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How many designers create furniture that allows meaningful place-making in modern office

DOLAH, Mohd Shahrizal

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**HOW MAY DESIGNERS CREATE FURNITURE THAT ALLOWS MEANINGFUL
PLACE-MAKING IN MODERN OFFICE**

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ABSTRACT

This research has investigated a participatory design method for furniture designers to allow users to express their aspirations through place making or creation of meaningful office workspaces. During my empirical work, I discovered that there were problems in getting the office workers to explain their ideas through verbal explanations. They did not have the right techniques and tools to express their ideas. From there I started to use mock-ups as tools to communicate and engage with the respondents in my investigation. In my research, I had identified a promising participatory design approach, role-play with mock-ups.

My method sought to build the techniques which previously used by Mitchell (1995) and Lemons et al. (2010). Firstly, I identified the importance of understanding the needs and aspirations of users with regards to office furniture. Then, using participatory design role-play with mock-ups, it had enabled all respondents and participants to reveal their current problems, needs and aspirations. They started to create useful design ideas and opportunities for designers in developing new workplace designs. From here on out, it became evident that this technique was useful, workable and quickly accessible for Malaysian designers in actual design practice or other similar developing countries. In relation to this, I developed a social interaction technique to inspire and enhance active participation.

The mock-ups helped the respondents to overcome their ignorance in design. It had also helped the participants and respondents to overcome their low awareness of 'design language' and started to share their concerns. These were not always practical design ideas but they provided distinct information which would be very helpful in developing and identifying design concepts. Through exploring how mock-ups could be used as productive tools to explore users' needs and aspirations, the outcome derived from this research, was aimed to develop and provide guidance in design research techniques. It was also intended to inspire designers in developing furniture that would create a meaningful office environment, reflecting users' needs and aspirations by allowing personalisation and place-making to occur.

Knowledge contribution in this research could be divided into three parts: 1) contribution for design practice (section 6.2.1); 2) contribution for design research (section 6.2.2) and contribution for design education (section 6.2.3). The study revealed, by using role-play with mock-ups directly with the users, allowed the designers to quickly become aware of arising issues without the need to do a potentially time-consuming, normative and tedious observational study.

My approach had the characteristic of intervention which allowed participants to go beyond normal practices, environments and scenarios. This could be seen in my findings during role-play with non-experts (section 5.1) and design workshops 01 and 02 (section 5.2).

This research approach is primarily leads to new understanding about practice and described as “practice-led” approach to research. This project had investigated, demonstrated and opened the possibility that these approaches could be turned into a practical participatory process toward design in furniture industry practise in Malaysia and created a potential to be further developed by other researchers as well as disseminated through education for future Malaysian designers.

Keywords: Design practice, Participatory design, user need, aspiration, mock-ups, role-plays with mock-ups, personalisation, place-making and practice-led.

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CHAPTER 1: INTRODUCTION

1.0. Introduction

This chapter provides an introductory background and overview to the research. It explains the rationale of the research and the importance of the investigation to designers who are interested in understanding users' needs and aspirations when developing a new office environment. It also investigates how furniture designers using a participatory design process can employ an understanding of personalisation, re-shaping and place making to develop furniture. To date, there have been no academics studies undertaken in this area (furniture and office environment) in Malaysia. During my Main data collection (refer section 5.3.1) experts explained that Malaysia did not have any design requirement for workplaces. All the workplace layouts were proposed by manufacturers with agreement of the client without any research on user needs (refer detail discussion in section 5.3.2). I will discuss further about Malaysian office scenario in section 2.5.4.

This is an investigation into an understanding of user needs in developing a meaningful office environment that uses furniture systems designed to manage space. The study focuses on Malaysian office environments, and involves users of open plan offices. This chapter begins with my past and present experiences that led to the main problem statement and the aims and objectives of this research. The final section indicates the original contribution to knowledge developed in this research.

Due to the rapid modernisation of Malaysia, the researcher is concern about how this research can be implemented in the design field in practice in Malaysia although it has wider implication for the design of offices and furniture. Its aims to provide guidance for designers in how to engage users in their research project to foster new design ideas in developing new workplaces.

1.1. My Past and Present Experience that have lead to my PhD Investigation

I graduated with a Bachelor in Industrial Design from MARA Institute of Technology (ITM) in 1994. After graduating, starting from 1995 to 2000, I worked with Bristol Technologies, one of the leading furniture manufacturers in Malaysia. As a full-time industrial designer, I was exposed to the Open Plan Office System (OPS) designs from Europe, USA, Canada, Australia and Asia. Working in close relationship with furniture makers and OPS manufacturers, I had come to realise that most of the workplace designs and office layouts in open plan offices were literally decided by OPS suppliers/salesperson or clients (mostly finance managers) and not by offices' occupants themselves. In most cases, ideas came from salesperson and clients, while the occupants usually did not have the opportunity to give their opinions.

For instance, if there was a discussion took place between suppliers/salesperson and clients in initial stage of design process, to me that was only the process of qualitative feedback in understanding the clients' interests and the purchase rating. Normally it would end up with the clients following the suppliers/salesperson design ideas and proposals. There was no space given to recognise and understand the end user needs and aspirations or those who would occupy the workplaces.

I had observed that workers were divided and placed in small spaces with a close supervision from a manager. According to Schlosser (2006) this approach can cause stress, distraction and a lack of privacy (Discussion about the Malaysian office can be seen in chapter 5).

'Reinventing the office cubicle was a daunting task. After all, the cubicle is not just a stand-alone piece of furniture. It is a whole office system. Because cubicles are essentially boxes, workers can be lined up in row and space planning is fairly direct' (Deasy et al. 2001:50).

I based my work on the assumption that user experience and interaction in the workplace need to be understood as part of the furniture development process.



Figure 1.1: Open Plan Office System (Source: Field work in Malaysia)

Following this experience, since August 2000 until today, I have been employed by Universiti Putra Malaysia (UPM) as a lecturer in the field of Industrial Design and have involved in design consultations and researches pertaining to furniture designs, including a project with the Department of Safety and Health, Ministry of Education (MOE), Malaysia on ergonomic designs. The main objectives of the project were to develop anthropometric dimension data for primary school students and propose a set of ergonomic primary school furniture as a side project. That was the first project where I started to involve users to express their needs and aspirations in developing design ideas in data collection.

Since then, I have developed a specific interest in furniture design development including public participation in the design process, of which, it has been neglected in Malaysia. As stressed by Yazid (2010), public participation could create a sense of ownership, gave a better understanding of the specific local context and reflecting the ideas of the communities.

Being a practitioner of industrial design and a lecturer in Malaysia for more than 18 years, it has given me a wide experience in OPS designs as well as knowledge in the way of how people interact within their work spaces. In my PhD investigation, I have been interested in investigating on how designers could create furniture that allows meaningful place-making in modern **workspace (as discuss in section 2.2 and 2.3)**. This investigation explored user interests, needs and aspirations in developing new workplaces.

'A new product may be useful to new user, but not to the current users who have developed skill and conventions around existing tools and practices. The researchers saw a product potential, but worker participants desired a less generally useful system that was more closely synchronized with existing practices' (Grudin and Pruitt, (2002:1)).

Users' experience and participation could be the main factors in the development of new furniture design and workplace.

Also as a professional, I have explored the responsibilities of designers who are involved in furniture industry, being one of them is to put the requirements from users into their consideration in designing furniture. The designers might foster a medium for users to express their emotions through the personalisation of their workplace. They might also design the office environment, so that, it would reflect the workers' needs in forming a feeling of importance (meaningful) and a sense of attachment to their work and organisation. Those kinds of senses are a potential help in rewarding them with satisfaction. These factors have influenced my research objectives.

In approaching this PhD project, I have explored how furniture designers, using a participatory design process, were able to adopt understandings in personalisation, meaningful workplace and place-making in developing workplace.

1.2. Problem Statement

There have been many discussions on the office environment, especially on productivity rates, office function, privacy, safety, and satisfaction, but there has been no study on the relationship between design and workplace personalisation. According to Duval et. al. (2002) and Brennan et. al. (2002), the majority of workers were negative about their environment, although these offices were intended to enhance communication, conversation and team unity. Similar to my findings discussed in chapter 5, most of the users gave negative feedback about their workplace environment in the early stage.

Brennan et. al. (2002: 294) stated that, many companies continue to adopt open plan office design concepts primarily because of the reduced cost in construction and maintenance. Another reason why open plan is so popular is the belief that it facilitates greater communication, which in turn, facilitates greater productivity.



Figure 1.2: Traditional Office. S.C. Johnson & Son Building by Frank Lloyd Wright. 1937-1939 (Source: Knobel (1987))

Although “*Burolandschaft*”¹ by Quickbornor team and X and Y theory by Douglas McGregor (section 2.1) was introduced to increase workers communication and productivity, the finding presented in *Traditional versus Open Plan Design*, showed that employees appear to be negatively affected by the relocation to open plan offices, reporting decreased satisfaction with the physical environment, increased physical stress, poorer team members relationship, and lower perceived job performance (ibid: 293). Traditional office can be divided into two types of office concepts. Workers working in a small space with four to six people or working in an open space with individual table settings (figure 1.3). Open plan design is a concept where office workers are working in a large open space. Workers are divided into small cubicles or sharing workplace with proper space planning and workplace configuration (figure 1.4).

¹ The office landscape approach to space planning pioneered by the Quickborner Team led by Eberhard and Wolfgang Schnelle based in the Hamburg suburb of Quickborner. It was intended to provide a more collaborative and humane work environment.



Figure 1.3: Individual Table Setting.
Johnson's Table and Chair by Steelcase 1938. (Source: Knobel (1987))



Figure 1.4: Open Plan Office System (Resolve System by Herman Miller).
From an anonymous source

Many people spend most of their working life in the workplace. According to Wells et al. (2007) based on a number of studies of user satisfaction in the workplace, personalisation offers many benefits to the workers and the organisation, as it can enhance job satisfaction, well-being and improve morale. Personalisation can be defined as the modification of an environment by its occupants to reflect their identities. Workplace personalisation can help release employees from work stress, help them express their emotions, and evoke positive emotions. It also makes the workplace more like a place of pleasure and fun, creating a sense of meaning for the working environment. Wells (2010) believes that designers have to understand the needs of the users before undertaking design. Therefore, I suggest a place-making approach may enable us to overcome these problems.

Place making is enabled by design, but enacted by individuals (Schneider, 1987).

The workplace should be designed to fit into the culture and nature of the work of a group (Harrison and Dourish, 2006).

The office is the place where people share their activities and interact with each other to achieve a common goal. Arguably, this purpose of working together may be helpful if personalisation helps users to express themselves. According to Rostam², a member of the Malaysian Interior Design Society (MID):

“...Malaysian designers are still using specifications that were provided by the British since Malaysia got its independence in 1957, whereas Britain itself no longer uses these, ...”

As a developing country Malaysia should have its own design specification referring to the Malaysian local context. Imran Zakaria³, Managing Director of Al-Ciptra Design pointed to the need for public participation in design:

“...Malaysian policy makers need to think about the future of the office environment. The changes in office equipment influences office design. We need design revolution. We need to determine the need of the workers or else the design will remain the same for another ten years...”

‘ The majority of the public may have limited awareness and knowledge on their right in planning. This could provide the implication: first the public is always satisfied and believed in the government’s proposal; Second, the public do not feel that participation is necessary and third, they do not understand the plan and do not know their rights. Therefore, people must be involved in decision making, resolving conflict and planning for their future’ (Dola and Mijan, 2003:5)

² EX05 Expert Interview on 16 December 2010

³EX 09 Expert interview on 4 January 2011. Al-Ciptra Design is the interior design main contractor for Putrajaya Development.

Mohammad Awang⁴, Professor in interior design and Founder of the Malaysian Interior Design Society (MID), stressed that

“...Malaysian office design was modelled since British colonization era, as we are moving toward as a fully developed country, there is no escape to involve public participation in policy making...”

Having identified the weaknesses in the Malaysian design process and through my empirical work (section 4.1), as a designer and researcher, I have been interested in developing a design method that would help designers to create furniture that allows meaningful place-making to take place in modern workspace. I have started to engage with users during my empirical work that was conducted in Sheffield UK in 2010. During the interview sessions, I found that there was a knowledge gap between myself (as designer/researcher) and the office's users. They had difficulties in explaining their ideas through verbal explanations. They did not have the required design knowledge in expressing their needs and aspirations. From that standpoint, I started to seek productive tools to approach the users in my data collection. I had used a participatory design approach, role-play with mock-ups as a tool to interact with the users as described in chapter 3 and further elaborated in chapter 4.

As environment and office culture change, the design of office environment should move along as well. The research has created a design methodology for designers to identify users' environmental experience in their office and workplace and propose a process to analyse their needs and aspirations.

1.3. Office Development in Malaysia

In Malaysia, there have only been a few research projects which have been conducted to evaluate office environments and worker satisfaction such as research done by Noordin and Jusoff (2009) in their research in evaluating the level of job satisfaction among Malaysian university staff.

⁴EX06 Expert interview on 29 December 2010

However, researchers have neglected office furniture and the office environment where a large proportion of people in the developed countries spend a third of their life. In Malaysia for instance, the normal working hours per day are 9 hours (from 8am to 5pm) and in certain departments, the workers take two hours extra in every day to complete their assignments.

The development of offices in Malaysia began after Malaysian independence in 1957⁵. The first decade of Malaysian independence, 1957-1967, showed the period in which the new nation took hold of its own reins (Chan 1987: 19) (section 2.4.4). With the changing of mood of the nation and released from the colonial British administration, the local Malaysian architects began to take over the development of office buildings in Malaysia.

This first decade is also the period when the Jabatan Kerja Raya (JKR) (formally known as Public Work Department (PWD)) established Standard Office Plans (figure 1.5). Public sector and institutional buildings were needed to meet the development of demand of a developing nation. In 1957, the JKR building was completed using mainly the standard plans for the office building. The plan is basically a single loaded corridor with offices on one side and staircase at the ends (ibid: 21) (figure 1.5). The development was followed by a government office building at Petaling Jaya in 1958, the parliament building was built in 1963 and Radio and Television Malaysia (RTM) in 1968 (figure 1.6).



Figure 1.5: Example of standard JKR building (1957). Source: Author

⁵Malaysia gained Independence from Britain on 31st August 1957.



Figure 1.6: Radio and Television Malaysia (RTM) (1968). Source: Author

In 1974, the Malaysian Government Complex was built in Jalan Duta (figure 1.7), Kuala Lumpur. The building was one of the largest office buildings in Malaysia, with places for more various government departments. The increase in the workforce in the early 1990s forced the Malaysian government to expand the office building to accommodate their office employees.



Figure 1.7: Malaysia Government Complex (1974). Source Author

Malaysia began its search for a new government administrative centre in the mid-1980s to divert some development away from Kuala Lumpur. A site at Prang Besar in the Sepang district was chosen in view of its strategic location between Kuala Lumpur and Kuala Lumpur International Airport (KLIA). The New Federal

Government Administrative Centre is named “Putrajaya” in honour of Malaysia’s first Prime Minister, YTM Tunku Abdul Rahman Putra al-Haj, for his invaluable contributions to the nation. While Kuala Lumpur will remain the country’s capital city as well as the premiere financial and commercial centre, Putrajaya plays the role of the new Federal Government Administrative Centre.



Figure 1.8: Perdana Putra Complex Putrajaya.
Source: Field study

Construction of the new city began in August 1995. When the city is fully developed, it will have a total of 64,000 housing units, which will cater for a population of around 320,000 people. In 2007, the population of Putrajaya was estimated to be over 30,000, which comprise mainly government servants (Federal Territory of Putrajaya). The development of the office building has influenced the office interior and working concepts reflected to the up-to-date modern contemporary appearances (Chan, 1987).

Putrajaya Vision is to become a well-managed, vibrant and prosperous Federal Administrative Capital that fulfils the socio-economic, recreational and spiritual needs of its residents and workers. Its main missions are to:

- Develop constructive engagement and alliances with all stakeholders and partners
- Build a high-performance, efficient and customer-friendly organisation
- Provide world-class public amenities and facilities

- Cultivate a conducive environment for thriving commercial activities
- Practice a high degree of good governance and integrity

"... Putrajaya government complex was built with the up-to-date interior design and furniture facilities. Furniture Manufacturer and suppliers proposed the most modern office concept. This design concept not only implemented at Putrajaya, but to all new government buildings in Malaysia..." (Rostam⁶).

Through my experience as a furniture designer in Malaysia, I saw a rapid development in the office environment since Malaysia gained its independence. Malaysia, formally known for agriculture, was transformed into an industrial country with a high proportion of administration work. A modern office concept was introduced in parallel with Malaysian "modernisation".

'Open offices were designed in the 1950s and reached their height of popularities in the early 1970s, when many companies converted to these types of designs. Originally claims by the designers of open offices were that they created flexible space, allowing layout to be more sensitive to changes in organisation size and structure' (Brennan et al., 2002:280).

As in Malaysia, this working concept was introduced during the iconic PETRONAS Twin Tower Project in 1992. The design concept was a reversed engineering project by local manufacturer working together with Steelcase of Canada. In contrast, during my expert interview in the main study in Malaysia, I found that before the PETRONAS project most government offices were using the traditional office concept.

"...The office was segregated into various zones. We have executive and non-executive zones. We have general workers, executive and decision makers zones in offices. All separated in different space..." (Mohammad Awang⁷).

⁶ EX5 expert interview 16 December 2010

⁷ EX06 Expert interview 27 December 2010

In 1998, the public sector workers started to move to Putrajaya. Putrajaya was planned to embrace two major themes, i.e. 'Garden City' and 'Intelligent City'.

Reflecting the 'Garden City' concept, Putrajaya's planners sought to reflect the very best in city planning and landscape architectural ideas to realise a new vibrant city of tomorrow as indicated by public material for the project (www.ppj.gov.my).

Based on my observation in professional practice, I found that Putrajaya is fully based on an open-plan office concept. The office workers' move from a traditional to an open-plan office system resulted in rapid changes in the in working approaches .

Zalesny and Farace (1987: 243) in their research in *Traditional versus Open Offices* reveal that, although an open-plan office concept aims to enhance communication and satisfaction, there are many reactions to a change in the office environment from traditional to open plan offices.

Workers reported a less physical setting, fewer positive perceptions of their job, less work satisfaction and less privacy in their new open environment than they reported in their old traditional environment.

According to Rahman (2010) in his research in design and cultural migration in Malaysian society, users that are experiencing social and cultural changes, are also still trying to adapt the elements of their previous practices to their new setting.

Further, he suggested that designers are required to offer more than just an improved version of a new product, but an appropriate design and social engagement system in which design and designers can both play a role in the social investigation that informs designing (ibid: 8).

Whiteley (1993:3) suggested that, the design profession needs to be both introspective and outward looking. It must look at its practices and value and their implication and it must look at the condition of the society and the world.

'Design must become an innovative, highly creative, cross-disciplinary tool responsive to the true needs of men. It must be more research oriented, and we must stop defiling the earth itself with poorly-designed objects and structures'. (Papanek, 1973:2).

Changes in the office environment influenced the workers' daily working activities and gave a new experience in working conditions. The Putrajaya office development has changed how office workers work in Malaysia. The Putrajaya office designs have influenced most of the office designs in Malaysia. As a new iconic Malaysian government administration complex it becoming a reference for other new office developments either for public or private agencies.

1.4. Research Objectives

- i. To gain a contextual understanding of how to engage stakeholders to get them involved in practical design methods.
- ii. To explore ways for furniture designers to understand daily activities in a workplace.
- iii. To explore the practical applications of participatory design with mock-ups.
- iv. To explore how participatory design methods can potentially be introduced in the developing market in Malaysia and other South East Asian countries.
- v. To develop a methodology and to gain new ideas in developing office workplaces, especially through the design of furniture in Malaysia
- vi. To develop a methodology for designers to create meaningful workplaces through a participatory, place-making approach.
- vii. To open design opportunities for future designers.
- viii. To explore user-engagement techniques in the design process in Malaysia.

1.5. The Research Questions

As office culture and working environments move from closed to open office environments, office furniture will also change. Some questions arose from my preliminary observations in this environment:

- i. How has the modern office landscape developed and what effect does it have on its user?
- ii. How can designers contribute in future workplace design to allow place-making to occur?
- iii. How can participatory design methods be implemented in this context?
- iv. To what extent can public participation resolve recent issues of office environment in Malaysia? What are the appropriate methods to enable designers and users to communicate the process of office environment development in Malaysia and countries undergoing similar development?

These research questions were derived from a contextual review of office environment development and from my practical work, including my early observation as a professional designer and pilot research as explained in section 4.1.1.

In general, my aims have developed 'from developing office furniture' to 'understanding workers personal needs and aspirations in a specific area of design-furniture for the office workplace (Section 3.1)

1.6. Findings

In my investigation I found that respondents struggled to describe their problems with their workplace (section 4.1). To overcome this problem, I started to use mock-ups as a tool to engage the respondents in my investigation.

This technique is useful, workable and quickly accessible for Malaysian designers or other similar developing countries when they are working alone. Using role-play with mock-ups directly with the users allows the designers to quickly gain insight of arising issues without the need to do a complex observation study.

Using participatory design role-play with mock-ups enabled all respondents and participants to reveal their current problems, needs and aspirations. They started to create useful design ideas and opportunities for designers in developing new workplace designs.

I have developed a social interaction technique to inspire active participation. The mock-up indirectly helped the respondents to overcome their ignorance in design and started to share their interests. (Since most respondents were non-designer and did not have sufficient design knowledge). It is further elaborated in section 5.5.

1.7. Knowledge Contribution

Before delving deeper into the main discussion, I would like to remind readers that the main objective of this project, apart from bringing about a new workplace/office design process, it was also aimed to help designers on how to engage users in their future project/design process which is feasible for them to reveal fresh ideas and opportunities in developing new designs for future use. The user-engagement processes and activities can be seen in chapter 5. A participatory design approach using role-play with mock-ups was investigated through a real-time engagement with the users (individual and design workshops) to reveal and develop their design ideas from the outset despite them being 'non-designers'.

This investigation was aimed to develop design guidelines for designers to develop furniture that creates a meaningful office environment by fostering personalisation and place-making to occur (section 2.3.1). It also sought to further develop on how mock-ups could be used as productive tools in exploring users' needs and aspirations as explored by Mitchell (1995) and Lemons (2010) (chapter 5 - Findings). This project examined on how these approaches could be included as part of a practical design process in furniture industry.

According to Taylor-Powell and Steele (1996), training may be necessary in doing observational studies. The level of training depends on the complexity of the observation and researchers' capabilities. In some situations, observation is done on the spot, within few hours or days, or researchers may record the observations after they have left the situation.

This study was also aimed to find out whether using role-play with mock-ups directly with users could allow designers to quickly become aware of issues arising without the need to do a complex observational study.

Knowledge contribution in this research can be divided into three parts: 1) contribution for designers/researchers (section 6.2.1); 2) contribution for design research (section 6.2.2) and contribution for design education (section 6.2.3). As explained earlier in section 2.5.4, Malaysia does not have guidelines or requirements for developing office furniture and office environment. Findings in this research would be able to help designers, policy makers and researchers to resolve their problems in understanding workers' needs and aspirations in preliminary stages of designing a workplace in the future.

A consultation form was also provided in this research, of which, it could be a part of a change management process as long as it is not done as a superficial arrangement and would lead to recognisable positive outcomes.

This research identified and tested a relevant method of users' engagement that influenced the development of a new workplace design. The method was then used to gain understanding of users' needs and aspirations that could be used by designers to develop future workplaces. The participatory design approach was designed to explore and demonstrate the usefulness of role-play with mock-ups as tools for users in expressing their ideas in a more particular context. I anticipate that this method could be further developed by other researchers (chapter 6 sections 6.2.1, 6.2.2 and 6.2.3) and would be of interest for design academics to disseminate the findings through teaching in their own professional practices.

This study was formulated to identify, refine and evaluate a successful process of participatory design (PD) using role-play with mock-ups as an evolution from previous PD approaches (section 3.1.1 and 2.1.2). I wished to discover whether this technique is useful, workable and quickly accessible for designers in Malaysia and other developing countries when design approaches have scopes for improvement. The results of this approach can be seen in chapter 4 (the implementation of methodology) of the method and chapter 5 (findings of the research).

1.8. The thesis structure

This thesis is divided into six main chapters:

- i. Chapter 1. Introduction and the overview of the research. This chapter explained the importance and the significance of the study in general.
- ii. Chapter 2. Reviews the issues concerning space and place, Malaysia in general and other research approached related in this study.
- iii. Chapter 3. Explains in detail the methodology that was employed in this research.
- iv. Chapter 4. Elaborates the methodology from my practical work.
- v. Chapter 5. Described the process of the research. Analyses the main issues that emerged from the themes and explore the empirical evidence with analysis of interviews conducted with a range of key informants.
- vi. Chapter 6. Provides final Conclusions and future recommendations.

1.9. Scope of Research

This research was grounded in Klang Valley⁸ and its surrounding area consisting of Putrajaya (Government office head quarter), Kuala Lumpur (capital city of Malaysia) and Selangor (the most developed state in Malaysia). Since I'm a practicing designer and design researcher in a public university in Malaysia, it is convenient for me to access that data. The research interest and theories that were developed in Malaysia at an early stage also gave me an advantage in understanding Malaysian office users in detail. Due to time limitations, it is important for me to focus the research on Klang Valley in order to achieve precise findings that would benefit the development of office environment in Malaysia. The practice of public participation covers a broad range of activities. (Refer Uzir Mahidin statement in section 2.5.4).

The research is concentrated on government/semi government staffs who are working in open plan office environments to gain insight in the process and this method can be tested thoroughly. It is also necessary to show this method is workable with particular relevant groups before it can be applied and implemented in other similar research contexts (refer reflection of method in chapter 6 section 6.3).

⁸Klang Valley (Malay: Lembah Klang) is an area in Malaysia comprising Kuala Lumpur and its suburbs, and adjoining cities and towns in the state of Selangor

CHAPTER 2 – CONTEXTUAL REVIEW

2.0. INTRODUCTION

This second chapter aims to present an overview of the relevant issues in this research context. An understanding of these issues will be valuable to provide direction and develop my research framework in further stages. The chapter begins by discussing about the participatory design approach that has been implemented by social science researchers in the design research field which was relevant and related to my research method in chapter 3. It was important to identify some of the approaches by other researchers, as this was able to help to determine relevant issues for this research context.

The chapter goes on to explore the background and the origin of the open plan office concept and explaining the theoretical concept of space and place that was implemented by space planners.

In the final section, this chapter will explore the background history and office development of Malaysia that was colonised by European countries from 1511 to 1957, which had great influences on the process of development in Malaysia especially on buildings, office working culture and country planning system. I will also describe the Malaysian context, briefly in terms of its geography, the people, and the open plan office system development in Malaysia.

2.1. RESEARCH METHOD and METHODOLOGIES

Designers and researchers are responsible to publish their work to the public as one of their social contribution as well as for professional recognition.

‘Design research has grown in importance since it was first conceptualised in the early 90s, but it has not been adopted for research in instructional technology in higher education to any great extent. Many researchers continued to conduct studies that principally seek to determine the effectiveness of the delivery medium, rather than the instructional strategies and tasks’. (Reeves et. al. 2005:96).

According to Collins, (2004:16), since the 1990s there has been a movement to develop a new methodology for carrying out studies of educational interventions under the labels "design experiments" or "design research,". Design research was developed to address several issues central to the study of learning, including the following:

- i. The need to address theoretical questions about the nature of learning in context.
- ii. The need for approaches to the study of learning phenomena in the real world rather than the laboratory.
- iii. The need to go beyond narrow measures of learning.
- iv. The need to derive research findings from formative evaluation.

Table 2.1 below shows the example of design research approach that has been widely used in many areas of design studies. The implementations of these methods depend on the researcher capabilities, types of respondents and their approach to the participants in their data collection.

Table 2.1: Design Research Method (source: author analysis)

	DESIGN RESEARCH	APPROACH
1	User-Centered Design(UCD)	Designed products and services resulting from understanding the needs of the people who will use them (product cycle). User-Centered designers engage actively with end users to gather insights that drive design from the earliest stages of product and service development, right through the design process. e.g (Mao et al., 2005), (Black, 2007),
2	<u>Cooperative Design</u>	Involving designers and users on an equal footing. This is the Scandinavian tradition of design of IT artefacts and it has evolved since 1970. e.g. (Ehn and Kyng, 1991), (Holmlid, 2009)
3	<u>Participatory Design (PD)</u>	A North American term for the same concept, inspired by Cooperative Design, focusing on the participation of users in the design process. e.g (Marcus and Jeff, 2006), (Kensing and Blomberg, 1998)
4	<u>Contextual Design</u>	Customer-centered design” in the actual context, including some ideas from Participatory design. Designer designs a product using his experience, observing the user. e.g (Beyer and Holtzblatt, 1999), (Holtzblatt,2001)
5	Lead Users	Lead users often have to develop the new products and services they need for themselves - they become user-

		innovators. A "lead user" concept has been proposed for new product development in fields subject to rapid change. e.g (Von Hippel 1986), (Urban and Von Hippel, 1988)
6	Ethnography	Qualitative research method in the social sciences, particularly in <u>anthropology</u> and in <u>sociology</u> . To describe the nature of those who are studied through writing/taking note. Might be called a "field study" or a "case report," both of which are used as common synonyms for "ethnography". E.g (Crabtree, 1998), (Pink, 2008)
7	Activity-Centered Environmental Design	Activities through use of modular scale models used by architect, landscape architect. E.g. (Mitchell, 1995), Yazid(2010)
8	User Environment Design (UED)	Activities through – use 2D (diagram/artefact) to propose a system and visualized a design before 3D scale models. e.g (Rahman, 2010)
9	Persona Design	Personas are design and communication tool to help all those involved in the creation of interactive systems to better focus their efforts on their users. A persona is a fictional character made to represent an archetype of a user, and is best derived from field research. They help direct the design, and clearly communicate that design to both in marketing and engineering teams. e.g (Grudin and Pruitt, 2002), Blomquist and Arvola(2002).

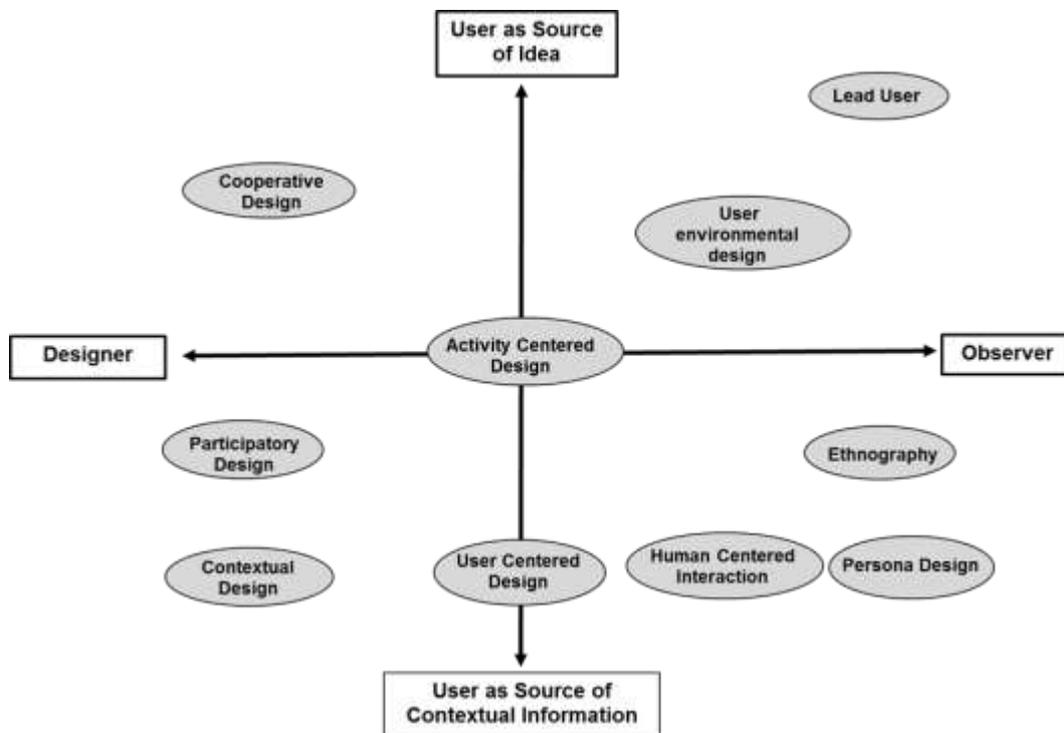


Figure 2.1: Design Research Approach positioning in Research. Source author

2.1.1. Participatory Design (PD)

Participatory design is a design approach that involved the designer and stakeholder (e.g user, employees, customer, etc.) in the design process in order to produce a usable design that meets the user needs and requirements. The approach has been used in several fields of research such as planning, architecture, software design, urban and landscape, graphic even medical products. It focuses on the design processes and methods of design to produce a better and quality artefact.

‘One of the key intentions of participatory research is to find ways for people to get involved in research and design activities that may impact on them. This allows them to define goals, contribute on their own terms in an emancipated manner, and take ownership of decision making processes’. (Foth and Axup, 2006:93)

Further, Forth and Axup in their research regarding participatory design found that, the practical advantages of following a participatory approach, have led to a whole range of new research methods, which were becoming increasingly accepted outside their organisational, cultural and disciplinary boundaries. Establishing the connection between researchers and respondents was one of the most challenging tasks that required a creative approach and an individual strategy for some research settings.

Participatory design started during the 70’s in Scandinavia. Crabtree (1998), Gregory, (2003). Foth and Axup (2006).

‘Participatory design, or co-operative design which it is sometimes called, has had a long traditional in Scandinavia. In the participatory design, the involvement of user building on their activity and participation is a well-developed technique’. (Holmlid, 2009:2)

According to Fisher and Ostwald (2002:135), PD has focused on system development at design time by bringing developer and users together to envision context of use.

This approach needs to evolve to fit the new users' needs referring to changing task and incorporation in a new system. The users explore a new set of design problems and in the same time create a new process and information.

Fisher and Ostwald in their research in participatory design revealed that, knowledge is no longer handed down from above either from designer or manager in design, but it is constructed collaboratively with users.

Gregory (2003:63) found that, user participation in design is desirable for several reasons with mixed motivation:

- Improving the knowledge upon which system are limited;
- Enabling people to develop realistic expatiation, and reducing resistance to change; and
- Increasing workplace democracy by giving the members of an organisation the right to participate in decision are likely to affect their work.

A product may be suitable to a current, but not to a new user who has been experiencing difference situations. A new data collection had to be carried out to explore and understand the needs and requirements that are more closely synchronised with existing practices.

Participatory Design is also known as Collective Resource Approach, Cooperative Design, Cooperative Experimental system Development, Work-oriented Design, Situated Activity, Contextual inquiry and Situated Design. The PD method that has been implemented by researchers including interview and observation, design-by-doing, mock-up envision, workshop, organisation games, co-operative prototyping, ethnographic field research, etc. (Ehn and Kyng, 1991), (Mitchell, 1995), (Crabtree, 1998), (Gregory, 2003) and (Holmlid, 2009).

According to Visser et al. (2007), these techniques produce data and insight that address functional, personal and social aspects of the experience. The user statements convey a number of different aspects about speaker experiences.

'PD researchers have a double agenda. On the one hand, they are interested in designing useful, experimental technologies and practices that they are informed by interaction with worksite participants. On the other, they are interested in developing more effective PD methods and practices that could be adopted by professional designers'. (Kensing and Blomberg , 1998:178)

'Designers become co-creators and co-owner of the information, resulting in higher degree of acceptance and use. The participatory nature of the proposed tools spurs deeper understanding and more intensive use insight from user studies in the creative process'. (Visser et al., 2007:35)

Participatory design as mentioned by Bowen (2009) can be described as:

'Participatory design can be expressed in two beliefs: firstly that a technical system's stakeholders have a democratic right to be include in its design and will benefit as a result; and secondly that including stakeholders in design activities results in better technical systems (for example more efficient, more usable, more profitable) (Bowen, 2009:53)

Further, Bowen in his research in a Critical Artefact Methodology revealed that PD aims to produce 'happier' (empowered, enabled, fulfilled) stakeholders and better products/productivity.

'Participatory design gives value to both human and operational improvement. Participatory design instead seeks to design technical systems that provide stakeholders with better tools for doing their work – to utilise and enhance rather than replace their skills. Participatory

design can also operate on several scales, affecting individual projects, companies or even national policies'. (ibid, 2009:53)

PD methods are a technique that helps a designer to connect with the potential users and to understand their needs, especially during the creative phase of the design process.

2.1.2. Participatory Design Approach in this Research

The previous section discussed the concept of participatory design research and its importance in relation to current research approaches. This section focuses on the participatory design approach implemented in this research. This research implemented participatory design (PD) approach and was influenced by Mitchell (1995), using role-play with mock-ups as a tool to enable designers to communicate with users in exploring design ideas. Although there are a few research projects that used Participatory design, most of other approaches had their limitations (table 2.2). I needed to seek an approach that was suitable in my research context.

As explained in section 4.1 during my practical work, I discovered that it was difficult to gain user-insight information by doing observation and this was compounded by users having the difficulty to explain their ideas verbally. Reflecting on this, I needed to explore an approach to enable designers to engage with users, which was easy to understand (both user and designer), allowing the designers to quickly become aware of arising issues without having to do a complex observational study and to reveal the users' needs and aspirations.

Table 2.2: Summary of Research Approach Similar to this Context

	Approach	Aims	Limitation
Ehn and Kyng (1991)	3D full scale mock-ups	To understand users' way of working	They used design language and design game to understand working system
Mitchell (1995)	Role play with 2D scale mock-ups	To explore user ideas in developing apartment layout	Users are the source of contextual information. Final was layout proposed by architect
Bowen (2009)	2D artefact	Critical artefact methodology	Provocative method to foster innovation
Lemons (2010)	LEGO block	Potential of model building to aid engineering student in solving design task	To evaluate and predict design engineering education.
Rahman (2010)	2D artefact	Lead user to develop ideas	Users are the source of contextual information. Design proposed by researcher.
Yazid (2011)	3D scale mock-up	Planning for Real® in urban park	Investigate the weaknesses and issues in planning landscape.

The method of users engagement by using mock-ups into the design process have been implemented in a number of design research projects, for example, Ehn and Kyng (1991), and these provide some practical examples how mock-ups could be an effective design language and Yazid (2010), demonstrated how a participatory design approach could be implemented in design practice.

'Mock-up can be the most useful tools in the design process. They encourage active user involvement, unlike traditional specification documents. For better or worse, they actually help users and designers transcend the borders of reality and imagine the impossible'. (Ehn and Kyng, 1991:172).

Ehn and Kyng used one-to-one mock-ups in their UTOPIA project. They used a design game to explore the future work situation for typographers and journalists.

Although mock-ups have limited inbuilt functionality, by using only a simple material such as cardboard boxes, they suggested that this method could answer certain questions:

- they encourage “hands-on experience”, hence user involvement beyond the detachment that traditional system descriptions allow;
- they are understandable, hence there is no confusion between the simulation and the “real thing” and everybody has the competence to modify them;
- they are cheap, hence many experiences can be conducted without big investment of equipment, commitment, time and other resource; and
- they are fun to work with. (ibid:173)

The mock-up approach has been used by industrial designers for decades in the design process. It has also been used to predict and evaluate the design ideas before actual products were made.

In contrast with the work of Ehn and Kyng, Mitchell (1995) used scale mock-ups in his housing project. He used an activity-centred environmental design approach basis of activities through the use of modular scale models. User experiences became the focus of designing.

‘Some approaches, for example, consist of designers generating designs using their traditional medium, two-dimensional scale drawing, and having potential users comment on them. These drawings are however difficult for many non-designers to understand to offer little scope for laypeople to have a meaningful input into the design process. From this point of view, computer-aided and drafting in most of its iteration has few advantages over two-dimensional on paper’. (Mitchell 1995:6)

In his housing project, a client (individual) was asked by the designer to perform their daily activities with scale human figures and at the same time

arranged the scale furniture and equipment appropriately to suit the activities. Clients performed their activities using a scale human figure in several iterations to ensure the layout was suitable for them to reflect their own wishes and ideas

‘Architects never spoke to the people for whom they are designing, instead basing their design only on the ‘desired number of rooms’ indicated by client in an initial questionnaire. These led to a range of anomalies, such as houses with too many rooms which were too small, because the client hadn’t understood in advance the implication of their decision, or houses with rooms of similar size when the need for those rooms was radically different’. (Mitchell 1995:7)

After the furniture, layout was agreed upon the client and architect, the walls, doors and windows were added. Once again, the clients were told to carry out their daily activities using the scale figure in order to identify any remaining problems with the house layout and made any necessary changes if needed.

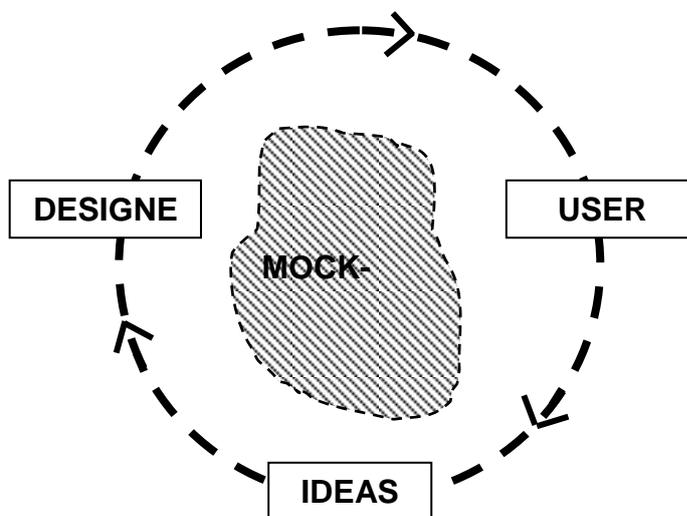


Figure 2.2: Role-play with mock-ups approach by Mitchell (1995) and Lemons (2010). Source Author

Similar to Mitchell’s approach, Lemon et al (2010) used model building (scale mock-up) as a tool in their research project. The main objective of their project was to investigate whether hands-on, model building activities can contribute to students’ understanding of the engineering design process. It was an interrelation process between designers and users to produce design ideas.

