereka bentuk persekitaran binaan and pengamal untuk mengutamakan ciri-ciri ruang dan reka bentuk yang kurang menghukum dan lebih bersifat pemulihan bagi penghuni remaja yang tinggal di institusi pemulihan remaja.

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**PHYSICAL LIVING ENVIRONMENT-PERCEIVED WELL-BEING OF
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ABSTRACT

The United Nations (UN) recognises good health and well-being as among the criteria for Sustainable Development Goals, extending to all individuals, regardless of age and gender. However, adolescent occupants in juvenile institutions are often being overlooked, and their well-being in these facilities remains questionable. Sensitising this scenario, this thesis explores the link between the perceived well-being of building end-users and the design of physical living environment at 13 juvenile institutions located in the peninsular region of Malaysia. The research objectives are twofold: (1) to inspect the current physical living environment of juvenile institutions in Malaysia, and (2) to assess the perceived well-being and satisfaction of adolescent occupants residing in juvenile institutions in Malaysia in regard to their current physical living environment. This study employed multi-method research design conducted in the form of Post-occupancy Evaluation (POE) at 7 probation hostels (*Asrama Akhlak – AA*) and 6 approved schools (*Sekolah Tunas Bakti – STB*). Walkthrough observation and end-user survey were performed to assess the conditions of the physical living environment of the juvenile institutions and to gather the perceived well-being of adolescent occupants respectively. The survey responses were then analysed using descriptive statistics walkthrough observations result was used to cross-verify the survey responses. It is found that while the majority of the adolescent occupants reported positive or neutral well-being, there remains a substantial proportion (25.53%) who are dissatisfied with their physical living environments. The findings showed that

the adolescent occupants generally felt content but had mixed feelings about their physical living environment in the institution. They were especially happy with the quality of lighting, their proximity to essential facilities, the ease of moving around and the support services available. However, they had concerns about privacy, personal space and the effectiveness of fire safety measures. By showing how such aspects of physical living environment directly affect the perceived well-being of adolescent occupants, this study offers insight for built environment designers and practitioners to prioritise spatial features and designs that are less punitive and more rehabilitative for adolescent occupants residing in juvenile institutions.

CHAPTER 1

INTRODUCTION

1.1 Research Background

The well-worn adage "children and youth are our future" testifies to the potential inherent in young individuals, which has resonated across generations. Yet, in reality, not all young lives are bestowed with the same opportunities for development, growth, and success. Those who are unfortunate often find themselves entangled within the confines of the juvenile justice system for their premature wrongdoings. Sensitising so, this study looks at the quality of juvenile institutions in Malaysia, which is deemed a critical and integral part of the educational system of the country as a whole. It establishes a sense of belonging to juveniles, which is crucial in developing good-quality adolescents after leaving the detention centre. Lidington (2017) stresses that "...the vast majority of prisoners will at some point leave jail and rejoin our communities, which is why what happens inside matters to us all. And it is why, when offenders are sent to jail, they should be held in conditions that help them turn their lives around." This statement acknowledges the importance of the environment in juvenile institutions in ensuring a better adolescent upon the completion of the rehabilitation process in the detention centre. Rehabilitation in juvenile institutions should provide an opportunity to reinforce the children's protection and support for their well-being from the earliest stage (Scottish Government, 2021).

Goal number 3 of the United Nations (UN) Sustainable Development Goals (SDGs) emphasises ensuring healthy lives and promoting well-being for all at all ages, implying that the health and well-being of young offenders in their correctional facilities are equally of the essence. Similarly, SDG 11 highlights the importance of

making cities inclusive, safe, resilient and sustainable for human beings by enhancing urban planning and management as well as reducing environmental impacts, thus increasing the opportunities for humans to consume choices and sustainable lifestyles they desire, particularly for vulnerable groups such as women, children, disabilities, and the elderly. On the other hand, the improvement of the well-being of adolescent occupants also reflects the vision of the Malaysian Shared Prosperity Vision 2030, which aims for effective institutional delivery (Enabler 3: Effective Institutional Delivery).

In response to the issues stated above, this research was designed to explore the physical living environment of juvenile institutions in Malaysia, particularly the well-being of adolescent juveniles in Malaysian juvenile institutions, by conducting performance assessments on juvenile institutions via Post-Occupancy Evaluation (POE) tools throughout Malaysia. This research aims to create a suitable and comfortable physical living environment for adolescent occupants during their rehabilitation process and shape better adolescents upon completing their remand period. The following remarks outline the contextual background of this research in brief.

1.1.1 Juvenile and Juvenile Institution

According to the Child Act 2001, "child" is defined as a person below 18 years old and has attained the age of criminal responsibility, which are the juvenile offenders aged between 10 and 17 years old, following Section 82 of the Penal Code. Furthermore, children below the age of 10 cannot commit a crime in Malaysia. However, juvenile offenders engage in "delinquent acts" rather than "crimes". Thus, if they are arrested or determined guilty, they shall be separately placed from the adult prisoners in the detention centre, also known as the juvenile institution. Juvenile

institutions are the correctional institutions for juvenile offenders. These institutions are also known as "reform schools" or "training schools" that foster young offenders, provide rehabilitation, education, and training and act as detention centres to equip them with sufficient competencies to live independently in society (Juvenile Justice: Institutions, 2006; Department of Social Welfare, 2004).

Juvenile institutions are government-owned public buildings characterised by unique features that act as educational institutions, practical skills training hubs and rehabilitation centres. There are three types of juvenile detention facilities in Malaysia: Henry Gurney schools (Sekolah Henry Gurney), probation hostels (Asrama Akhlak – AA) and approved schools (Sekolah Tunas Bakti – STB) that cater to juveniles from all over Malaysia. The Henry Gurney schools are under the surveillance of the Malaysian Prison Department, controlled by the Malaysian Ministry of Home Affairs, whereas the AAs and STBs are controlled by the Department of Social Welfare Malaysia (Jabatan Kebajikan Malaysia – JKM), a ministry within the Ministry of Women, Family and Community Development responsible for administering these juvenile institutions (Department of Social Welfare, 2004). Thus, this research specifically focuses on probation hostels (AAs) and approved schools (STBs) in this research.

Malaysia has been making progress in improving children's rights since ratifying the Convention on the Rights of the Child (CRC) in 1995 and enacting the Child Act in 2001. At the same time, juveniles' rights to education, medical and mental care, safety and humane treatment must be guaranteed while staying in these juvenile institutions. In this case, given that the juvenile institutions are geared toward juveniles and juveniles spend a significant amount of time in juvenile institutions, the adolescent occupants' satisfaction and well-being within the built environment in juvenile

institutions must be considered. In addition, the quality and standards of the built environment of their physical living environment must be addressed to affirm the well-being and comfortability of the occupants in the institutions. Hence, juvenile institutions should be designed in a way that provides a satisfactory level of comfort for the adolescent occupants of the institutions; a high level of user satisfaction and well-being could deliver efficient operation and design in maintaining the standards of future construction of similar buildings.

The Malaysian government released the Shared Prosperity Vision 2030 (SPV 2030) in the year 2020, outlining the government blueprint for the upcoming years from 2021-2030 comprising all Malaysian, including youths and children. Three objectives, 15 guiding principles, seven strategic thrusts and eight enablers were identified to achieve this SPV 2030. It is interesting to note that one of the enablers of Malaysian Shared Prosperity Vision 2030 is the effectiveness of institutional delivery (Enabler 3: Effective Institutional Delivery). Therefore, it is critical to evaluate the quality and effectiveness of Malaysian juvenile institutions in rehabilitating adolescent occupants in terms of residents' satisfaction and well-being towards the built environment to achieve the desired goals under SPV 2030.

1.1.2 Built Environment-Occupants Relationship

The built environment has a sizable impact on public health. According to Swarbrick's eight dimensions of wellness, the environmental dimension is among the dimensions that affect one's health, well-being and quality of life (Swarbrick, 2012). Studies have shown that the built environment is often engaged in its occupant's physical and mental well-being, whether directly or indirectly. The influential power of the built environment to the public started during the Industrial Revolution of the 18th century when conditions were unsanitary, with workplaces that were always

overcrowded. Although the conditions have improved over centuries, there is still a crucial connection between public health and the built environment (Perdue, Stone, & Gostin, 2003). According to Perdue (2003), the built environment has an influential impact on public health, most notably chronic disease. Today, although information about healthy living can be obtained through government advertisements, pamphlets and official websites, people will continue to suffer from health problems if they still live in poorly designed physical environments. In light of this, a healthy built environment should be constructed and maintained for its occupants to ensure their well-being and satisfaction.