(figure2.2). Once the circle was completed, the same process would be implemented with other users to produce different ideas.

Lemons used a model building approach for three main reasons. First, students frequently had difficulty visualising a structure from a two dimensional (2D) drawing. Second, model building offered the students the opportunity to investigate the differences between real behaviour and conceptual model used to predict that behaviour. Third, building model was able to give students tangible results faster than theoretical courses.

'We found that physical construction of a model during an open-ended design task helped students generate and evaluate ideas, better visualize their ideas, and helped students uncover differences between real behaviour and the conceptual model used to predict that behaviour'. (Lemons et. al., 2010:288)

As a result, model building might be a useful tool in helping students to engineer a design process which might be explained, to some extent, by experiential theory. (ibid:289)

Another researcher that used the same approach was Yazid (2010) in his Phd research. Yazid investigated the public participation techniques that might have addressed the existing issues and weaknesses, in relation to public participation in developing public park in Kuala Lumpur, Malaysia. He used scale mock-ups as a tool in his research technique.

As a result, he highlighted the 'Planning for Real' method, as an appropriate participation technique, for incorporation into the urban landscape development process in Malaysia, in order to achieve a better quality life for the people.

Bowen (2007) stated that, an initial approach is to use low fidelity prototypes (after Ehn & Kyng, 1991) with stakeholders to develop an understanding of

their needs. In conducting these activities a common limitation became apparent.

Stakeholders had difficulty responding usefully to the prototype as the novel application of the technologies they illustrated was unfamiliar. People found it hard to articulate what they needed if they did not know what they could have.

Rahman (2010) in his research stated that, understanding between users, product and environment could play an important role in the design process in Malaysian context. He found that a successful product or system required a high level of interaction between designers and users. In his approaches, he used conceptual design (2D images) as provocative objects in investigating individual and groups responding to the concept of migrating product design. As in many cases, designers have always been predicting the product development based on their professional knowledge and experience without understanding the users' lifestyle.

In my investigation I combined, developed and refined the method of using sketches (early discussion in design workshops (section 5.2)), mock-ups (3D models) and interaction which was role-play with mock-ups (individual and groups) to explore users' needs and aspirations (as explained in chapter 3). The result from the role-play with mock-ups became the main design idea in future design development (section 5.1, 5.2, 5.3 and 5.4). In my research, I used the method of user-engagement in the design process to create a design methodology (refer section 6.3). In this method, users were the source of ideas for designers in developing designs in most of the related research and it also used users' opinions as source of contextual information. My research was primarily focusing around establishing and testing methods for accessing those user-ideas.

2.1.3. Practice-Led

One of my research strategies in this research is to apply participatory design method in actual design discussion in order to reveal users' needs and aspirations. In this research a used role play with mock-ups as productive

tools to explore and produce design ideas in response to the contexts under investigation (section 3.2.2.3 and 3.2.3.4). In this design project I have been a practising designer to produce design ideas.

According to Bowen (2009), designers have to practice design in order to conduct research. This research then could be said to be practice-led research, which has also been termed 'research *through* design' (Archer, 1999).

Bowen suggested three possible relationships between research and practice;

- Research *about* practice – enquiry focussed on practice;
- Research *for the purposes of* practice – enquiry to inform or provide material for practice;
- Research *through* practice – enquiry achieved via practice.
(ibid:2009:35)

Bowen explained that, the *about* and *for the purposes of* forms of research can qualify as academically rigorous research *providing* they adhere to the criteria of the research traditions they fit within.

According to Rahman (2010) "Practice-led" research is concerned with the nature of practice and leads to new knowledge that has operational significance for that practice.

Further, Rahman explained that these techniques enable researchers to gain insight and develop holistic thinking about product service, environment and system. This includes both new possibilities and the constraints of a given situation.

The results of practice-led research may be fully described in text form such as guideline/guidance without the inclusion of a creative work or artefact. The focus of practice-led research is to explore new knowledge about practice, or to advance knowledge within practice.

If the research leads primarily to new understandings about practice, it is practice-led (ibid:2010)

Further, Pedgley (2007) in his research on capturing and analysing own design activity revealed that;

'Practice-led research is a mode of enquiry in which design practice is used to create an evidence base for something demonstrated or found out. It involves a researcher undertaking a design project subservient to stated research aims and objectives. Thus, the main motivation of practice-led researchers is to elicit and communicate new knowledge and theory originating from their own design practices' (Pedgley, 2007:463).

According to Pedgley practice-led has been widely used among researchers and students of university especially institutions/departments that involve in art and design, where new research culture are being grown rapidly.

'Practice-led research has significance because it empowers academically competent designers to utilise their design expertise and assert ownership on design research. This is commendable not least because it promises contributions that complement those from researchers who do not profess to be designers' (ibid:2007:463)

Further, he has developed a research model of how to success fully integrate design projects within academic research. In each of these models, the inclusion of a design project constitutes an empirical enquiry from which designing (as activity) and designs (as outcomes) are sources of research data.

- Model-1. Find out about current design practices (e.g., pursue a design project to help uncover decision-making processes and social responsibilities).
- Model-2. Devise improvements in design methods (e.g., pursue a design project to help conceive and develop new design procedures, information, priorities, and tools).

- Model-3. Make improvements to designed artefacts (e.g., pursue a design project to help contribute to how a type of product can or ought to be designed, how it can be improved, and to demonstrate benefits).(ibid:2007:464)

Research done by Pedgley provides a useful description of practice-led research that I can use to justify my research methodology. This is important to me to develop my own view about design research (Model-1 (section 2.1.1 and 2.1.2), Model-2 (section 3.2.2 and 5.1) and Model-3 (section 5.5 and 6.2)).

2.2. WORKPLACE DEVELOPMENT

The 20th century had witnessed many changes in the office environment, in particular in construction and office technology, and the increase in the office workforce which resulted in large numbers of people sharing limited office space. According to Duval et al. (2002:4), with the technological developments in building new buildings could be designed in many different ways. Iron, steel and concrete facilitate higher and deeper space, while electricity provided indoor lighting and elevators.

Workers were separated into smaller rooms or private offices and only a few of them shared office space (ibid 2002:4). While this office concept was implemented in most offices, the new idea that emerged after World War II, derived from socialist ideology that spread in the Northern European region and emphasised on more non-hierarchical environment.

One of the main streams, “*Burolandschaft*”⁹ (figure 2.3), was introduced in Germany by Quickborner Team in 1950. The term was translated as “office landscape” (Zalesny et. al.(1987); Knobel (1987); Budd (2001); Brennan et al. (2002)). The main idea behind the theory was to bring managers, officers and staff members to sit together to work as a team. The ideas also involved arranging the office furniture, for example tables, filing cabinet and shelves in large open spaces. “*Burolandschaft*” is

⁹ The office landscape approach to space planning pioneered by the Quickborner Team led by Eberhard and Wolfgang Schnelle based in the Hamburg suburb of Quickborn. It was intended to provide a more collaborative and humane work environment.

basically a management theory (Quickborner was initially a management consultancy, not a design group). Their emphasis was to create a works group in their own workspaces.

In the 1960s in America, the X Y theory was developed by Douglas McGregor. This management theory described two different criteria in workforce motivation. It was widely used in office management and organizational development. In this theory, it was assumed that X is the traditional view, where workers had to be directed and controlled, whereas Y, was an integration of individuals and organizations (Budd (2001); Gershenfeld, (2006).

In theory X "...the bosses set the objective, exercise control. Ultimate knowledge lies at the top. Independence is discouraged and mistakes call for penalties..."In theory Y"...it is natural for people to seek responsibility and they enjoy it. Performers at any level need challenge and encouragement to gain top performance. Unique knowledge and skill lies at all level in a healthy organization..." (Knobel 1987:74)

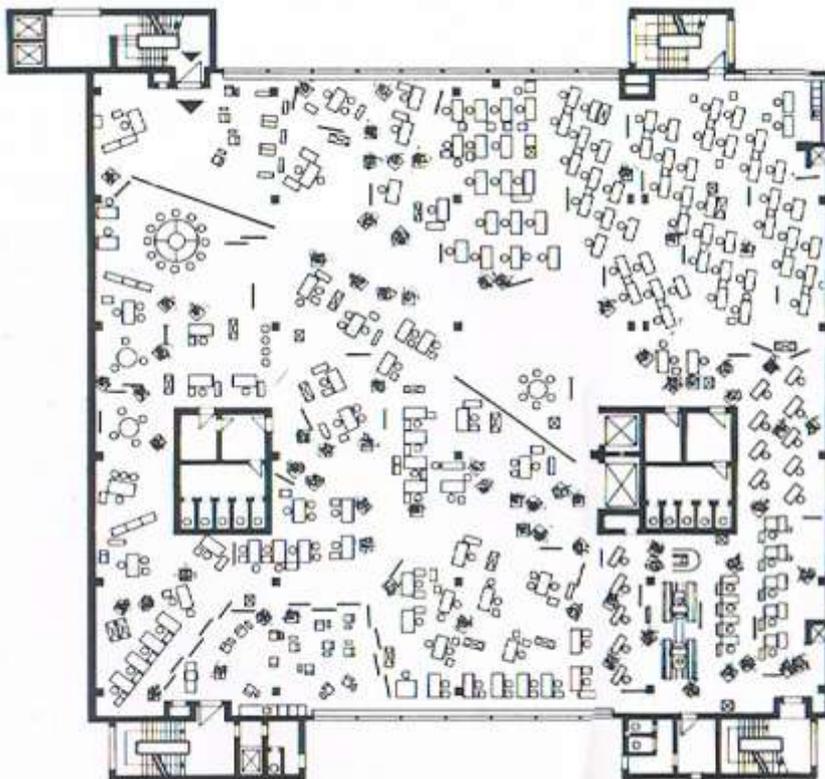


Figure 2.3: "Burolandschaft". Source: Knobel (1987)

The X Y theory influenced Herman Miller in designing Action Office 1 and 2. Open Plan System (OPS) furniture designed for open plan offices was introduced in 1964.

Robert Propst, assisted by Herman Miller's furniture company designer, George Nelson, developed Action Office 1 (Figure 2.4). It offered office furniture that consisted of a basic desk and filing accessories with a T-shaped cantilevered, die-cast, polished aluminium frame. In 1968, Propst developed Action Office 2 (Figure 2.5), an office modular system that could be customised according to the user's needs.

The panel-based design consisted of desktop, shelves, a storage unit and a panel system that divided and organized space in the office (Knobel, 1987). Open plan offices provided a flexible working environment, space utilization and cost savings. They also promoted team work and communication among offices' occupants (Chales and Veitch, 2002).

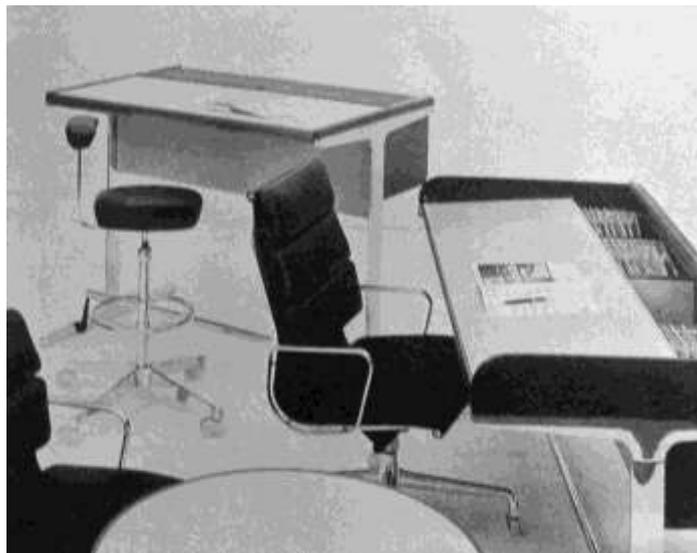


Figure 2.4: Action Office I. Source: Knobel (1987)



Figure 2.5: Action office II. Source: Knobel (1987)

The concept of office design in the 20th century concentrated on satisfying the workers (Knobel, 1987).

The mobile workplace was developed by Workscape21, a workplace studies programme at Cornell University (Becker and Tenessen, 1995). Although, in theory, the concept offered advantages to workers in organising their work, space and time, workers demonstrated a desire to work in a more fixed environment.

Riratanaphong (2006:49), in his study on mobile workplaces mentioned that, although the idea of flexible working allowed workers to work from home, the workers may suffer from overwork and stress at home.

The implication of technological advancement drove people to work at all hours could subjugate rather than liberate. Furthermore, 'home-working' for more than about 50% of working week, could result in isolation and loss of team spirit (ibid 2006:50).

The discussion showed the working concepts since the early 20th centuries. It was vital to have a clear understanding of the working concepts' development which could be useful information for the researcher. It could provide a new challenge for designers and researchers in improving and developing the future office design and working concepts.

2.3. PLACE in SPACE

Early in my investigation, I examined the literature of space and place to understand the concept of space and place in several fields of study and the differences in its meaning from the perspective of groups of users, especially Tuan (2008), Schneider (1987), Harrison and Dourish (1996), Cresswell (1996), Gieryn (2000) and Miller et al. (2001). The study revealed that space and place were the familiar words that denoted a common experience. Space can be defined as a relation between physical aspects, for example, the relation between wall to wall or floor to ceiling.

In a bigger geographical context, space can be viewed as the relation between north and south, east and west. Space is opportunities whereas place is a fact of reality. A house is a space in which to live (opportunities) whereas a home is a place where people interact with their daily activities (reality). Buildings are designed by architects to provide spaces for people. We live in spaces, but move in places.

According to Stedman (2002:563), sense of place can conceive as a collection of symbolic meanings, attachment and satisfaction with a spatial setting held by individual or group. Personal experiences and the daily activities that occur in the space make people form an attachment to that space. Space and place are generally closely related terms, as both involve a feeling of density and a sense of crowding. A space cannot be a place for everybody because places are more related to personal emotions. Space and place are antithetical feelings. To understand how space and place are related to humans, we need to explore the meaning under specific conditions. A space will become a place when it is thoroughly familiar to us. In other words, place are relationship between people and their environment.

'Space and place are familiar words donating common experience. We live in space. There is no space for another building of the lot. The Great Plains look spacious. Place is security, space is freedom: we are attached to the one and long for the other. Geographers study places. Planners would like to evoke "sense of place". These are unexceptional ways of speaking. Space and place are basic components of the lived world; we take them for granted'. (Tuan, 2008:3).

The definitions of place and space have been defined and discussed by many researchers from different disciplines; however, in my research, I needed to identify more clearly in terms of design approaches and researchers that were relevant to my investigation. The discussions of place in space were focusing on environment and behaviour, environmental psychology and office interior, involving closely with users' relationships with their office environment.

Miller et al.(2001:35) mentioned that, sense of place is an amorphous concept that can be adapted to interior setting. It can be measured by combining a variety of factors in a workplace. Sense of place in the workplace is significantly related to job satisfaction and motivation, designers and their clients must evaluate the impact of allowing the employee to establish sense of place in a workplace.

Currently, more concepts and definitions of space and place have been developed, and these depended on the area of research involved. The definitions presented were selected according to the relevance of my research. In conclusion, the concept of space and place was much integrated with human interaction and behaviour in understanding on how people reacted in a space and place, also an important factor in understanding and developing a specific environment. These factors could be useful guidelines for designers to improve and develop a new office environment according to the needs of a specific group of occupants.

2.3.1. Place-making

Schneider (1987) in his research stated that, environment and people are not separable and that the people in an environment make it what it is. The people make the place.

Place-making is a fundamental concept in architecture and urban design. According to Harrison and Dourish (1996), the aims of place-making are to ensure the environment design should fit with its surroundings, maintaining a pattern in the surrounding environment such as colour, material or form.

‘Architect and urban designers are concerned not simply with designing three- dimensional structure (spaces), but place for people to be’.(ibid, 1996:69).

The term has been used by architects and planners to describe the process of creating environment that would attract people because it has been pleasurable or interesting.

“... We have theories, specialism, regulations, exhortations, demonstration projects. We have planners. We have highway engineers. We have mixed use, mixed tenure, architecture, community architecture, urban design and neighbourhood strategy. But what seems to have happened is that we have simply lost the art of place-making; or, put another way, we have lost the simple art of place-making. We are good at putting up buildings but we are bad at making places...” (Bernard Hunt, 2001)¹⁰

Place-making is an approach to the planning, design and management of public spaces. It involves observational and interviewing process to the people who live and work in a particular space/place, to investigate their needs and aspirations.

PPS¹¹ Project done Metropolitan Planning Council of Chicago stated that the concept of "spaces" and "places" have very different meanings. A space is a physical description e.g land, building etc, whereas a "place" connotes an emotional attachment to the environment. PPS has developed basic 11 principles (as listed below) of place-making that can be used to develop space and place. The 11 principles developed by PPS have the similarity of approach with my research context. For example my research had involved the office environment, in doing so I engaged office users to explore and

¹⁰Keynote speech by Bernard Hunt, Managing Director of HTA Architects Ltd. Sustainable Place-Making Forum.

¹¹ Project for Public Space is a non-profit planning, design and educational organisation dedicated to helping people create and sustain public spaces that build stronger communities.
<http://www.pps.org>

reveal design ideas in my study context as stated in point no 1. Most of these place-making principles by PPS, can be adopted in developing the office environment which both is related with space, place and user emotional attachment (especially point no 1, 2, 3, 4, 5, 6, 7, 8, 10 and 11).

1. The community is the expert

People who use the space regularly provide the most valuable perspective and insights into how the area functions. They also can help identify issues that are important to consider in improving the space. Uncovering and incorporating their ideas and talents is essential to creating a successful and vital community place.

2. You are creating a place, not a design

Design is an important component of creating a place, but not the only factor. Providing access and creating active uses, economic opportunities, and programming are often more important than design.

3. You can't do it alone

A good public space requires partners who contribute innovative ideas, financial or political support, and help to plan activities. Partners can also broaden the impact of a civic space by coordinating schedules for programming and improvement projects.

4. They'll always say, "It can't be done"

Every community has naysayers. When an idea stretches beyond the reach of an organisation or its jurisdiction and an official says, "It can't be done," it usually means:

"We've never done things that way before." Keep pushing. Identify leaders in the community who share your vision and build support. Talk to your alderman and get him or her engaged.

5. You can see a lot just by observing

People will often go to extraordinary lengths to adapt a place to suit their needs. Observing a space allows you to learn how the space is used. Composite of people doing various activities

6. Develop a vision

A vision for a public space addresses its character, activities, uses, and meaning in the community. This vision should be defined by the people who live or work in or near the space.

7. Form supports function

Too often, people think about how they will use a space only after it is built. Keeping an active mind is used when designing or rehabilitating a space can lower costs by discouraging unnecessary functions, as well as potentially eliminating the need to retrofit a poorly used public space.

8. Triangulate

The concept of triangulation relates to locating elements next to each other in a way that fosters activity.

9. Start with the petunias

Simple, short-term actions such as planting flowers can be a way of testing ideas and encouraging people their ideas matter. These actions created meaningful spaces.

10. Money is not the issue

A lack of money is often used as an excuse for doing nothing. Funds for pure public space improvements often are scarce, so it is important to remember the value of the public space itself to potential partners and search for creative solutions.

11. You are never finished

About 80% of the success of any space can be attributed to its management. This is because the use of good places changes daily,

weekly and seasonally, which makes management critical. Given the certainty of change and fluid nature of the use of a place at different times, the challenge is to develop the ability to respond effectively. A good management structure will provide that flexibility.

This information is then used to create a common vision for that place. The vision can evolve quickly into an implementation strategy, beginning with small-scale, do-able improvements that can immediately bring benefits to public spaces and the people who use them.

Place-making is an approach that involves physical artefacts that are related with our surrounding environment. Place-making that is pleasurable to users could contribute to better office environment and user satisfaction. Office workers are located in space, but they need a place to act.

2.4. USER SATISFACTION TOWARD MEANINGFUL WORKPLACE

The importance of a meaningful workplace and the concept of an office environment and its relationship with office workers has been discussed by a number of researchers, authors and scholar since recent years (e.g., Scheiberg (1990), Wells (2000), Wells and Thelen (2002), Spagnolli and Gamberini (2005), Vischer (2007), Haynes (2007) and Dinc (2009).

One of the challenges in designing an environment is to enhance individual approach and behaviour. A good design for one person or group may not be suitable design for others.

Users reacted in two ways, approach or avoidance. Approach included positive behaviour, such as a desire to stay, work and explore, meanwhile avoidance reflected the opposite (Bitner,1992).

Wells (2000:239), in her research in environment psychology, stated that, with the changing nature of the office, employee personalisation takes on special significance. She clarified that personalisation can be classified into three as:

- Personalisation done by individuals to their own spaces (eg. their bedroom or workplace) or groups to their collective spaces (eg. their office building)
- Personalisation can be done in places (eg. offices, rooms, hospital) or to objects (e.g. computer, work instruments, clothing)
- Personalisation may be done to a place or an object that belongs to the user either permanently (e.g. their house or computer) or temporary (eg. their seat on a bus or their library books) (ibid:240).

Personalisation is the deliberate decoration or modification of an environment by its occupants to reflect their identities. Schneider (1987:440) claimed that environment and people are not separable and that the people in an environment make it what it is. They behave the way they do because they were attracted to that environment, were selected by it and stayed with it. Different kinds of organisation attract, select and retain different kinds of people, and it is the outcome of the attraction-selection-attrition (ASA) cycle that determines why organisations look and feel different from each-other.

Further, Scheiberg (1990p.335) suggested that, the personalisation of space acts as reflexive communication through emotional responses to the items that surround them; employees design a workspace that “speaks” to them and aids them in their day-to-day functioning, both emotionally and intellectually. The personalisation of space can also indicate something about the individual and his or her emotional relationship or commitment to the unit or organisation.

Wells (2000), Wells and Thelen (2002) and Wells, Thelen and Ruark (2007) highlighted the importance of understanding user needs and office personalisation; Wells (2000:239) in his research revealed that there is an indirect relationship between personalisation and employee well-being with satisfaction with the physical work environment and job satisfaction as intervening variables.

The concept of general satisfaction is defined as the extent to which a worker feels positively or negatively about his or her job. It refers to employee’s satisfaction with

the general aspect of a work situation such as pay, supervision and the firm as a whole. (Noordin and Jusoff, 2009:122).

According to Scheiberg (1990:334) there seem to be a connection between positive emotions regarding the workplace, satisfaction and job performance. Satisfying user needs can lead to greater satisfaction and ease in the workplace in turn making an employee feel better about their job. Thus, personalising their workplace is the process to be meaningful. It's referring to employees' satisfaction with the general aspect of work situation such as pay, supervision and the firm as a whole.

Research done by Perry and O'Hara (2003) in display-based activity in the workplace revealed that through making and use of place, workers project information about themselves, and what they are doing makes them more than simply spaces for working and they become socially meaningful places. This is supported by Zalesny et. al. (1987:240), who states that the physical setting (workplace in this context) provides information about people in a social position, the physical setting of work should be a potential important symbol of organisation and status.

Reflecting on this, I found that many researchers in several areas have discussed personalisation and meaningfulness in the office environment, but none have mentioned how it could be revealed and be developed. This investigation was focusing on how place making could be developed by individual and groups to create meaningful workplaces.

2.4.1. Workplace Privacy

Anjum (2004) in her research found that there are many debates on well-designed office environments focussed generally on physical structure of the building (lighting, construction materials, heating, ventilation and air-conditioning) , its location, building type, experiment in office layout and interior design. All of the above are important but do not address on the actual workers, how the environment might affects workers productivity.

With the development of new technology nowadays, the office occupants are experiencing a new era of working culture. Office design must aim to provide a balance between the requirement of office management and the needs of the office occupants.

“Office design must aim to achieve a balance between the requirement for collaborative working methods and personal needs of the individual. Ultimately it is this balance that will improve productivity and creativity.”
(*ibid.* 2004:27)

According to Kupritz (2001) in his study for today’s office workforce concluded that the most basic privacy needs to optimize social contact (with both incoming stimulation and outgoing information) and to avoid crowding.

Sundstrom et.al. (1982) in their research found that, the importance of privacy would increase with the complexity of the job, because people doing relatively complex jobs would be more sensitive to disruption by noise/visual distraction. Thus, privacy and physical enclosed are associated with both satisfactions with the workplace and job satisfaction.

Further, Anjum (2004:30) stated that in a workplace context, privacy primarily means control over accessibility of oneself to others and opportunities to maintain confidentiality. The privacy can be identified as:

- i. Speech or conversation privacy
- ii. Aural or acoustic privacy
- iii. Visual privacy
- iv. Territorial privacy
- v. Information privacy

“Nobody really understands what anyone else feels about privacy and rarely do people describing privacy analyse precisely what they mean”
(*Raymond and Cunliffe, 1997:89*)

To overcome this issue, designer/researchers need to understand the user expectation and their behaviour perceptions on privacy.

2.5. MALAYSIAN CONTEXT

2.5.1. Study Site: Malaysia in World Map

Malaysia is the 66th largest country by total land area, with a land area of 329,847 square kilometres (127,355 sq mi) located at Asia region (figure 2.6). The capital city is Kuala Lumpur, while Wilayah Persekutuan Putrajaya is the federal government administration head quarter. In 2010, Malaysia population exceeded 28.3 million.



Figure 2.6: Malaysia location. Source <http://www.worldatlas.com/webimages/country/asia>

2.5.2. Geography

Malaysia is a South East Asia country. It has land borders with Thailand in west Malaysia, and Brunei and Indonesia in East Malaysia. (figure 2.7). It is linked to Singapore by a narrow causeway, and also has maritime boundaries with Vietnam and the Philippines.



Figure 2.7: Malaysia map: source <http://www.worldatlas.com/webimages/country/asia>

Malaysia is made up of 13 states and three federal territories. These are divided between two regions, with 11 states and two federal territories on Peninsular Malaysia and the other two states and one federal territory in East Malaysia being separated by South China Sea. As Malaysia is a federation, the governance of the states is divided between the federal and the state governments, while the Federal government has direct administration of the federal territories (Federal Territories and State Government of Malaysia, 2010).

2.5.3. The People

Total population of Malaysia was 28.3 million in 2010, compared with 23.3 million in 2000. This gives an average annual population growth rate of 2.0 per cent for the period 2000-2010. The state with the highest growth rate for the period 2000-2010 was Wilayah Persekutuan Putrajaya (17.8%), followed by Selangor (2.7%), Melaka (2.6%) and Sabah (2.1%). Population distribution by state indicated that Selangor was the most populous state (5.46 million), followed by Johor (3.35 million) and Sabah (3.21 million).

The population share of these states to the total population of Malaysia was 42.4 per cent. The total population was 28.3 million of which 91.8 per cent were Malaysian citizens and 8.2 per cent were non-citizens.

Malaysian citizens consist of the ethnic groups Bumiputera¹² (67.4%), Chinese (24.6%), Indians (7.3%) and others (0.7%). Among the Malaysian citizens, the Malays were the predominant ethnic group in Peninsular Malaysia which constituted 63.1 per cent (Department of Statistic, Malaysia 2010).

2.5.3.1. Population Density

Population density of Malaysia stood at 86 persons per square kilometre in 2010. Selangor being the most populous state was only ranked fifth in terms of population density with 674 persons per square kilometre. Among the most densely populated states were Kuala Lumpur (6,891 persons), Penang (1,490 persons) and Putrajaya (1,478 persons). (Department of Statistic, Malaysia, 2010). Klang valley, consist of Kuala Lumpur, Putrajaya and Selangor were the most developed state in Malaysia where the capital city and the government administration headquarter of Malaysia was located.

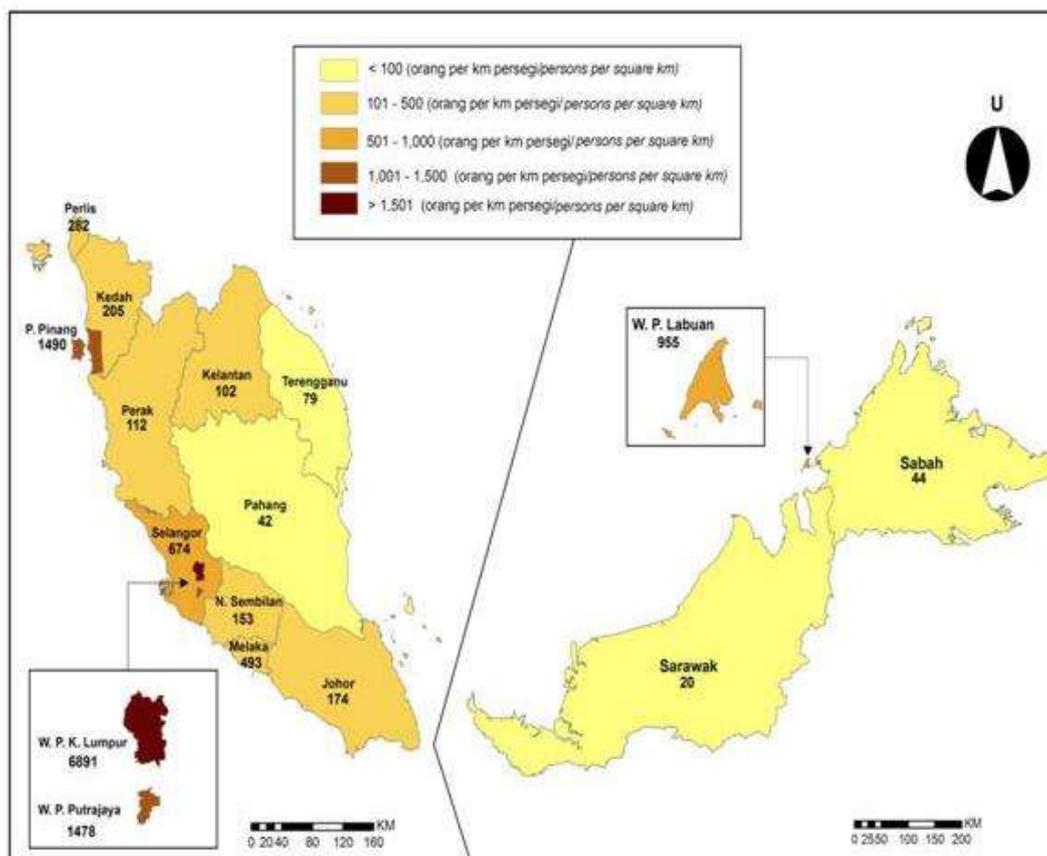


Figure 2.8: Population Density by State

¹²Malaysian term to describe Malay race and the indigenous peoples of Southeast Asia, and particularly in Malaysia.

2.5.3.2. Malaysian History

Malaysia had been colonially ruled by three European countries for about 500 years. The arrival of the European can be divided into three Eras, which were Portuguese, "Dutch and the British Era."

- i. Portuguese era 1511-1641
- ii. Netherland era 1641 – 1824
- iii. British era 1824 - 1957

Malaysia gained its independence from British in 31 August 1957. British returned to England and leaving its legacy behind. Their influences started to make their impact especially the modernist-influenced buildings that were built in many Malaysian cities. The style is apparent in many administration buildings, court buildings, schools and the public sector buildings, in Penang, Kuala Lumpur and Singapore (Chan 1987:16).

2.5.4. Malaysian Office Development

Furniture developments are closely related to building's development technologies. The development influenced the needs of furniture design and interior environment in the office.

According to Fuad Eusoff¹³ managing director of Terroreka Design, there is no written evidence about the development of the modern office concept, especially open plan office in Malaysia. However, the office concepts are still new. It started in early 1991 and all the information can be gathered by interviewing the designers who are involved in this industry.

Thus, according to Kor Hong Beng¹⁴ most of the designers that were involved in developing the open plan system are still working in the leading furniture companies in Malaysia such as Steelcase-Art Wright, Bristol, Merryfair and Eurochair.

¹³EX03 Expert interview on 15 December 2010

¹⁴EX04 Expert interview on 14 December 2110

Fuad and Kor Hong Beng mentioned that in the early development of office furniture, most of the furniture dimensions came from the European companies where they were gathered during the trade exhibition.

The manufacturers were referring to the dimensions from Germany, Sweden or Italy and modified them according to the local context. There were no standard dimensions. Each furniture manufacturer produced different sizes of furniture.

According to Azmiza Aziz¹⁵, professional architect at Norman Azane Architect:

“...Malaysia doesn’t have Malaysian Standard. Our building and furniture dimensions mostly come from the United Kingdom or America. Architects get the entire dimensions from suppliers and manufacturers. I’m not sure where they get it. We are using these dimensions since early 50s before we get our independence from Britain. Everything from United Kingdom or America, from doors, windows, floors, furniture, etc...”

Azmiza stated that, there are three government bodies who are responsible in providing and controlling the Malaysian standard guidelines. Economic Planning Unit (EPU), and Malaysian Administration Modernisation and Management Planning Unit (MAMPU) are involved in providing guideline of office requirement (furniture and facilities) and office space. Jabatan Kerja Raya (JKR) (Public Work Department) involved with standard building requirements. Most dimensions come from UK and US.

According to Mohammad Awang¹⁶ a Professor in interior design,

“...The dimensions that we have are from the United Kingdom. I think they were used since independence. Some of the manufacturers are referring to China, but China itself referring to UK. There are no such things as Malaysian standard. The standard produced by Standards and Industrial Research

¹⁵EX07 Expert interview on 28 December 2010

¹⁶EX06 Expert interview on 27 December 2010

Institute of Malaysia (SIRIM), is more toward safety and Health, but do not refer to size (design)..."

Further, According to Ruhaizin Sulaiman¹⁷ product design researcher and ergonomist of National Design School;

"...there are no standard dimensions provided by any authorities or professional bodies, the furniture and partition etc., dimensions were provided by local furniture manufacturers in Malaysia. The size was depending and referring to the size of the raw materials. For example when they cut the plywood, they will maximize the usage. The manufacturers will ensure there are no wastes in materials. So they will estimate the furniture dimension according to the raw material..."

Office development in Malaysia began when the first government offices were built at Petaling Jaya in 1958, followed by the Parliament building, which was built in 1963, and Radio and Television Malaysia (RTM) in 1968. In 1974, A Malaysian Government Complex was built in Jalan Duta, Kuala Lumpur. The building was one of the largest office buildings in Malaysia, with places for more various government departments. Since Malaysia gained its independent in 1957, the office building development has grown rapidly. Until today, the developments of government buildings in each state of Malaysia are still ongoing.

Uzir Mahidin¹⁸, director of Malaysian Statistic Department stated that the government office buildings played important roles in influencing the office development in Malaysia. According to Uzir;

"...government sectors were the largest labour force in Malaysia. Until 2010 the government staffs consist of 1,071,432 million. The non-managerial¹⁹ staff increased 2% in every two years. As the largest groups of labour force, it gave

¹⁷ EX11 Expert Interview 19 January 2011.

¹⁸ EX12 Expert interview 22 August 2010

¹⁹ Worker that not relating to a manager or to the functions, responsibilities, or position of management

a big impact in Malaysian office development especially in the office building and the way people work in their office. The office guidelines that were used as policy in developing government offices were also referred by other semi government and private sectors in Malaysia. Any changes in government office guidelines will influence other sectors concurrently...”

Dimension for office staff provided by EPU, JKR and MAMPU is listed in table 2.2 below²⁰

Table 2.2: Worker Workspaces per/person. Source: EPU 2000, second edition

	Gred/Level	Square metre/per person
A	JUSA A	42 square metre (room + personal toilet)
B	JUSA C and B	42 square metre (room)
C	N54 to 58	36 square metre (room)
D	N43 to 52	28 square metre (room)
E	N25 to N44	9 square metre (room)
F	N14 to N24	3 square metre
G	N6 to N13	1.5 square metre

In the table above, category A to E is an office officer (decision maker) where all of them sitting in a room where F and G are the office clerical staff. This research focused on office occupants in categories F and G where all of them were sitting in open plan office space focused on non-managerial staffs which was the biggest labour force group in semi government/government in Malaysia (section 4.3.1.1).

The dimension provide by EPU in table 2.2 is the dimension that refer to workers working space that allowed them to get 1200mm Length x 750mm width (scheme F) and 1500mm Length x 750mm width (scheme G).

According to EX03 (in section 5.1.1.2) the policy makers only provide sizes without giving any furniture guidelines that have to be included in one workplace per person. The requirements of each workplace depend on the supplier of particular projects in

²⁰N = refer to clerical work scheme. JUSA = refer to The main officer of the public sector. Source by EPU 2000, second edition

agreement with the client. Thus, the designer in design workshop 03 stated that there were no attempts to involve users to give ideas and opinion in developing any workplace. Through my early observation, field work in Malaysia and my professional experience as a designer, I found that many government offices did not follow the guidelines provided by EPU as listed in table 2.2. As a result of this, the user felt 'lack of control' of their workplace and stated to get personal of space to achieve their needs and aspirations.

Mohammad Awang explained that:

“... to standardise the workplaces, each office workers in the open plan space was provided with same size of workplace. So the management can reduce furniture cost although they know each office worker should be provided with different size of workplace according to their job scope...”

Further he mentioned that:

“... offices should be segregated into various zone. Executive and non-executive should be different in different zone. Previously they allocated N25 to N13 in one big open space ...”

This finding gave a big implication in my research. Since there were no research and academic writings published in Malaysia, it gave me a challenge to provide design guidance for designers as listed in section 6.4. This research was challenging when it came to get data from the Malaysian office occupants. Since Malaysians are not used to give opinions, I had to seek an approach on how to engage users in the design process to reveal their needs and aspirations. Further, this research is my contribution toward the design research, designer and design education (section 6.2)

2.5.4.1. First Decade 1957 – 1967

The first 30 years after independence show the important development of Malaysian office buildings. The development can be divided into three main

stages as explained by Chan (1987) and Persatuan Arkitek Malaysia (PAM) (2007):

- First decade 1957 – 1967
- Second decade 1968 – 1977
- Third decade 1978 – 1987

Since the first British settlement was built in 1879 in Kuala Lumpur, Malaysian cities have grown and developed from villages into modern cities. Kuala Lumpur appeared to be one of the modern Asian cities and retains plenty of colonial buildings.

The first decade showed the new development of Malaysia. By the time of the independence, a number of Malaysian architects had already returned after receiving their architectural education, particularly in the UK. Malaysian architects were given full responsibilities for major building projects in the country, but still controlled by British trading houses in Malaysia. (Chan, 1987)

The architecture of this period was likely to remain international modern. The majority of the architect firms were influenced by contemporary British Architecture (ibid 1987:20).

Public sectors and offices and education buildings were needed to accelerate the need of the developing nation. Early important office's buildings include The Denmark House, Great Eastern Insurance Building, Malayan Banking Berhad and Chartered Bank in Kuala Lumpur, AIA Building and United Malayan Banking Corporation (UMBC) in Penang (PAM 2007).

As a symbol of a new nation and truly democratic system in Malaysia, The Parliament Building Kuala Lumpur was completed in 1963 (Kuala Lumpur city guide). Standard building plans were introduced (referred section 1.3) to change the mood of colonial British to Malaysian nationalism.

2.5.4.2. Second decade 1968 – 1977

The second decade of independence was the phase of rapid growth. National plans were prepared by Economic Planning Unit (EPU) to give the direction for Malaysian development. First Malaysian Plan was introduced in 1966-1970 followed by second Malaysian Plan from 1971-1975.

The Second Malaysian Plan emphasised the building industry designating it as an engine for the pillar for the economy. It also incorporated the New Economic Policy (NEP) and stressed modernising and diversifying the economy, with focus on developing rural industrialisation in the form of agricultural processing (Second Malaysian Plan 1971-1975)

‘The 1971-1975 periods are an especially challenging one from the point of view of job creation. These five years showed the rapid growth in the size of labour force and advances in its educational attainments. The task was to create enough jobs and right kinds of job to make effective use of the more advanced education being received by young people’ (Second Malaysian Plan 1971-1975:50)

Due to the rapid growth of labour force in Malaysia, the need of office buildings was increased concurrently. This period saw a rapid development of building in Malaysia. Major offices such as government agencies, banks and ministries headquarters were constructed during this decade. In this period saw the intention to try to develop a Malaysian identity in architecture.

2.5.4.3. Third decade 1978 – 1987

The third decade saw the accelerated growth of building in Malaysia. It was influenced by the massive labour growth of the private and public sector. The Malaysian fourth and fifth plans were launched. Confidence of the investor resulted in the increase of investment in both public and private sectors large building projects.

‘The high economic growth of this period was accompanied by a structural transformation of the economy, in line with the modernization and diversification of the economy and gradual shift from low productive to high productive modern activities’. (First Malaysian Plan, 1986-1990:11)

The commercial buildings and offices in this decade were built on a larger scale compared from the previous decades. Many high rise offices were built for landmark proposes (example figure 2.7) and some for specific tenants or owner occupiers.



**Figure 2.9: Dayabumi Complex(1984).
One of Kuala Lumpur Earliest landmark**

This period witnessed the rapid growth in the public sector workforce. The idea to have a new Federal Government Administrative Centre to replace Kuala Lumpur as the administrative headquarter emerged in the late 1980s. The vision to have modern offices was the idea from Malaysia Prime Minister, Dr. Mahathir Bin Mohamad²¹

²¹Malaysia fourth Prime Minister.