Building performance elements such as colour, lighting, spatial layout are not merely aesthetic choices but powerful psychological tools that can evoke emotions, influence behaviour, and impact mental health. For instance, colour in the living space of built environment could affect emotions such as calm blue and green promote relaxation, while red and yellow can increase energy level. Moreover, a well-designed built environment that facilitates easy navigation, natural lighting, appropriate acoustic control can enhance cognitive function, improve overall satisfaction of the occupants. Despite advancements in building design since the Industrial Revolution, critical connection between public health and built environment remains.

Nawawi and Khalil (2008) stated that a building's completion should be capable of performing its functions satisfactorily for its occupants. A routine maintenance programme should be implemented after the building is occupied to ensure that the occupants can utilise the amenities provided in the space. Numerous studies have shown that poorly built structures can lead to several sicknesses, such as Sick Building Syndrome (SBS) and Building-related Illness (BRI), among others (Sanni-Anibire & Hassanain, 2016). Furthermore, most human beings spend a

significant time of their life indoors (80-90%), as emphasised by the ASHRAE guidelines (KLEPEIS et al., 2001; Evans, 2003; Al horr et al., 2016; Bower, Tucker & Enticott, 2019). A built environment researcher has the responsibility to determine whether the quality and performance of the built environment can meet the occupants' satisfaction and well-being.

However, an understanding of how the built environment affects occupants' well-being is still inadequate (Eberhard, 2009; Nanda, Pati, Ghamari & Bajema, 2013; Bower, Tucker & Enticott, 2019). Therefore, a thorough Post-Occupancy Evaluation (POE) becomes necessary to evaluate the quality performance of the built environment and, at the same time, identify the possible problems for easy future maintenance to fulfil occupants' satisfaction and well-being. In this study, the quality and performance of juvenile institutions and adolescent occupants' satisfaction and well-being are investigated through various POE techniques and approaches. By understanding these dynamics, we can create built environments that not only meet functional needs, but also support the psychology health and overall well-being of occupants.

1.1.3 Public Health and Well-being in the Malaysian Context

The 2020 Human Development Report by the United Nations Development Programme (UNDP) ranks Malaysia 62nd place out of 189 nations on the Human Development Index (HDI) with a score of 0.810, putting it in the "very high" category of human development. Malaysia's population has been expected to reach 32.7 million in 2021 (Mahidin, 2021). According to the Malaysian government, the Health Ministry's financial allocation under the 2022 Budget, which focuses on people's health and well-being, increased by 1.5% to RM32.41 billion compared to the RM31.94 million in the 2021 Budget (Dawn Chan, 2021) to fulfil Theme 2 of the

Twelfth Malaysia Plan, which aims at increasing the health status of its people to ensure a healthy and productive nation (Government, 2021).

In recent years, people who suffer from Sick Building Syndrome (SBS) have been increasing in Malaysia. Syazwan, Jalaludin, Norhafizalina, Azman and Jusoff (2009) investigated the occurrences of SBS in Tower 1, KLCC Building (Building A), which had been operational and occupied for over 10 years, and Pusat Tenaga Malaysia in Bangi (Building B), which had been operating and occupied for less than three months at the time. The SBS was present in 68.8% of the staff in Building A but only 36.1% in Building B. The study then established that Malaysians lack sufficient awareness of SBS, and education must be incorporated into them. Analysis of the relationship between the built environment and its occupants is crucial in defining the causes of SBS-related sickness while lowering the number of SBS cases in Malaysia. Through POE, potential factors affecting occupant satisfaction and health can be identified, serving as a feedback and feedforward mechanism to avoid repeating mistakes being made during a built environment's design, planning and construction stages.

1.2 Problem Statement

The Malaysian government has allocated significant resources to upgrade and expand juvenile institutions of approved schools (Sekolah Tunas Bakti-STB) and probation hostels (Asrama Akhlak-AA), as reported by the Ministry of Women and Community Development and UNICEF Malaysia (2013). However, the budget allocated raises an important question of whether the fundamental design and layout of these facilities remain unchanged or whether they have undergone any significant improvements that concern the end-users, which are the adolescent occupants' needs, or whether it was just directed merely for expanding the physical building, maintaining

its status quo. The STBs and AAs provided by the Malaysian government serve as the remand cum rehabilitation facilities for juvenile offenders. The federal government owns the vast majority of these public correctional facilities in Malaysia. Nonetheless, the process of designing and improving juvenile institutions involves multifaceted challenges and issues, such as rehabilitation, social services and criminal justice. Finding comprehensive solutions to these complex issues can be time-consuming. Thus, despite the allocation of significant resources, there are valid concerns about whether the fundamental physical design of these juvenile institutions has catered to the evolving needs of adolescents or has remained static, with the allocation primarily directed toward expanding the institution that causes these juvenile institutions to be overlooked in terms of environment enhancement concerning the adolescents' needs. The effectiveness of such correctional facilities in accomplishing their correctional and rehabilitation goals for adolescent occupants remains a questionable subject, given that physical design and living environment play an important role in the occupants' well-being.