'Being located within the Multimedia Super Corridor, and in line with the Government's e-Government initiative, Putrajaya is also developed as an intelligent city. Multimedia technologies will be in place to facilitate communication and interaction between Government offices, between the Government and the business community, as well as between the Government and local population and general public'. (Perbadanan Putrajaya, 2011)

'The impact of international trends and ideas on the Malaysian designed environment became more instantaneous. This is reflected not only in the very up-to-date contemporary appearance of the architecture but also the interior of the building. The apparent need for the transfer of technologies in the architecture, new communication system and information technologies'. (Chan, 1987:28).

The Putrajaya and Malaysia city developments are still ongoing until Malaysia becomes a fully developed country by the year of 2020.

2.5.5. Open Plan Office System Development in Malaysia

According to Fuad Eusoff²² the pioneer designer of open plan office system and the manager of TerreReka, the office furniture systems was introduced in Malaysia in early 1990s during the development of the iconic PETRONAS Twin Tower (figure 2.10) or also known as KLCC in Kuala Lumpur capital city of Malaysia in 1992-1994. This is the first office furniture system mega project that used of the open plan office system concept in Malaysia.

The building can be divided into two towers, tower one was occupied by PETRONAS and tower two were occupied by PETRONAS business partners from local and international companies including Huawei Technologies, Accenture, AVEVA, Al Jazeera English, Carigali Hess, Bloomberg, Boeing, IBM, Khazanah Nasional Berhad, McKinsey & Co, TCS, HCL Technologies, Krawler, Microsoft and Reuters.

²²EX03 expert interview on 15 December 2010.

Artwright (Malaysian company) joint-ventured with Steelcase from America, in supplying workstations for PETRONAS office in tower one building. Artwright used Steelcase's office system design and mass-produced the products in their factory in Puchong, Malaysia. Most of the designs were influenced by Steelcase. Steelcase's design used steel instead of an aluminium frame with Medium Density Fibreboard (MDF) as the screen board panel.

“...they used the terms, ‘Workstation’ for furniture in rooms and ‘Cluster’ for the workplace at the open space. They used USA products for the cluster and the table systems were imported from Germany and Italy. Everything from abroad. This is the first and the one and only company produced OPS in Malaysia at that moment. They supplies open plan office systems from chair, partition, storages, everything just name it...”
(Fuad Eusoff. Expert interview)



Figure 2.10: PETRONAS Twin Tower. Source Pilot Study in Malaysia

According to Kor Hong Beng²³, ex-production manager at Artwright and previously as Managing Director of Emerge Company, Artwright started their

²³EX04 expert interview on 14 December 2010

business as a drawing board and chair manufacturer in the early 1980s and now is one of the leading companies in office furniture systems in Malaysia.

The development of office buildings and office working concept encouraged many local businessmen involving into the furniture industry. The demand of the products and the acceptance of the open space working concept boosted up the open-plan office system in the Malaysian market.

“...Bristol and BFS company started with a chair and ‘desking’ system in 1990. Same as Merryfair and Eurochair. All of us are related to each other. Owner of Bristol, was Artwright’s founder sons. BFS, Merryfair and Eurochair owner and designers/staff mostly from Bristol and Artwright company. We built up the furniture industries together. We have good relationship between each other and we know who are the ‘key players’ in this industry...” (Kor Hong Beng. Expert interview).



Figure 2.11: Tile system steel frame structure (Source Bristol Tech. Sdn. Bhd.)

In mid 1980s, there was a European company established in Singapore, called Bena. They tried to penetrate to Malaysian market, but were not accepted by Malaysians. Users in Malaysia could not accept open plan office concepts. Due to that all furniture, manufacturers did not introduce the systems into the Malaysian market. In mid 1980s, most government or private sector office, preferred to use closed offices with individuals or in a group working in a small space. Spaces were divided with floor to ceiling partitions made of gypsum board. They called it partitions not a wall.

After the open-plan office system concept was introduced at KLCC, users and manufacturers started to accept the concept, and the system was implemented in many new office developments in Malaysia. The OPS was the symbol of modern office in Malaysia.

The OPS concept is flexible and can be reconfigured in various ways of office layout as required by the customer. Since the introduction of open-plan office systems, individual work areas have become progressively, more compact even as work styles have evolved toward increasing collaboration. By dividing space into a cubic area, the office workers are given more space and privacy.

2.6. Conclusion

This chapter has reviewed the related issues in this research. This chapter has discussed a participatory design approach, especially the concept of role-play with mock-ups that have been implemented in various design fields. The approach was used in a design process that involved users to participate in design development and planning process.

‘Designing need not only be a means of data collection but can advance the research in other way; this seems to reflect aspect of research where designing work provides a channel for researchers to embody their observation of the stakeholders into new artefacts. These are brought back into the stakeholder’s activities to help participants reframe their understanding of the research issues in the light of new possibilities.’
(Rahman 2010:59)

Having reflected on this contextual review, my focus was to investigate how designers/researchers could respond to the users’ needs and aspirations, and how to engage the stakeholders in design development and thinking process that could contribute new knowledge as stated in section 1.6. Participatory design with role-play with mock-ups was used as a tool to gather design opportunities and a source of ideas. My aims were to produce a methodology for furniture designers in designing new office workplace/environment. In chapter 3 and 4, I will explain and discuss the method that was used and how it was developed for this research.

CHAPTER 3: RESEARCH METHOD AND METHODOLOGY

3.0. INTRODUCTION

The aims of this chapter are to present an overview of my research methodology and to explain the methods employed for this research. This chapter contains a strategic discussion on how the research methodology was developed. This section discussed the search for appropriate research to explore the techniques of users' participation, and how this design process can be implemented by future furniture designers in developing office environments in order to enhance the existing design practise in Malaysia. Throughout this chapter, I will discuss the selected research methods, strategies and processes which enabled the data collection for this research and the techniques required to analyze them. This is the first part of my method chapter. The implementation of the methodology is elaborated in chapter 4. I have explained the outline of my research methodology ahead of my methods and this methodology was refined during my practical work and pilot study and explained in chapter 4.

3.1. RESEARCH METHODOLOGY

My research aims and objectives were developed in RF1 and RF2 as shown in table 3.1 and the investigations that were conducted become more advanced than my earlier predictions. Contextual review on application of research methods and techniques by other researchers began to expand the scope of my research aims and objectives from a broad perspective concerning users in my practical work.

My objectives have been narrowed to focus on how workers create their workplaces reflecting to their personal needs according to their daily practical work. The development of my aims and objectives are shown as follows. I used interviews during my early practical work where I found that it is difficult to communicate and understand the user needs and aspirations. From there I started to use mock-ups as tools to communicate and engage the user in my pilot study and main data collection (Section 4.1).

Table 3.1: Development of Research Aims and Objectives

	RF 1 (research proposal)	RF2 (PhD confirmation)	Development Outline
Aims	To develop a principle for designers to develop furniture that creates a meaningful office environment reflects the identity of workers by allowing personalisation and place making.	To develop methodology, an understanding and new knowledge in reshaping personnel's workplace and place making in modern office that leads to a meaningful office environment. The method perhaps could influence the practice of designers in developing a new office environment	The focus of the study has been developed from developing office furniture to understanding workers' personal needs in a specific area of investigation.
Research approach/ technique	Open ended interview and observation in the early stage. Role-play with mock-ups was introduced during my pilot study.	Role-play with mock-ups with individual was introduced. It is understandable, where the author can more quickly gain the office worker's insight	Role-play with mock-ups technique with experts, non experts and design workshops
Objectives	To compile and examine how office workers create a meaningful place making To observe how workers personalize their workplace To develop a methodology, based on this experience for a meaningful office environment.	To explore how people perform their daily activities in their workplace. To explore practical application of participatory design with mock-ups approaches. To develop a methodology and to gain new ideas in developing a new modern office workplace. To explore how participatory design method might be introduced in developing market in Malaysia.	The objectives were narrowed and the focused on the workers' individual workplaces rather than the overall office environment. The investigation also focused on Malaysian office environment as a case study.

The goals of this research were to explore participatory design with mock-ups as tools to understanding users' needs and aspirations in developing a new workplace the design. The aims of investigation were to investigate how furniture designers' using a participatory design process can employ understanding of personalization, re-shaping and place-making to develop a new office environment.

This method can be developed continuously by other researchers and disseminated through teaching future designers in Malaysian design institutions.

3.1.1. Research Approach Development

I started my investigation by identifying the issues regarding users' participation in developing new office environment in Malaysia. This had led into identifying a certain condition of workplace which could be enhanced and developed by Malaysian designers and manufacturers, especially workplace in open plan office space. This investigation explored the appropriate techniques of user participation that could be adopted into the Malaysian context.

During my tenure as an industrial designer, I had identified that there was a shortcoming in design consultation between furniture manufacturers and clients in Malaysia. Most of design decisions were made by suppliers and office managers without referring to users. Marhizah Abdul Razak²⁴ manager in Ministry of Finance (MOF) of Malaysia stated that;

"...Everything was depending on the suppliers and office managers. MOF just follow the proposals and we assume that everything was completed..."

According to Samsudin²⁵ managing director of Polygon Resource;

"...Malaysian manufacturers are practicing the same processes on and on. The Client (office manager) provides the guideline and the manufacturers provide the solution but everything is depending on money and budget..."

Through my professional experience and my early practical work in Sheffield UK (section 4.1), I chose to investigate the potential of participatory design approaches

²⁴EX10. Experts interview on 11 January 2011. MOF is the main department that handling purchasing for government sectors.

²⁵EX02 Experts Interview on 13 December 2010.

in my investigation. These approaches and theories involving engagement with users in data collection (as discussed in section 2.5) were implemented in many parts of the world leading to successful outcomes (e.g. Ehn and Kyng, (1991) and Mitchell, (1995)) (section2.5.2) inclusively United Kingdom, United States and many European countries but not in Malaysia. One of the ideas of this research was to see whether contemporary ideas from users' perspectives were able to be implemented into professional design practise (refer section 2.1.1 and 2.1.2).

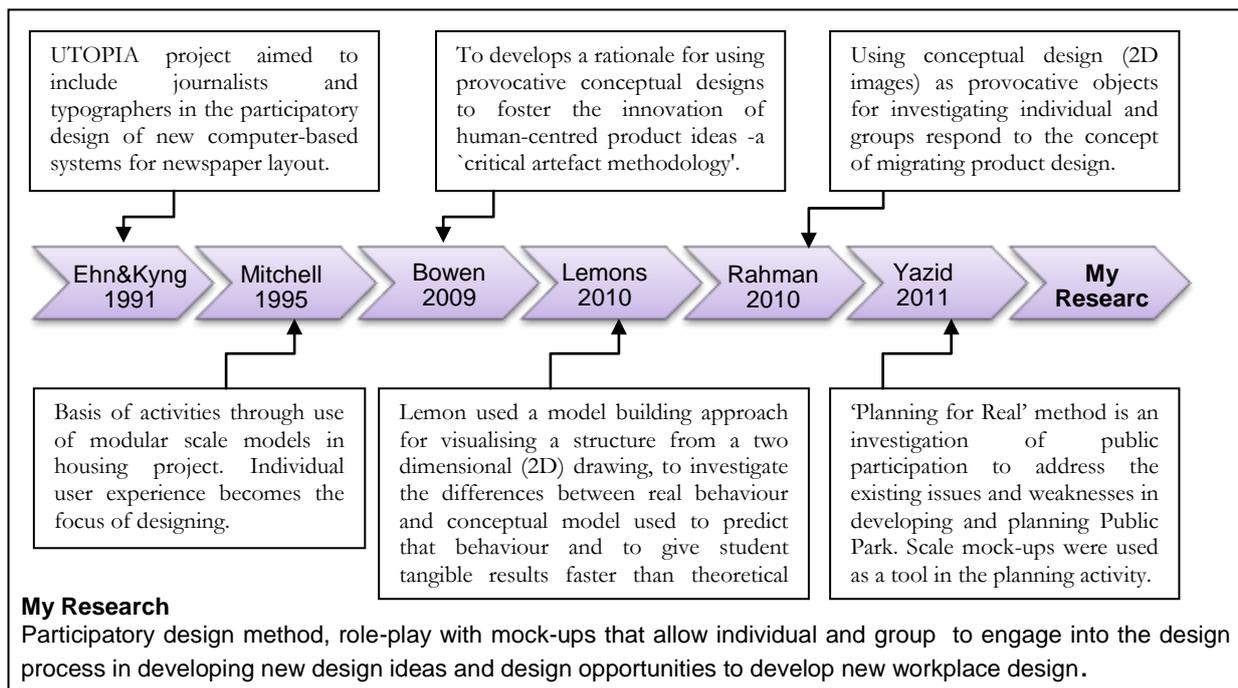


Figure 3.1: User Engagement Methods/Approach that Similar to this Context

3.1.2. Research Frame Work

The research frame-work adopted, partly used by Rizal Rahman, (2010) who created a frame-work working with stake-holders and seems to work effectively in United Kingdom and Malaysian contexts. In his research, he used interviews and observations to explore user opinion. Further in his project, a user participation approach was used to investigate how individuals and groups used design as tools to produce design ideas and I decided that his research techniques might work in this research project.

The interview was a continuous process concurrent with the design work to produce new design ideas. Designers need ways to understand how people will use the things we produce and design the “system of use” with as much care as we might take over attractive form and other physical functions (Rust, 2004).

In this research, the interviews and designing processes/workshops formed a triangulation toward the research objectives. The interviews were used to identify individual/groups needs in parallel with the design output providing possible design ideas which may be validated and developed during the interviews. Therefore, this research is based on users’ participation research and the research strategy techniques could be divided into stages as shown in figure 3.2.

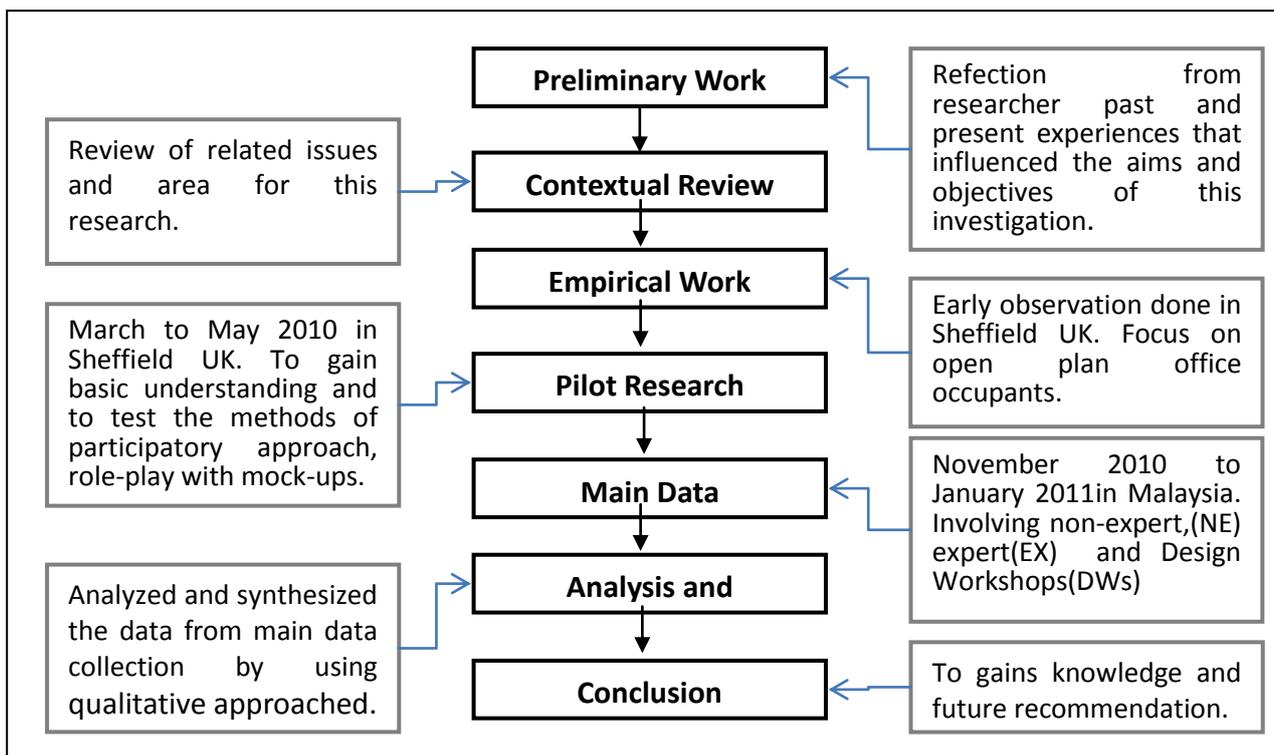


Figure 3.2: Research Framework

3.1.3. Data Collection Techniques

As the research framework for this study has been discussed in section 3.3, I have explored several appropriate data collection techniques for collecting data for this research. Mixed method or triangulation techniques such as observation and semi-structured and in-depth interviews were used in this

investigation. According to Bryman (2006:98) mixed-method or multi-strategy research can be helpful to researchers in clarifying the nature of their intention or their accomplishments. Further, Denscombe (2008:272) stated that some researchers used mixed method data to, (a) improve the accuracy of their data, and (b) to produce a more complete picture by combining information from complementary kinds of data or sometimes (c) as a means of avoiding biases intrinsic to single-method approach.

In a later stage, role play with mock-ups was used in the data collection to allow users to demonstrate their practices and experience changes in their workplace, as suggested by Ehn and Kyng (1991), Mitchell (1995) and Lemons et al. (2010). Lemons et al. (2010: 288) in their study using models in teaching engineering design, claimed that physical construction of a model during an open-ended design task helped students generate and evaluate ideas and visualize their ideas better and helped uncover differences between behaviour and the conceptual models used to predict that behaviour. This design approach was developed further in my PhD research. The techniques and methods for the data collection are shown in Table 3.3 below.

Table 3.2: Data Collection Techniques

	Pilot study	Main Field Work	To identify current problems	To identify user needs/ideas	To review Current Practice	To find Opportunities	To Develop Concept
Personal experience			√		√	√	
Contextual review	√	√	√	√	√	√	√
Internet search/Office environment	√	√			√		√
Direct Observation	√	√	√	√	√	√	√
Open ended interview	√	√	√	√	√	√	√
Role play (mock-ups)	√	√	√	√	√	√	√
Government documents		√	√		√	√	√

3.2. RESEARCH METHOD

Having been an industrial designer, a design lecturer and researcher for more than 18 years, have given me a wide experience in Open Plan Office System (OPS) designs and the way people interact in their workplace. Working in close relationship with furniture makers and OPS manufacturers, I realised that most of workplace designs and office layouts in open plan offices were decided by OPS suppliers and finance managers, rather than by the occupants.

Workers were divided and placed in cubicle spaces with a close supervision from a manager. This approach would cause stress, distraction and lack of privacy (Schlosser, 2006). I based my work on the assumption that users' experience and interaction in workplace needed to be considered as part of furniture development process.

Since I am a trained furniture designer and have involved in many Malaysian offices furniture design projects, it would be of my interest to investigate on how designers could invent furniture that would allow meaningful place-making to take place in modern workspace. This investigation explored users' interests and needs in developing new workplace. Users' experience and participation could be the key factors in the development of new furniture design and workplace.

Designers might create opportunities for users to express their emotions through the personalisation of their workplace. They might also create office environment so that it reflects workers' needs to form a feeling of importance and sense of attachment to their work and organisation. The sense of meaningful and user-friendly workplace would contribute to office workers' satisfaction.

In my tenure as an industrial designer at one of the leading furniture manufacturers in Malaysia, I had started to develop my initial observation in understanding the pertinent matters with regards to guidelines, furniture standards and design concepts. It also included establishment of good rapports with experts relating to my areas of investigation. During the initiation of this research, I began to identify areas of contextual review and developed my own framework that had to be futher explored and investigated.

This study began with an attempt to define the issues pertaining to workplace development in government offices, also involving people working in open plan office spaces. In this research, I explored the techniques through users' participation in developing new workplace design. The research also explored the appropriate techniques through public participation that could be adopted into Malaysian context.

3.2.1. Contextual Review

This section explains the relevant issues to these research areas. The understanding of these issues provides direction and helps to develop my research framework in further stages. Boote and Beile (2005) and Hart (2001) stressed that the goal of the literature review was to develop our understanding and indicating some means of improving the situation. Further, researchers or scholars need to understand what has been done before, the strengths and weaknesses of existing studies, and what they might mean. Thus, it functions to 'look again' (re + view) at what other have done in area that is similar, though not necessarily identical to, one's own areas of investigation (Leady and Ormrod (2010:66).

According to Leady and Ormrod (ibid:66), as researchers we should know the literature about our topic areas very, very well. In addition to helping us to pin down our own research problems, a literature review has numerous other benefits such as:

- It can offer new ideas, perspective and approaches that may not have occurred to you.
- It can inform you about other researchers who conduct work in our area – individual whom you may wish to contact for advice or feedback.
- It can show you how others have handle the methodological and design issue in studies similar to your own.
- It can reveal sources of data that you may not have known existed.
- It can introduce you the measurement tools that other researchers have developed and used effectively.

- It can reveal method of dealing with problem situation that may be similar to difficulty you are facing.
- It can help you to interpret and makes sense of your finding and, ultimately help you tie your result to the work of those who have preceded you.
- It will bolster your confidence that the topic is one worth studying, because you will find that others have invested considerable time, effort and resource in studying it.

To succeed in any investigation, many researchers have carried out distinct research findings and without understanding the literature in their related fields, would put a researcher at disadvantage. In this study, I have reviewed related documents such as journals, books, conferences proceeding, planning reports, design guidelines and articles from the internet and also print documents which were relevant to my research to elicit data. Contextual review in this research was concentrated on several topics and can be categorised into different types of knowledge as follows:

- Environmental Behaviour.
- Office personalisation and satisfaction.
- Space and place.
- Participatory design in design research.
- History of office furniture and the development of modern office environment (worldwide and Malaysia)
- Background to Malaysia and Kuala Lumpur.
- Background to Mock-up technique in design research.

3.2.2. Qualitative Technique

Qualitative techniques were the most appropriate methods to be implemented in this research with respect to collecting, analysing and collecting data. As Kitzinger (1995: 229) noted, qualitative methods are particularly useful for exploring people's knowledge and experience, also can be used to examine not only what people think, but how they think and why they think in such a way (section 2.5.2).

Furthermore, Deasy et al. (2001: 54) suggested in details that qualitative research explores on how many people accept or reject certain concepts. It also tries to understand users' needs that might drive the results. Thus, qualitative feedback helps researchers to understand the "why" behind the result. In this research, it was crucial to get an explanation from users regarding their needs and aspirations in their workplace.

McCracken (1998:16) claimed that qualitative research normally looks for pattern of interrelationship between many categories rather than describing only about relationship between a limited set of theories. This research also adopted a part of social research methodology. However the social research technique used, had indirectly influenced the development of the methodology in this research and affected my data collection e.g. interviews with experts and non-experts and focus groups (design workshops). According to Creswell et. al. (2007:239), the selection of a qualitative research design based on considerations such as the audiences, the researchers training and experiences with different forms of qualitative designs.

Bryman (2006:111) stressed that qualitative research is often depicted as a research strategy whose emphasis on a relatively open-ended approach to the research process frequently produces surprises, changes of direction and new insights.

Therefore, for this research, the qualitative technique with open ended in depth interview and direct observation seem to be the most appropriate. This research has developed a strategy and follows this technique to elicit data:

- i. Reflection based on the researcher's own working experience.
- ii. Review of literature and related issue to office and design.
- iii. Practical work: interview with office workers.
- iv. Pilot work: Non-expert interview/observation to identify relevant concepts, refine research question and appropriate methods(using mock-ups)
- v. Main data collection: Non-expert/observation, expert interview and design workshop(using mock-ups)
- vi. Data analysis synthesis

3.2.2.1 Open-ended interview

Since this research involved in depth investigation on users' opinions, open-ended interview was the most appropriate technique to elicit data. As pointed by McCracken (1998: 34), the first objective of a qualitative interview is to allow respondents to tell their own story in their own way. Thus, McCracken (1998: 17) stressed that, the purpose of qualitative interview is not to discover how many, and what kind of people share a certain characteristic. It is to gain access to cultural categories and assumption according to which one culture construes the world. This research explored users' personal/group aspirations and opinions in developing their future workplace.

According to Geer (1991), the reason for researchers using closed-ended questions is easier to ask, code and analyze compared to open ended questions, but the crucial issue is that open-ended questions could measure the attitude of public opinions accurately. Further, it provides better ideas in public opinions.

In relation to this, Jackson and Trochim (2002:308) claimed that open-ended survey responses are extremely useful in helping to explain or gain insight into organisational issues but at the same time to generate both interesting and challenging types of text to analyze. The limited response length of the survey format forces respondents to express themselves in more of a concise "list" format while at the same time giving them the opportunity to "vent" or explain themselves in a short narrative form.

There were two main groups of respondents in this research consisting of non-expert (section 4.3.1.1) and expert groups (4.3.1.2). These interviews were conducted to gain users' experiences and problems in their existing workplace and to explore currents issues pertaining to office development in Malaysia. Respondents' experiences and knowledge from these sessions had contributed to the development of the design concept for the new workplace design.

The respondents' comments, opinions and suggestions then, were analyzed and examined thoroughly to improve the place-making processes in developing meaningful workplace designs. Although the design workshops also involved open-ended interviews, the discussions were relying on other respondents' ideas that were demonstrated to them in those workshops.

3.2.2.2. Pilot Research

The previous section (3.3) described in general the framework and the introduction of the techniques used in this research. This section discusses the chosen methods that had been implemented and tested in my pilot work. The pilot work was performed in Sheffield UK between March to May 2010. The aim of the pilot work was to gain basic understanding about the users' needs and the engagement with their workplace as stated in section 4.1.1.1.

Aims of the pilot research were:

- a. To explore how workers create their workplace reflecting to their personal needs according to their daily work.
- b. To test and explore appropriate methods for this research.
- c. To provide direction for my methodology development.

3.2.2.3. Role Play with Mock-Ups

This section describes the methods and techniques used in my social inquiry that was carried out in my main data collection. It explains the purpose of role play with mock-up approach that involved users' participation in developing new workplace design concept since these approaches had been one of the main tools in my research. Due to the differences in level of knowledge and design experiences between users and designers, sometimes if they were unable to effectively communicate between them; it was highly recommended to use mock-ups (three dimensional full scale mock-ups) as an alternative tool (Ehn & Kyng (1991)).

Other similar research suggested the use of scale mock-ups as in the approach used by Mitchell (1995) (contextual review section 2.5.2). They used mock-ups to explore users' needs and an effective design language that made sense to the respondents.

A participatory design approach was adopted to allow me in exploring as well as developing a design method for this research. The participatory design method allowed the users to be involved in the process of design development at early stage. According to Whyte et al. (1991:20), in participatory design approach, people participate actively with researchers throughout the research from the initial design to the final presentation of results and discussion of implication of their actions. This approach had facilitated my design technique to be systematically explored. This design concept was also used to generate more design ideas and concepts and developed continuously in design workshops. The design work in this research had transformed the users' needs and aspirations into visible workplace design concepts.

The outcome of this research was not attempting to produce final design or end product that would be able to solve current problems in developing workplace design but it was aimed to foster knowledge and design opportunities that could be used and developed by future designers, of which, it could be adapted by them when they encounter such situation as well as developed by Malaysian design institutions.

3.2.2.4. Role Play with Mock-Ups Aim and Objectives

Existing qualitative design approaches such as interviews and direct observation were used to understand the users' environment experiences and approaches in their daily work. Through ideas, opinions and dissatisfaction about their current workplace, main role play with mock-ups were used to generate new ideas and the users' needs and aspirations (individual and group) in workplace design process.

The aims of the role play are:

- To provide instruments/tools to support my design work.
- To explore how people perform their daily activities at their workplace.
- To explore new ideas in developing office workplace.

An indirect result from the role-play approach was the design work that had contributed to the design development in this research. It had also generated design criteria that changed and created design opportunities in developing new workplace design. According to Ehn and Kyng, (1991), Mitchell (1995), Lemons et. al. (2010) and Yazid (2010), 3D models during role play design task, help us to generate and evaluate ideas and they give better visualisation of our ideas. Thus, the conceptual design work had also challenged the users to generate their own ideas and needs in order for them to work comfortably in their future office environment (Section 4.2 mock-ups development).

3.2.2.5. Mock-Ups

Mock-ups (Figure 3.2) were made using several materials such as cardboard, soft board and wooden blocks. Existing scale models, such as dolls mugs and flowers, were also used in the role play. Through my review, there are no specific scales used for mock-ups in the role play with mock-up activities e.g Mitchell (1995), used 1" : 1' scale (one inches equivalent to one feet) modular scale whereby Lemons et al. (2010) used existing LEGO®²⁶ block for their model building project. It depends on the researcher's approaches and the context of the research. In this investigation, the mock-ups were fabricated in a scale of 1:7 millimetres, so they could be stored in a small box for mobility purposes. As for me this was considered to be an appropriate size to be presented to the respondents whether during individual or groups sessions.

²⁶ *Lego* (trademarked in capitals as *LEGO*) is a line of construction toys manufactured by the *Lego* Group, a privately held company based in Billund, Denmark



Figure 3.3: Mock-ups

3.2.2.6. Direct Observation

Direct observation was one of the social inquiry techniques used in my data gathering activities, especially during the interview sessions with office workers. In conducting my role play with mock-ups, direct observation was initiated to identify any information that was not mentioned in role-play activities. Observation was an essential element to understand an ongoing behaviour, process and outcome of unfolding situation. Taylor-Powell and Steel (1996) stated that “Seeing” and “listening” are the keys to observation. They clarified that observation provides the opportunities to document activities, behaviour and physical aspects without having to depend upon peoples’ willingness and ability to respond to questions.

According Yazid (2010), direct observation is very useful when details of an activity need to be accessed and when interview techniques are unlikely to draw out the required information due to the respondents either not knowing or being unwilling to say during the interview sessions.

In this study, direct observation was conducted during role play with mock-ups demonstration to office workers. Since most of the respondents were from non-design background, it was more appropriate to ask them to

perform their daily activities at their workplace by using mock-ups rather than explaining them verbally. A direct observation approach allowed me to view the users' daily activities, their needs and the users' aspirations in new workplace design process.

Observations activities were systematically recorded through audio and visual format using a digital Hard Disk Drive (HDD) video camera and Digital Single Lenses Reflex Camera (DSLR). As stressed by Taylor-Powell and Steel (1996), and Yazid (2010), observation needs to be recorded. Observations pertain to what we see as well as what we hear. Recording can be done through various techniques such as audio and visual. The audio and visual is an extension to the eyes and ears that provide evidence that can be used for analysis later.

The video camera and a tripod were placed at the side (left or right depending on the setting) of a table. Due to the small sized mock-ups (1:7mm scale), the video recording only focused on the task performed to get a clear and sharp video clip, and a term of no-face photo capture was agreed upon with the respondents to avoid from exposing their identity. Demonstrative photographs of the participants in the existing workplace were captured twice (taken during the middle of a session) as well as photos of new ideas of desired future workplace (at the end of the session). Photos were taken to support the interviews and as visual evidence.

3.2.3. Sampling

My main fieldwork was performed between November 2010 and January 2011 in Malaysia. It was organised after I completed my pilot study in Sheffield, UK. All the preparation such as questionnaires for expert and non-expert users and a set of mock-ups were prepared at Sheffield before the actual fieldwork took place in Malaysia.

This research was focused on government²⁷/semi government²⁸ servants working in Klang Valley and its surrounding areas consisting of Putrajaya (Government head quarters), Kuala Lumpur (capital city of Malaysia) and Selangor (most developed state in Malaysia). As explained in section 2.4.4 government sectors play an important role in office development.

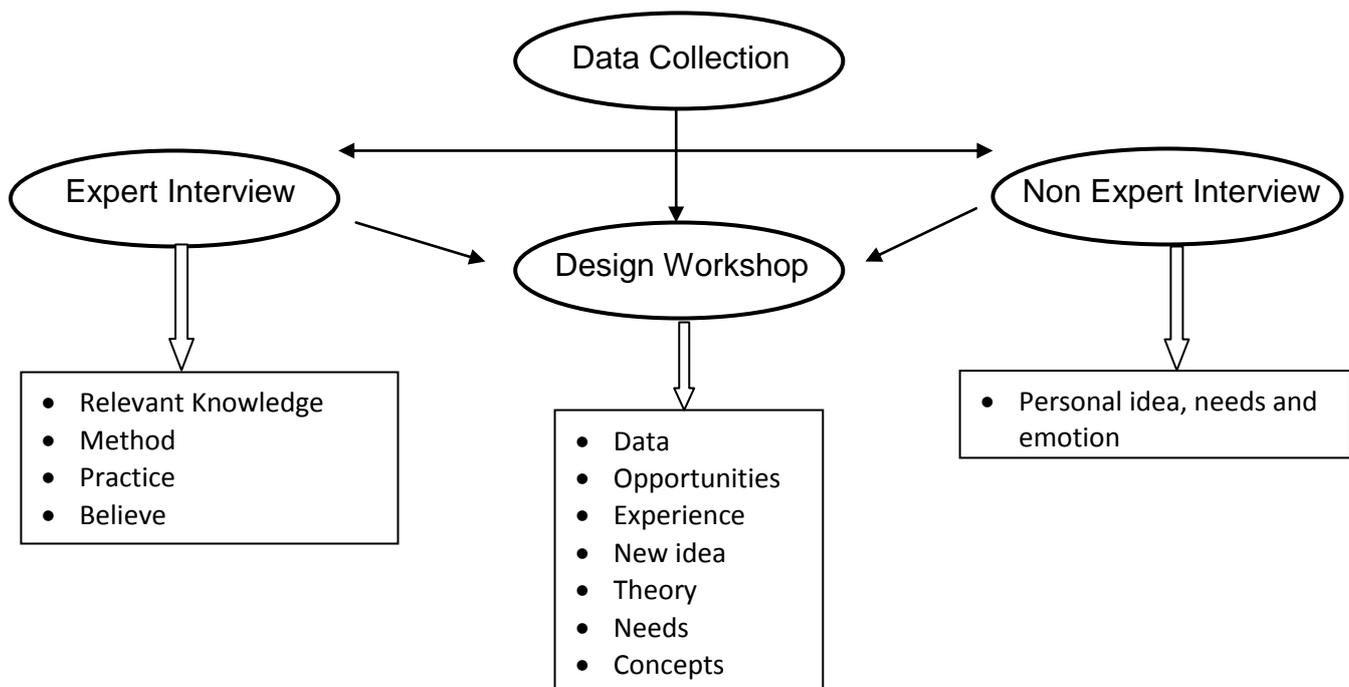


Figure 3.4: Main Data Collection

According to Dola and Mijan (2006), Malaysian government planning's approach has been characterized since the British colonization era and it is a challenge for the government to shape a new approach to encourage participation from the public. This investigation involved users' participation in developing new design concepts.

Data collection can be divided into three different groups which are; Non Expert Interviews, Expert Interviews and Design Workshops (figure 3.4). In this section I will explain in detail of each different group.

²⁷A government or state agency is a permanent organisation in the machinery of government that is responsible for administration of specific functions.

²⁸Semi-government is a term which is usually used to define a company, department, or an institute which is basically a government run institution however it enjoys a certain degree of independence.

In each group, I will explain my main objectives and the rationale in selecting respondents. I will also outline the methods and role play with mock-up procedures undertaken. The chart below shows the social inquiry activities.

Groups were coded as:

- i. NE- for non-expert group
- ii. EX – for expert group
- iii. DW – for design workshops

Table 3.3: Data collection schedule November 2010 to January 2011

Month	Week	Non Expert Interview (NE)	Expert Interview (EX)	Design workshops(DWs)
Dec 6/12/2010-	1	NE01 NE02 NE03 NE04		
13/12/2010-	2		EX01 EX02 EX03 EX04	
20/12/2010-	3			DW01
27/12/2010-	4	NE05 NE06 NE07 NE08		
Jan 3/1/2011-	5		EX05 EX06 EX07 EX08	
10/1/2011-	6	NE09 NE10 NE11		DW02
17/1/2011-	7		EX09 EX10 EX11 EX12	DW03
24/1/2011-	8			DW04

3.2.3.1. Non Expert Interview (NE)

The main data collection gathered in this research also included from interviews with office occupants. All selected respondents were office workers that had experienced working in open plan office space.

Social research techniques such as participatory design approach with mock-ups, open-ended interviews and direct observation were used. The aims of these role play with mock-ups and interviews were to gain users' needs and aspiration. This was the first part of a prototype participatory design activities which were evaluated in this research.

In the role plays and interviews, this research had observed how office workers used mock-ups to demonstrate their existing workplace and 'performed' their approach in their daily job. The users then re-shaped their new workplace layout according to their individual needs.

The participatory design activities were conducted in Malay language as all of the respondents were Malaysian and they felt more comfortable speaking in their 'everyday' language although most Malaysians are able to speak in English. All text of interviews was translated into English to be understood by international readers and for the purpose of coding in data analysis software. All transcripts used respondents' actual words. There were eleven respondents involved in non expert interview. All of them were working in various governments/semi government offices in Malaysia. (Detail of the non-respondent background is discussed in (section 4.3.1).

Table 3.4: Non-expert Respondent

No	Name	Occupation	Institution	Department/office
1	Zeze	Clerk	Government	Academic division dept
2	shyra	Public relation clerk	Semi government	Dept. of Communication
3	Fadhil	Assistant clerk	Government	Dept. of Forestry
4	Dahlia	General Assistant	Semi Government	Sustainable Design dept.
5	Wan	research assistant	Semi government	Institute of Tropical and Forest Products
6	Fitri	Clerk	Government	Dept of Finance

7	Azizi	General assistant	Government	National Assessment and Registry's Service dept
8	Yana	admin assistant	Government	Prime Minister's Department
9	Siti	General clerk	Government	Ministry of Higher Education
10	Izzam	Tutor	Semi government	Multimedia Academy
11	Razak	Academic assistant	Semi government	University Putra Malaysia

3.2.3.1.1. The Procedures

The procedures can be divided into 3 steps as shown in figure 3.5 below. Step one: introduction (Q1). Step two: Showing their current workplace (Q1,Q2, Q3 and Q4) and step 3: New ideas. (Q5). (Refer interview questions in section 3.5.3.4)

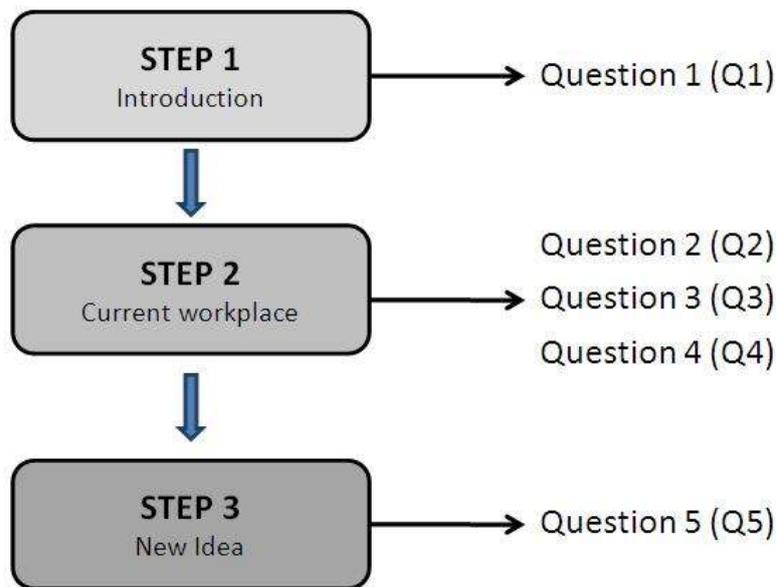


Figure 3.5: Interview with Office Workers/user

Step 1 - The interviews started by introducing myself to the respondents. I explained to the respondents my past and present working experience and my research interests that reflected in this research. The respondents then explained their daily activities in their office.

The conversations continued more towards respondent's background, their past and present experience about current issues with regards to office environment, and their workplace environment. The objective of the conversations was to develop relationship between myself and the respondents as well as to produce an inventory of their daily activities.

Kamaruzzaman²⁹ (2010) stated that personal background and working experienced influenced workers behaviour in their working environments.

By understanding respondents' background, it helped in giving basic understanding about respondents' social background such as education, hobbies, interests, household income and working experience.

Step 2- The sessions continued with a briefing on the objectives and focus of the research. I then explained about timeline and development of open plan office past and present especially the ideas behind the concept of the plan, of which, has been introduced in Northern Europe in 1950s, then developed in America. Examples of workplace images of current offices were shown to the respondents to give them a clear understanding of the topic discussed. The images also gave them basic ideas and aspirations in developing their new workplace design. The respondents then were shown the sample of workplace layout that was developed from previous role play (pilot work). The intention was to give some basic understanding on how to perform in a role play with mock-ups. It was then further explained to them on how to use the mock-ups in this investigation (training session). I also described each unit of the mock-ups and facilitated their use during the role play activities (refer section 4.3.1.3 point ii)

²⁹EX01 Expert interview 13 December 2010

Step 3 - Role play started after respondents understood and became comfortable with the mock-ups. In the beginning, the respondents were asked to sketch layout configuration of their office (where they sat in their office) in my research session record form. From there, it gave me the understanding of their physical office environment, how many staff working in the space and what type of workplace that they were sitting in. By referring to their sketches, the respondent then, assembled their workplace layout, assisted by the researcher. They explained their daily activities in their workplace during the role play session. The final step of the role play was to produce fresh ideas of workplace design. By using the mock-ups, the respondents constructed their new workplace according to their needs and aspirations.

Once the workplace designs were established, the respondents explained the rationale and reasons about their new workplace design. The photos of the activities were taken twice; the respondents' current workplace and the new idea of workplace design. The mock-ups then were disassembled and stored in a box, the similar role play process will be repeated with other respondents.