As described earlier, the quality of the built environment and physical living environment has become the main criterion in ensuring the health of its occupants concerning their satisfaction and well-being. Moreover, research indicated that providing an environment that replicates life outside of confinement reduces the likelihood of recidivism (LaBarre, 2010). Consequently, if adolescent occupants cannot discover tranquillity and contentment throughout their rehabilitation in juvenile institutions, their behavioural and emotional well-being will probably be negatively impacted. Thus, since significant resources have been made available for STBs and AAs, these resources must be effectively employed to address the fundamental issues at the core of juvenile institutions. The physical design and the physical living

environment should align with the goal of promoting the well-being and rehabilitation of adolescent occupants.

As the built environment and physical design of the living environment play a role in adolescent occupants' well-being, building evaluation of juvenile institutions becomes necessary. Statistics from Malaysia's Social Welfare Department indicated that juvenile crime rates generally increased from 2013 to 2020. In 2020, the number of children involved in crime rose by 10.5% to 5342 cases compared to 2019 (4833 cases). The number of first-time offenders rose by 15.7% to 4,916 cases, while repeat offenders fell by 27.2% to 426 cases (MALAYSIA, 2021). However, questions remain regarding the effectiveness level of current juvenile institutions' physical design for their occupants. Hence, it is now imperative to increase the effectiveness of the institutions in promoting successful rehabilitation in terms of their physical design and physical living environment through design revisit and re-evaluation, and at the same time, elevate the overall well-being of adolescent occupants.

Despite extensive building evaluation research made by previous built environment researchers, inadequate attention has been given to juvenile institutions where there are only mere studies exploring the relationship between juveniles and the physical living environment in juvenile institutions, especially in Malaysia. Currently, studies about the relationship between adolescent occupants and their physical living conditions in juvenile institutions in the built environment field in Malaysia are close to nil. In legal contexts, incarceration is not intended to make the offenders suffer through inhumane treatment as punishment but rather to make them lose their freedom (Kjolberg, 2016). Besides, young individuals should not be sentenced to imprisonment (UNODC, 2015). Logically, if adolescent occupants continue to be treated in dehumanising manner while in juvenile institutions, their behaviour may reflect this

treatment. Hence, despite significant resources allocated, concerns persist about the effectiveness of Malaysian juvenile institutions' designs in addressing the needs and well-being of adolescent occupants, highlighting the need for a re-evaluation of the physical living environment to ensure effective rehabilitation.

1.3 Operational Definition

In this study, the term “Physical Living Environment” refers to the comprehensive spatial and environmental setting within the juvenile institutions, encompassing more than just the dormitories where the adolescent occupants reside. Since adolescents are not permitted to leave the institutions, the juvenile institutions have become their entire living space, affecting every aspect of their daily lives. The term extends beyond the mere interior design and includes all elements of the built environment that influence their physical and psychological well-being. Typical spaces available within juvenile institutions include workshops, canteens, classrooms, and recreational areas, each playing a crucial role in the daily routines and rehabilitation process of the adolescent occupants. The Physical Living Environment, therefore, includes the arrangement and quality of these spaces, as well as natural lighting, ventilation, acoustics, safety features, and other environmental aspects that collectively contribute to the overall rehabilitation and well-being of the adolescent occupants within the institution.

1.4 Research Questions

Addressing the identified issues above, this research intends to delve more into the physical design of the living environment of juvenile institutions in shaping quality adolescent occupants concerning their health and well-being during their rehabilitation in the juvenile institutions in Malaysia since their crime, well-being, spatial design and architecture are all interrelated subjects (Beijersbergen, Dirkzwager, van der Laan, &

Nieuwbeerta, 2016). As famously quoted by Winston Churchill, "We shape our buildings, and afterwards, our buildings shape us". In short, it is crucial to study both subjects to obtain more information and additional knowledge to strengthen the understanding of juvenile and juvenile institutions' context in the built environment field, which is beneficial for future improvements.