Respondents were interviewed in a room or staff lounge near to their office to give them realistic office environment and the sense of personal emotion. Work practice in the office environment had become so habitual for the users and they often had difficulties in articulating what they did and why they did it (Bayer and Holtblatt, 1999:34). By observing at or near to their workplace also gave me an understanding on how workers approached their work every day. In this session, workers were asked to 'perform' their daily activities at their current workplace and then were asked to 're-shape' their new layout that suited to their daily needs. The role play sessions lasted approximately in 40 to 50 minutes.

3.2.3.1.2. Questions Development

A set of questions in table 3.5 were developed as the main questions. They were developed during initial stages of practical work as explained in section 4.1. The interviews were open-ended and the questions were elaborated. Five main questions were used to guide the interviews and elaborated in relation to respondent interests.

The five main questions were:

- (i) Introduction - tell me about yourself
- (ii) User approach to work – what is your job (use mock-ups to explain the workplace).
- (iii) User practical work – show me the practical task you do (use mock-ups to explain the workplace).
- (iv) User emotional needs – is your workstation suitable or unsuitable (use mock-ups to explain the workplace).
- (v) User new idea – if you have complete freedom, what will your workstation look like (use mock-ups to show idea), together with initial questions as guideline.

The respondents were given assurance that all information given would be classified as confidential and they had right to withdraw at any time. They were also asked for permission for the interviews to be auditory and visually recorded. Since all respondents were Malaysian, the interviews were conducted in Malay language to facilitate easier understanding and communication process between myself and the respondents. The interviews lasted approximately within 30-45 minutes.

Table3.5: Interview Questions

	Theme / Task flow	Initial interview questions to develop further questions
Q1	Introduction Developing relationship	i. Name ii. Respondent background iii. Working experience
Q2	User approach to work (Using mock-ups)	iv. Can you show the layout of your office and your workplace? v. Who develops and provides the layout? vi. Have you changed your workplace for your needs?
Q3	User practical work (Using mock-ups)	vii. Can you show me your daily job activities? viii. Does this layout and workflow work well for you? ix. What can make it more personal?
Q4	User emotional needs (Using mock-ups)	x. Is anything in your place very personal? xi. What are the things that are important and enjoyable for you in your workplace?
Q5	User new ideas (Using mock-ups)	xii. Have fun trying out new layout

3.2.3.2. Expert Interview

Limited literature work and published data were found with regards to design and office environment in Malaysian context as mentioned in section 1.1, the aim of the expert Interviews was to provide a background understanding for my study. Interviews with experts were arranged a month before the sessions took place. Contact was established while I was at Sheffield UK before I went back to Malaysia. The appointments were arranged through e-mail and letters. After agreements were met, respondents were sent brief descriptions of the project and the aims of the interview to be undertaken via e-mail. The expert interviews were conducted from 8 December 2010 to 15 January 2011 in Malaysia.

Most of the interview sessions were conducted at respondents' offices but some others were at public venues for instance, at a coffee houses or restaurants. They were conducted either fully in English or Malay

language but however in some cases they were conducted using both languages. Most of Malaysians have formal English language education in primary and secondary school, and they have the ability to speak in English, but in this study most respondents preferred and felt comfortable to speak in Malay. All the interviews were recorded using a digital audio recorder with a smart phone as back-up, within the consent of the respondents. Details of the respondents' background are discussed in section 4.3.2.

Table 3.6: Expert User

No	Name	Age	Occupation
1	KamaruzamanMohd	56	Professor
2	SamsudinMandar Shah	40	Managing Director/industrial designer
3	FuadEusoff	45	Manufacturer/Industrial designer
4	Kor Hong Beng	50	R & D Manager/Industrial Designer
5	Rostam Rahim	42	Interior design consultant
6	MohamadAwang	58	Professor
7	Azmiza Aziz	40	Architect
8	Anwar Ramli	35	Assistant director
9	Imran Zakaria	40	Project director
10	Marhizah Abdul Razak	38	Manager
11	RuhaizinSulaiman	46	Researcher
12	UzirMahidin	48	Director

3.2.2.1.1. Interview Procedure

The approach of this interview was similar to the approach used in section 3.6.1.1. The interviews started by introducing myself to the respondents. I explained to the respondents my past and present working experience and my research interests that reflected in this research. Then, respondents started to introduce themselves, covering their past and present background as well as their involvement in areas that were related to this research. I showed printed images of current modern office environment that was able to reveal their experiences, beliefs, practices and interests which instigated further discussion. The images also helped the respondents to give their opinions during the sessions and led to a wider scope of discourse.

In the final session of the interview, I showed the printed images of workplaces that had been developed from previous role play with mock-ups sessions with non-expert. The intention was to gain further opinions and information of the topics that were being investigated. The respondents elaborated rules, regulations and guidelines in developing the workplace according to their related field of expertise. The session provided data on the current practices and beliefs that were implemented in Malaysian furniture industry, also to explore the actual scenario in Malaysian office environment.

3.2.3.1.2. Questions Development

A set of questions in table 3.7 were developed as the main questions. They were the reflection of the questions from the non-expert respondents, also interrelated with each other. Questions for non experts were developed to explore the users' needs and aspirations, whereas the questions for experts were constructed to explore actual scenario in office environments. I used open-ended questions and further elaborated during the interview. Four main questions were used to guide the interview and developed according to respondents' interests. Those questions were divided into four sections as follows:

Table 3.7: Questions Development

	Sections	Questions
Q1	Warm-up questions	i. What is your main role in this company/institution? ii. How long have you been working with this company/area? iii. How long have you been involved in office Furniture/related area?
Q2	Office Furniture design/ Environment (showing images of modern office)	iv. What are the differences between past and present design/related area? v. Is it still relevant with current office environment? vi. Do Malaysian companies still implement this? vii. Where do company get the guideline/dimension/method/procedure in design?

Q3	Office Development	viii. What can you say about current trend? ix. Who influenced the design? x. Why these design influenced your company? Any reason?
Q4	Future Prediction (showing result from role play)	xi. Can these ideas be replaced? Why and why not? xii. Can these ideas be implemented? Why? xiii. Can these ideas create more design opportunities? xiv. Can you give your opinion why? Or why not?

The sessions were recorded using a digital audio recorder and a smart phone as back-up within the consent of respondents. Images of current office and mock-ups development by the office workers were printed as handouts during the interview.

3.2.3.3. Design Workshops

The aims of the design workshops were to explore participatory design process of specific design spaces. Design workshops (DW) were conducted four times in Malaysia between the month of December 2010 and January 2011. The design workshops were held in University Putra Malaysia. It was set up at the discussion room of Faculty of Design and Architecture. In this room a laptop was used to show digital images and video from previous role play with the non-expert respondent, and a video camera with tripod were used for video recording. The video camera was positioned at the front, centre of the participants. Detail of the design workshops were discussed in section 4.3.3. The design workshops lasted approximately 60-90 minutes.

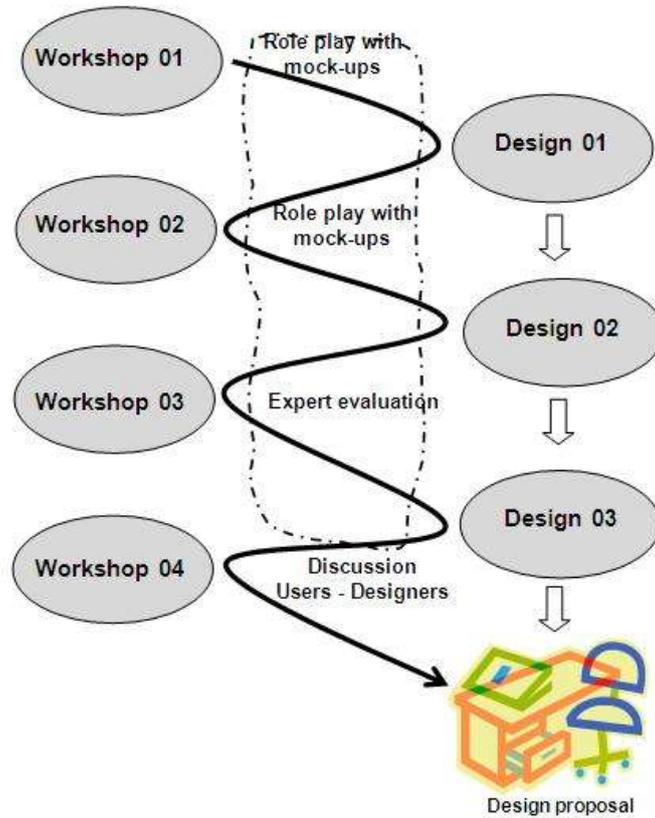


Figure 3.6: Design Workshops

Design workshops were conducted four times as shown in figure 3.5 and were divided into 3 groups as explained in my next section.

3.2.3.3.1. Participants profile

In these design workshops, participants were divided into three different groups as follows:

Table 3.8: Design Workshop Groups

	Design workshops (DW)	Activities Location	Group code	Group detail	Note
1	DW01	UPM Malaysia	DWO	Office workers	Open plan office occupant
2	DW02	UPM Malaysia	DWS	Industrial design	Final year design student
3	DW03	UPM Malaysia	DWD	Design and manufacturing	Designer from expert interview

i. Office Workers(**DWO**)

Snowball method was adopted and the participants were identified through recommendation by the workers during non-expert interviews in Malaysia. All participants were volunteers from various government departments around Klang Valley and had experience working in open plan office environment. The researcher established connection with participants through email and several phone calls prior to field work. Five out of 10 participants were chosen to participate in design workshop according to criteria prescribed. They were contacted via email and phone to confirm the time, location, place and their agreement to participate in the workshop. I also conducted short telephony interviews to gain understanding of their background. The selected participants were chosen based on:

- a. Government/semi government staff.
- b. Open plan office occupant.
- c. Their ability to speak and give opinions.
- d. Willingness and openness to contribute to this investigation and their consent that their interviews to be recorded.

ii. Industrial Design Students(**DWS**)

Participants were identified and selected through universities where they were attached and recommended by their lecturers and professional colleagues prior to the field work. The connection with local universities was established through email. Participation was initiated through the recommendation by lecturers who understood the research purposes, thus suggested suitable candidates. Deep evaluation and interviews were done to identify suitable students based on criteria listed below.

Participants were then contacted through email to confirm the time, location, place and their consent to participate in design workshop.

Most of design students selected were in the age of between 20 to 25 years old. According to Rahman (2010) age group of participant between 18 to 25 years old would be the most suitable for sampling as they were mobile and likely to be involved in and accepting of change.

‘Building a physical model presents students with the non-idealities of real world engineering, and offers them the opportunity to investigate the differences between real behaviour and the conceptual model used to predict that behaviour’. (Lemon, 2010:289)

Further Morgan and Spanish (1984:257) noted that Students in this age group are likely to have more experience with informal discussion of our chosen topic. The selected participants for design student group were chosen based on:

- a. Their communication skill and confidence to speak.
- b. Undergone their internship³⁰
- c. Selected students with good design knowledge and experiences

iii. Designer (**DWD**)

Expert respondents from previous sessions were invited to give their opinions in design workshop 03. Since they had engaged with the research in early stage, it was better for me to seek further opinions and continuous ideas from them. Two out of 12 experts (EX02 and EX04) volunteered to get involved in the workshop.

³⁰Internship is compulsory for industrial design students in Malaysia. Student will be sent to local or abroad design organizations for 1 semester internship.

Both experts were designers who had also been involved in open plan office development and design manufacturing in Malaysia. Expert evaluations, relevant professional experiences and knowledge were used to review the users' mock-ups and concepts resulting from the workshop.

Appointment was made through phone calls to seek available time and venue for the workshop, based on their free time. It was aimed to identify whether the process would create useful design concepts. The self-selected designers were chosen based on:

- a. Willingness and openness to contribute to this investigation and their consent that their interview to be recorded.
- b. Their willingness to spend time to this investigation.
- c. Practical and working experience
- d. Knowledge in furniture design and manufacturing

Table 3.9: Profile of Design Workshops

Design workshops (DW)	Location	Participant code	Occupation	Note
DW01	UPM Malaysia	DWO	Office workers	Open plan office occupant
DW02	UPM Malaysia	DWS	Industrial design	Final year design student
DW03	UPM Malaysia	DWD	Design and manufacturing	Designer from expert interview
DW04	UPM Malaysia	DWO, DWS and DWD		Discussion between users and designers

3.2.3.3.2. DW01 and DW02 Procedures

DW01 and DW02 were used to gain groups understanding of their workplace experience, needs and aspirations. It also involved stakeholders in the process of generating new design thinking with mock-ups.

The design workshops with stakeholders (DW01 and DW02) were conducted in 3 main stages as below.(Refer section 4.3.1.3)

- i. Stage 01 - Introduction. Briefing on the objectives and purpose of the design workshop. Build up connection
- ii. Stage 02 - How to use and mock-ups training session
- iii. Stage 03 - Role play with mock-ups. Participants used mock-ups to develop a new workplace

3.2.3.3.3. Design Workshop DW03 – Designers Evaluation

In DW03, designers reviewed the stakeholders' design ideas resulting from DW01 and DW02, to identify whether the process had created useful design concepts. The workshops with designers were conducted in 3 main stages as below. Refer section 4.3.1.3.

- i. Stage 01 - Introduction. Briefing on the objectives and purpose of the design workshop. Build up connection.
- ii. Stage 02 - Mock-ups training session
- iii. Stage 03 - Design development

3.2.3.3.4. DW04 - (Discussion Users and Designer)

DW04 was held with users and designers aiming to explore participatory design process of specific design spaces. DW04 was the conclusion for the design workshops. The objectives of DW04 were to create design opportunities for designers. The workshop with designers was conducted in 3 main steps as below. Refer section 4.3.1.3.

- i. Step 01 - Introduction. Briefing on the objectives and purpose of the design workshop. Build up connection.
- ii. Step 02 - Explaining the aims of each previous design workshop (DW01, DW02 and DW03)
- iii. Step 03 - Open discussion between DWO, DWS and DWE.

3.3. DATA ANALYSIS AND SYNTHESIS

This part of the research was to analyze respondents' opinions, needs and aspirations. In future, the data will be able to be used as reference in advancing design concepts and opportunities. This investigation adopted qualitative analysis techniques.

Data from respondents' (individual and workshops) in interviews and role play with mock-ups was transcribed into English language, quoting actual words using Microsoft Word Software. It was for analysis of qualitative themes that was then extracted from the content of interviews and role play with mock-ups. The transcriptions were coded; keywords were highlighted manually and grouped in 3 main themes i) lack of control ii) personal control of space and iii) aspiration. All sub topics in chapter 5 (findings) were referred to those 3 main themes and the quotations selected in the discussion were also used to illustrate them. Detail explanation of keywords and themes is explained in section 4.4.2.

The data from interviews and role play with mock-ups would form the main element to evaluate proposed design opportunities and be developed further. This would help to form frameworks of how designers could engage with users in design work as well as identify whether the process would be able to create useful design concepts.

3.4. MAIN FINDINGS ON METHODOLOGY

Methodological findings are a key factor that contributed to the knowledge Contribution. In this research I explored and revealed that the mock-ups were productive tools that provide many advantages for the designer/researcher in their data collection (refer section 5.5).

i. Mock-ups as tools.

Mock-ups were used to engage and facilitate user during the role-play activities. Mock-ups are tools for communication between designer and user.

- ii. **The Advantages of Implementing Role-Play with Mock-Ups**
The used of mock-ups enable non-designers to participate directly in the design process. It also helps me understand the user needs and aspirations.
- iii. **Engagement with User**
To connect with the participants, an understanding between user and designer need to be considered. In this research interviews and mock-up training session were used to build an understanding and connection with users (individuals and groups).
- iv. **Respondents Participation**
The mock-up helps the respondents to overcome their ignorance in design and start to share their interests. This created a 'bridge' between researcher and user.

3.5. CONCLUSION

This chapter had demonstrated and discussed on approaches derived from non-expert and expert interviews, design workshops, also explained the functions of role-play with mock-ups. This research had adopted participatory design approach with mock-ups to explore and determine the appropriate methods of user participation in developing new workplace design. The approach was to investigate how furniture designers,' using participatory design process, was able to employ understanding on personalisation, reshaping and place-making to develop furniture.

Furthermore, this chapter had also explained and described in details the procedures undertaken during data gathering activities with three different groups. Data from this process is analysed and explained thoroughly in chapter 4 (data analysis and synthesis). The methods used had also enabled me to develop and accomplish the finding of research and conclusions for future work as explained in chapter 6.

CHAPTER 4 - IMPLEMENTATION OF METHODOLOGY

4.0. Introduction

This chapter presents the analytical technique in my practical work (early observation of office users done in Sheffield) until the main data collections in Malaysia that involved non-experts, experts and design workshops. I will describe the analysis that was used in my qualitative research data collection to create a description of user-engagement in design activities. I will explain my experience in the design processes throughout the research.

The analysis will reveal the chronology of the research approach and the narratives from the respondents regarding their current practice and their needs and aspirations toward new development of their future workplace. This includes the respondents/participants belief in place making and the personal control of space that could create meaningful workplaces.

Continuing the discussion in chapter 3, in this chapter I will explain the role-play with mock-ups activities that were carried out in this investigation and as tools to assist designers to generate design ideas. This could enable future designers to become more responsive to the needs and aspirations of office occupants in selected environment settings. Finally in this chapter I will elaborate in detail how the data in my main data collection was managed. The wide range of data was analysed and coded into keywords and divided into themes.

4.1. My Early Practical Work (connecting with user)

I started my empirical work by conducting interviews with administrative workers at the Science Park and One Eleven building at Sheffield Hallam University, United Kingdom. The aims of the empirical work were to explore the user's experiences of their workplace. Primarily, the questions were to gain insight, aspirations, needs and questions for developing my research approach in the later stage rather than gaining general information about office working culture.

The observation focused on how office workers interacted with their workplace in their daily activities at their workplace. Suggested by Bayer and Holzblatt (1999), through observation and asking questions of the user as they work will develop a shared interpretation of the work. Therefore, I used this approach to gain understanding of the user's daily activities and their engagement with their workplace.

Through my observation in office workers workplace, I discovered that it was difficult for me to gain insight information from the user by doing observation. During the interview, I also discovered that there were problems getting the office workers to explain their ideas through verbal explanations because they were non-designers and did not have any knowledge or ideas about designing. The office workers also did not have the ways and tools to express their ideas in limited time.

According to Simonsen and Kensing (1997), they spent approximately a period of ten months to gain data where ethnographic techniques like observation and video recording were applied. Reflecting on that, I started to seek productive tools to approach the users that could be understandable where I could gain their insight more quickly. My research approach was influenced by Mitchell's (1995) work, using mock-ups as tools to communicate with users' in my pilot and main data collection. According to Mitchell (1995) and Lemons et al (2010) the mock-ups allowed users (non-designers) easily to express their opinions and aspirations in developing new ideas. They used mock-ups to enable users to "play out" their situation. This approach can be seen in my pilot study (section 3.2.2.2) and main data collection (chapter 5)

Through my professional experiences as designer, academician and my early practical work in the UK, I started to strategise my method in how to engage users in my data collection. In doing so, I tested the approach in my pilot research as explained in section 4.1.1. One of the objectives of the pilot research was to explore the appropriate approach for this context.

4.1.1. Pilot Research

Existing qualitative social science approaches such as interviews, direct observation and role plays were used in this preliminary stage to understand the users' reactions towards their workplace and to examine how they personalise their workplace according to their emotional needs and their practical work. The application of existing methods and techniques in a participatory design approach with mock-ups from previous researchers (e.g. Ehn and Kyng (1991), Mitchell (1995), Lemons et al (2010)) had been implemented in my early investigation to gain understanding of the users' ideas, needs and aspirations toward their new workplace design as discussed in section 2.1.

A set of mock-ups was fabricated to be used as tools in the pilot research data collection. Before the mock-ups were used in my data collection, several discussions were made with my supervisor and two of my PhD colleagues during the PhD weekly meeting to finalise the reliable parts and accessories that should be in the mock-ups setting. The mock-ups, were tested and discussed with the office occupant at C3Ri³¹ research unit 12, Sheffield Hallam University before it was used in my pilot work. The aims of the pilot research were stated in section 3.2.2.2.

The respondents were interviewed at or near to their offices to give the realistic office environment and the sense of personal emotion. Work practice in the office environment has become so habitual for the users and they often have difficulty articulating what they do and why they did it (Bayer and Holtblatt, 1999). By observing at or near to their workplace also gave me an understanding on how workers approach their work every day.

4.1.1.1. Participant

A snowball sampling approach was adopted in this pilot research. According to Biernacki and Waldorf (1981:141), snowball or chain sampling is a method that has been widely used in qualitative research.

³¹Cultural, Communication and Computing Research Institute(C3Ri)

The method yields a study sample through referrals made among people who share or know of others who possess same characteristics that are of research interest.

Six respondents from a respective range of occupations and social backgrounds were selected. All respondents were in Sheffield UK for the purposes of studying, doing their internship and working and had a variety of experiences in different types of office working environments (table 4.1).

Table 4.1: Respondents Background and Experience (pilot study)

No	Code	Name	Occupation	Nationality	Age	Working Experience/yr
1	R01	Zull	Researcher	Singaporean	40-45	Above 10
2	R02	Deedi	Landscape architect	Malaysian	35-40	Above 10
3	R03	Anim	Teacher	Thailand	35-40	Above 10
4	R04	Azyu	Tutor	Malaysian	35-40	Above 10
5	R05	Anuar	Administrator	Malaysian	30-35	Below 10
6	R06	Jacky	Administrator /researcher/ lecturer	British	35-40	Above 10

4.1.1.2. Role Play Procedure

The interviews began with explaining the timeline and the development of open plan offices past and present. The sessions continued by a briefing on the objectives and the focus of the investigation. Examples of workplace images were shown and timeline was explained to the respondents to give them clear understanding of the topic discussed. The images also gave them a basic idea during the interview and opinion in developing their new workplace.

Respondents then were told how to use the mock-ups in this investigation. I described each unit of the mock-ups and explained to them how to use it during the role play activities. The mock-ups were fabricated in many sizes as basic square boxes that represented furniture and other office accessories. Interviews started after respondents understood and became comfortable with the mock-ups.

At the end of the session, I showed the workplace layout that was developed from the previous role play. The intention was to give some ideas and freedom for the respondents to perform the new idea that they felt suitable and reflected their emotional needs

4.1.1.3. Interview Guideline

A set of questions in table 4.2 were developed as the main questions. The interviews were open ended and the questions were elaborated on during the interview.

There were five main questions to guide the interview and these were elaborate in respondent interest. Most of the questions were revealed from my empirical work (connecting with user) in the early stages of my research.

The five main questions were: (Q1) introduction - tell me about yourself (Q2) user approach to work – what is your job and who develop your workplace? (Q3) user practical work – show me the practical task you do? (Q4) user emotional needs – is your workstation suitable or unsuitable (use mock-ups to explain the workplace)? and (Q5) user new idea – if you have a complete freedom, what will your workstation look like (use mock-ups to show idea)?.They could arrange their workplace without any limitation with design, space and guideline. The main reason I gave them such freedom (during pilot study and main data collection) was to ensure their ideas was limited by referring to their previous/current workplace. By having a complete freedom allowed them to reveal more insight that would create more design opportunities. This can be seen during the pilot research (section 3.2.2.2 and role-play with mock-ups (individual and groups) in my main data collection (chapter 5). The respondents were given an assurance that all data given would be confidential and they had their right to withdraw at any time. They also were asked for their consent for the interview to be aurally and visually recorded. (Consent form – appendix 1)

Table 4.2: Interview Questions

	Theme / Task flow	Initial interview questions to develop further questions
Q1	Introduction Developing relationship	i. Name ii. Respondent background iii. Working experience
Q2	User approach to work (Using mock-ups)	iv. Can you show the layout of your office and your workplace? v. Who develop and provide the layout? vi. Have you change your workplace for your needs?
Q3	User practical work (Using mock-ups)	vii. Can you show me your daily job activities? viii. Does this layout and workflow work well for your? ix. What can make it more personal?
Q4	User emotional needs (Using mock-ups)	x. Is anything in your place is very personal? xi. What are the thing that important and enjoy full for you in your workplace?
Q5	User new ideas (Using mock-ups)	xii. Have fun trying out new layout

4.1.1.4. Direct Observation

Respondents used mock-ups to demonstrate their existing workplace, their approach in their daily job and their idea for new designs. Observations activities were recorded through audio and visual format using a digital video camera and Digital Single Lens Reflex Camera (DSLR). The video recording only focused on the task performed. Pictures captured twice, the pictures of existing and the new ideas of workplace layout.

As agreement with all respondents (expert, non-expert and design workshops), no photographs captured to identify participants in person. Digital photographs were taken to support the interviews and as visual evidence.

4.1.1.5. Data Analysis

Interviews with Malaysian respondents were translated into English. Each abstraction identified was given a code or keyword (eg personalisation, privacy, place-making, meaningful workplace etc). Each transcription was organised into categorisation, and was grouped into major themes. For example, concept/code/keywords of bringing personal belongings to the office were grouped into the theme of personalisation.

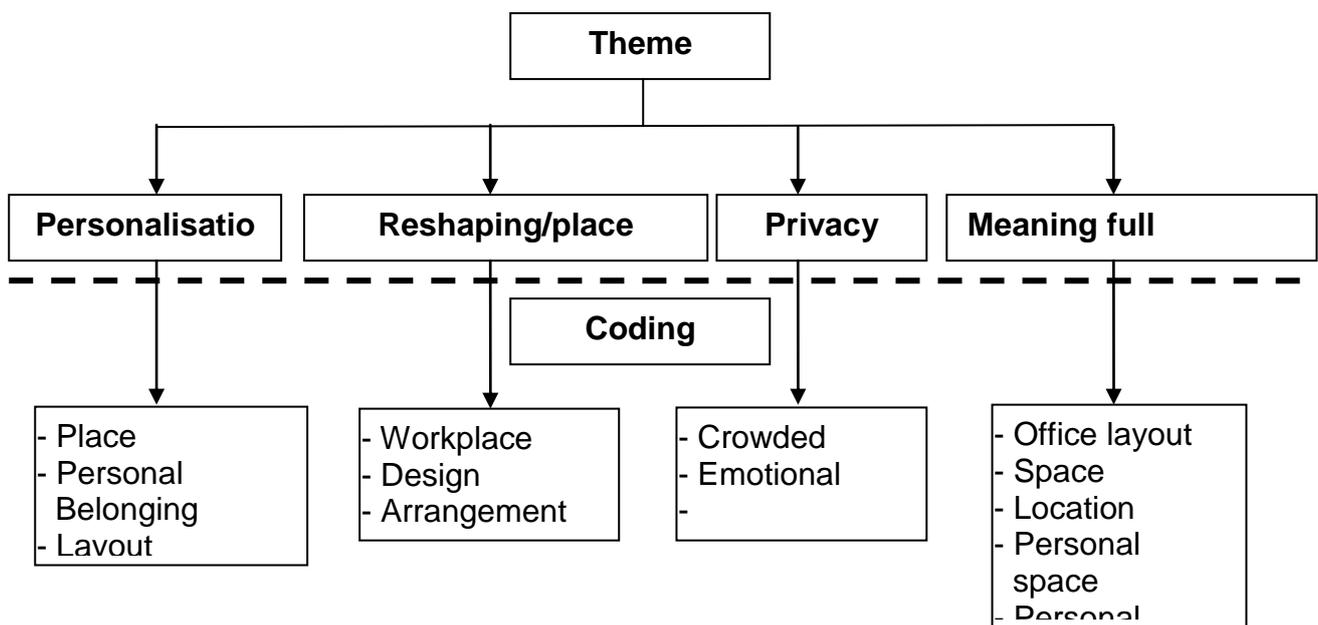


Figure 4.1: Pilot Study Themes

Table 4.3 and 4.4 shows the main themes in this pilot research. The mark √ appears each time when the themes occurred in the interviews and will be explained later in the initial finding section. The table is divided into two sections table 2 represents respondents existing workplace and table 3 represent new ideas developed by respondents.

Table 4.3: Existing workplace

Theme	R1	R2	R3	R4	R5	R6
Personalisation	√	√	√	√	√	√
Privacy					√	
Reshaping	√		√		√	√
Meaning full Workplace					√	√

Table 4.4: New workplace

Theme	R1	R2	R3	R4	R5	R6
Personalisation	√	√	√	√	√	√
Privacy	√	√	√	√	√	
Reshaping	√	√	√	√	√	
Meaning full Workplace	√	√	√	√	√	√

4.1.1.6. Initial Finding

The results from my pilot research had provided me the research direction and influenced my data collection later in this research. The result of my pilot research was presented and discussed at IASDR 2011³² (appendix 2)

i. Respondents Respond to the workplace Personalisation

Respondents were asked whether they personalised their current workplace as well as whether they were going to personalise their new workplace. The roles play and interview sessions revealed, that all respondents personalised their workplaces. Most respondents' brought their own belongings to their workplace. R01, R02, R03 and R04 brought their belongings such as mug, pens collection, family photos, books, clock, instant drinks, biscuits, pillow, table lamp and plant.

A study done by Wells (2007) and Wells and Thelen (2002) showed that 70% to 90% of workers personalised their workplaces. They also found that personalisation gives many benefits to the workers and the

³²IASDR2011, the 4th World Conference on Design Research, was organized by the International Association of Societies of Design Research (IASDR). Delft, Holland 31 Nov – 4 Dec 2011.

organisation where it could enhance their job satisfaction, well being and morale improvement.

Unlike others, R05 and R06 had their own view in personalisation. Although they did not bring their belongings, but they still personalise their workplace by rearranging the office equipment (e.g computer) or office accessories (e.g exhibition postcard).

Personalisation is also related to organisational issues. Users' workplaces most likely reflect their company rather than the user (Wells, Thelen and Ruark, 2007). Thus Brunia and Gosselink (2009) claimed that, personalisation could create an identity, status, place ownership and comfort.

ii. Re-shaping and Redesigning Workplace (place-making)

This theme can be divided into two categories which are before and after the layout development.

a. Existing layout (before new idea development)

According to Deasy, Flannery and Rhea (2001) the managers and manufacturers who are responsible in purchasing workstations are fairly satisfied with them. As a result, some of the respondents had the tendency to reshape their workplace from the first time they moved into the office. R02 and R3 moved their cabinet according to their daily and personal needs.

Meanwhile R06 had done major changes in her workplace. She rotated her workplace 180° to ease off her daily workflow and for comfort.

According to Anjum, Ashcroft and Paul (2004) in their research regarding workplace design, office workers making decision about the layout and furniture create an impact on workers' productivity.

Type of job and user needs strongly influence user to reshaping and rearrange their workplace. In relation, Riratanaphong (2006) in his research, revealed that furniture and space configuration for individuals must match with the occupants comfort and health.

b. New idea in developing new workplace.

Respondents were asked to perform their ideas to develop a new workplace layout according to their personal needs. They were free to express their idea and not limited to current environment. Most of the respondents had the tendency to develop their workplace according to their nature of work and daily working activities. For example R01 needed a bigger table due to his job (dealing with plan and planting layout).

Their ideas were also influenced by their experience with the current environment. For example, R04 referred to her office in Malaysia.

Brunia and Gosselink (2009) claimed that workplace identity was more related to workers specific task and workplace personalisation helping workers to give the environments a more human feeling, in which people would feel comfortable.

iii. Privacy in Office Environment

Although privacy was almost never mentioned directly by the respondents in the interview, the way respondents reshaped their workplace, showed an important finding. Most of the respondents preferred to have a partition to divide their space with others and to show their territory.

According to Anjum, Ashcroft and Paul (2004), workers arrange their desk and chair to avoid eye contact and interaction with co-workers.

They also like to mark the boundaries of personal space by storage units, screen or partition and by putting up personal posters or photos.

Example of this was, R06 moved her table around (360°). R06's existing table was facing toward her boss.

Kupritz (2001) claims that workers needs privacy to concentrate on their work. R04 and R03 preferred to have a partition for privacy so they could concentrate on their daily work.

iv. Respondents reaction toward meaningful office workplace

People need personalisation to create a meaningful workplace. A meaningful office not only focuses chair and desk, storages and partitions, but the whole systems of the office environments. Meaningful workplaces are not just limited to physical aspects, but it also includes an emotional experience. Brunia and Gosselink (2009) and Scheiberg (1990) stated that emotions play a vital role.

Scheiberg (1990) said that “there seems to be a connection between the emotion regarding the workplace, job satisfaction and job performance”.

Most of the respondents had the tendency to show how to create a meaningful workplace. Example of these R03, R04 and R05, reshaping their workplace so they could feel like being at home. They created their own personal space at their workplace. R04 stated that a beautiful, clean and well arranged workplace design would motivate people to come to the office. R05 described that an office should have something therapeutic to prevent stress.

Meaningful workplaces can be achieved in different ways and for different reasons according to different needs. People seek several additional ways to make the environment familiar and comfortable for

them and mark their identity in the organisation (Brunia and Gosselink, 2009).

In my pilot study, respondents' had the tendency to reshape their workplace referring to their home or previous office and environmental experiences.

4.1.1.7. Limitation of Pilot Research

The initial findings from the pilot study had influenced my main data collection in Malaysia. The limitations of the pilot study are as follows.

Table 4.5: Pilot Research Limitation

	Limitation	Consequences
i.	Mock-ups components and accessories used during the pilot work were very limited.	Existing scale models, such as dolls mugs and flowers, were used for the main data collection. Various option of table top size, partition height and side table were introduced. Extra quantities of square boxes (big and small) were fabricated to give more option to the respondent during the role play in my main data collection.
ii	Selection of respondent for the pilot research was limited in small number due to time constraints.	Larger scale study with more respondents. Proper schedules were arranged. Office workers were invited to involve in individual and group role-play with mock-ups session.
iii	The environments to which they are working were less realistic with the real situation in my subject area.	Sessions were conducted whether in a room near their office or they will taken to research room with office setting in UPM
iv	It is not method to get rich formal data, but method how designer to quickly gain insight the user in limited time.	It is easy to use, understandable and workable for me or other designers in our project work in the future.

4.1.1.8. Conclusion (Pilot Research)

Through the pilot research, I began to develop an appropriate method to engage with office workers in developing a new office workplace. The role plays with mock-ups activities were tested and suitable approaches to be used in my main data collections were identified and formulated. The approach allowed respondents to perform their daily practical work easily and allowed me/designers to identify present problems and the needs of the users in their new/future office design.

This overall research project was developing a method that allowed designers to recognise and understand the problems that emerged from users which could easily be identified through their normal practice as designers.

Leading on from this pilot study, further work was planned for this research that included larger scale with more respondents and focusing in specific office workers in Malaysia.

4.2. MOCK-UPS DEVELOPMENT

Mock-ups were developed twice during the research process (figure 4.2), during and after the pilot study was done. Reflections from the limitation in the pilot research (section 4.1.1.8) revealed some weaknesses. Scale mock-ups provided in the role-play activities were very basic so that they could limit the design ideas. Respondents were asked to give their comments and ideas regarding the mock-ups activities for further improvement. Their comments were used in mock-up development.

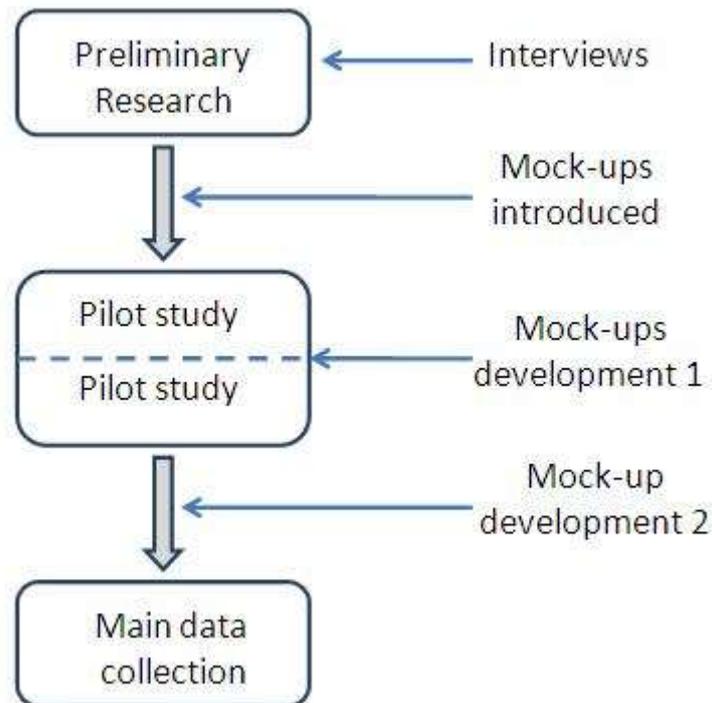


Figure 4.2: Mock-ups development

The process of mock-ups development was undertaken over about a week. The mock-ups were fabricated on a scale of 1:7mm from the actual dimensions that were used in furniture manufacturing industries, so they could be stored in a small box for mobility purposes. Lightweight materials such as cardboard, soft board and Balsa³³ wood block were used to fabricate the mock-ups. Existing scale models, such as dolls, mugs and flowers were also used. Some of the mock-ups were made in 'anonymous' shape so it could be represented as 'anything' in the layout according to users' imagination (e.g item ii, iii, xi, xii, xiii).

The mock-ups were made in white colour (original mounting board colour), so the participants could focus role play and discuss about the design rather than other issues such as colour, material, finishing etc. as suggested by Rahman (2010) in his research project, his presentations were transformed from real photos into plain sketches to avoid the participant discussing wider issues.

³³Balsa wood, a very lightweight material often used as construction material and model making.

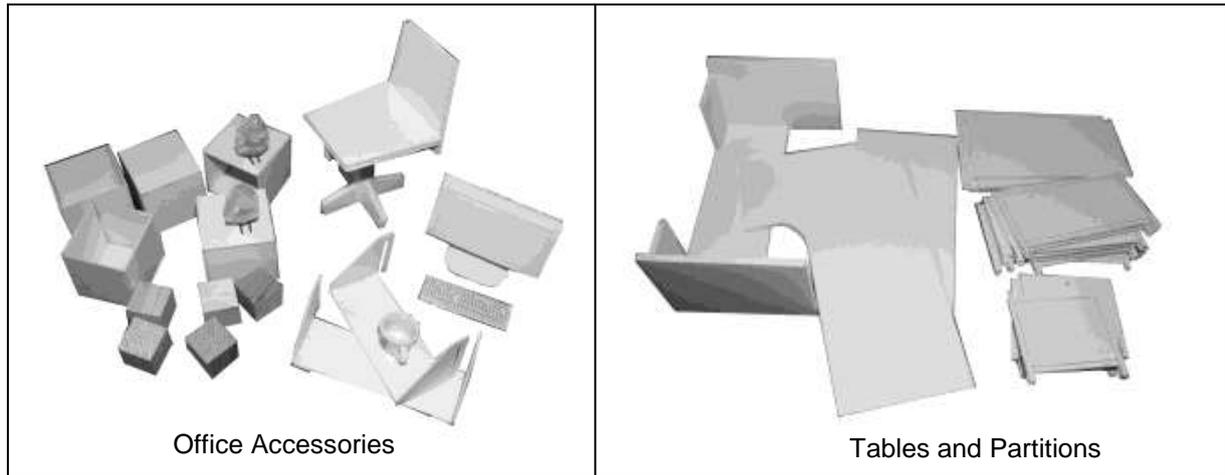


Figure 4.3: The Mock-ups. Source: Author 2010

All mock-ups fabricated consist of:

- a. One table structure = 720 height x 1000mm width
- b. Two table top
 - i. One piece = 1200 length x 750 width mm
 - ii. One piece = 1500 length x 750 width mm
- c. Three side table 750 x 600mm
- d. Three side table leg
- e. One office chair
- f. One set of computer screen and keyboard
- g. Four hanging shelf(with two different sizes)
- h. Eight set of scale low screen partitions:
 - i. Four set = 750mm width x 900mm height
 - ii. Four set = 600mm width x 900mm height
- i. 8 set of scale add-on panels (add on the low screen partition to increase the partition height):
 - a. Four sets = 750mm width x 400mm height
 - b. Four sets = 600mm width x 400mm height
- j. Two set of 450mm width x 900height low screen partition plus three add-on panel 450mm width x 400mm height.
- k. Twenty pieces = 300 x 300 x 300mm scale boxes(square Boxes)
- l. Forty pieces = 100 x 100 x 100mm scale boxes (square Boxes)
- m. Other accessories = mug and flowers

The mock-ups were developed to provide more options for the respondents. More accessories were added and two sizes of square boxes were introduced to allow more design ideas. Extra table top size and side table attachment (square shape) were added to provide more options in workplace. Various sizes of partition and add-on panel were introduced to allow respondents to create many types of configuration and modify the partition height. The add-on panel could be attached on top of another partition to get preferred partition height according to respondents' need.

The respondents were free to arrange the square boxes according to their needs and aspirations without any design guideline and dimension limitation. The 300 x 300 x 300mm scale boxes could be used to represent office furniture such as pedestal, cabinet, storages and other furniture as necessary and the 100 x 100 x 100mm scale boxes could be used to represent office accessories such as printer, tray, filing, etc.

4.3. DATA MANAGING FROM THE MAIN FIELD WORK

McCracken (1998) in his book regarding qualitative research methods mentioned that, the analysis of qualitative data is the most demanding aspect of the qualitative process.

'Qualitative research is often depicted as a research strategy whose emphasis on a relatively open-ended approach to the research process frequently produces surprises, changes of direction and new insight' (Bryman, 2006:11)

Basit (2003) explained that, throughout analysis, researchers attempt to gain a deeper understanding of what they studied and continually refined their interpretation. Researchers draw on their firsthand experiences with setting, informant or documents to interpret their data.

For this research, the data collected came in as audio and visual format. Interviews were conducted using open-ended questions, and role-play with mock-ups was used to explore users' needs and aspiration. This technique was adopted due to its ability to give a sense of freedom to respondents as discussed in section 2.5.2.

In my research interviews with experts, non-experts and design workshops were recorded and transcribed (example in appendix 3), apart from that role-play with mock-ups with users (individual) and groups (design workshops) were being photographed.

4.3.1. Interview

Dortin (2002) stated that, the process of conducting and reading interviews are important in higher education research and development.

Rahman (2010) and Yazid (2010) suggested that, each interview should be identified with a code for future references, which enables the data to be more easily identified in specific time, location and exact research activities. It will provide a monitoring system for the researcher throughout the data analysis stages.

For example, in this research each transcription was coded with code number according to the series of interview as described in section 3.6. For example, person in non-expert group would be coded started with NE01, NE02 etc. Experts were coded with EX01, 02, etc. The design workshops were coded in three main groups. Participants in design workshop DW01 were coded starting with DWO01, DWO02, etc. Design workshop DW02 was coded starting with DWS01, DWS02, and design workshop DW03 was coded starting with DWD01, DWD02 and DWD03. There was no number coded to participants in design workshop DW04 because all participants were coded starting from DW01, DW02 and DW03.

‘Transcription is explored as a transformative process, a bridge between interview and analysis across which the data as well as the interviewer-researcher, are re-orientated toward the process of analytical reading’ (Dortin, 2002:207).

4.3.1.1. Non-Expert Participant Profile

Selected respondents were contacted through e-mail and telephoned before the field work was carried out through suggestions made from

my local contacts, colleagues, worker's managers and friends. Later, a snowball sampling approach was adopted. A similar approach that was used in my pilot study (refer section 4.2). The respondents came from various ranges of occupations having experienced working in open plan office space. Before selection was made, the decision on selecting respondents was influenced through my judgment during my first contact by email and telephone calls. Their suitability could be identified through their commitment, interest and consent with the research. All selected respondents were focused on non-managerial staff consisting of the biggest labour force in semi government/government in Malaysia as stated by Uzir Mahidin in chapter 2 section 2.5.4.

The respondents started with small numbers of office workers and expanded through their local contacts. The workers made a suggestion and proposed the potential candidates among their friends and colleagues. The respondents then were contacted by phone asking about their willingness to contribute to this research and the agreement made to that interview was also to be recorded. Table 4.6 below shows the detailed breakdown of the respondents. Non-expert participants were coded as NE. The rationale for choosing the respondents was based on:

- i. Government/semi government staff. (non-managerial group)
- ii. Practical experience working in open plan office space
- iii. Their working environment - working in an open plan office
- iv. Their willingness to contribute to this research and the agreement made to that interview was to be recorded
- v. Had the ability to speak out and give opinion (can be determined during contact via call and e- mail)

Table 4.6: Respondents Profile

Code	Gender	Background	Education Level	Working Experience
NE01	F	<p>She is a general clerk at academic division since 2007. Her first job since graduated from Community college.</p> <p>Young office occupant. Showing her aspiration to reshaping her workplace according to her needs.</p>	IT Certificate	5 years
NE02	F	<p>Started her career as clerk at Chemical Company of Malaysia(CCM) in 2004 and in Jan 2007 worked at Celcom Telecommunications. Currently she is working at Dept. of Communication Putrajaya as Public relation clerk since end 2008.</p> <p>Working in open space for almost 4 years in a difference type agency. CCM and Celcom are private companies and IKRAM was semi Government Link Companies (GLC). She has an experiences working with three companies that have difference office approaches and of office layout.</p>	Secondary school	8 years
NE03	M	<p>He is working as assistant clerk at Department of Forestry Serdang since 2004. Working in open space/very big room occupied by 5 pupils. In 2008 he was transferred working in open plan office. Working in difference condition, influence him to reshape his current workplace by referring to his previous office set-up.</p>	Diploma holder	8 years
NE04	F	<p>Working as a general assistant at Sustainable Design Institute since June 2009.</p> <p>Freshly graduated from college and UPM was her first job. She in a process of adapting and gaining</p>	Diploma holder	3 years

		working experiences in her new working environment.		
NE05	F	She is a research assistant (RA) at INTROP Serdang. Her job is handling research grant application from Feb 2005 until Dis 2008. Currently working with Unizar Terengganu as RA. Moving from city to sub-urban exposed her with the requirements of modern office working style.	Degree holder	7 years
NE06	F	She is working at department of purchasing, Ministry of Higher Education Putrajaya as treasuries clerk since Nov 1997. She has an experiences working in difference types of workplace layout but in the same office space.	Training Certificate	15 years
NE07	M	Started his career at shell in 2005 as general assistant. Currently working at National Assessment and Registry's Service Section Selangor since 2007 as general clerk. He has experience working with private and government agency.	Secondary school	7 years
NE08	F	Started her career in year 2000 as admin clerk at National Unity kindergarten, Prime Minister's Department, Pahang. In 2003 she was transferred to Kuala Lumpur and promoted as admin assistant in the same department. She has experience working in two levels of positions and working at two different states in Malaysia, rural area and city.	Diploma holder	12 years
NE09	F	Started her career in Jan 2005 as substitute teacher. In Feb 2006 she worked as a clerk at SEGI Collage. Currently she is working as general clerk at Ministry of Higher Education (MOHE) Putrajaya since june 2007. She has experiences working with private and government agency. Working with various agencies gives her difference experiences working in different type of office	Degree holder	7 years

		environments.		
NE10	M	Graduated in Nov 1997. He worked at multimedia firm for 2 year from 1998 to December 1999. In year 2000 he worked as a tutor at Cosmopoint College and moved to Multimedia Academy in 2002. He is sitting in open plan office space mix with academic and non-academic staffs. As an academician, he feels that he should have better workplace compared to non-academicians.	Degree holder	15 years
NE11	M	Worked as general clerk at TNB in 1997 and pursue his study at UiTM in 2003. In 2007 he started his carrier as design assistant at design company for 1 year and joined UPM in 2008 as a academic assistant. He is sitting in closed office sharing with another colleague and moved to open plan office environment in Nov 2010. He tends to reshape his new workplace referring to his past experiences.	Degree holder	8 years

4.3.1.2. Expert Participant Profile

The experts, including policy makers, and people from Malaysian government departments and institutions were involved in current office environments, historical issues, current practices and social experiences. The chosen respondents were persons from design, management, manufacturing, end user expert and ergonomic background with the age range between 34 to 58 years old and most of them were important individuals in their own field (e.g EX03 and EX04 were pioneer in office furniture/open plan office system in Malaysia).

Most of the expert respondents were recommended by my professional and academic colleagues and through my own professional contact. The interviews provided data on current practice and beliefs in

developing office environments in Malaysia. The selected experts were chosen based on their:

- i. Practical and working experience
- ii. Knowledge in furniture design and manufacturing
- iii. Knowledge of their expertise being related to my areas of investigation (e.g design, ergonomic, management etc)
- iv. Willingness and openness to contributed to this investigation and their consent that their interview was to be recorded.(could be determined during contact via call and e- mail)

The aim of the expert interviews was to gather information, perspectives and current practise regarding the Malaysian office environment. These experts had the ability to explain, the authority to influence policy makers, to describe the context of current issues in Malaysian office situations and were able to provide experience from insight which was not available through literature review. Expert participants coded as EX. Table 4.7 below shows the expert interview profile including their area of expertise:

Table 4.7: Expert Profile(expert interview)

	Occupation	Background	Expertise
EX01	Professor in consumer study	He is working with National University Business School. Involved in many consumer research project regarding user satisfaction in office environment.	End user expert
EX02	Managing director/ Industrial designer	He is the designer and managing director of Polygon Resource, one of the leading furniture companies in Malaysia. He has been involved with open plan system (OPS) and office furniture industries since 1996.	Office furniture/ Industrial Designer
EX03	Owner / manufacturer	Owner and designer of TerroReka Sdn. Bhd. A medium size design company with 15 staff. Their main businesses are OPS and	Design and manufacturing/ Industrial Designer

		furniture design consultancy and manufacturing. He is the pioneer designer in open plan office development. Involved in OPS design since 1989.	
EX04	Director/ R&D Manager	Owner/director of Emerge Industries. He is One of the pioneer designers that involved in furniture manufacturing. He has been involved with furniture manufacturing since 1990. His roles in his company are handling furniture production and design. He also involved in sales, administration, product development and production.	Furniture manufacturer / Industrial Designer
EX05	Interior design consultant/ Lecturer	Working with national university Design school. He is the member of Interior Design Council of Malaysia (IDM). He has involved in many design project and consultancy in developing offices in Klang Valley.	Interior design
EX06	Professor in interior architecture	Working with national university Design school. He is the Founder of Interior Design Council of Malaysia (IDM). He has been involved in many researches in developing Malaysian standard. He is expert in interior design, furniture and consumers.	Interior design/ consumer experts
EX07	Architect	Registered Senior Architect working at Norman Ezane Architect, a medium size architect firm with 10 registered architects. Their company is expert in office design construction. One of the companies that involved in developing the Putrajaya offices building.	Building design and construction
EX08	Assistant Director	He is working with National Landscape Department of	Office management

		Malaysia located in the Putrajaya Malaysia. As an assistant director, he is one of the government officers that involved and have the authority in decision making in developing government office.	
EX09	Project Director	He is the associate partner and interior designers at Al-Ciptra Design one of the leading interior design consultant in Malaysia. He has been involved in interior design since 1994. His company is one of the main contractors that involved in developing the Putrajaya government office complex interiors.	Interior and office furniture design
EX10	Manager	She is working with Ministry of Finance (MOF) of Malaysia located in Putrajaya. She is one of the officers that involved in processing and set-up the standard guideline in purchasing furniture and office equipments for Malaysian government offices.	Product planning and costing
EX11	Researcher / Senior Lecturer	He is working with National University design School. He is one of the experts in static and dynamic anthropometric dimension (ergonomist), especially in home and workplace design.	Ergonomic
EX12	Director	He is working with National Statistic department of Malaysia. He is the person that in charged and responsible in handling any analysis regarding Malaysian development.	Analyst expert

4.3.1.3. Design workshops

Participants (including the researcher) were involved in the design workshops with the age range between 20 to 45 years old. DW 01 and DW 02 were conducted with users (both groups were mixed male and female), DW03 with designers and DW04 were the final discussion involving participants in DW 01, 02 and 03 as shown in table 4.8. The number of participants in DW01 and DW02 were five persons in a group as suggested by Fern (1982), Morgan and Spanish (1984) and Kitzing (1995).

Kitzing (1995:229) suggested that the ideal group size is between four and eight people, it is particularly useful for exploring people's knowledge and experience and can be used to examine not only what people think but how they think and why they think that way.

Fern (1982:2) noted that the ideal group size depends on the seating arrangement. He stated that, there are no differences in the number of idea produced between five to nine member groups and between four to seven member groups.

In these design workshops, I chose to invite five persons in each session (working with user) due to the size of the mock-ups and the table arrangement was also to be taken into consideration. In my early observation when conducting my pilot study, five persons seemed to be the appropriate focus group size working with my 1:7mm scale mock-ups. With larger groups, there would be physical difficulty which tended to prevent all members from participating and interacting with the mock-ups.

Morgan and Spanish (1984), concluded that, the researchers can decide which form of focus group is the best suited to his/her research. This flexibility was one of the things that originally attracted the researchers to the focus groups approach.

Table 4.8: Profile of Design Workshops

Design workshops	Location	Code	Occupation	Note
DW01 22/12/2010	UPM Malaysia	DWO01 DWO02 DWO03 DWO04 DWO05	Office workers	Open plan office occupant + researcher
DW02 13/1/2011	UPM Malaysia	DWS01 DWS02 DWS03 DWS04 DWS05	Industrial design	Final year design student + researcher
DW03 20/1/2011	UPM Malaysia	DWD01 DWD02 DWD03	Design and manufacturing	Designer from expert interview + researcher
DW04 26/1/2011	UPM Malaysia	Participant from DW01, DW02 and DW03		Discussion between users and designers + researcher

i. Design Workshop (DW01 and DW02) - Users

The design workshop with stakeholders had 3 main stages. The first stage was to build up connections between the researcher and the participants, focusing on sharing ideas and experiences. Second stage was the training stage where the participants were trained to use and play with the mock-up. The final stage was the design stage where participants used mock-up to develop a new workplace design according to their needs and aspirations. The aim of the workshop was to use the mock-ups process to generate ideas from the whole group members rather than individual as in the pilot study.

Stage 01- Introduction Session

The sessions started with a briefing on the objectives and purposes of the design workshops. The participants were asked to complete a consent letter in their agreement to participate in the design workshops and their activities to be recorded aurally and visually.

Examples of images from current workplaces and mock-up layouts from the previous pilot study were shown to the participants to give

them clear understanding of the process. The sessions continued with the participants sharing their experiences working/engagement in open plan office environment. Then, all participants gave their own perspectives and how it related to their current practices and environment. At the end the session, the researcher explained the timeline and the development of open plan office past and present. The images shown, also gave the participant's basic ideas and opinion in developing their new workplace during the workshop. This session took around 20 minutes.

Stage 02 – Mock-Up Training Session

It was necessary to run a training session with the participants to ensure they understood the process and how to handle the mock-ups before the workshop began. In this session, I described each unit of the mock-ups. The mock-ups adopted the 'LEGO' concepts that enabled the users to attach and detach parts. I explained to them on how to attach the partitions and change the height from low to high screen panels also how to combine it to make them wider. The mock-ups were made in square boxes. The participants could construct the boxes to represent the office furniture and accessories such as cabinet, mobile pedestal, printer, files etc. Other parts of the mock-ups such as table sizes, side table, and models from toys were also explained thoroughly. At the end of the session the participants were allowed to try and play for the proposed of training and to familiarise themselves with the mock-ups.

Stage 03 – Design Development (Role Play with Mock-Ups)

The role-play started after respondents were familiar and comfortable with the mock-ups. I showed the images of workplace layout that were developed from the previous role-play with non-expert respondents. The intention was to give some basic ideas for the participants. The activities were concentrated to develop a new workplace design according to the task given.

The role-play began by the researcher asking the question, “...*if you have a complete freedom, what will your workstation look like...?* Use mock-ups to show your ideas...” the role of the question was to challenge the participants’ ideas. This message was reinforced as the session progressed. (Refer pilot study 4.1.1)

In the early stage 03, the respondents discussed among their group members about their aspirations and needs in specific workplace in order to produce design specifications for their role plays activities. Since the group were mixed with male and female members, the layout should meet the requirements of multiple needs e.g. gender etc. The discussion took around eight to ten minutes. After a short discussions and agreement were made among group members, they started their role-play with mock-ups activities. By using mock-ups, the participants assembled their desired workplace according to their group members’ needs and aspirations.

While participants assembled their workplace, I took an observational note as a record for future references and assisted them when necessary. According to Fern (1982:9), groups led by focus group moderators did not produce significantly more ideas than un-moderated discussion group. The result is the same.

Once the workplace design was established, each group member explained the rationale and reasons about their new workplace design. The ideas of the discussions were to explore deeper understanding about the workplace that was established during the role-play. After the activities were completed a final photographs were captured. Digital photographs captured twice, the respondents’ current workplace and the new idea of workplace design. The mock-ups then were disassembled and stored in a box, and the role-play process would be repeated with another group later. Sessions last for 60 to 90 minutes.

ii. **Design Workshop 03 (DW03) – Designers Evaluation**

The design workshop with designers was divided into three main stages. The first stage was to build up connection with the designers. Focus on designers working experiences and area of expertise. Second stage was the training stage where the designers were explained to work with the mock-up during the role-play. The final stage was the design stage where the designers used mock-up to develop a workplace referring to the user's needs and aspirations. The aim of the workshops was to review the office workers mock-ups and concepts emerged from the design workshops DW01 and DW02, to identify whether the process had created useful design concepts.

Stage 01- Introduction Session

The sessions started with a briefing on the objectives and purpose of the design workshops. The designers were informed that their activities would be recorded in audio and visual format. Although the designers were engaged with the research in earlier stages, the research briefing was to refresh and update the designers about the current status of the ongoing project. Sets of guidelines from Economic Planning Unit (EPU) of Malaysia were printed as a hand out and were used for further discussion. The guidelines consisted of the office workstation standard dimension for government offices. The aims of the discussion were to gain clear understanding about the main criteria in developing office layout for the government offices that had been established by the policies makers in Malaysia.

Later, I showed to designers the photographs of the workplace design revealed from the previous design workshops (DW01 and DW02). I explained and elaborated the user's needs and aspirations in their new workplace.

The designers then gave their feedback and opinions referring to their experience and the current practice by the furniture manufacturers.

Designers with relevant professional experiences reviewed the users' layout and concepts from the design workshops, to identify whether the process had created useful design concepts.

Stage 02 – Mock-Up Training Session

Procedures in sections 3.6.3.2 (mock-ups training session with user) were adopted in these sessions. Working with designers was easy compared with the users since they were furniture designer experts and familiar working with mock-ups in their professional practice. Although the mock-ups were made in scale, their scale ratio referred to the existing office furniture that was workable in real office environments. As stressed by Ehn and Kyng, (1991), mock-ups should be understandable that can represent the real situation. Therefore, it is easy for the designer to visualize the layout in actual environment.

Stage 03 – Design Development

To gain more understanding, the designers assembled the basic workplace referring to the guidelines and specifications provided by EPU, according to specific workplace design. The designers then explained and elaborated the reasons why the layout was designed in such ways. According to the EPU guidelines, the open plan office occupants (non- managerial staff) layout was only limited to a specific cubicle dimension (sq meter per person) and budget. As a result, the designs and furniture provided were very limited to basic furniture. The session continued with the designers developed the workplace by referring to the design concepts which emerged from the previous workshops with users (DW01 and DW02) and the EPU guidelines.

The aims of the sessions were to provide design opportunities and solution that could meet the needs and aspirations of the users and the requirements of the policy makers.

While participants assembled their workplace, I took an observational note as a record for future references. Once the workplace was

established, each designer elaborated and explained the rationales of the workplace developed. At the end of the sessions, the designers created a potential workplace design that could be presented to users for further discussion and development in design workshop 04 (DW04). After the activities were completed, final photographs were captured. The mock-ups then were disassembled and to be repeated for another design workshop.

iii. **Design workshop 04 (DW04)**

The design workshop with designers was divided into three main steps.

Step01: the workshop started with the researcher explaining the objectives of the Design Workshops 04 (DW04). Although they were engaged with the research in earlier stages, the research briefing was to refresh and update the participants about the current status of the ongoing project. The participants were informed that their activities would be recorded in audio and video format. Later, the designers introduced themselves to the participants (stakeholder) especially regarding their past and present working experience, their position in their company and their involvement in developing open plan office working in Malaysia. Each participant then, introduced themselves to all members in DW04, to establish a connection between participants and designers. Having a good understanding and relationship made the participants felt comfortable and as a part of the design workshop session.

Step 02: I then explained the aims of each design workshops as follows:

- DW01 and DW02 were to gain users' understanding of workplace experiences and aspirations. This was the first part of a prototype participatory design activities which was evaluated in this research. It involved stakeholders in a process of generating new design thinking with mock-ups.

- DW03 was expert evaluations. Designers with relevant professional experiences were involved to review the stakeholder design ideas emerging from the design workshops DW01 and DW02, to identify whether the process had created useful design concepts.
- DW04, users and designers were conducted to explore participatory design process of specific design spaces. DW04 was the conclusion for the design workshop. The objectives of DW04 were to create a design opportunities for designers.

Step 3: The sessions continued with the designers explaining to all participants about the requirement in developing new government offices. According to Anwar³⁴, assistant manager at Department of Landscape Malaysia, every new office in development had to follow the requirements stressed by the Department of Public Service of Malaysia. The main requirements were the standard guidelines that include furniture, partition, working space square meter per person, cabinet etc that was provided by EPU.

The researcher demonstrated images of design ideas emerging from DW01, DW02 (workshop with users) and DW03 (workshop with designers). The images showed the comparison between the designs that were developed by users and designers.

The participants (users) were requested to give comments and share their ideas about the workplace design and their suitability referring to their needs and aspirations. Later then the designers elaborated and explained the rationale of the new workplace layout proposed by the designers in DW03. The idea was derived from the users' needs and aspiration in DW01 and 02 and also referred to the guidelines provided by EPU.

³⁴EX08 Expert interview 2 January 2011

Several sketches were produced in the DW04 by the participants to discuss and demonstrate their ideas. At the end of the discussion, a final workplace design sketches were produced and agreed upon by both users and designers groups.

In DW04, the users and designers discussed and gave their opinions on the workplace design that had been proposed by designers. The aims of the session were to identify whether the participatory design process conducted, had created useful design concepts and that suited the design solution in allowing users to create a meaningful workplace design.

4.3.2. Digital Audio and Visual

Audio and visual tools were one of the important raw materials in this research. Video was used to record the role-play with-mock-up activities. Videos were recorded in every role-play session with mock-ups with non-expert respondents and design workshops. A digital video camera with tripod was used and placed either at the front left or right side of the respondents and at the centre during the design workshops were taking place. Video footages were used to evaluate the users' engagement and how participants in both activities used the mock-ups as tools to generate design ideas. The images then were given reference codes similar to respondents and activity codes. The videos from the interview with non-expert respondents 06 were coded in a file labelled as NE06 and the video from the design workshop 01 were coded in a file labelled as DW01 and located in folder NE06 and DW01.

4.3.3. Digital Photograph

Digital photographs were captured in every observational session especially with non-expert respondents and design workshops. Digital photographs were captured twice (minimum) in every session by using Digital Single-Lens Camera (DSLR). Together with interviews, digital photographs were used to evaluate whether the design activities had produced potential design ideas and also as evidence for future reference. The images then were given references codes following the similar pattern as the respondents or activities.

The images from the interview with non-expert respondents 06 were coded in a file labelled as NE06. The images from the design workshop 01 were coded in a file labelled as DW01 and located in folder NE06 and DW01.

4.3.4. Role-Play with Mock-Ups Design Activities

The objectives of the role-play with mock-ups were to investigate the needs and aspirations and to explore participants' insight and design ideas. The role-play with mock-ups was divided into two categories:

- i. The role-play with mock-ups with individual
- ii. The role-play with mock-ups with groups.

The layout design produced was mainly from the participants' point of view and their experiences working in specific office environment. The role-play activities were not only used as tools to assist them to express their thoughts but, to help them to visualise their specific ideas about the subject. The design work in this research had transformed the participants' needs and aspirations into a visible workplace design concept.

Each layout design captured was then organised in photo editing software, reproduced in digital (jpg. format) and printed on A4-sized papers. The printed photographs were analysed and coded as explained in section 4.3.3. and also used as evidence to support my interviews. There were twenty layout design ideas which were produced in my data collection, 6 from pilot study, 11 from role-play in non experts and four from design workshops.

Table 4.9: Role-Play with Mock-ups Activities

	References code	No of layout/design ideas produced	Time/date	Activities
1	RO	6	March to May 2010	Pilot work
2	NE	11	Nov 2010 to Jan 2011	Main field work (non-expert respondents)
3	DW	4	Dec 2010 to Jan 2011	Main field work (design workshops)

4.4. DATA ANALYZING

According to Basit (2003:143), data analysis is the most difficult and most crucial of qualitative research. Coding is one of the significant steps taken during analysis to organize and make sense of textual data.

Furthermore, he stated that, coding or categorizing the data has an important role in analysis. It involves subdividing the data as well as assigning categories. (ibid: 144)

McCracken (1998) stressed that there are five stages to the qualitative analysis process.

- Stage 1 - Treats each interview in its own term.
- Stage 2 - Develops, first, by themselves, second, according to evidence in the transcript and third, according to previous literature and cultural review.
- Stage 3 - Examines the interconnection. To check ideas as they emerge from the process.
- Stage 4 - Determination of patterns of inter theme consistency and contradiction.
- Stage 5 - Pattern and theme, as they appear in several interviews that make up the project, and subject them to final process of analysis.

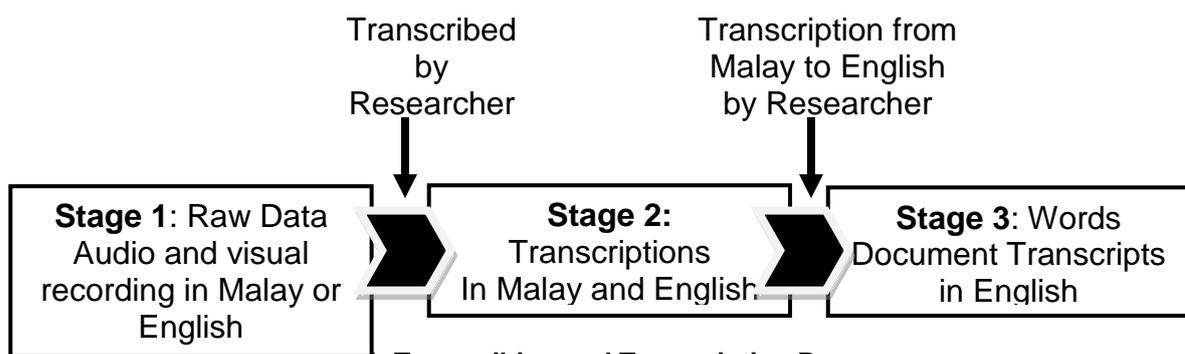


Figure 4.4: Transcribing and Transcription Process

The audio as well as visual data derived from interviews and role-plays performed by groups and individual was processed thoroughly to determine the context based on users' needs and aspirations. The data then was analyzed in three stages as shown in figure 4.4 before the final English transcripts were produced. (transcript- appendix 4)

- Stage 1: Raw audio and visual data was recorded in Malay or English during the interview and role-play with mock-ups activities.
- Stage 2: The verbatim interviews were transcribed by researcher in Malay and English. Direct translations and close examination searching for clues of meaning, keywords and codes.
- Stage 3: Transcriptions were translated to English by the researcher.

4.4.1. Interview Translation

All Interviews with experts and role-play with mock-ups with non-experts were done in either Malay, English or mixed Malay-English languages. Although all Malaysians were exposed with English education since primary stages, most of respondents felt more comfortable to speak in Malay. Using everyday spoken language allowed them to express themselves more effectively in confidence. The used of 'everyday' language gave freedom to the respondents.

According to Rahman (2010), the used of Malaysian 'everyday' language in the interview seems to have been more effective and relevant in discovering cultural issue and participants' unspoken wishes.

Malay language was also used to encourage freedom in conversation, self-confidence and to allow natural expressions from the participants during the interviews.

There were no complex terminologies used by the respondents during the interviews. They were using simple Malay terms in everyday life. The translations were conducted by the researchers as the interviews did not involve complex words. A professional translator was not hired due to maintaining the integrity of the interviews and the respondents' original words as mentioned by Dartin (2002), self transcription is a process of understanding the interviewer.

'Transcribers must be carefully cued and supervised so that the transcripts are indeed "verbatim" record, and not excerpted or summarized versions of the original tape'. (McCracken, 1982:42)

4.4.2. Coding, Keywords and Themes Process

The process of coding or categorising the data into certain keyword and codes had an important role in qualitative analysis. It involved subdividing the data into themes as well as dividing into sub categories.

‘Codes or categories are tags or label for allocating units of meaning to the descriptive or inferential information during the study. Codes usually are attached to chunks of varying-sized words, phrases, sentences or whole paragraphs, connected or unconnected to a specific setting’. (Basit 2003:144)

The name category would be derived from the concept as the researchers already had identified it from their disciplinary and professional reading, literature and from the past and present experience as well as the beliefs in their practice.

The use of computer analysis software was increasingly demanding, being used by many researchers, however, in this research the coding process was done manually by the researchers. Carey (1995), Yazid (2010) and Nasir (2011) were among the few researchers that used manual coding technique by using various methods such as note card, cut-and phase, highlighted notes etc.

Bringer et. al. (2006) stated that the advantage of using computer-assisted qualitative data analysis software program (CAQDAS) such as NVIVO is the ability to transform the way data are viewed (from static to dynamic) in a way that makes relationships between categories more visible by using text formatting and hyperlinks to other documents and categories.

Basit (2003) found that the computer and text analysis packages do not do the analysis for the researchers. The user still must create the categories, do the segmentation and coding, and decide what to retrieve and collate. No

amount of routine analytic work will produce new theoretical insight without the application of disciplinary knowledge and creative imagination.

After attended the CAQDAS³⁵ course in Sheffield Hallam University UK, I could conclude that the programme took over marking up, sorting, recognising and collecting task, which could also be conducted manually.

The main coding from this study was revealed from role-play with mock-ups with non-expert (individual) and design workshops (group). Interview with experts was used to provide a background understanding for my study as stated in section 3.6.1 and 3.6.2). In-depth interview of eleven non-expert respondents and conducting four design workshops were initiated to explore their needs and aspirations. 53 issues were identified and revealed in the transcripts (table 4.10). The issues seemed to be interconnected with one another. The 53 issues then were analysed again and finally summarised into 39 categories. E.g some respondents mentioned about the appearances of the workplace (form, shape, colour etc). The word 'appearances' were categorised as design.

Table 4.10: Main issues in coding

No	Code	No	Code
1	Workplace personalization	28	Territory
2	Crowded	29	Office environment
3	Limited space	30	Need
4	Messy	31	Unsuitable design
5	Disturbing situation	32	Cramped
6	Personal space	33	Personal emotion
7	Design	34	Sense of belonging
8	Emotional feeling	35	Ergonomic
9	Frustration	36	Un-comfort
10	Communication	37	Feel like home
11	Personal use	38	Personalised with belonging
12	Place making	39	Anger
13	Satisfaction	40	Ownership of space
14	Dissatisfaction	41	New layout
15	Working environment	42	Arrangement
16	Privacy	43	Unchanged environment

³⁵ Computer Assisted Qualitative Data Analysis

17	Work motivation	44	Personal identity
18	Comfort	45	Product emotion
19	Not enough space	46	Disturbing environment
20	Congested space	47	Hope
21	Personal belonging	48	Uncontrolled space
22	Safety	49	Unorganized
23	Appearance	50	Work concentration
24	Function	51	Anthropometrics dimension
25	Sleep	52	Meaningful workplace
26	Layout	53	Own belonging
27	Safety and health		

In the final stage, the transcripts were analysed thoroughly one more time to justify and divide the 39 categories according to the appropriate themes. The 39 categories were found to be interconnected to one another were further compressed into three main themes. These were; Lack of Control³⁶(not getting in current workplace), Personal Control of Space³⁷ (what they did/wish to get in current workplace) and aspirations (their needs for a new/future workplace). (Figure 4.5)

³⁶My term of issue arise in current workplace

³⁷My term of what they did and wishing to get in current workplace

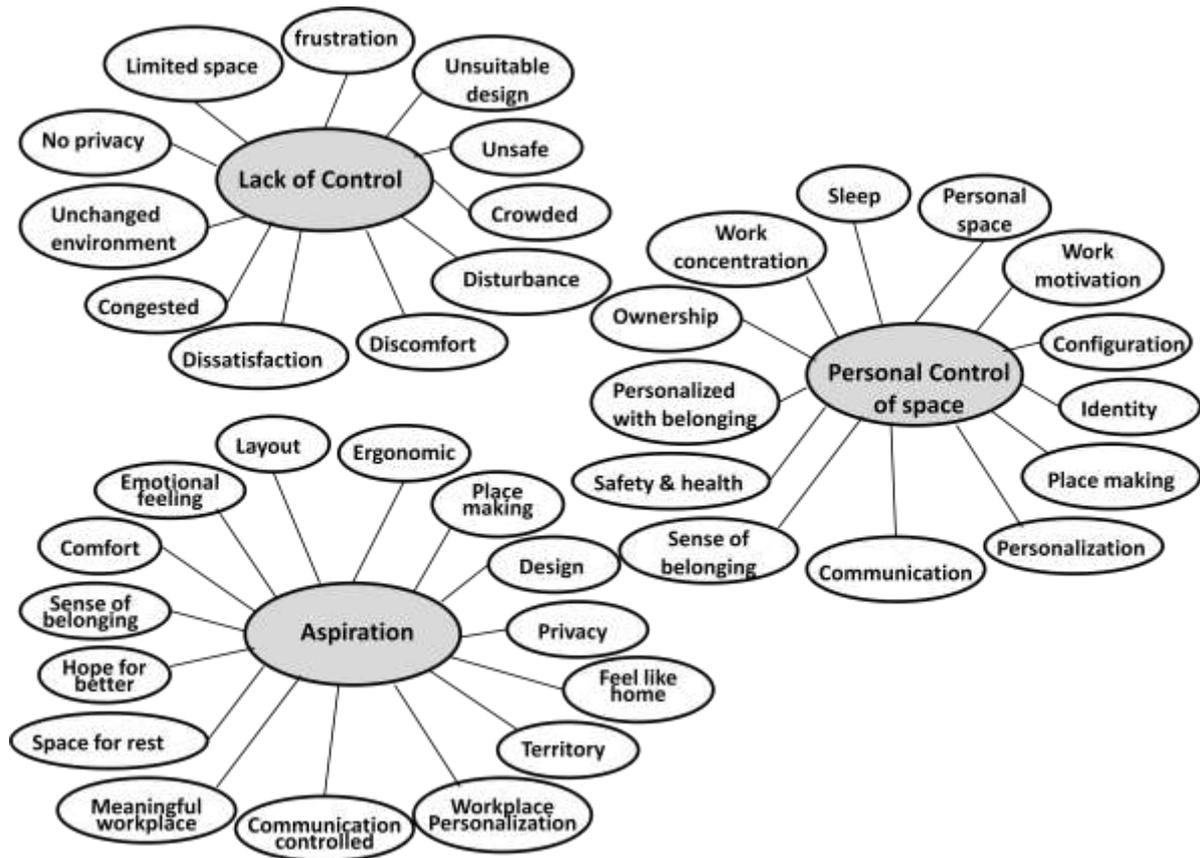


Figure 4.5: Themes Arose from the Data Analysis.

Table 4.11 below shows the number of main categories which arose during the data analysis.

Table 4.11: List of Themes Arose from the Data Analysis

Theme 1: Lack of Control – issue arise in current workplace												
		NE 01	NE 02	NE 03	NE 04	NE 05	NE 06	NE 07	NE 08	NE 09	NE 10	NE 11
1	Limited Space	/	/	////	//	/	////	//	//	//	/	////
2	Frustration	//	/	/	/	/	////	//	/			
3	Unchanged environment	/	/	/	//	/	/	/	/	/		//
4	No privacy	/	/	//	//	/		/	/	//		
5	Unsuitable design	/	/	/	/	/	/	/	/	/		//
6	Unsafe				//	//		/		///		
7	Crowded	//		/	/	/	//			/		
8	Disturbances	/		//					/	/		
9	Congested			/	/	/	/			/		
10	Discomfort			/		/			/		//	
11	Dissatisfaction	/	/	/	/	//	/	/	/			/

Theme 2: Personal Control of Space - what they did and wishing to get in current workplace

		NE 01	NE 02	NE 03	NE 04	NE 05	NE 06	NE 07	NE 08	NE 09	NE 10	NE 11
12	Personalised with belonging	/	///	/	/		////	/	///	//	///	//
13	Configuration	///	/	/	/	/	////	/	/	//	/	/
14	Ownership		/				////	//	/	/	///	
15	Work motivation			//			/	//	//	/	///	
16	Communication	/		//	//	//			/		//	
17	Work concentration		/		//		//	/				
18	Place making						/		/		///	///
19	Personalisation	/	/								/	///
20	Safety and health								//	/	/	
21	Personal space	/	/	/	/	/				/		
22	Identity								/			/
23	Sleep			/	/	/						
24	Sense of belonging		/	///		/	//		/		/	//

Theme 3: Aspiration – for new workplace(individual role-play)

		NE 01	NE 02	NE 03	NE 04	NE 05	NE 06	NE 07	NE 08	NE 09	NE 10	NE 11
15	Design	///	////	///	///	///	//	//	////	///	////	////
26	Privacy	/	///	////	//	///	///	//	/	/	/	/
27	Layout /arrangement /environment	/	/	//	////	/	////	//	/	//	////	/
28	Territory		/	/	///	/	/	/		/	//	
29	Workplace Personalization	//			//				/		//	
30	Ergonomic		/	//	/						/	//
31	Communication controlled		//	//	/	/	/					//
32	Sense of belonging				/	/	/		/			/
33	Comfort	/	//	/								
34	Emotional feeling	/							/	/	/	
35	Place making	/	/			/						
36	Meaningful workplace		/		/		/					
37	Space for rest			/	/	/						
38	Hope		/						/			
39	Feel like home					/						

Aspiration – for new workplace (design workshops)					
		DW01	DW02	DW03	DW04
1	Design	////////////////////	////////////////////	////////////////////	//////////////////// ///
2	Privacy	//////////	////	///	////
3	Layout /arrangement /environment	//////////	////	//////////	////
4	Territory	///	////	///	
5	Workplace Personalization	////	//////////	//	
6	Ergonomic	///		//	///
7	Communication controlled	////	////	/	
8	Sense of belonging	///	//	///	///
9	Comfort	//	///	//	////
10	Emotional feeling		//////////	//	//
11	Place making	/	////	//	//////////
12	Meaningful workplace	///	///	//	
13	Space for rest	//	//	//	///
14	Hope	///	//		///
15	Feel like home	/	//		//

4.5. CONCLUSION

This chapter describes the process of my practical work in this context. The research processes from the early until final stage had enabled me to develop the research methods and they were implemented in my main data collection. Results of the data from various formats revealed from interviews and role-play with mock-ups (individual and groups) were obtained and analysed. Findings from interviews showed the respondents and participants' point of view and visions for better future office environments. The findings from role-play with individual (NE) and groups (DW) were the key factors in exploring the office occupant needs for new office layout.

The qualitative data analysis approach used by social researchers was engaged in this investigation allowing me to identify themes and categories that were revealed in

the main data analysis. This approach gave me the practical understanding in how to engage users in my investigation and develop my research methods.

Knowledge through the participatory design method, role-play with mock-up had identified the users' needs and aspirations where they could be derived through the themes and categories.

Therefore, the themes, views and opinions from respondents could assist me in reviewing design ideas and my thinking as discussed in chapter 2. This method had developed my understanding theoretically about users' needs and aspirations and also could be useful for other designers.

In the next chapter, I will discuss and explain the themes and categories identified in this data analysis. The data will continue to be discussed qualitatively through the following chapter 5, to explore user-engagement activities, assisted by designers in discovering the users' needs and aspirations for future office workplaces.

CHAPTER 5: FINDINGS (ANALYSIS AND SYNTHESIS)

5.0. INTRODUCTION

The previous chapters explained the practical work and methods implemented in my main data collection. In this chapter I will analyse and synthesise the main issues that emerged from the themes and explore the empirical evidence with analysis of interviews conducted within the range of key informants. This chapter has three parts:

- i. It evaluates the roles of designers in conducting the role-play with mock-ups that involved users' engagement in data collection. It involved conducting design activities with office users (section 5.1) and design workshop (section 5.2, 5.3 and 5.4).
- ii. It explains the data management processes which became a part of design guidance in my investigation.
- iii. It explains the methodological outcomes for this investigation (section 5.5). These findings proposed some guidance for researchers and designers who are interested in developing new office environments and conducting similar work that employs the similar approach.

Most of the respondents' quotes in this chapter were the original words as mentioned in section 4.4.1. They spoke in mixed Malay and Malaysian-English and had created some challenges in translating. Quotes in Malay that had been translated into English, reflected the intended meaning as accurately as possible. The parts of the quotes in Malaysian-English were the reproduced verbatim, thus made some of the sentences ambiguous if they are read in UK English. I tried to clarify any ambiguities as much as possible.

Example quotation from NE06 non-expert:

"... For me I wanted bigger, nice, clean and well arranged workplace design..." ('nice' : beautiful. 'clean': neat/ tidy)

5.1. FINDING FROM ROLE-PLAYS WITH MOCK-UPS WITH NON-EXPERTS

This investigation was based on a combination of practise based and social inquiry as introduced in chapter 3, and explained in chapter 4. This section describes the main themes arising from the data analysis in section 4.4.2.

In the role-play, the respondents gave their opinions about their current workplace design that related to their practises and experience of their current office setting. They gave their comments on the pros and cons of the current workplace, office set-ups and proposed some design ideas that they believed could meet their needs and aspirations. Their comments and feedback factored in their insights derived from individual interviews and the office workplace layout (past and future) that was developed during the role-play sessions. The method only revealed users' knowledge and experience.

Reliable data was not provided on formal health and safety issues, although it was highlighted by respondents during the interviews, but the method may have revealed safety problems that may not be seen by other approaches.

As explained earlier (4.3.1.1), a total of 11 respondents were interviewed comprising six government and five semi-government office occupants. Most of them were working in Klang Valley. In the analysis of role play, I identified three themes, each with a number of categories, as shown below:

5.1.1. Theme 1: Lack of Control

“Lack of control” emerged as the main source of dissatisfaction issue in current office layouts. As discussed in section 2.3, users' satisfaction played an important role in office workplace and environment. For example, Brennan et al. (2002:280) in their research found that, employees' satisfaction with their work environment is important to organisations, and indirectly related to commitment and turnover intentions.

5.1.1.1. Unchanged Environment

Every role-play was started with a short interview to form some information about involvement in office development.