Based on the problem statement, as a practice of understanding the juveniles and Malaysian juvenile institutions, the central inquiry of this research is: What is the relationship between the built environment and physical design of juvenile institutions and their occupants' well-being and satisfaction level towards the physical living environment? Therefore, this research needs to address three research questions (RQs) as below.

RQ1: What is the current condition of the occupied Malaysian juvenile institutions in terms of the physical living environment?

RQ2: How do the adolescent occupants perceive their current physical living environment and its impact on their well-being and satisfaction within juvenile institution?

1.5 Research Aims & Objectives

This study aims to foster physical enhancement of the living environment within juvenile institutions in Malaysia towards better well-being for the adolescent occupants. Hence, two research objectives were identified in this study as follows:

RO1: To inspect the current physical living environment of juvenile institutions in Malaysia.

RO2: To assess the perceived well-being and satisfaction of adolescent occupants residing in juvenile institutions in Malaysia in regard to their current physical living environment.

1.6 Research Scope

This research focuses on assessing Malaysian juvenile institutions and their adolescent occupants' well-being during their rehabilitation and will be carried out in all the approved schools (Sekolah Tunas Bakti-STBs) and probation hostels (Asrama Akhlak-AAs) in Peninsular Malaysia under the authority of the Malaysian Social Welfare Department (JKM). However, the Henry Gurney Schools established in 1949 under Juvenile Courts Act 1947 [Act 90] to house young offenders are excluded from this study because they fall under the surveillance of Malaysian Prison Department and are controlled by the Malaysian Ministry of Home Affairs. These institutions are more akin to prisons, catering juveniles who have committed more serious offenses, and are not focused on rehabilitation in the same manner as the STBs and AAs.

This study focuses on the extent and determinants of STBs and AAs performance in influencing the adolescent occupants' satisfaction level and their state of well-being all over Malaysia, mainly focusing on their dormitories. The dependent variable in this study is the satisfaction and perceptions of the juvenile occupants towards their physical living environment in the juvenile institutions. The extent of the quality and performance of the juvenile institutions and their state of well-being are assessed via the identified building performance elements to comprehend their correlation in creating a built environment influencing the adolescent occupants' well-being and satisfaction. The building performance elements standards and guidelines are adopted from relevant sources.

The central purpose of the assessment is to enlighten future scholars in promoting a comfortable physical living environment for juveniles in Malaysia, besides serving as feedback and feedforward for future enhancements and improvements.

1.7 Research Significance

This study holds immense significance as it aligns with the two key objectives. Firstly, by achieving the RO1 that focuses on inspecting the current physical living environment of juvenile institutions in Malaysia, the research contributes to a more effective evaluation procedure through a thorough, comprehensive and systematic study on evaluation studies. By incorporating research on evaluation findings into evaluation practice, researchers could produce evaluation practices of more significant influence and higher impact (Chris L. S. et al., 2016). Besides, according to Lewis, Harrison, Ah Sam and Brandon (2015), Research on Evaluation (RoE) contributes to a substantial and growing body of knowledge about evaluation that can influence evaluation thought, practice and training.

Secondly, in attaining RO2, which involves assessing the perceived well-being of adolescent occupants, this study aims to bridge the gap in attention to correctional facilities from environmental researchers. The lack of such focus inhibits the building of evaluation knowledge in Malaysian juvenile institutions. Through a deep understanding of the impacts of the physical living environment on adolescent occupants in terms of subjective satisfaction and well-being, this research emphasises the importance of conducting building assessments in Malaysian juvenile institutions.

On top of that, the outcomes of this research will significantly contribute to juvenile institution construction and effective interior design studies in the broader

field of the built environment. It provides valuable insights into facility conditions, the relationship between the physical setting and adolescent occupants' satisfaction and well-being, as well as informed adjustments to architectural designs. Thus, the goal is to enhance the physical living environment of Malaysian juvenile institutions, fostering positive rehabilitation and emphasising the priority of adolescent occupants' comfort, satisfaction and well-being.

1.8 Organisation of Thesis

This thesis is outlined based on six chapters. The description of each chapter is defined in Table 1.0 below.