Most of the respondents explained that they were working in a workplace that had not changed for more than three years:

"...I have been working in open space for almost four years in different types of agencies. CCM and Celcom are private company and IKRAM is semi-government sector. These three company have difference office approaches of office environment and layout but they apply the same office concept which is open plan office ..." (NE02, non-expert).
(Different core business but using same office furniture)

In contrast with NE02, NE01 explained that she had been sitting in the same environment:

"...I have been working in open space environment for almost four years. The office layout has been changed last two years, but I'm still sitting at the same table and chair (workplace). Although it was changed, but is still the same layout and the same environment..." (NE01, non-expert)

Similarly, NE05, NE06, NE08 NE09 and NE11 also explained the same situation. Although they got promoted to higher post/levels they were still sitting in the same workplace without having any changes. One of the respondents stated that:

"...I'm been sitting almost 11 years in this open plan office space. The office layout was rearranged in every two years, but I'm still using the same table and chair (workplace). In every two years new staff 'squeezing' in, so we have to maximize the space that we have. The space is crowded, but we don't have any option. The layout will keep on changing, but I'm still sitting in the same workplace..." (NE06, non-expert) ('table': desk)

This aspect of unchanged workplace and office environment had also been stressed by experts. Although there were changes in office layout but the workplace eventually were the same:

"...The design concept of Malaysian open plan office system is almost the same from past and present. Malaysia is developing the same thing on and on. Difficult to change because we don't have our own office standard..." (EX02 expert interview)

Supporting the statement, the manager at one of government offices in Malaysia agreed that there were no differences in the past and present office environment.

“...Not much different between past and present office in term of design and office layout. After twelve years moving to Putrajaya, I think the government office concept irrelevant now-a-day. Each level/post should have different furniture and facilities. But currently they get the same...” (EX08, expert interview)

5.1.1.2. Users Descriptions of Workplace Changes

In the interviews, the respondents admitted that there was a development in their workplace. As mentioned by Uzir in 2.5.4, the numbers of office occupants increased up to 2% in every two years. Although changes were made, all respondents stated that they were not involved in any office development and decision, especially pertaining to furniture and workplace by giving this example:

“...We not involved in any office layout development. We just received the furniture. They said this layout is temporary. They are going to rearrange this layout next year but I’m not sure when...” (NE01, non-expert) (‘They are going to rearrange this layout next year’: They will change the layout next year)

Similarly, to that opinion some respondents explained that:

“... We not involved in any layout development. Furniture and layout was provided by our admin and management officers. We just received the workplace...” (NE04 and NE05, non-expert) (‘workplace’: furniture system-chair, desk, cabinet and partition)

“...Our registrar, I guess. The furniture is already there. Every workplace was provided with a set of furniture. We not involved anything. Everything decided by the management...” (NE10, non-expert)

Basically, the workplace development was decided by the manager after discussing with manufacturer/supplier without considering the office occupants’ opinions whose were going to occupy the workplace.

“...The client will provide the guidelines. We will design according the guidelines provided. The workplace design referred to the office occupant job task and rank in the office. For example they have grade N6 to N44. All consultants follow the same workflow and guideline...” (EX09, expert)(‘For example they have grade N6 to N44’: staff in grade N6 to N44 level).

Further, the office manager explained that:

“... We are following the General Order (GO) provided by Public Service Department for every government office. We have using the guidelines/ procedures for ages. I think we are still using the guidelines provided by British during the British era...” (EX08, expert interview)

Most of the respondents agreed that the office development should be guided by professionals who understood about office needs and guidelines. A respondent mentioned that:

“...Furniture and layout was provided by our admin proposed by our training unit. They don’t have staffs that expert in office furniture. All of them don’t have design background...” (NE01, non-expert)(Figure 5.1).

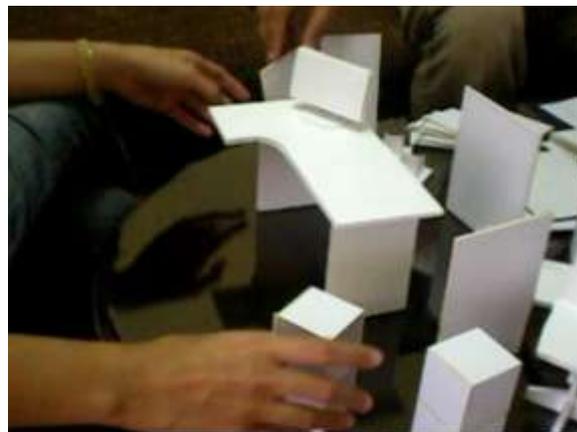


Figure 5.1: Workplace Changes (NE01)

“...Furniture and layout was provided by our admin officer or management manager. We just received the workplace and where to sit...” (NE03, NE04 and NE05, non-expert)(‘We just received the workplace and where to sit’: received the furniture and our individual space)

“...I think the personnel from finance and development department involved in developing the workplace. They the one that makes the decision...” (NE07, non-expert)

5.1.1.3. Users' Current Workplace/Layout

Mock-ups were used as a tool to communicate and allow the respondent to perform their daily activities as mentioned in section 3.2.2.3. They used mock-ups to construct their current workplace.

Referring to experts, EX02 and EX08 (expert interview) mentioned most workers would be provided with basic furniture such as one table, a mobile pedestal, an adjustable chair and a personal computer. That was the basic furniture for open plan office layout.

“... for semi/government sectors, we have to follow the ‘general order’ from the Public Admin Department. That was the basic furniture provide to the open plan office occupants in most government offices. The ‘check list’ was provided by EPU...” (EX08, expert interview)

The respondents were asked to show and give their opinions regarding their current workplace.

“... We received one table, one mobile pedestal, one adjustable chair and one personal computer. Unlike other offices, our workplaces were open. There were no partitions or dividers between the workers. We sit facing the wall and not divided with any partition. So, we can see each other...” (Figure 5.2)(NE05, non-expert) ('open': open spaces)

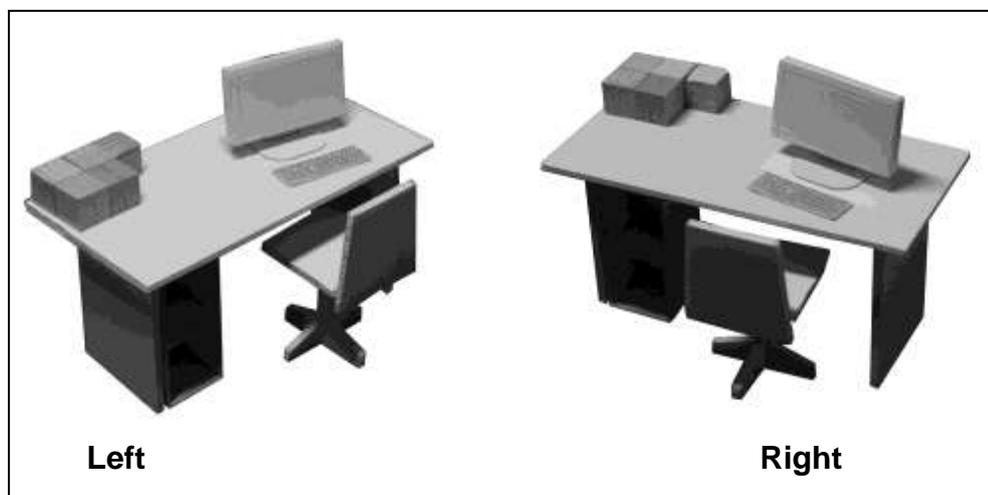


Figure 5.2: NE05 Workplace

“... We received one table, one mobile pedestal, one adjustable chair and one personal computer. The workplaces were divided with low partition. We are sitting on an island of four people. Each of us has the same furniture...” (Figure 5.3)(NE09, non-expert)

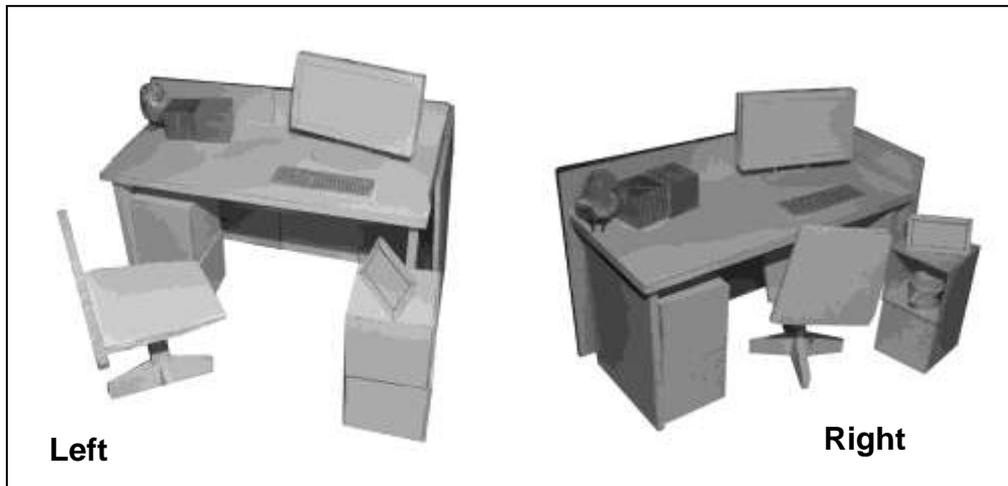


Figure 5.3: NE09 Workplace

In certain cases, office workers received different types of workplace layout.

“... I received one L-shape table, one mobile pedestal and adjustable chair and one personal computer. The workplace is divided with low partitions. Sitting on an island of four people...” (NE06, non-expert) (Figure 5.4)

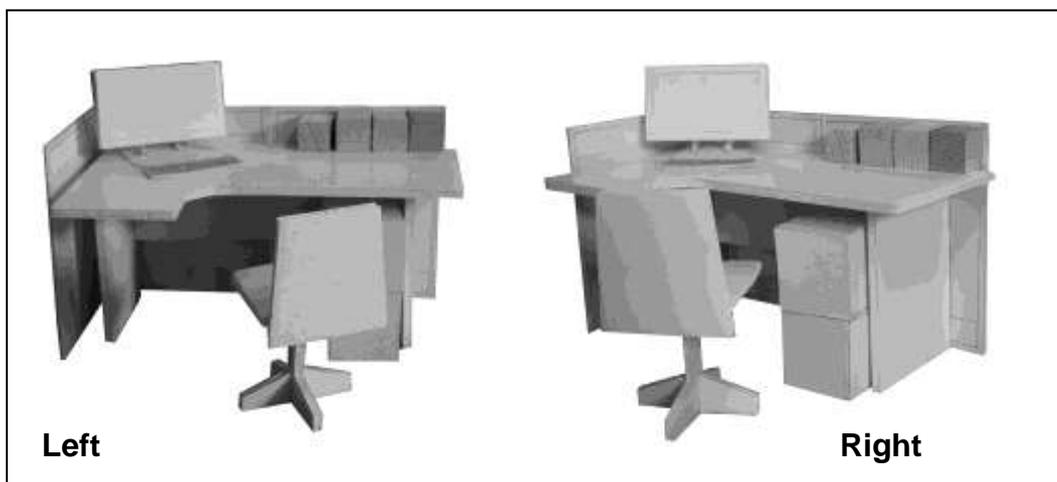


Figure 5.4: NE06 Workplace

5.1.1.4. Users' Reflection on Their Current Workplace/Layout

In 5.1.1.3 the respondents shows their current workplace/layout provided by their manager/department/agency. Although they were provided with proper office furniture, but most of the respondents agreed that the design of the workplace was not suitable for their job task.

Ten of the respondents (NE01, NE02, NE03, NE04, NE05, NE06, NE07, NE08, NE09 and NE11) mentioned that they were given with unsuitable workplace design;

"...Our workplace is not standard and not properly designed. Workspace should refer to post/ level in the office. Higher post should get bigger workplace..." (NE01, non-expert)

"...The workplace design should follow the correct anthropometric dimension. This is the requirement of safety and health department. I need good arrangement workplace design. For example, I can organise all the filing and personal stuff in separate area..." (NE03, non-expert)

"... This workplace design is not suitable for me. I don't have enough space for me to put the daily files, so I put all the files under the table. I put it in one paper box under my feet's. Under my table is very crowded with dustbin and many other stuff..." (NE06 and NE09 non-expert)

"...The workplace was designed without referring to our job task. I keep my stuff under my table, on the floor. The space is limited. That is the only way. I put all the memo scattered on the floor so, easy to me to refer..." (NE11, non-expert)

Due to improper and unsuitable design, most of the respondents mentioned that their workplaces were congested by giving this example;

"...Our workplaces are too congested. We don't have a space to 'move'. For short-term working environment maybe yes. It is not suitable for long term office space..." (NE04 and NE05, non-expert)

“...the management moved the photocopy and shredder machine behind me. So my workplace becomes congested in every time when the staffs are using the machine...” (NE09, non-expert)(‘moved’: transfer)

Refer to this situation EX06 and EX03 responded that;

“...The user/worker doesn’t feel comfortable psychologically and physically because the design of the office is too exposed. Segregate to various zone e.g. executive and non-executive zones should be different. We should have general workers, executive and decision makers’ zone in office...” (EX06, expert interview)

“...Malaysia manufacturers still lack of awareness about furniture dimension and standard. Most of the workplace was designed totally based on budget and space provided by client...” (EX03, expert interview)

5.1.1.5. Limited Space

All of the respondents stated that their current workplaces were limited in terms of space and storage that resulted in discomfort and frustration. Three respondents stated that:

“...My space is limited and I not even can ‘move’. Some of the staff in this office get bigger workplace although their post lower than me. I don’t think they need big workplace...” (NE01, non-expert)

“...Our workplace is small, not enough space. We sit to close. Because of the workplace is too congested and limited, so I always use my friend desk when they were not around...” (NE03, non-expert)(‘were not around’: not in the office)

“... The space is very limited. We need some space to walk and move. My colleagues cannot pass through when I move my chair to the back. We have to squeeze in and squeeze out. That is the real situation...” (NE06, non-expert)(‘pass through’: walk through)

The respondents were asked if they changed their workplaces according to their needs to make them more spacious or conducive to work. Three respondents stated that.

“...We are not allowed to change anything. Its stay the same as we enter the office the first time, but if we allowed there to do so, there is no space to change anything...” (NE07, non-expert)

“...Not because the management did not allow us to make any changes, but the spaces is limited and too crowded. There is an empty space beside me; the space was reserved for new staff. But I don't know when the space will be occupied...” (NE09, non-expert)

“...For the office layout, no. For my workplace, yes many times especially my computer screen. I move it to give some space for me to put my daily files. I rearrange my workplace because it uncomfortable that makes me difficult to move. Unless I have bigger table with separate working and typing area...” (NE08, non-expert)

5.1.1.6. Disturbance

Most of the respondents felt, that there were many disturbances resulted from their current workplace set-up. Inappropriate work place layout and limited space, made them uncomfortable physically and mentally. Uncontrolled situations such as acoustics/sound from telephone, people talking, walking in the office made them uncomfortable and it was difficult to concentrate on their jobs. Examples of some of the statements made were:

“...I need privacy when doing my daily work. I cannot concentrate when people talking while I'm working. Too noisy...” (NE03, non-expert)

“...People talking and walking around me. I feel very distracted. Although we working in open space but we still need some 'peaceful' in certain situation. We cannot always work with this entire disturbance at all the time...” (NE05, non-expert)

“...Yes if the workplace place is too open we cannot concentrate on our job task. Many distractions. At least should divide the worker so they have their own territory. If the office is too open it will become as a public space and it become messy...” (NE10, non-expert) ('At least should divide the worker so they have their own territory': divide with partition so the workers get their privacy space)

5.1.1.7. Workflow

All respondents were asked whether the workflow provided was suitable for their job task and met their everyday needs. All respondents commented that the current office workflow did not work well. Planning decisions were made without the understanding of the office workers individual job tasks.

Every open plan office occupants sat on the same layout provided by the manufacturer and the layout also considered the assumption from manager. The respondents' statements stated:

"...My workplace is too small. Not enough storage. The management provide space without referring to job task. Some of us here get bigger space because off their seniority. That is not fair. Instead of position in office, the workplace should also refer to job task..." (NE01, non-expert)

"... This workplace is too small and not comfort. Not enough space for me to do editing for my meeting minutes. I have complained to my HOD but no action taken. Their reason is not enough budgets. I have suggested to rearranging my workplace to allowing bigger spaces but they don't allow it..." (NE08, non-expert)

Statement by NE01 and NE08 showed the irrelevant space provided by the management. The manager neglected the opinion from their staff that occupied the office spaces.

"... This layout is not suitable with my job task. It's too congested and cramped and no privacy while working. The management did not provide me with enough storage." (NE04, non-expert)

"... No privacy in my workplace. Our head of department wanted a small discussion space at the centre of the office so he moves the photocopy and shredder machine behind me. The layout is very dangerous, sometime staff accidently put their hand on the shredder machine and sometime they accidently shredded their own documents..." (NE05, non-expert)

"...The workplace layout is not very suitable because no privacy. The partition is too low. Certain letters are confidential maybe other staff can see it and tell the info to others. Working beside me is person attached to other section. There is no security at all. Each department members should be located together. So far we don't have any cases but we have to take precautions..." (NE07, non-expert)

Statement from NE04, NE05 and NE07 showed the factor of 'lack of control' in their workplace. Improper space provided that was not suitable for their working environment.

'... Although we were provided with big cabinets in the filing room, but the cabinets were used to keep the files that have closed case/done. Not for daily filing. So I keep my files where ever space that I have near to me. That why my workplace became messy and crowded...' (NE06, non-expert)(*'That why my workplace...': as a result my workplace...*)

Statement from NE06 showed another issues in lack of control in the office layout. Unsuitable storages location did not meet the users' daily need.

Due to issue arose in the interview, by using mock-ups, all respondents had the tendency to reshape their current workplace according to their needs and aspirations as discussed in section 5.1.2.

5.1.2. Theme 2: Personal Control of Space

Through my professional experience and interviews with experts, I had found that most workplace layouts were decided by finance managers and manufacturers. These buyers and suppliers were fairly satisfied with the workstation. In the interview, dissatisfaction was reported and led the users to personalise their workplace according to their needs and aspirations (5.1.1.4.).

Most of the respondents were implementing place-making (as discussed in section 2.2) and personalisation concept to make their current workplace becoming more meaningful to them as discussed in section 2.3.

5.1.2.1. Personalised with Belonging

According to Well and Thelen (2002:301), employees who have a low need for privacy tend to personalised their workplaces more than employees with high need of privacy.

Their research on workplace personalisation concluded, that personalisation had many benefits for employees and businesses, such as job satisfaction with better work environment.

Further they found that, personalising workplace with personal items and belongings (Figure 5.5) served to express people's personality, emotions and status within the company, thus helped the employees cope with stress.



Figure 5.5: User's Workplace (NE05)

"...workers in open spaces tend to personalize their workplace with their own belongings compared to workers that work in closed office. This is the ways to mark their territory. Person in closed office has their own office spaces so they have low needs of personalization..." (EX01, expert interview)

"...There are no regulations mentioning that workers cannot personalise their workplace. They can decorate the place with small items, but not too much. Each office has their owned "corporate image". (EX08, expert interview)

All respondents mentioned that they personalised their workplace with their personal belonging such as mugs, pictures, pillows, etc that reflected themselves or their organization.

"...I decorate my workplace with flower, butterflies (toys) and mug. I put the accessories such mug and keychain in one corner. I will look at it when I feel bored ..." (NE01, non-expert) (Figure 5.6)



Figure 5.6: Personalised with Belonging

“... I put some accessories such as mug and keychain. I use the in-out table tray to keep my personal belonging. A mug on the top, small souvenirs in the middle and instant drinks at the bottom compartment. I put my entire personal stuff there...” (NE06, non-expert)(Figure 5.7) ('put': keep)

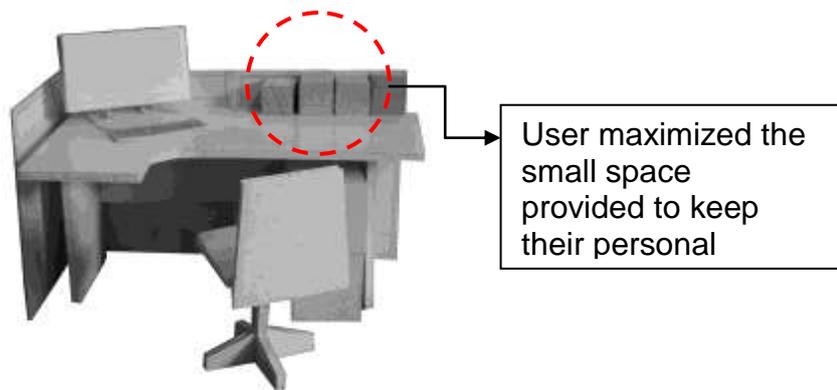


Figure 5.7: Maximizing the Small Space

“... I decorate my workplace with my own souvenirs such as keychain, mug, cutlery toys and magnets. I bring my family photo from home...” (NE08, non-expert) (Figure 5.8)

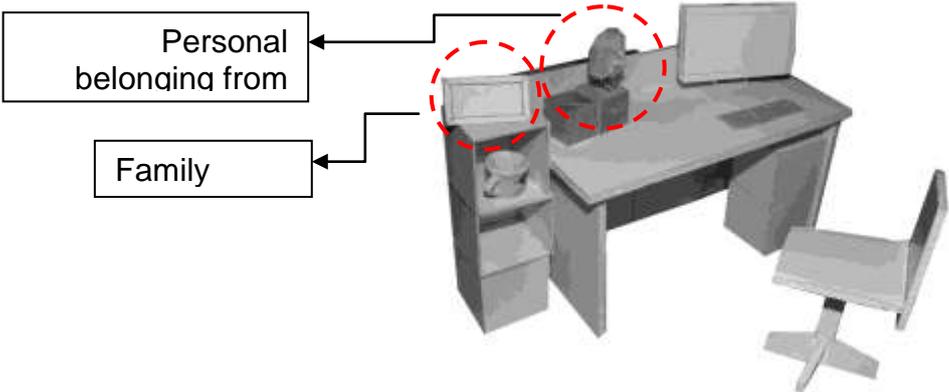


Figure 5.8: Personal Belonging from Home

Unlike others, NE03, NE04 and NE05 personalised their workplace with their belonging that reflected their office corporate image.

“... We are sharing space so don't really feel like doing personalisation. I just personalised my workplace with books, excellent service award medal and picture of my office team achievement...” (NE03, non-expert)(Figure 5.9)



Figure 5.9: Personalisation Reflecting to their Organisation

“...I did not really personalize my workplace. All stuff in my workplace is belong to the company. I just arrange the company annual prospectus to personalize my table...”(NE04, non-expert)(Figure 5.10)

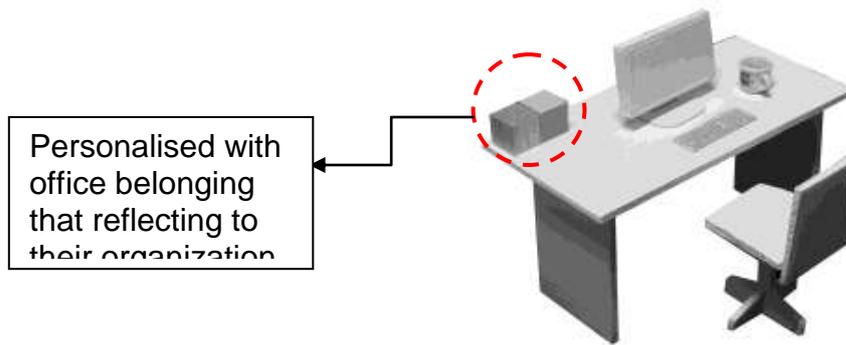


Figure 5.10: Personalisation with Office Belonging

“...I just personalised my computer by using our company logo on my screen saver. I also arrange our department catalogues/brochures at a side of my table. This place is open space and I’m always dealing with people. So I have to keep it look more professional...” (NE05, non-expert) (Figure 5.11)

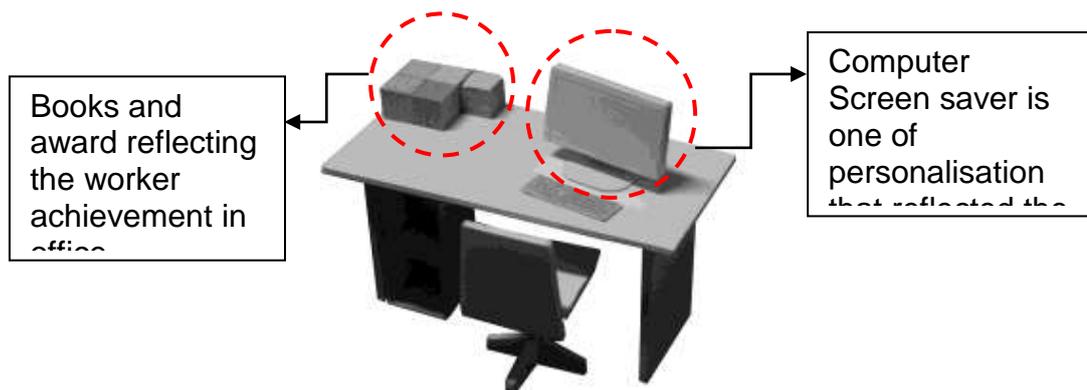


Figure 5.11: Personalisation with Office Identity

5.1.2.2. Place-making

Some of the respondents re-arrange their office layout according to their practical needs. They used they own assumptions to rearrange their office layout and they believed it would improve their working environment. NE10 and NE11 changed their workplace in total for better office layout.

“... I have changed the office layout. I don’t like it. I move my table 180degree and facing toward the window. I think after changing the layout we get bigger space...” (NE10, non-expert) (Figure 5.12)

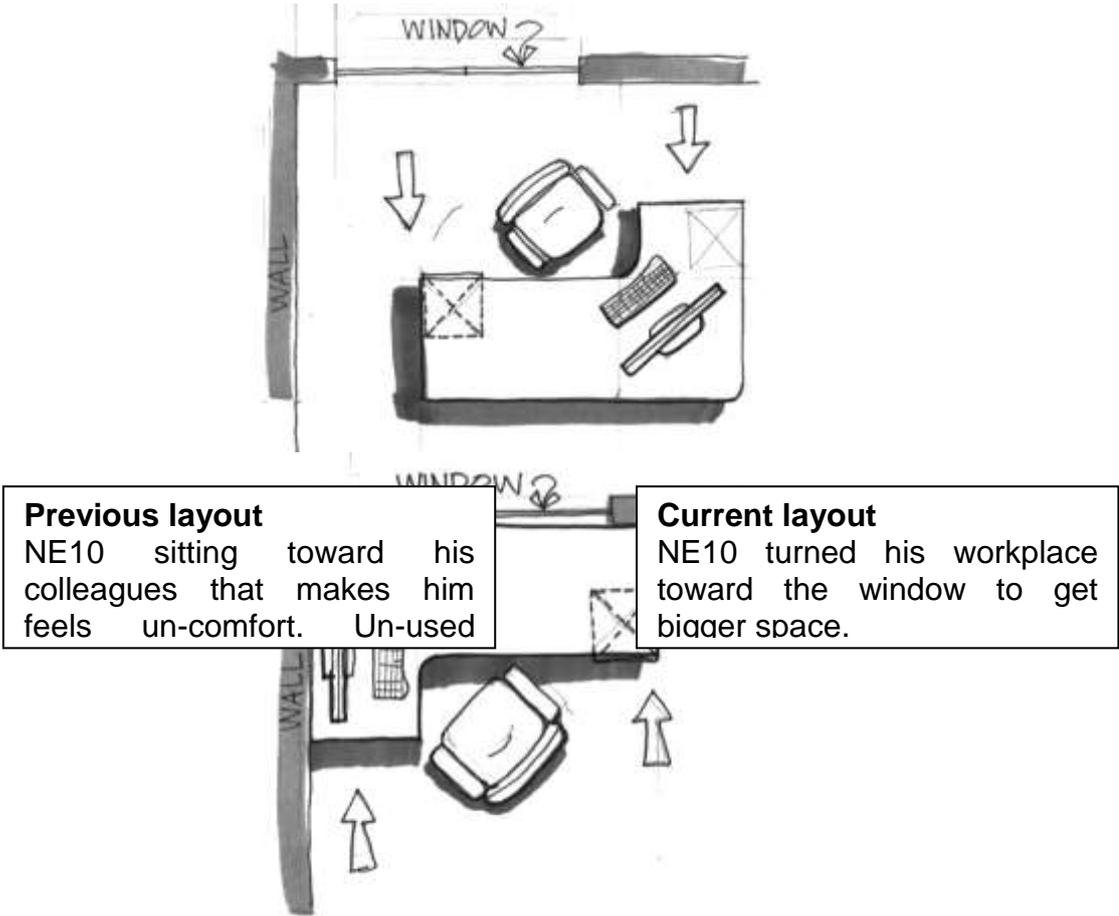


Figure 5.12: Place-making by NE10

“... Yes. We have changed the layout two times. The numbers of staff in our office increased every year. We changed the layout every time when we have new staff. The management have to change the layout to accommodate more people in a small space...” (NE11, non-expert interview)(Figure 5.13)

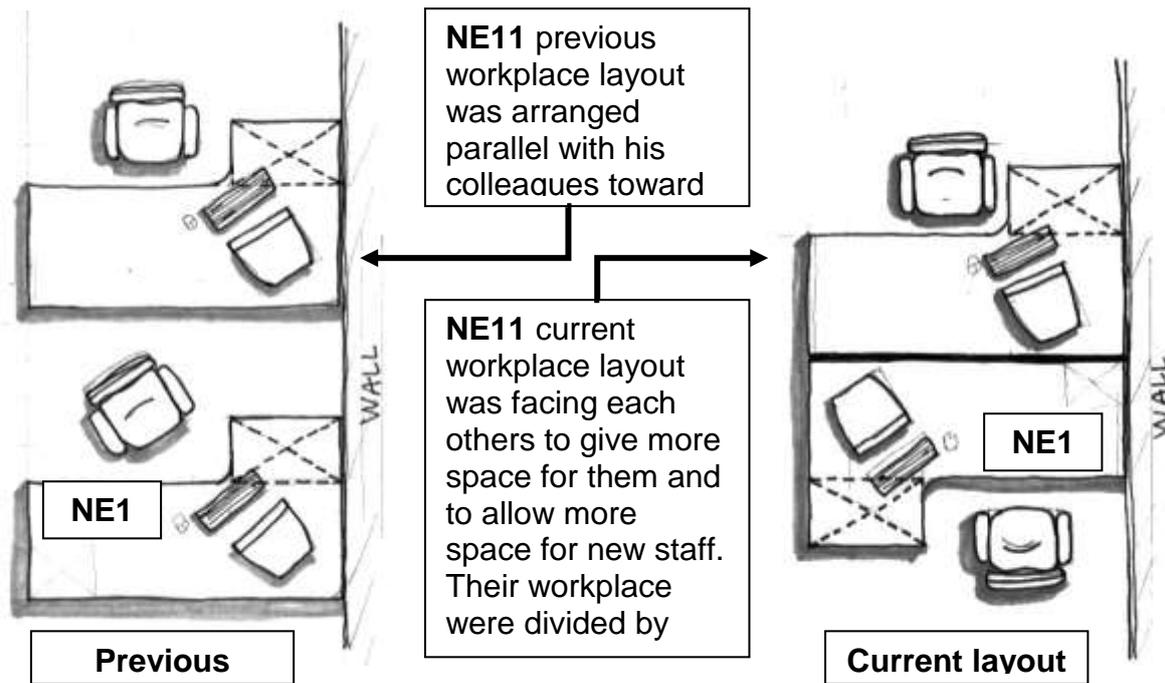


Figure 5.13: Place-making by NE11

Unlike NE10 and NE11, NE08 arranged her office equipment for better space;

“... I move the office equipments many times. Especially my computer screen CPU and printer to get more space and better working environment. This area is small so I just do what I can do best to get better place...” (NE08, non-expert)

According to NE08 opinion, although he had small space but he still did some personalisation to it;

“... Our Boss provides us with basic workplace. Depend on us how to re-shaping or personalised the workplace according to our identity...” (NE08, non-expert)

According to EX01, in certain cases, office occupants should adapt themselves to the office environment.

“...It does depend on the office occupants. For example small space will satisfy the user if they can get personal control of the space. It's no point when they gets bigger space but controlled by their boss. It will influence the workers. Whether they like it or not they have to stay at their place...” (EX01, expert)

5.1.2.3. Sense of Ownership

From the workstation layout produced in the role-play with mock-ups, it could be seen that all respondents personalised their workplace whether with their own belongings or office ornaments as indicators to mark their place/territory and to show their sense of ownership to their workplace (Figure 5.14).



Figure 5.14: Marking their Territory (NE07 (left) and NE11 (right))

According to Perry and O'Hara (2003:593) their research found that, displayed information provides important information about identity and ownership.

The participants were very aware of their displays expressed about themselves and what others thought of them, and this was equally important factor in what they chose to display and not display. Example of personalisation including:

"... I to put some family photo on my desk for as working motivation and some butterflies to make it more cheerful and ownership the workplace. By seeing the butterflies, all staff in this department knows this is my workplace. This is my identity..." (NE01, non-expert)

"...I admit that this workplace belongs to the government, but as workers that sit in it, we must take a good care and show our sense of belonging to our workplace..." (NE02, non-expert)

"...Our workplace is the only personal place we owned in the office. Where we sit, work and developed ourselves. The workplace can be as our territory and the place that we can show our sense of belonging to our office..." (NE05, non-expert)

"... I put some decoration to make my workplace look beautiful that can mix between work and personal thing to make it more meaningful..." (NE06, non-expert)

“... Workplace itself is about personalisation that reflects personal identity. Good workplace environment can motivate us to make our job done...” (NE08, non-expert)

“...We must show our sense of ownership to represent our identity in our office. We know that the workplace is not our belonging. It is meaningless to decorate the space. We cannot change it in total. What we can do is put some accessories such as souvenirs, gifts and pictures to show our sense of belonging...” (NE11, non-expert)

5.1.2.4. Office Safety and Safety and Health

Another important issue mentioned by the respondents was office safety. Although they personalised their workplace with their personal belongings, some of the respondents felt it was not safe to keep them in the office.

“...I’m not really left my personal belonging at my workplace. Most of this is stuffs are owned by my department. It is not safe. I’m sharing space with many people; the door also is easily can be opened. Anybody can take our stuff that left here...” (NE05, non-expert)

“... Not safety at all. This workplace is too public. People walk through my workplace everyday. We don’t have any stolen cases so far, but we have to take precautions. We have complaint about this issue, but no action taken. That why I don’t really personalize...” (NE07, non-expert)

“...The furniture provided is not complete. The drawer and the filing cabinet provided without the keys. The personal belonging that I brought from home is not very valuable in term of price. I will take back my valuable stuff with me every day. It is not safe...”(NE09, non-expert)(I will take back..: I will bring back...)

“... I think most of the furniture provided is ‘recycled’ from the previous workers. It look OK, but most of it is not complete especially without the keys. People can easily take our stuff. Anything is possible. But I don’t border about it so much. I still personalised my workplace with my belonging from home... ” (NE06, non-expert)

NE09 and NE11 mentioned that, the office layouts were lack of safety and health precaution.

“...The management put two machines, photocopy and shredder behind me without proper layout. This is very dangerous, sometime staff accidentally put their hand on the shredder machine and sometime they shredded their documents accidentally. To prevent this,

I stick a notice and I covered the shredder machine using my daily files...” (NE09, non-expert)

“...We cannot do anything with the design because everything is fixed. There is a lot of wiring behind our computer monitor. Since there are no partition provided in-between me and my friend, we used mounting board to separate the wire and now its look better...” (NE11, non-expert)

In contrast, NE01 and NE08 explained that the safety and health regulation implemented by their department was the main obstacle to place-making and personalisation.

“...I would like to put some small items and decoration, but our boss not allowed us to do that due to safety and health and ISO (International Organisation for Standardisation) regulation. We have limited space. Difficult to change...” (NE02, non-expert)

“...We are not allowed to change, move and modify anything due to so-called safety and health regulation. But for my opinion is not about the regulation, this is because the space itself is too crowded and cramped. That why the management did not allow us to do anything...” (NE08, non-expert)

5.1.2.5. Personal Space

Most of the respondents created personal space to make their workplace meaningful to them (Section 2.3). Workplace and office occupants were inseparable and attracted to the environment. Office workers personalised their workplace to represent their personal emotions and responses to the environment.

The workplace “speaks” by itself. According to Riratanaphong (2006), in human psychology some people need something to inspire themselves something that related in relaxing their minds.

EX07 and EX09 explained that, workers came to office to work not to socialise;

“... Everything in office is ‘office matter’. They are no time to talk about family or hobby. You were paid to do the office job. The workplace didn’t influence the productivity...” (EX07, expert interview)

“...We cannot give the workers freedom to make their workplace is personal to them. If they feel too comfort they become lazy and surfing internet without doing their daily job. They not decision maker. They just do what their officer asked them to do...” (EX09, expert interview)

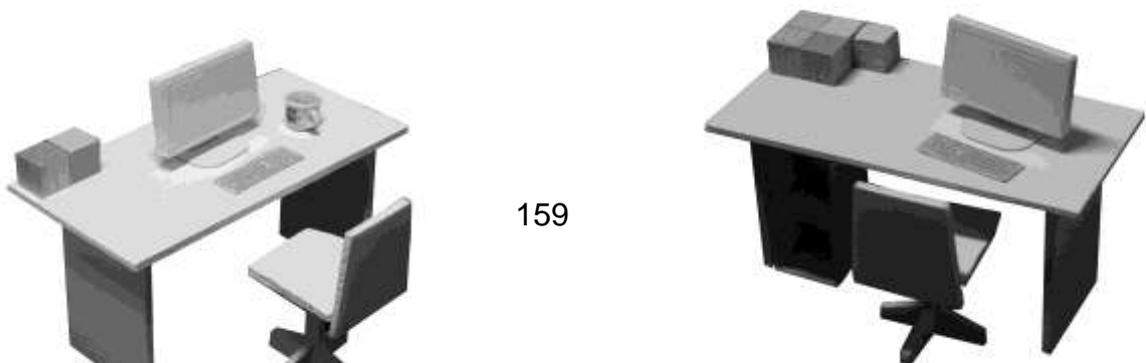
EX07 realised that most workers personalised and created their own personal space at their workplace that was not permitted in some government department due to regulations. To prevent this, he suggested that every organisation should have an allocation to build staff lounge in the office to allow office workers to socialise with others.

“...The manager should provide special space for the workers. So they can keep their personal stuff such as shoes, cloth etc. in one place. We should provide changing room, staff lounge etc. The workplaces provided are for working only...” (EX07, expert interview)

All respondents understood as office workers they were paid to do their daily job, on other hand, they needed to create their own personal space to make them feel attached to their organisation and to release stress and take a rest due to long working hours. These were some examples of how office workers controlled their space in office to fulfil their personal needs. These findings showed how users needed personal space to rest.

“... I divided my workplace into three spaces. Space for computer, writing and space where I can lay my head or rest for few minutes at my workplace...” (NE03, non-expert)

“...I like to sleep during the lunch break. I will make sure the space under my table clear because I think I might want to sleep during lunch hour...” (NE04 and NE05, non-expert) (Figure 5.15)(‘I will make sure the space under my table clear...’: I will make sure the space under my table is empty...’)



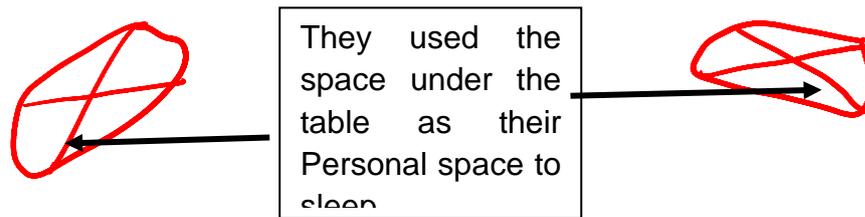


Figure 5.15: Personal Space to Sleep by NE04 and NE05

Similar to this, NE010 and his colleague, rearranged their workplace to have personal space for themselves. By changing the layout, it allowed them to have better personal spaces.

“... I have nice friends sharing space with me. Although this space a bit congested, but we still can get space for our personal belonging where we can release our stress after long working hour. We change our workplace layout so we can place a small cabinet in the middle to keep our action figures (toys) collection...” (NE10, non-expert) (Figure 5.16)

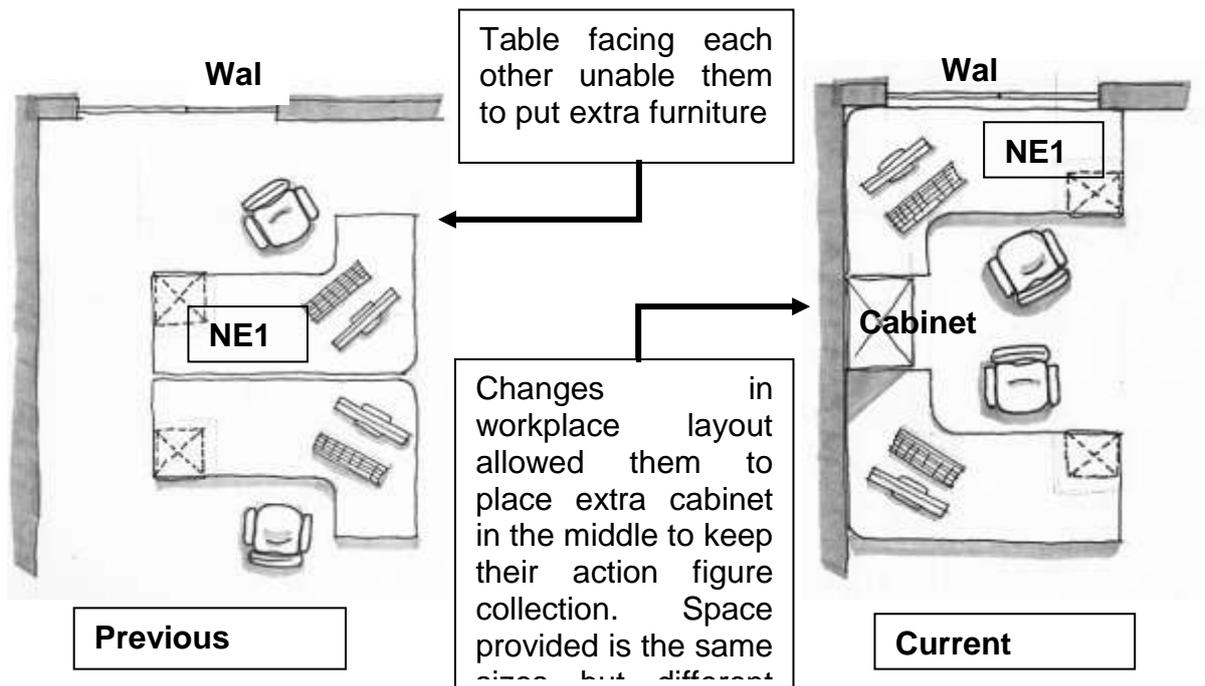


Figure 5.16: Personal Space I for Better Personal Space

5.1.2.6. Connecting with Others

One of the main objectives and advantages of working in open space was to enhance communication and promote teamwork. The layout was designed in

cluster concept (cluster of two, four or bigger island of configuration) to maximize and fully utilise small space for certain number of people.