Table 1.0: Organization of Thesis

Chapters	Descriptions
Chapter 1: Introduction	This chapter presents the introduction to the research containing important terminology, including research background, presentation of the problem statements, research questions, research objectives, scope and research significance, and the organisation of the thesis.
Chapter 2: Literature Review	Chapter 2 provides a discussion of literature related to the scope of the research. It contains reviews on previous empirical research and research methodology. This chapter will conclude with a conceptual framework formulated from the research gaps.
Chapter 3: Research Methodology	Chapter 3 outlines the detailed process and tools involved in data collection. It also involves the categorisation and grouping criteria for the data collected later on.
Chapter 4: Results	This chapter reveals and presents detailed descriptions of the data analysis collected from all the juvenile institutions and responses from selected respondents in Malaysia. This chapter contains the research findings, validity and reliability of the data analysis. A summary of research findings is presented towards the end of the chapter.
Chapter 5: Discussion & Conclusion	Chapter 5 provides explanations and reflections on the findings in relation to research questions, objectives and the body of literature in the field of study. It contains a summary of the key findings and their main contributions, highlighting the limitations of research and providing suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Malaysian Correctional System

Malaysia's modern criminal justice systems are based on English law, as it was once a British colony from the eighteenth century until 1957. During the British occupation of Malaysia, English law was introduced and accepted in various legal areas, including juvenile justice (Mustaffa, 2016). Its criminal justice is handled and enforced by three distinct agencies: the police (investigation and prosecution), the judiciary (criminal justice process) and prisons (correctional agency for offenders). These three agencies fall under the Malaysian correctional agency, namely the Malaysian Prison Department within the Malaysian Judicial System under the Ministry of Home Affairs (Omar, 2014).

In addition, Omar (2014) mentioned that the prison department of Malaysia has embraced the concept of rehabilitation of the Humanistic Theory towards offenders and inmates in Malaysia. The first program introduced for rehabilitation purposes was the Program Khidmat Bakti (Volunteer Service Program) in the 1980s, followed by the Therapeutic Program in 1992. Finally, in 2002, a more structured rehabilitation system, namely the Human Development Program (HDP), which incorporated all previous rehabilitation approaches, was launched. HDP focuses on the development of attitude, skill and knowledge (ASK) of inmates. This program contains four primary rehabilitation modules, which are:

1. Education and Guidance (Petty Crime Offenders)
2. Therapeutic Community (Drug User)
3. Academic (Young Offenders and Juvenile Inmates)

4. Halaqah (Islamic Religion Approach)

2.2 Environmental Design and the Justice System

Numerous theories and a vast amount of empirical research in the social sciences demonstrated that modest changes in the situational environment can significantly affect human behaviour (Chalfin, Hansen, Lerner, & Parker, 2021). Crime prevention through environmental design has been developed and promoted to create a physical living environment for reducing the crime rate in a built environment. Significant practices in preventing crime through environmental design include Crime Prevention through Environmental Design (CPTED) and Alley-gating, highlighting the crucial role played by the environment in preventing crime. In other words, identifying the impacts and benefits of the environmental design in juvenile institutions is crucial.

There is compelling evidence that natural and built environmental design affects physical, mental, as well as emotional health and well-being. Environments are said to be capable of alleviating negative consequences such as anxiety, depression, aggression and post-traumatic stress disorder (Toews, 2020). Ulrich et al. (2008) and Toews (2020) emphasised that medical buildings and rooms with adequate privacy, adaptability and small intimate spaces promote faster healing and recovery. These health benefits could be extended to the criminal justice system to fill in the gap of creating a suitable built environment to reduce recidivism and improve the well-being of offenders and inmates. Several studies have shown that access to nature could reduce aggression and, in other words, reduce recidivism. Interaction with nature promotes serenity and reduces stress in prisons; for instance, a correctional officer experiences less stress with a simple nature mural desire for an outdoor working environment (Van der Linden, 2015; Wagenfeld et al., 2017; Research Report:

Developing the Evidence for Evidence-Based Design, 2012). These encouraging findings suggest that young offenders may also benefit from environments that prioritise their satisfaction level of physical, mental and emotional well-being.

2.3 Understanding Correctional Facilities and the Design Contexts

The United Nations initiated a United Nations Standard Minimum Rules for the Treatment of Prisoners, also known as the "Nelson Mandela Rules" in December 2015 after 60 years of revisions from the first standard rules presented in the year 1955 (UNODC, 2015). This rule encompasses 122 rules that emphasise equality and the philosophy of confinement. Besides, this rule also comprises minimum living standards to be provided in all kinds of correctional facilities, including juvenile detention centres, which brings attention to the design needs of correctional facilities for inmates' well-being.

2.3.1 Global Scenario

According to Fair and Walmsley (2021), there are over 10.3 million people detained in prisons and jails throughout the world, including juveniles. Correctional facility designs such as prison design provide a significant impact on the life experiences of incarceration. However, studies on the relationships between the physical environment of correctional facilities and well-being remain scarce (Moran & Turner, 2019; Engstrom & van Ginneken, 2022). Even though every country is different in population size and justice system, the target to provide good correctional facilities and environment design are similar worldwide.

Standards for adult local detention facilities (3rd ed.) were then released in 1991 as a guiding principle for jail design according to the American Correctional Association (ACA) standards (American Correctional Association, Standards for

Adult Local Detention Facilities, 3rd Edition, 1991). Besides, Beck (1999) suggested new designs for jails, including direct and indirect supervision design, linear design, fewer dormitories design and jail design elements, in his publication. Moreover, a Jail Design Review Handbook released by Mark Goldman (expert in juvenile and adult correctional facilities planning) in the year 2003 also guides in designing a new jail, renovating an existing jail, as well as reviewing the existing jail design (Goldman, 2003). Jail Design Guide (3rd Edition) was released by the National Institute of Corrections (NIC), the US Department of Justice to overcome the increasing number of inmates in the States. This third edition discussed the existing correctional standards and ways to improve based on various major design considerations, including spatial functional components (Kimme, Bowker, & Deichman, 2011).

In China, although the ancient correctional facilities were influenced by political aspects such as the influence of the old United Kingdom and the United States, the modern Beijing Prison was built with their own intended purposes (Chu, 2021). According to Chu (2021), the Beijing prison design comprises multiple features from the old Qing dynasty designs to the new modern design features of Western buildings, such as a clear centre, reinforced concrete and thick brick walls.

In the Philippines, they also have a Bureau of Jail Management and Penology (BJMP) that supervises and controls jail planning and design. The BJMP Standard Procedures on Jail Planning and Design prescribe the procedures for conducting jail design (BJMP, 2019).

However, in Malaysia, there is still very little information about correctional facility design guides in its local context. Currently, the main attention is given to the crime inmates overcrowding conditions in prisons and detention centres (Nair, 2022).

According to the data released by the World Prison Brief (WPB), the total population detained in prison in Malaysia was 69,507 people as of 25th August 2021 (Fair & Walmsley, 2021). In accordance with this overcrowding issue, the Home Ministry has announced the new largest prison construction in Kelantan; however, experts have critiqued that building the new large prison will not address the crime overcrowding issue, "The building of this new prison will merely help in minimising the problem, not resolving it," said Datuk Sundramoorthy Pathmanathan, a criminology professor with Universiti Sains Malaysia (USM) (Borneo Post Online, 2022). Thus, to address the current crime overcrowding situation in the Malaysian justice system, a proper design guide is needed to ensure proper correctional facility planning, designing and construction process.

In short, even though juvenile institutions are different from adult jails, the structure of the architectural design is still similar. The urge to have a design guide is necessary for creating a supportive and safe environment for juveniles to enhance their lived experience during their remand and rehabilitation periods. It is important to monitor the adolescent occupants' health and well-being during their stay in juvenile institutions.

2.3.2 Design for Well-being

In recent years, the design of correctional facilities has shifted to prioritise the well-being of their occupants. Environmental psychology is utilised by Bernheime et al. (2017) to reveal the relationship between the built environment in prison to its occupant's well-being in the new prison design guide. The new prison design guide proposed by Bernheime et al. (2017) includes elements building performance elements like lighting and acoustic design. Besides, the aim of proposing the new design guide is to improve the prison environments to support the inmate's rehabilitation process

through architectural design. The new correctional facility design is not designed to replace the existing standards but to enhance elements for the psychological needs of occupants.

Moreover, Engstrom and van Ginneken (2022) explored 16 environmental elements as the ethical elements in prison design through their study to portray the connection between prison environment design and inmate's well-being. They opined that adjusting potential ethical elements in prison environment design features could improve occupants' well-being simultaneously. Furthermore, Karthaus et al. (2019) proposed evidence-based design measures for correctional facilities that could support the health and well-being of occupants. Environmental psychology is utilised in the development of the design measures owing to its characteristics of providing calm and reducing fear, resulting in better well-being in an individual.

Today's correctional facilities are gradually transforming and shifting to a new approach concerning the rights and health of the occupants, just like other facilities such as residential and educational facilities. However, although the prison design is transforming, the correctional facilities in Malaysia are still maintaining the "status quo" in their designs, especially in juvenile institutions compared to adult detention centres. It is widely known that the physical living environment of individuals affects their physical and psychological growth. Thus, it is important to take care of the adolescent occupants' well-being during their remand and rehabilitation in Malaysian juvenile institutions. Hence, a proper juvenile institution design comprising juveniles' perceptions is necessary in the local Malaysian context.