According to experts (EX), they still implemented the “*Burolandschaft*” (all workers are equal) concept that was introduced by the northern European and the X Y theory (command and control) developed by American designer (section 2.1).

For example NE07 described a manager mindset similar to “*Burolandschaft*” thinking (section 1.2)

“... The reasons the management implementing the open plan office concept is to prevent workers to do things other than office work. This concept educates workers to work as a team and trust each other. Unless they are decision makers that need privacy to do their job and their decision maybe confidential...” (NE07, non-expert)

EX09 and EX05 both appeared to follow the X and Y theory model that limited worker autonomy.

“... In certain situation the management cannot give the workers’ privacy. If they feel too comfort they become lazy and busy surfing internet without doing their daily job....” (EX09, expert interview)

“... This is the dream of the office workers, this is their request. But these ideas are not necessarily good for them. What we should do is to educate the users what they should do rather what they should get/want. Why did they need more space? Did the space contribute to productivity? That is the most important issues ...” (EX05, expert interview)

NE03, NE04 and NE05 mentioned, although their workplace were cramped and congested, they admitted that the office layout had enhanced communication. Eye contact, verbal chat and workflow, allowed communication among colleagues that made them felt accepted in the office thus contributed to users’ satisfaction (section 2.3).

“... I feel enjoyed working in this situation because it easy for me to communicate with other. The open office concept allows us easily to discuss about our project. Closed office makes me want to sleep because it is too privacy...” (NE03, non-expert)

“.. We changed the layout so we communicate easily. This is the advantages of the open office concept other than this, no...” (NE04 non-expert)

“... It’s good to have open plan office concept, but we cannot work in open space all the time. As human we still need some privacy and barrier. Its feels annoying to listen people taking and walking behind me all the time. Unwanted communication...” (NE05, non-expert)

Some of the office workers rearranged their workplace because of their job task. Example of this,

“...I’m working at Corporate Communication Department and dealing with public. Suppose the workplace should be design for ease of communication but our layout seem the same with other department. We changed the layout to makes ‘our life easier’. We moving to new open space and we hope it will be better...” (NE02, non-expert)

Due to some reasons, NE08 changed her workplace layout according to her job, which in most of the time dealing with staff. She also had special reason of experiencing ‘*Claustrophobia*’ when sitting in her workplace.

“... I request to the management to change the partition from medium to low partition or change to the glass screen so I can see all my colleagues sitting around me. I fear of sitting in a cramped space and sitting alone...” (NE08, non-expert) (Figure 5.17)

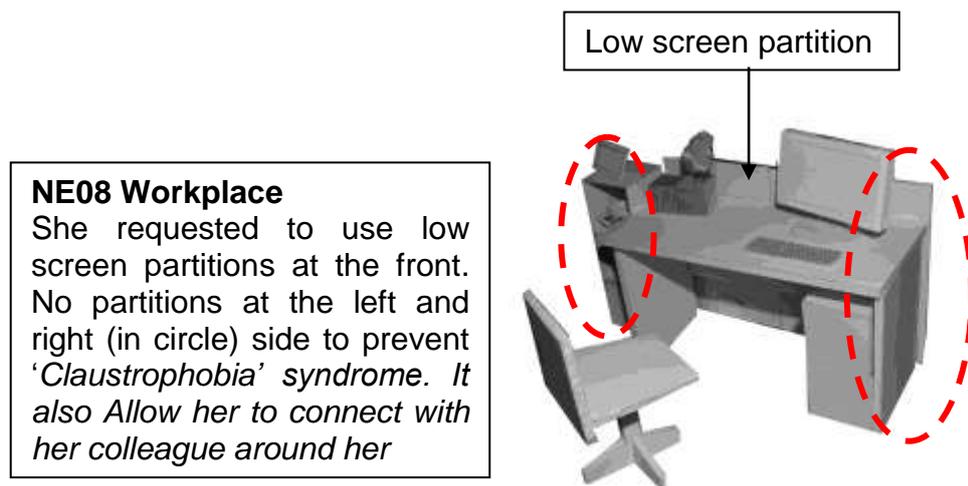


Figure 5.17: Personal/special Need of Layout

5.1.3. Theme 3: User Aspirations

The previous section (5.1.1 and 5.1.2) revealed some important issues arising in open plan office environments in Malaysia showing respondents' dissatisfaction through users taking personal control of their current workplace to meet their personal needs. This section discusses the respondents' aspirations for new workplace.

“Breaking out of the box” meant reinventing the standard office cubicle. Although attitude has been shifting toward recent years, the cubicle has been an accepted standard in corporate world for decade’. (Deasy et. al.:50)

5.1.3.1. Aspiration for New Workplace Design

The main issues discussed in this investigation were the design of the workplace. Bowen (2007) (in section 2.5.2) explained that users find it difficult to express what they need if they have no pre-existing model to refer to.

In conducting role-plays with mock-ups in this investigation, a common limitation becomes apparent.

Experts explained that we were still using the same size of furniture since 1950s without any changes, based on the British colonisation era, whereas Malaysian has difference anthropometries.

“... We need total Design revolution. Government needs to think about this for future government workplace...” (EX09, expert)

“... We get the guidelines from Economic Planning Unit (EPU). But who decide it? Who verify these criteria? We need to know who is responsible with these entire dimensions. There are no architects working in EPU. Their job is only planning...” (EX07, expert)

EX04 and EX08 agreed that it was time for the office management and manufacturers to understand the users' needs and aspirations toward their office environment.

"...The manufacturer should provide the customers with design solutions rather than thinking about profit..." (EX04, expert)

"... As long EPU have the budget and finance department agree to release the money. It's fine with me. The office workers are the person that did the entire daily job so they deserve to get good furniture referring to their job task and needs. We just give them basic furniture, but will expand depending to current needs..." (EX08, expert)

Although design was not mentioned directly since most of the respondents were non-designers, the way they expressed themselves during the mock-ups sessions showed their ideas for new workplace design (e.g Figure 5.18). All respondents gave their opinion for the needs and aspirations for new workplace. Example of these;

"... The layout should give us a comfortable working environment. In my opinion, good workplace will facilitate our movement and systematic workflow. Easy too worked..." (NE01, non-expert)

"... Office is not just for sit and doing our daily job, but office is about better environment, privacy and office arrangement. Place where we develop ourselves in office..." (NE02, non-expert)

"... I want a good workplace design that can make me feel comfort like being at home. Office is not just for working, it is our second home..." (NE05, non-expert)

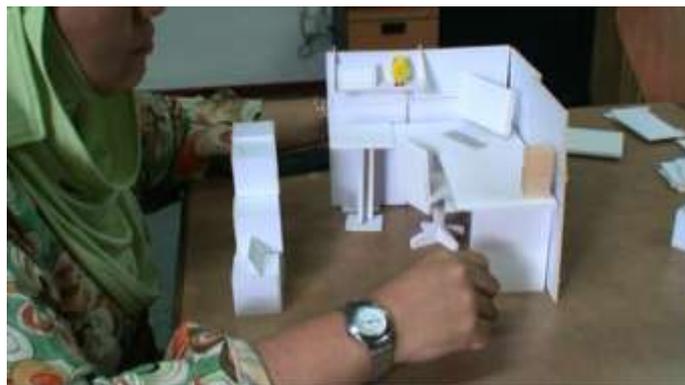


Figure 5.18: Mock-ups in Action (NE06)

"... In my opinion, Good workplace will facilitate our movement and our workflow systematically. People will work more professionally when they have good working environment..." (NE06, non-expert)

Workplace design was seen to have many benefits for respondents such as working motivation.

“... Colours also play importance role. This office is too bulky and looked old because of the colour. Makes me feels bored. Cold and bright colour motivated me to work and give energy...” (NE03, non-expert)

“... Workplace is the only thing we have in office, so we need a good workplace and working environment. Good workplace it will motivate me to do my daily work and come to office everyday...” (NE07, non-expert)

“... For me comfort is the main criteria. When we feel comfort it will motivate us working. It will increase the working satisfaction and working quality. When we emotionally feel comfort it will influence our daily job performance...” (NE10, non-expert)

5.1.3.2. Aspiration for Privacy

Most of the respondents interviewed, said that there were too much interferences from people around them. From people talking in the office, into the phone and people walking, as a result, they found it difficult to concentrate on their daily work.

Visual privacy was one of the main issues, with some of the respondents complaining that they had difficult to concentrate with their job when they could see others walking around them. Some of the respondents hoped to get higher partitions around them in order to gain more visual privacy.

“... I need partition because I need privacy and I need my own territory to do my work (Figure 5.19). It is difficult for me to concentrate to do my work when people walking in front of me...” (NE03, non-expert)

NE07 workplace
Medium high screen partition at the front side to give visual



Figure 5.19: NE07 Aspiration

“... Privacy is my main priority. Without privacy I cannot do my work. I would like to get high screen partition to prevent eyes contact with my friend especially when I’m doing my work (Figure 5.20)...”(NE04, non-expert)

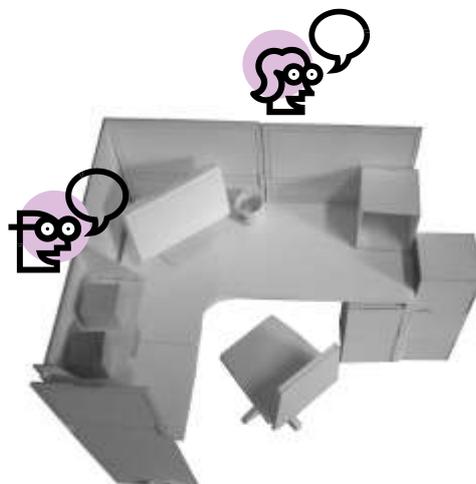


NE07 workplace
Medium high screen with solid panel screen partition at her side to prevent eye contact with others

Figure 5.20: NE04- Aspiration for Privacy

Another aspect, that some of the respondents disapproved, was being over heard when others talking to each other or on the phone. Impact of this, they hoped to get higher partition as they believed; it could reduce the sound coming toward them.

“... First is privacy. I don’t want to be disturbed when I’m in my job. Higher partition also can absorb noise and sound...” (NE07, non-expert) (Figure 5.21) (‘I don’t want to be disturbed when I’m in my job’: I don’t want to be disturbed when I’m working)



NE07 Workplace
Medium high screen partition at the front and side table to preventing sound from front and side.

Figure 5.21: NE07- Preventing Sound

“... I prefer to have higher partition at the front and left for privacy and to preventing the sound. I need concentration when I’m working. The partition should be full solid screen partition or maybe, glass screen at one side at the front...” (NE05, non-expert) (Figure 5.22)

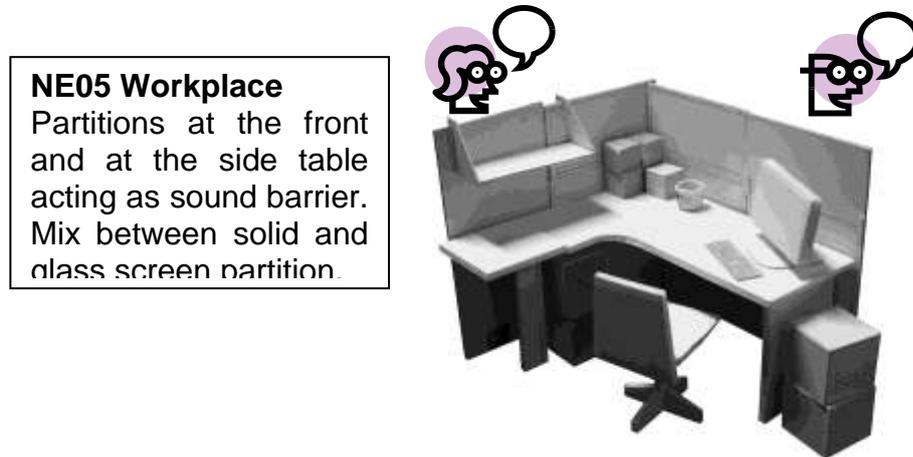


Figure 5.22: NE05- Sound Filter

5.1.3.3. Aspiration for Place-Making

According to Anjum et.al. (2004:27), the people making decisions about the layout and furniture of an office environment, can have an enormous impact on the well-being and eventual productivity of employees.

They found that place-making concept (section 2.3.1) was a balance between collaborative working method and personal needs of the individual that would improve productivity and creativity.

In the role-play with mock-ups, all of the respondents were allowed and had the freedom to change their workplace according to their personal ideas as stated in section 3.5.2.4. All the respondents made a total changed in their workplace layout according to their needs and aspirations.

“... I prefer to have L-shape table and the side table depend on where I’m sitting. My table should be facing toward the door. So I can see staffs that walk in and they cannot see what I’m doing. I want higher partition for privacy...” (NE01, non-expert) (‘So I can see staffs that walk in and they cannot see what I’m doing’: So I can see staffs that walking and they cannot see what I’m doing). (Figure 5.23)

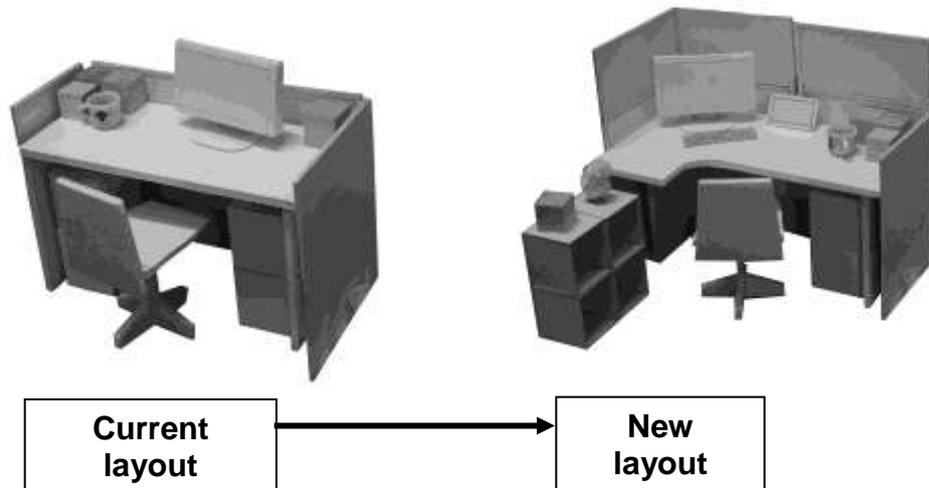


Figure 5.23: NE01-Place-making to Develop New Layout

“... I want L-shape table with the side table at my left. I prefer medium height partition at my front and left for privacy. The panel should be mix with solid and glass screen partition. Partition at my left side, I would like to have low partition...” (NE03, non-expert) (Figure 5.24)

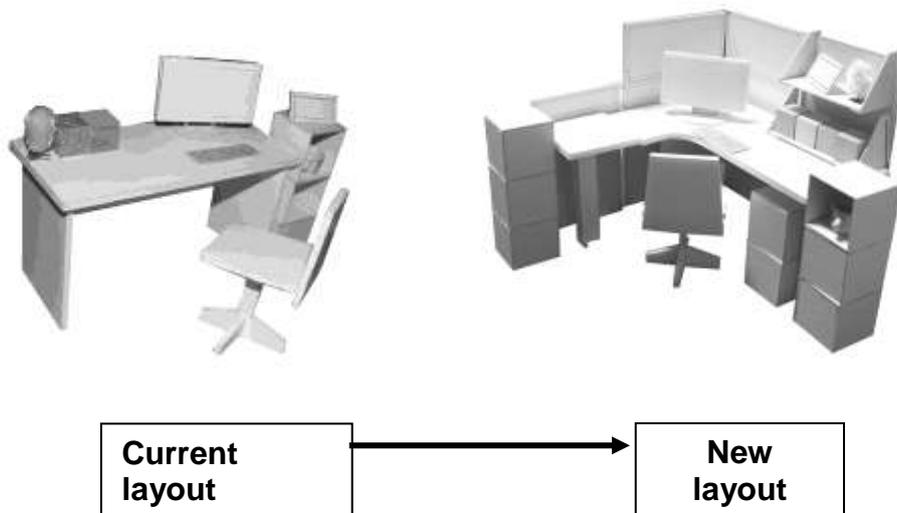


Figure 5.24: NE03-Place-making to Develop New Layout

“... I always wanted a L-shape table and the side table at my left. I prefer higher partition at the front and left for privacy. The partitions should be solid panel partition, but one side will be glass maybe at front so I can see the surrounding area. If possible I would like put curtain at my table because I want to sleep under my table during lunch hour...” (NE05, non-expert) (Figure 5.25)

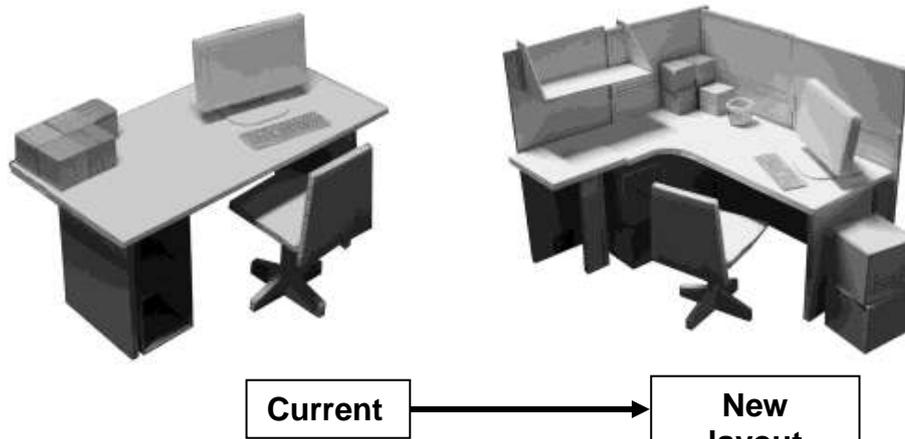


Figure 5.25: NE05-Place-making to Develop New Layout

Some of the respondents explained that they needed bigger space and to have more storage to keep their personal belonging and their daily files. Impact of this, they constructed an extra storage at the back of their workplace.

“... I want L-shape table and the side table at my left and till working in the same situation cluster of four people. I want higher partition for privacy. I don’t need mobile pedestal. I want cabinet to put files and my stuff. I prefer to have open and closed cabinet. Closed cabinet is for my personal stuff and open cabinet for the filing. I prefer to have glass screen for all my partitions...” (NE06, non-expert)(Figure 5.26)

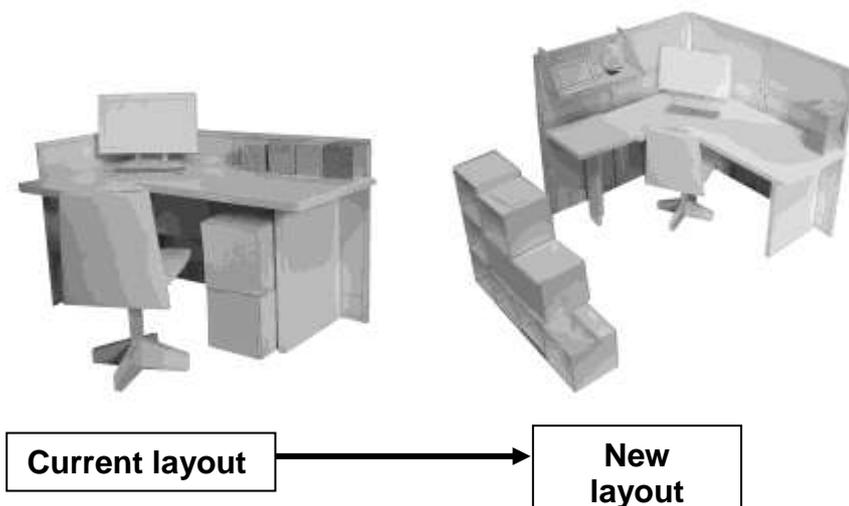
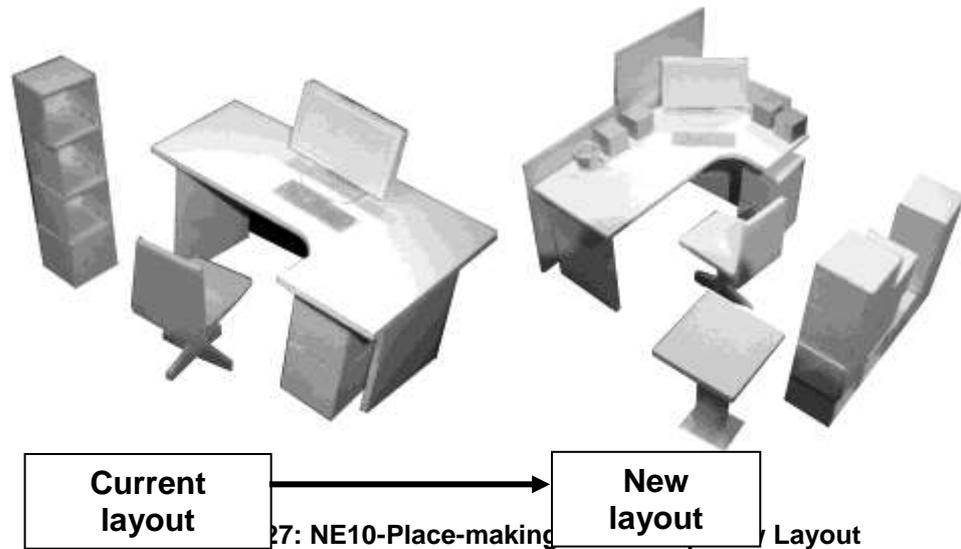


Figure 5.26: NE06-Place-making to Develop New Layout

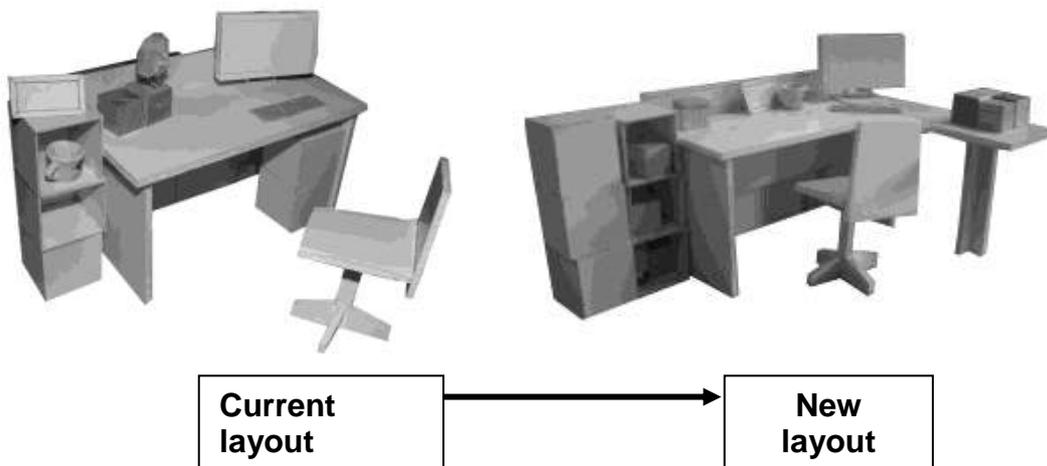
“... I would like to have L-shape table same as what I have now. I prefer to have multiple height partition. The medium high screen partition is to cover my computer and people cannot see me while I’m working. It’s also as a lighting barrier and I need privacy while working. I would like to have more storage to

keep my books and personal belonging. Open cabinet for book closed cabinet for personal stuff and valuable things...” (NE10, non-expert) (Figure 5.27)



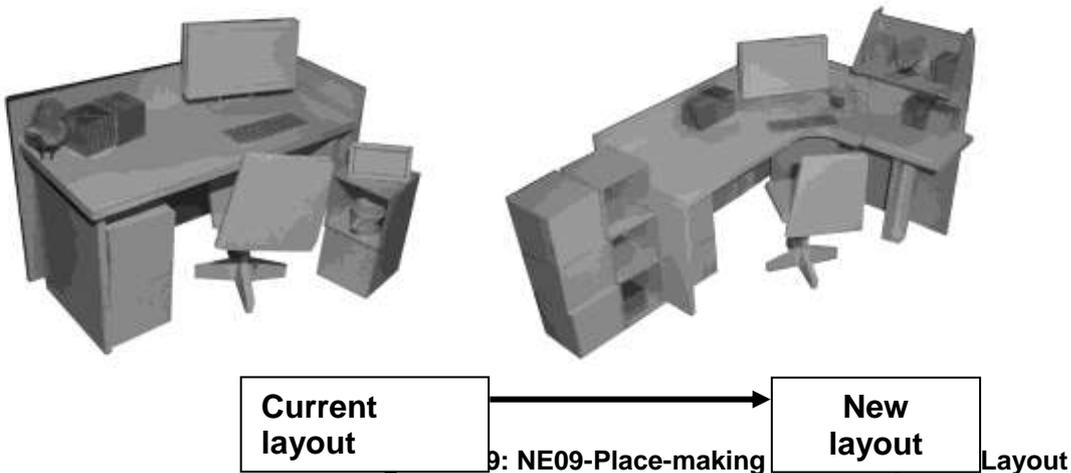
Unlike others, NE08 changed her workplace to overcome an emotional problem, which was the fright of sitting alone.

“... It would be nice if I can get L-shape table with the side table at my right. My previous L-shape is at left side but I want right side. I think it is more comfort for me. The layout should be cluster of two people. I want low partitions because I’m scared of sitting alone. I need extra cabinet to keep the office files and my personal stuff. I need bigger workplace to avoid the feeling of crowding and facilitate my movement...” (NE08, non-expert) (Figure 5.28)



“... I want L-shape table and the side table at my right. The partitions that divided between me and my colleagues should be low screen, but medium high screen partitions at the right side for privacy and to prevent from being seen by my boss. It is better to have drawer that

attached to the table as part of the table structure. More safety and nobody can take it or move it. I need two spaces for storages. The hanging cabinet, to put daily files whereby the side cabinet to keep all the files that seldom has been used. The cabinet should half closed and half open and can be locked for safety purpose..." (NE09, non-expert) (Figure 5.29)



5.1.3.4. Aspiration for Own Territory

According to Brown (2009:45) territorial behaviour is a self-other boundary regulation mechanism that involves personalisation of a marking of a place or object and communication that is 'owned' by person or group.

Based on the role-play with mock-ups, most of the respondents marked their workplace as personal territory that could help them preventing unwanted interruption by colleagues and to show their ownership to their workplace. According to the respondents, the main function of territoriality was to maintain their workplace privacy.

"... I need partition because I need privacy and I need my own territory to do my work. I don't like when people looking at me while I'm doing my work..." (NE03, non-expert)

"... Workplace is the place where workers mark their own territory in their office. Office is not just for sitting and doing our daily job, but office is about better environment, privacy and better office arrangement..." (NE04, non-expert)

"... The workplace can be as our territory in the office. People will work better when they have good working environment and sense of belonging..." (NE05, non-expert)

NE08, NE10 and NE11, used their own belonging to mark their territory. They decorated their workplace with their own belongings to show their sense of ownership to their workplace provided to them.

"... I decorated my workplace with souvenirs such as keychain, cutlery toys and magnets. I put my family pictures to make it personal and to mark my territory..." (NE08, non-expert)

"...Workers will feel sense of belonging and meaningful when having their own workplace. We mark their territory with our own belonging..." (NE10, non-expert)

"... I displayed items that related and belong to me in one corner so people will know that is my place. We must show our identity in our workplace..." (NE11, non-expert)

In relation to this, Brown (2002) has explained that is a crucial to identify the important aspects of territoriality. Territoriality is social behaviour where people mark and defend their claims.

'Territorial behaviour are not simply about expressing ownership over and object (e.g. this is mine) but are centrally concerned with establishing, communicating and maintaining one's relationship with that object to other in the social environment (e.g that is mine and not yours!)' (ibid:45)

5.1.3.5. Aspiration for Comfortable Workplace

Another main issue highlighted by the respondents during the role-play with mock-ups sessions, was to get a comfort/ergonomic workplace. Equal comfort in terms of physically or emotionally as mentioned by Well and Thelen (2002), good workplace design is indirectly associated with enhanced levels of well-being and physical health.

During the interview, some of the designers explained, that it was the time for Malaysian manufacturer to concentrate on design rather than profit.

“... We must remember different people have different needs. We have our basic products, but we need to comply everybody needs. We have to design our product with flexibility. Previously we are selling furniture, but now we have to provide solution...” (EX04, expert interview)

“... Most office workers spend most of their working time at the workplace, around 25-30 years. Before they retired many of them get back pain problem. Health will influence to other thing such as stress and user dissatisfaction. All these factors will affect working performance. As the designer and researcher we need to think about the user needs and the ergonomic factors that could contribute to healthy workplace...” (EX05, expert interview)

Most of the respondents reshaped their new future workplace that they believed could fulfil their needs and aspirations in their daily activities. They also believed that good office design could contribute to good working environment.

“... We spend most of our time in the office sitting in our workplace. The furniture designs should follow the correct anthropometric dimension. This is the requirement of safety and health...” (NE03, non-expert)

“... Workplace place should be designed with good space planning and proper design dimension. The good example is the kitchen in our house. Arrangement off the layout facilitates a good working flow...” (NE05, non-expert)

“... People can work with comfort when they have good working environment. We should have a conducive office environment so the worker can have more space to move. We should have a nice and well designed workplace so it can motivate us to do our daily job...” (NE07, non-expert)

In relation to this, NE09 stated that good design could contribute to healthy working environment by giving her opinion,

“...Office furniture plays an important role in contributing healthy office environment. We need to have good furniture because we spend most of our time at office. Good design can reduce staff from taking medical leave due to stress or other sickness caused by long hour of working...” (NE09, non-expert)

NE10 and NE11 stressed more specifically that, the furniture should be designed with proper ergonomic design dimension. Workers spent most their time at workplace and the furniture would influence them physically.

“... Ergonomic furniture design is importance for safety and health and better workflow. If the design is nice we emotionally feel great. The whole workplace will motivate and influence my job performance concurrently...” (NE10, non-expert)

“...I spend most of my time in my workplace. The workplace should be designed to facilitate our daily work. I wanted the storage near to me so it's easy for me to reach all my stuff within my hand range. Good environment and ergonomic workplace will facilitate me in doing my daily task. Without all these elements I will feel boring...” (NE11, non-expert)

5.1.3.6. Aspiration for Meaningful workplace

In the role-play with mock-ups, most respondents had the tendency to reshape their workplace according to their personal needs and aspirations. They personalised their current layout and rearranged their future workplace by using their own belongings such as toys, pictures, pen collections, etc. to show their connection with their workplace and to make it more meaningful (section 2.3). Due to 'lack of control', most of the respondents also had the tendency to take 'personal control of their space' by using their own belongings to fulfil their needs and aspirations. Examples of these;

‘... I decorate my workplace with the thing that meaningful to me such as flower, butterflies (toy) and my mug. I wanted my workplace look beautiful and clean all the time that reflected to my personal identity...’ (NE01and NE 03, non-expert) ('clean': neat and well arranged)

“... We must adapt ourselves with the space provided. We personalised the workplace to make it more meaningful to us.

We cannot change it in total, but at least that the only thing we can do, to make it more meaningful...” (NE11, non-expert)

NE04, NE05, NE08 and NE10 (Figure 5.30) mentioned, that the furniture provided should be designed to allow personalisation that could contribute to a meaningful workplace that reflected their own identity.

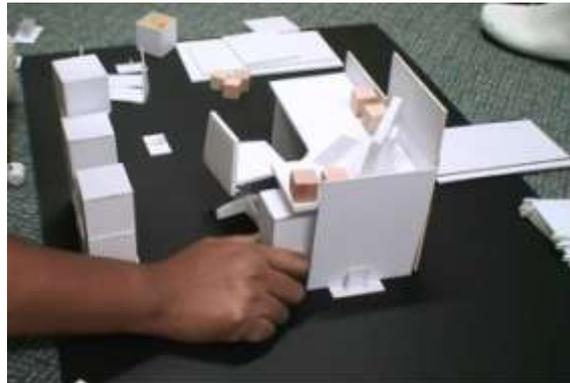


Figure 5.30: NE10 Workplace

Wells (2000) in her research into workers satisfaction reported, that most office workers stated that they wanted to feel like an individual rather than a ‘cog in a machine’ and that personalisation allowed them to convey their individuality. In this context all respondents conveyed their personal ‘touch’ to their workplace in a way to show their personal identity.

“... Instead of privacy, we need partition because we can use it to decorate our space. By decorating the workplace it will shows our identity that giving us the feeling of meaningful and belonging to our organization...” (NE04 and NE05, non-expert)

“... For my opinion the office furniture should be designed to facilitate office occupants toward meaningful workplaces. Workplace design will influence worker’s emotions. Unorganized workplace layout will make my brain emotionally cramped...” (NE08, non-expert)

“... We will feel meaningful when we get the ‘personal control’ of our workplace. As the result we feel happy and will work more systematically and professionally. (NE10, non-expert)

All of the respondents agreed, that there was a need for designers to understand the office workers' needs in the office before designing, because they were the end users that would occupy the space provided.

The results of the role-play with mock-ups with non-experts clearly confirmed that the respondents took 'personal control of space' to make the current workplace meaningful to them. The result also revealed their ideas and aspirations of their future workplace that could be implemented and adapted in their future office environment.

Further design development was carried out to investigate and triangulate the respondents' opinions in these role-play with mock-ups. The results and further discussion are discussed in section 5.2.

5.1.4. Summary of Findings

5.1.4.1. Theme 1: Lack of control

- Unchanged Environment - unchanged office layout explained by respondents.
- User Description of Workplace Development – respondents explained that they were not involved in office development.
- Users' Current Workplace/Layout – respondents showing their current office layout by using mock-ups
- Users' Reflection on their Current Workplace/Layout – respondents' dissatisfaction with unsuitable workplace design for their job task.
- Limited Space – limited space that resulted in discomfort and frustration.
- Disturbance – disturbance in current workplace made the respondents uncomfortable physically and mentally.
- Workflow – not proper planning in office layout without referring to respondents' job task.

5.1.4.2. Theme 2: Personal control of Space

- Personalised with Belongings – to express personality, emotion and status.
- Place Making – rearrange office layout according to their practical needs.
- Sense of Ownership – using their own belongings as indicators to mark their territory and sense of ownership.
- Office Safety and Safety and Health – current office layout lacked of safety and health precautions.
- Personal Space - creating a personal space to make their workplace meaningful for them.
- Connecting with Other – using office layout to facilitate communication among colleagues.

5.1.4.3. Theme 3: User Aspiration

- Aspiration for New Workplace Design – express them with new workplace design.
- Aspiration for Privacy–visual and acoustic privacy.
- Aspiration for Place Making – changing their workplace according to their needs and aspirations.
- Aspiration for Own Territory – mark their territory to prevent unwanted interruption and to show their ownership.
- Aspiration for Comfortable Workplace – respondents' showed their beliefs that good office design would contribute to good working environment.
- Aspiration for Meaningful workplace – respondents personalised their workplace to show their connection and make it meaningful.

5.2. DESIGN WORKSHOP DW01 and DW02

The aims of the design workshops were to explore a participatory design process for specific design spaces (refer section 4.3.1.3. for detail explanation in design

workshops procedure). To support the task of creating a new layout, examples of images from current workplaces and mock-up layouts from the earlier stages were shown to the participants to give them clear understanding of the process and to provide an overview of the project. The factors of 'lack of control, 'personal control of space' and 'aspiration' that were revealed from the mock-ups workshops with office workers were explained to the designers and the participants. Design workshops were run once with each of the three main groups (office workers, design students and furniture designers) and once with all of the three groups as explained in chapter 3 section 3.6.3. The aims and main activities role-play with mock-ups in design workshop DW01 and DW02 were:

- i. Discussing about space planning in their workstation (section 5.2.1)
- ii. Reviewing workplace layout produced in section 5.1 (section 5.2.2)
- iii. Developing a new workstation concept (section 5.2.3)
- iv. Discussing the workstation that was constructed in the design activities (section 5.2.4)

5.2.1. Developing New Design

Without being prompted, all participants commented that design played an important role in office layout to influence workers' performances and job satisfaction. In this design development process, they developed the workplace design that they believed could meet the needs and aspirations of individual or groups. Idea development was the main activities in the design workshops. All participants in the design workshops explained their experience on the current issues with regards to workplace in the early stages and voiced their preferences regarding the future design of the workplace in getting clearer situation of its pertinent issues. Participants expressed their opinion that:

"... I don't change anything in my workplace. The workplace is the same as what I get in the first day..." (DWO02, design workshop01)

"...It's too 'open'. Have no privacy. Openness is good, but sometimes I need privacy to do my work..." (DWO03, design workshop01)

"... For me the space is too small and congested. Too many people shared a small space, in one open place. It's really congested..." (DWO01, design workshop01)

“... I don't like it because the workplace is too 'public'. Many interference while working. I need privacy. (DWS04, design workshop 02)

Participants explained that the space available for the workstation played an important role in its configuration. They realised that many manufacturers had their own dimensions and standard workplace configurations even though they believed that they were expected to follow the guidelines provided by policy makers. They also produced furniture according to practicalities of production without referring to any standard anthropometric dimension.

“... Most of head of department did not have any knowledge about design. They just provide justification, project brief and the need of their department before purchase the furniture. Everything is depending on the supplier...” (DWO01, design workshop 02)

“... Everything is based on trust. These also depend on the worked ethic actually. The manufacturers that involved in certain project must be honest...” (DWD01, design workshop 03)

“... Some of the manufacturers were only thinking about profit making. They don't bother about requirement and solution. They will go for the highest profit that they can get...” (DWD02, design workshop 03)

Through my observation, I found that through discussion the participants had their mutual consent that the office workplace should be divided into three sub-spaces. Through their previous experiences their workplace was cramped and had limited space for working. By dividing the workplace in three sub-spaces could facilitate their daily work and resulted in getting a bigger workplace.

“... We should divide the workplace into three sub-spaces; (Figure 5.31). (i). Working space, (ii) computer and (iii) Multipurpose space...” (DWS03, design workshop 02)

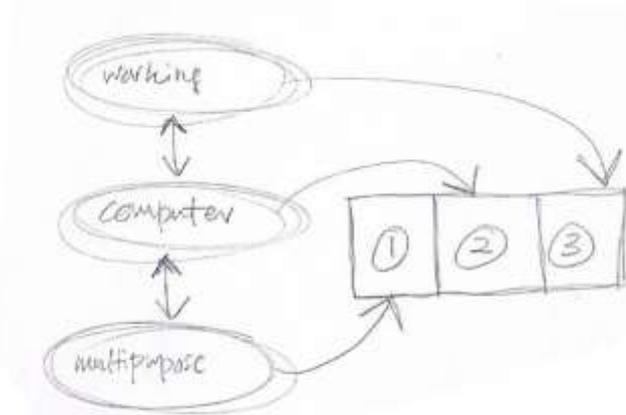


Figure 5.31: Workplace Sub Area. Source: Design Workshop 02

“... We need to divide the spaces at least into three areas so we have different spaces to do our daily task (Figure 5.32). Workers will work more organised when they have proper workplace layout...” (DWO02, design workshop 01)

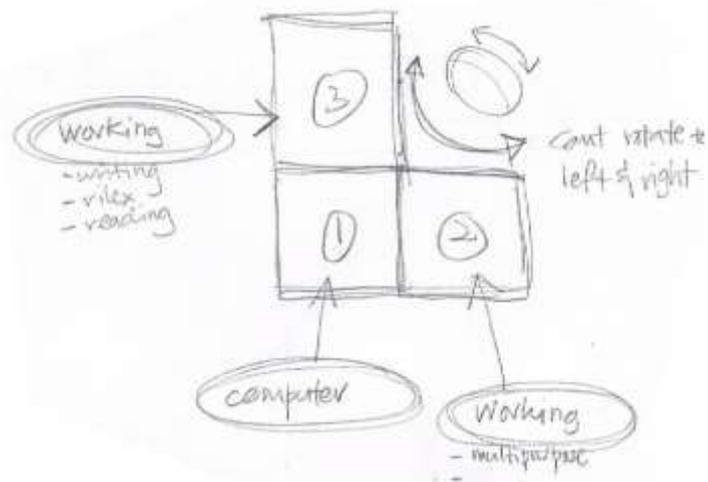


Figure 5.32: Working Area. Source: Design Workshop 01

“... Workplace is just the same as production line in the factory. We should have a system to organize the production line...” (DWS02 design workshop 02)

This confirm research by Riratanaphong (2006) who had studied about expectation toward office practise in the future, he observed that workers were often treated as a mechanism of production instead of self-directed individuals. Employees were concentrated in one place, isolated from an external environment and their home with high level of control and discipline.

“... The computer should be at the centre, the working space and the multi-purpose can be at the left or right side depend on the office user whether he or she is left of right handed...” (DWS01, design workshop 02)

Participants in DW02 mentioned that the space provided for the office workers per person was not standardised in each office. They stressed that the size and layout should be determined according to their job task (Figure 5.33).