2.3.3 International Standards for Juvenile Buildings

Acknowledging the vital role played by juvenile institutions in the rehabilitation and social reintegration of adolescent occupants, many countries have also developed their designated design guidelines and best practices to enhance the effectiveness of these institutions. For instance, the US Department of Justice emphasised the importance of providing adequate space and appropriate programs to support the physical, emotional and educational development of adolescent residents by guiding juvenile justice planners and practitioners on how to anticipate space needed for juvenile institutions, as well as plan and cost-effectively design the facilities. The design guidance is applicable as early as the design and space planning stage, including population projection, facility capacity, program needs, functional space requirements, as well as safety and security considerations. It could assist juvenile architects in making informed decisions regarding the size, location and types of juvenile facilities needed to meet the adolescent occupants' specific needs (Butts & Adams, 2001).

As early as in the year 1987, the National Bureau of Standards, now known as the National Institute of Standards and Technology (NIST), published a design guide and standards for building materials, equipment and systems used in detention and correctional facilities (Dijkers & Reeder, 1987) to alleviate the performance issues encountered in correctional facilities back then. The NIST is a renowned laboratory agency under the US Department of Commerce focusing on physical science, such as physical measurement and material measurement. Thus, the design guide provides a focus on the standards and guidelines related to the construction and design of materials, equipment and systems used in detention and correctional facilities, aiming

to ensure the safety, security and functionality of the facilities while planning and designing new correctional facilities.

In the year 1992, the American Correctional Association (ACA) provided direction and guidelines on planning and preferred elements in designing juvenile correctional facilities. The handbook covers topics such as consultant selection, site selection, space planning, building cost, design and construction development of juvenile correctional facilities, including aspects such as security and safety considerations, environmental factors and future considerations. The handbook involves case studies and derived examples of best practices to be applied in juvenile corrections facility design. Moreover, the handbook emphasises the significance of the design and architecture of juvenile facilities in overall juvenile justice planning; the juvenile buildings are more than just shelters; they play a potentially effective function in creating a comfortable environment for rehabilitation. Factors such as light, colour, noise, texture and the relationships of space and element arrangements contribute to the efficiency of the facilities as tools for potential rehabilitation.

On the other hand, the NAATAP (Native American and Alaskan Technical Assistance Project) published a design guide to provide a comprehensive process for designing juvenile facilities (McMillen & Justice Planners International LLC (JPI), 2000). The design guide emphasises the importance of understanding the needs of those who will use the facility; in this case, the adolescent occupants who reside in the facilities; and how designing juvenile facilities differently from adult detention facilities to achieve better rehabilitation outcomes by creating a conducive residential environment. Furthermore, the guidelines also detail the significance of creating normative environments that could encourage normal behaviours and positive responses from adolescent residents inside the juvenile facility. Besides achieving the

normative environments through small group sizes of staff, specific physical features such as movable furnishing, wall colours, view of nature and sound-absorbing building materials could also promote the adolescent occupants' cooperation to prepare them for social reintegration after their rehabilitation period.

In Sweden, Ulrich R. (2019) proposed a few evidence-informed design recommendations for juvenile facilities for the Swedish National Board of Institutional Care (SiS) that aim to inform about the interrelationships between the physical living environments of juvenile institutions with the adolescent occupants' stress and aggressive behaviours. Studies have shown the negative consequences of negative living conditions on youth development, particularly in correctional facilities (Ulrich R., 2019). A conceptual model of creating a stress-reducing environment to improve rehabilitation treatment and safety outcomes within the juvenile facilities was proposed by Ulrich, encompassing design recommendations such as noise-reducing design, nature and garden accessibility, daylight exposure, as well as living unit sizes adjustment, based on the evidence and theory from various field. The recommended design features highlight the importance of evidence-informed design in mitigating environmental stressors and improving rehabilitation treatment outcomes of adolescent occupants within the institutions, as well as creating safe and conducive institutional environments. At the same time, the researcher also aimed to balance between scientific theories and practical usability of the design features for designing youth facilities.

The Oregon Juvenile Department Directors Association (OJDDA) has released the latest edition of the Oregon Juvenile Detention Facility Guidelines revised by the Youth Development Council and the Oregon Department of Corrections in 2020, providing a framework for the operation of juvenile detention facilities in Oregon from