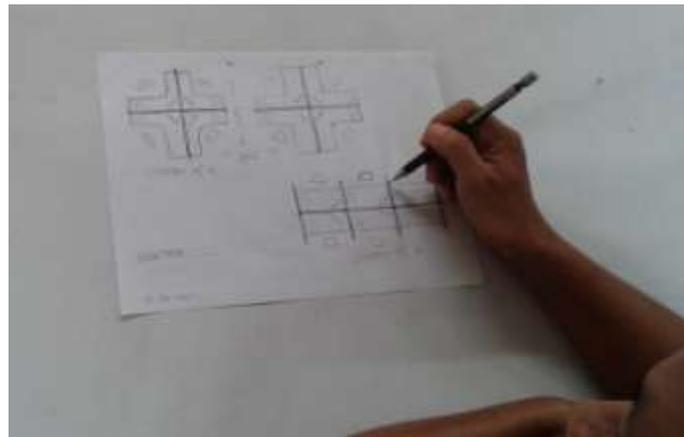


Figure 5.33: Idea Sketches by Participants. Source: Design workshop 02

“...If we don't have table without side return, the ideal office layout should be in cluster of four or six people the maximum. (Figure 5.34).It can give enough space for workers to move or otherwise the space will be cramped...” (DWS01, design workshop 02)

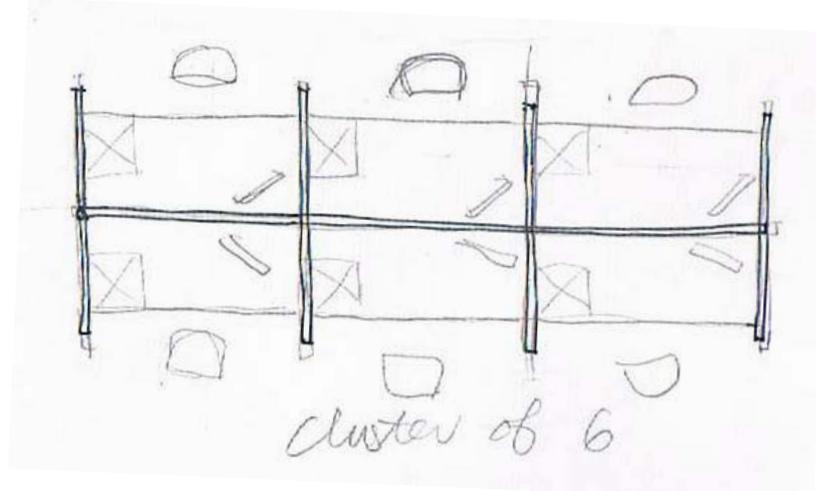


Figure 5.34: Layout Aspiration by Participant. Source: Design workshop 02

“...We prefer to have the cluster of four with L-shape table office layout. (Figure 5.35).It gave us more space around us. It's also facilitates the movement and office flow...” (DWO05, design workshop 02)

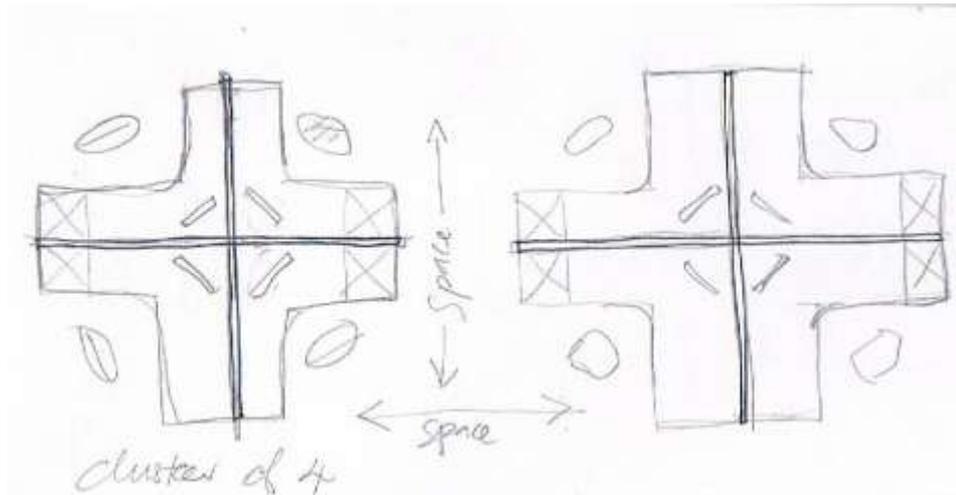


Figure 5.35: Workplace Configuration by Participant. Source: Design workshop 02

In the discussion, participants in DW01 and DW02 commented that the ideas of having cluster of four or six could be ‘unreal’, but for them that was the ideal suggestion to prevent crowdedness. Users showed a strong wish to reconfigure their workstation when the opportunity was given.

“... It was our role in this role-play to suggest these ideas. We have undergoing the experience in our daily work. We sit in a long row in the office and the space becomes congested. That why we limit the layout between four or six persons. This is the layout that what we think is the best...” (DWO03, design workshop 01)

“...Before designers and manufacturers investing many money and time in design work. They should understand the needs of the users...” (DWS05, design workshop 02)

When they were asked about their current workplace the participants responded;

“... Our current workplaces were arranged in a row preventing from us to move smoothly...” (DWO01, Design workshop 01)

In contrast, participants in DW01 (e.g. DWO04) said that the workplace they sketched was quite similar to their current workplace and their previous working environment.

“... the layout should not too open, but just with my team same as we have now. Enable us to discuss our task. Having this concept allowing us to share and to establish the concept of teamwork in working...” (DWO04, design workshop 01)

During the workshops with users, I noticed that the participants were aware of the consequences about the ideas sketched and proposed by them. For the participants, this was the opportunity for them to ‘speak-out’ their ideas. They participated actively to produce design ideas for further development (refer summary of finding in section 5.2.6.1). In the next stage, they used the mock-ups to perform their needs and aspirations in specific workplace design.

5.2.2. Re-shape-ing New Ideas

Developing a workstation was the important activity in the design workshops (Figure 5.36). During the role-play with mock-ups, the participants in all workshops seemed to use the mock-ups as a tool for analysis and negotiation between groups. Once the mock-ups were in use, it was observed that the participants who had been reticent became more active in contributing ideas to the discussion. This can be seen by DWS02 and DWO05;

“... I also was thinking that we should arrange the basic furniture before adding the additional furniture and accessories according to our group discussion...” (DWS02, design workshop 02)

“... I like the L-shape table. We can put our computer at the centre, so we can have the space for writing and multi-purpose space at left or right. Easy for us to turn left or right...” (DWO05, design workshop 01)

Their idea was agreed and accepted by other group members;

“... I agreed. We preferred to use L-shape table so it can be divided into three sub-spaces as discussed...” (Design workshop 01)



Figure 5.36: Mock-ups in Action. Source author (Design workshop 01)

A few ideas that were not thought out during the initial discussion were revealed once they started the role-play with mock-ups. Using three dimensional mock-ups, it had helped them to predict the real office situation. The DWS02 and DWO05 said that;

“... We can build the basic furniture, checked the configuration and makes changes if needed...” (DWS02, design workshop 02)

“... There is always something we didn't think of during our earlier discussion. When we started to build, it much easier to understand...” (DWO05, design workshop 01)

It was also seen, compared to the initial observation, a greater number of ideas emerged after the mock-ups were introduced and participants appeared to arrive at an agreement more easily.

5.2.3. Place-making for Privacy

In this role-play, the participants adopted a place-making concept used by architect and urban designer to create balanced environment (refer section 2.3.1). Place-making is a fundamental concept in architecture and urban design. According to Harrison and Dourish (1996), place-making should fit with its surroundings, maintaining a pattern in the surrounding environment such as colour, material or form.

After reviewing the workstation produced by office workers (non-expert) and agreed with the design direction in their sketches, the participants started to use the mock-ups to build a workstation based on group agreement (Figure 5.37).

“... For us, we need workplace with privacy, but in the same time we still can communicate with other...” (DWO02, design workshop 01)

“... The boss should give us some space for privacy and doing our job without feel being monitored...” (DWO01, design workshop 01)

“... My place is always messy when I'm doing work. So I want to prevent my colleague saw that situation. I need privacy. Women don't

like men staring at us while we are working. At least we should have some glass partition as barrier...” (DWS03, design workshop 02)

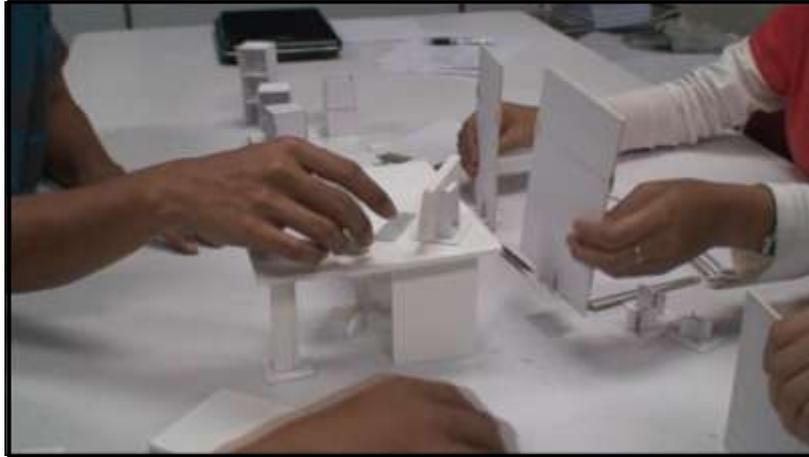


Figure 5.37: Place Making - Mock-Ups Activities.
Source author (Design workshop 02)

“... We need concentration while working. How do we going to do our work when people staring at us all the time. Although we get just a glass panel I already feel ‘privacy’...” (DWS04, design workshop 02)

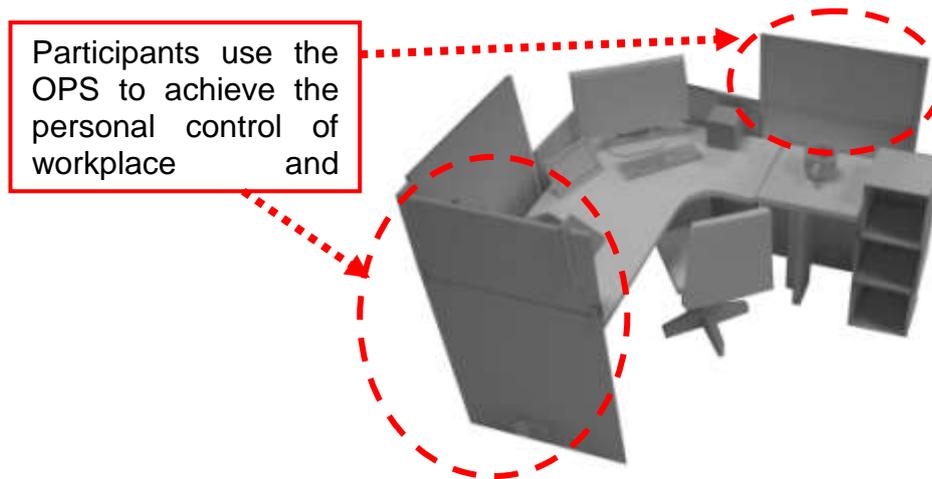
“...by allowing us to do some place making, we can archive privacy. The management wanted a quality work from us. We wanted a quality ‘place’ to work...” (DWS05, design workshop 02)

During the mock-up process, participants developed their ideas through discussion, with the mock-ups going beyond the initial sketches ideas. I found that every participant voiced out opinions and ideas in the role-play with mock-ups discussion. This process created an active participation among group members. For example, they preferred to have partitions to get privacy;

“... We wanted the OPS that people cannot see us when we are sitting and can only see us when we are standing (Figure 5.38)...” (DWO04, design workshop 01)

“... Eye level (medium height screen) should be OK. We still can see our colleague at the front or side of us when we are sitting (Figure 5.38)...” (DWO05, design workshop 01)

“... I want screen at least the same height of the computer or above. People can see me, but cannot see what I’m doing. Much better (Figure 5.38)...” (DWO01, design workshop 01)



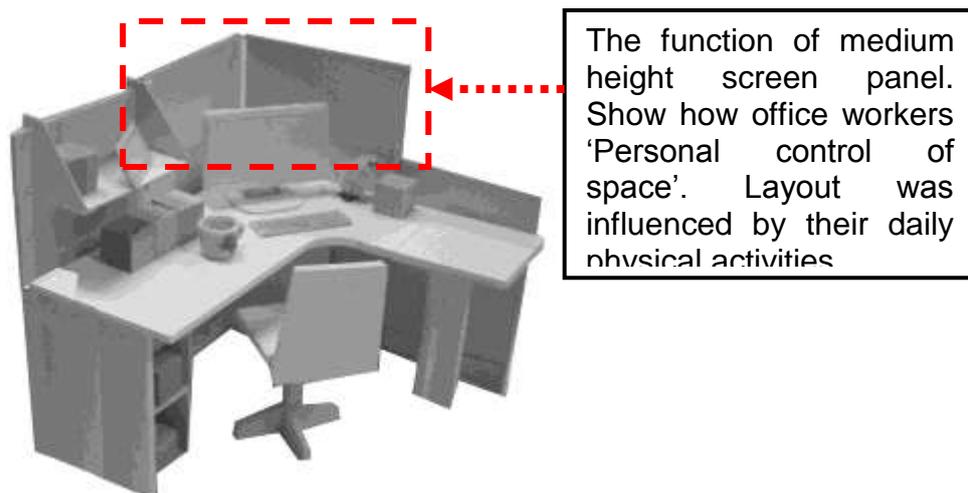
Participants use the OPS to achieve the personal control of workplace and

Figure 5.38: Idea from Design Workshop 01

Participants in DW01 and DW02 expressed their ideas of personal control of workplace (Figure 5.39 and 5.40). Incorporated with their ideas in early sketches, they generated their workplace concept.

“... We need screen for privacy and to prevent eyes contact with other. We don't feel comfortable and secure when people looking at us (Figure 5.39)...” (DWS01, design workshop 02)

“... One more thing why we need medium height OPS is to preventing glare from the ceiling light. So the partition function is to reduce the glare (Figure 5.39)...” (DWS02, design workshop 02)



The function of medium height screen panel. Show how office workers 'Personal control of space'. Layout was influenced by their daily physical activities

Figure 5.39: Idea from Design Workshop 02

“... Sometimes it depends on our job task in office. If our job task need concentration so we should have screen for privacy. At least medium screen with glass pane l(Figure 5.39)...” (DWS05, design workshop 02)

Research by Sundstrom et.al. (1982), Kupritz (2001) and Anjum (2004) in their research revealed that, designer/researcher need to understand the user expectation and their behaviour perceptions on privacy. Office design must aim the provide balance between the requirement of office management and the needs of the office occupants.

To fulfil the needs of many office users, some of the participants stated that they should build a multiple screen height for different purposes. They performed their current office activities by using the mock-ups to experience the office situation and proposed their ideas (Figure 5.40).

“... Maybe we should have multiple screen height. Depending on the various function and privacy...” (DWO03, design workshop 01)

“... The personal area should have higher screen. We need privacy and don't want people see us eat or drink at our workplace...” (DWO04, design workshop 01)

“... The screen at the computer should be lower. The design makes us easy to communicate and discuss while working...” (DWO02, design workshop 01)

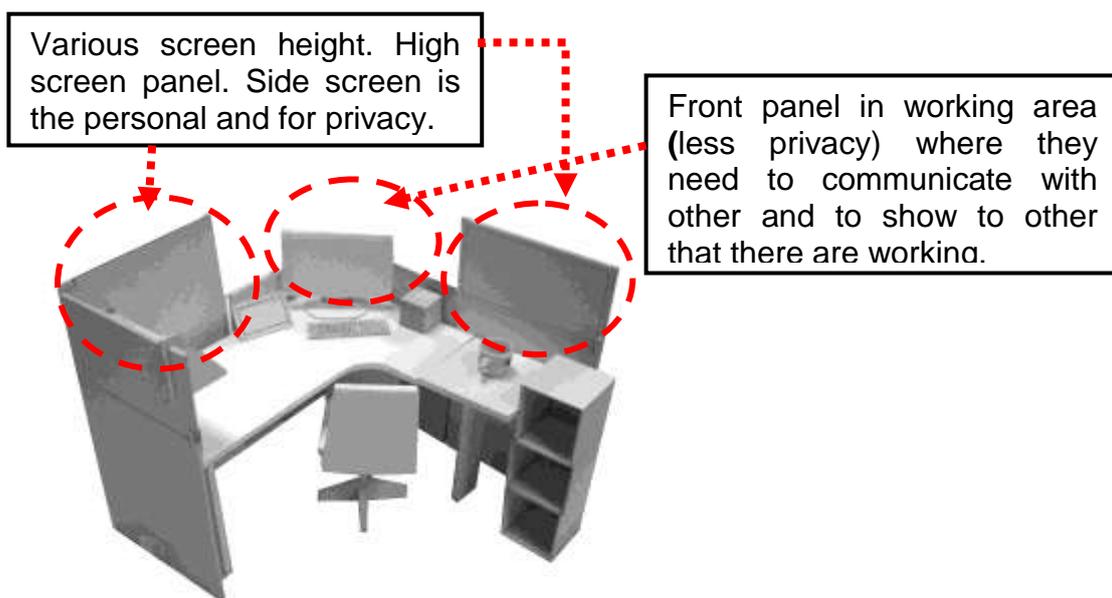


Figure 5.40: Multiple OPS Height DW01

The idea of multiple screen height also proposed by design workshop 02 group;

“... We should have high panel at the front and side and maybe we should have low panel at one the side that attached to our colleague for easy communication. We can discuss our job given while working (Figure 5.41)...” (DWS01, design workshop 02)

“... The OPS itself can be multipurpose. We can pin-up poster at the high panel and to decorate the place. We also can hang the hanging shelves...” (DWS03, design workshop 02)

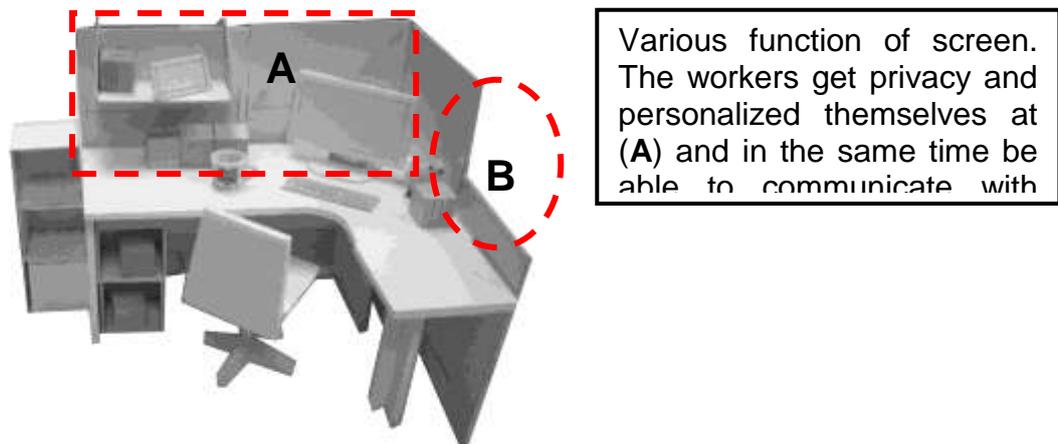


Figure 5.41: multiple screen height DW02

Interviews with office workers and in design workshops revealed that they needed extra storage. They explained that they kept their daily files and personal belongings under the tables due to lack of storage. As a result, their workplace became cramped and congested. Participants explained that;

“... I prefer to have extra storage. I can organise the filing according to it priority. Sometimes workers have many important filing, but they don't have enough space to keep the daily files...” (DWS02, design workshop02)

“... Storage is part of the office system. It can be as part of the design...” (DWS05, design workshop02)

DWO03 mentioned that;

“... Many managers not agreed and don't want to provide extra cabinet to the workers due to costing. Although we have a filing room in the office, but it is not enough. The workers are the one that did the daily task so they are the ones know what the best...” (DWO03, design workshop01)

Obviously, through interviews with experts, I found that most experts (designer, architect and office managers) were particular with the guidelines provided by EPU. Those experts explained, they knew the best facilities for the workers and they assumed that the furniture provided were appropriate with the workers job task.

5.2.4. User Preferences toward Meaningful Workplace

Scheiberg (1993) in section 2.3 mentioned that workplace designs by users are metaphor to their situation in office both emotionally and intellectually. In the design workshop, it was revealed how participants used place-making activity to gain sense of ownership and mark their territory in their office as well as workstation, leading to contribution to meaningful workplaces. Personal control of space in making their workplace more meaningful;

“...Change it to glass panel. As long I have my boundary to mark my territory. I like this layout because (refer to layout produce in DW01) at the side (with medium screen) is place for keeping our personal belonging. So people don't have to see that. In the same time we can still communicate from the front side...” (DWO05, design workshop 01)

“... I like to collect toys. Makes me feel release and to show to other that this is my workspace. I will put it at the side area where nobody can see it. I will display the thing that I like the most in front of me so I can look at it all the time. It makes the workplace become more meaningful...” (DWO01, design workshop 01)(Figure 5.42)

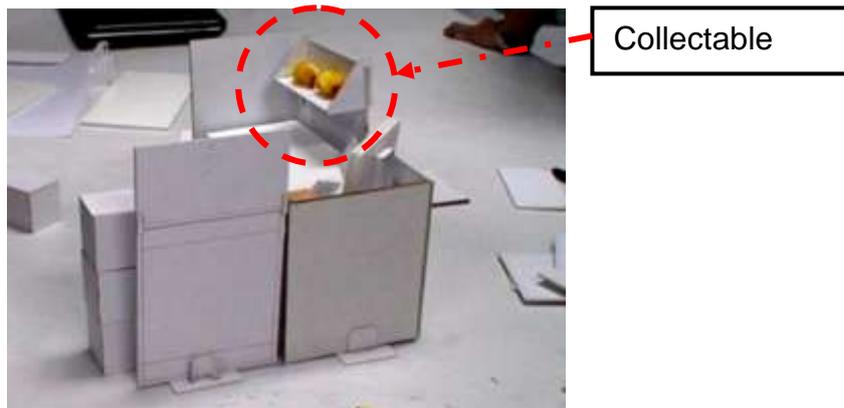


Figure 5.42: Marking Territory. Source author (Design workshop 01)

“... The more the better. Office is like my second home. So I need more storage to keep my stuff and personal belonging. I can bring many of my stuff. It makes me feel comfort. It also motivated me to come to work. I want to make my office just like my home...” (DWS03, design workshop 02)

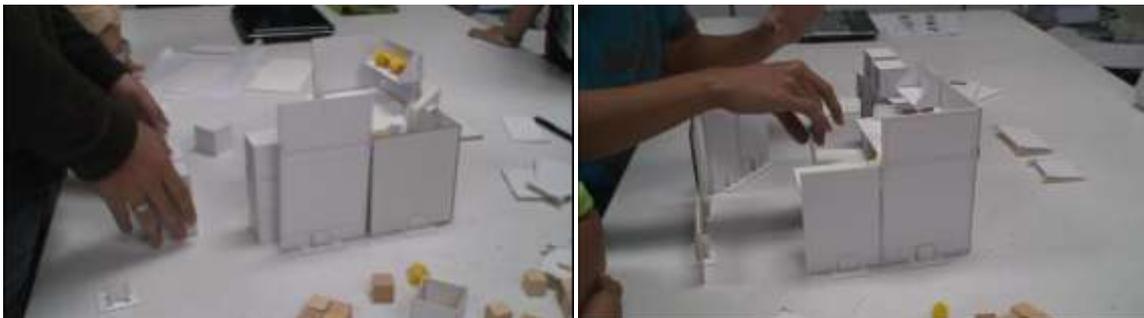


Figure 5.43: Layout Emerged from Design Workshop 01 (left) and Design workshop 02(right)

“... When we feel the ownership we feel we close and attached to the place. The place is meaningless if the place didn't mean anything to us...” (DWS05, design workshop 02)

In design workshops I found that, participants showed various ways to achieve a meaningful workplace. Some participants' opinions were;

“... Personal belonging and sense of meaningful in workplace is important. When we feel stress, the workplace itself can release my stress. We can look at our personal belonging to motivate us to do our work, for example picture of family, collectable item, etc. Motivate us to relax and gave us the passion in working...” (DWS02, design workshop 02)

“... Workplace design is important to make us feel enjoy working. I will personalize my workplace so it doesn't look boring. The workplace in the office looks the same. So by personalize it we feel different with other and become meaningful to me. For me I need something different, individual touch...” (DWO03, design workshop 01)

“... I always think how to personalize my workplace to make it meaningful to me. If I can put some plant and little pond is much better. The sound of the water makes me feel relax. ‘Emotional therapy’. The plant can give fresher look in office and refresh my visual...” (DWS04, Design workshop 02)

In design workshop activity I found many ideas emerged from users’ opinions in creating meaningful workplaces according to their needs and aspirations indirectly (refer Figure 5.43)

5.2.5. Layout emerged from DW01 and DW02

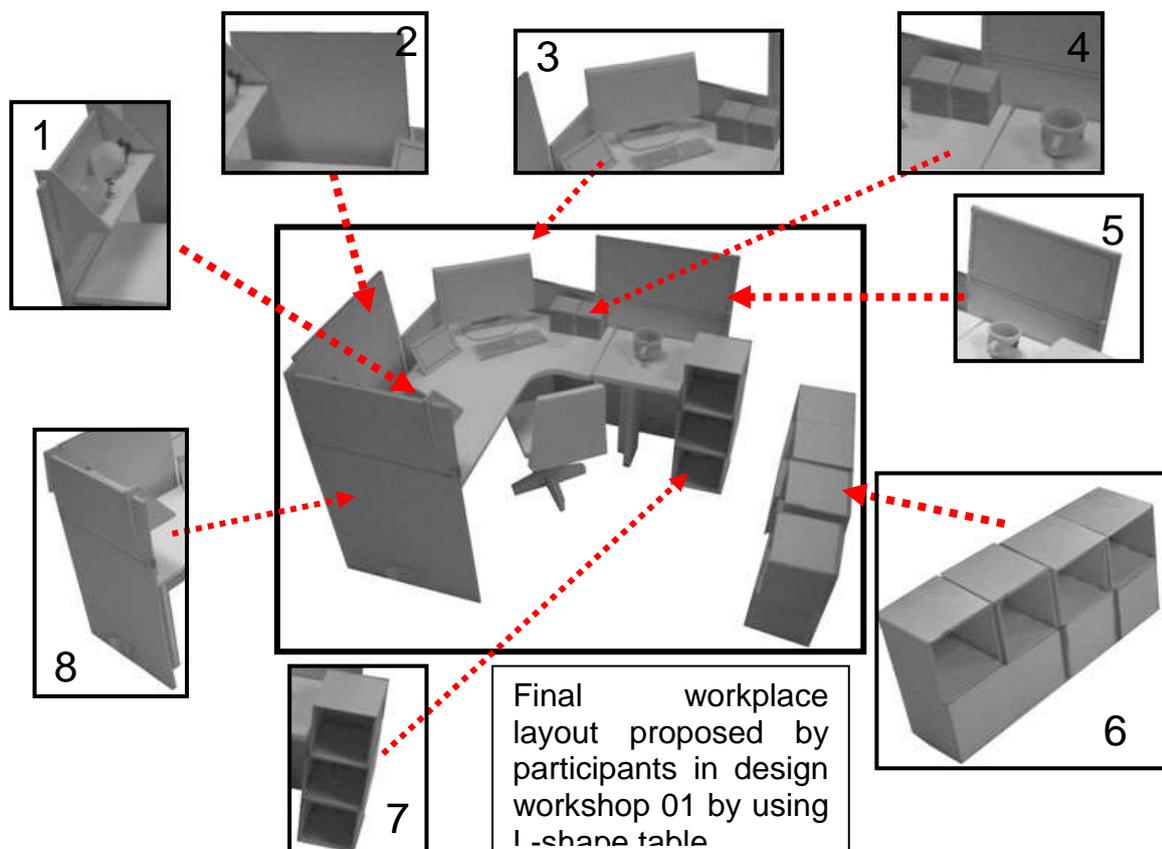


Figure 5.44: DW01 User Needs and Aspirations

Table 5.1: DW01 Needs and Aspirations (Figure 5.44)

No	Description
1	Hanging shelves - for extra storages and to display personal belonging for personalisation
2	Front screen - High screen panel - (solid or glass panel) - personal control of space and privacy
3	Front screen - Low screen panel – to allow them to communicate during working
4	Personal belonging – example of personalisation by displaying personal items to marked their territory and ownership

5	Side screen - high screen panel (solid or glass panel) – personal control of space and privacy
6	Low cabinet Top part (Open) – For less priority item such as daily files, references book etc. Bottom part (lockable) – To keep priority/important item that need for security. To keep user personal item such as bag, laptop etc.
7	Multi purposed open cabinet - to keep personal belonging such as collectible item, books, instant drink etc.
8	Side screen - high screen partition (solid or glass panel) - personal control of space and privacy

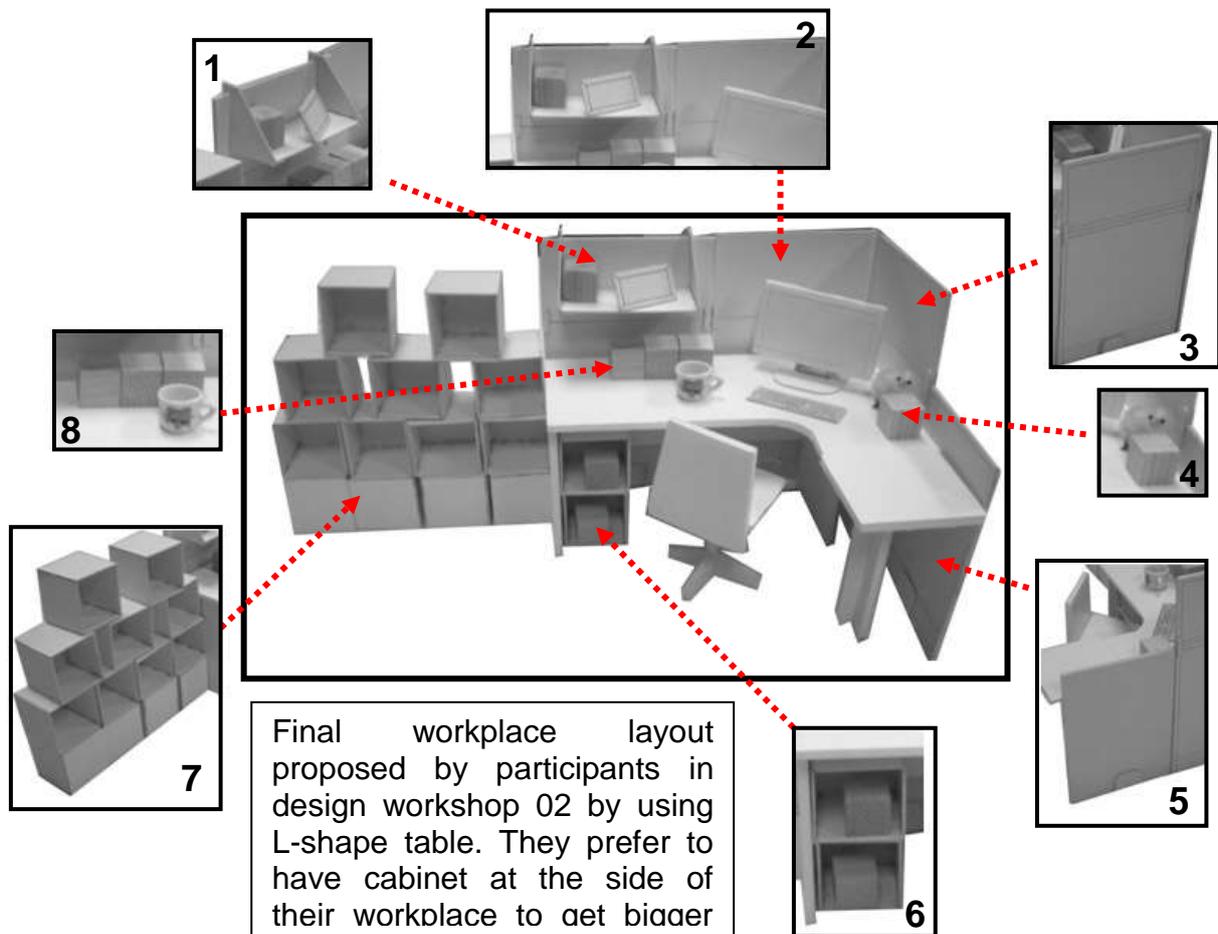


Figure 5.45: DW02 User Needs and Aspirations

Table 5.2: DW02 Needs and Aspirations(Figure 5.45)

No	Description
1	Hanging shelves - extra storages and to display personal belonging for personalisation
2	Front screen- high screen panel (solid or glass panel) - personal control of space and privacy
3	Side screen - high screen panel (solid or glass panel) – personal control of space and privacy
4	Personal belonging – example of personalisation by displaying personal items to marked their territory and ownership

5	Side screen Low screen panel – to allow them to communicate with colleague at their side while working
6	Open mobile pedestal for keeping personal belonging
7	High cabinet Top part (Open) – For less priority item such as daily files, references book etc. Un-symmetrical design to show the differences of their ideas then previous design Bottom part (lockable) – To keep priority/important item that need for security. To keep user personal item such as bag, laptop etc.
8	Personal belonging – example of personalisation by displaying personal items to marked their territory and ownership. For work motivation

5.2.6. Summary of Findings in DW01 and DW02

5.2.6.1. Developing New Design

- Initial discussions resulted in an agreement among members of the group.
- ‘Ice breaking’ session to enhance communication among group members.
- This was the stage where participants got engaged in the method during the design workshop (role-play).
- Brainstorming activity revealed and enriched user ideas.
- Early discussion could seek early solution to prevent dissatisfaction among members at the next session.
- Opportunities to ‘speak out’ their ideas.

5.2.6.2. Re-shape-ing Ideas

- Participants used mock-ups as tool to analyse and negotiation
- Participants that were reticent became active when role-play with mock-ups was used.
- Role-play with mock-ups revealed more enriched design ideas compared during the initial discussion in the early stages.
- Mock-ups helped participants to simulate office situation in the manner of real situation.

5.2.6.3. Place-making for Privacy

- Created an active continuous discussion by referring to their layout.
- Participants started to modify and created meaningful workplace beyond initial ideas sketches.
- Participants incorporated the ideas in their discussion (sketches) and layout they developed (mock-ups)
- Created design opportunities for future development.

5.2.6.4. User Preference toward Meaningful Workplace

- Participants combined their ideas to create a workplace to meet the requirement of all groups member.
- Sought an agreement among group members in creating meaningful workplace.
- Created workplace according to specific preferences.
- Created workplace according to their needs and aspirations (Figure 5.38 and 5.39)

5.3. DESIGN WORKSHOPS DW03 – WITH DESIGNERS

The final stage of the design process was the expert (designers) evaluation and discussion between me and the experts (designers). The aims of the design workshops were to identify whether the process had created useful design concepts and created a design opportunities for designers as discussed earlier in chapter 2, sections 3.6.3.4 and 3.6.3.5. The aims and main activities of role-play with mock-ups in design workshop DW03:

- i. Discussing the role of Designer role in design process (section 5.3.1)
- ii. Evaluating design ideas created by the office users, DW01 and DW02 (section 5.3.2)
- iii. Producing and proposing a new layout ideas (section 5.3.3)

“.. From here we can see many design idea and opportunities. The needs of open plan office panel for privacy. How the users created their future workplace layout that referring to their need and aspirations toward meaningful workplace.....” (DWD01, DWD02 and DWD03, design workshop03)

5.3.1. Designers Role in Design

The design issues that were highlighted by the designers in the design workshop 03 were the focuses on the guidelines provided by EPU. DWD01, DWD02 and DWD03, explained that they had to follow the guidelines and in the same time needed to fulfil the clients' expectation. Budget allocated by clients was one of the main constraints in every design development. They discussed and gave their opinions;

"... Designers can create more spaces without referring to the EPU or JKR regulations, but the overall cost will be increased. They can get what they want if their request is related to productivity..." (DWD01, design workshop03)

Further, DWD03 explained that;

"... The worker requested many things if we did not educate them. But the purpose of having it, and why they want it they don't understand. The managers know the needs of the offices and will controlled in overall. Too much facilities and accessories will make the workplace become unorganised..." (DWD02, design workshop03)

Interviews with expert (EX) in the earlier stage found that most experts agreed that users had their own needs and aspirations, but in other hand the workplace should refer to the worker job task.

"... It's depending on the nature of the job and the office occupants' attitude. For example small space will satisfy the user if the room is tidy. Although they get bigger space but not well manage, it become unorganised. Like it or not they have to work at their space..." (EX01, expert interview)

"... We need to think the needs of the workers. Exp; If they need more storages, did the storages are important? Could it contribute to productivity? Depend on the workers job task and current need. If their job need storages to keep the entire daily file so we should provide it..." (EX08, expert interview)

From designers' point of view in DW03, the workplaces ideas emerged in DW01 and DW02 could be good for users, but not necessarily for office management. DWD01, DWD02 and DWD03 explained that;

“... Designer cannot follow individual needs. We design and producing in mass production. It depends to their managers and at the end it's depend on the budget. For me the workers must follow the office regulations. They come to office to work and not for chatting. They must accept what were provided by the management...” (DWD01, DWD02 and DWD03)

“... One of manufacturer role is to propose ideas to the client that they think might meet the needs and aspirations of the users. Manufacture producing furniture in mass-production and it is impossible for them to meet the requirement of each individual. The layout maybe good for them, but not for the management...” (DWD01 and DWD02, design workshop 03)

In contrast, in expert interview (designers and office managers), commented that the roles of designers were not only to provide furniture but also to provide design solution. In doing so, the designers had to understand the office culture (section 5.5.6) and office development (section 5.5.5).

“... The designer task nowadays has to be changed. Instead of providing design idea they also responsible to provide solution...” (EX04, expert interview)

“... If we think about with long term of health effect by right the design should be reconsidered. The job task and technology nowadays are different compare to ten years ago. So the design and trend should be different...” (EX05, expert interview)

“... The workstation should be designed to last long. Static and dynamic dimension should be implemented. That is the most important requirements in office furniture. When the users' age increased the body posture will be changed. The design should be changed accordingly. The furniture for elderly workers is different compare to the younger workers...” (EX11, expert interview)

During DW03, I found out there were conflicts of opinions between designers and participants (by referring to layouts developed by the user). The layouts went beyond the requirements from professional designers in practice. As designers, they must compensate between design practise, policy maker requirement (EPU, JKR and MAMPU³⁸) and users' needs and aspirations. In the next section designers evaluated the layout emerged from DW01 and DW02 and analysed whether it revealed useful design ideas.

³⁸MAMPU – Malaysian Administrative Modernization and Management Planning Unit

5.3.2. Design Evaluation

Design evaluation could be divided into two stages. The evaluation was referring to the research themes (section 5.1.1, 5.1.2 and 5.1.3). First to evaluate office user currents layout and second, the design ideas that revealed from office users in the role-play with mock-ups and the design workshops. Design evaluation could be divided into two stages;

Stage one -The first stage of the design evaluation was to evaluate the main problems in current workplace (Figure 5.46)



Figure 5.46: Evaluation by Designers in Design Workshop 03.
Source Author DW03

'Designers have also the responsibility to forecast the long-term consequences (the socio-psychological impact on society). However, the overall socio-psychological impact of this change can only be evaluated after a certain period to learn for the future'. (Anjum et al. 2004:28)

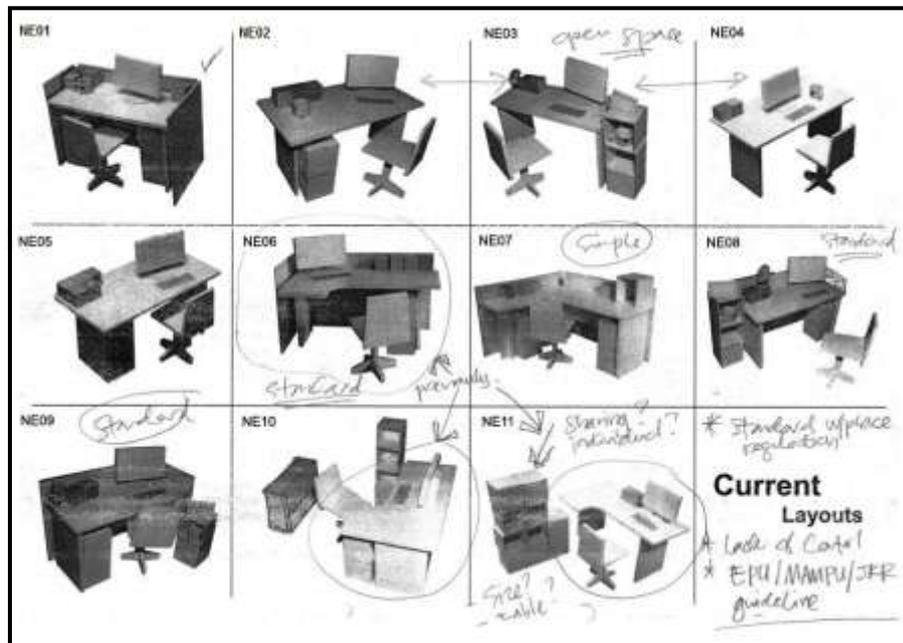


Figure 5.47: Office Workers Workplaces

According to DWD01 and DWD02, the basic furniture that should be provided in every semi/government offices is following the General Order³⁹ (GO) provided by Public Service Department (JPA) (Figure 5.47).

“... All manufacturers that involved in semi/government project have to follow the project brief and JPA guideline. Director/manager/head of department will decide the furniture by referring to the government budget and GO...” (DWD01 and DWD02, design workshop03)

“...the workplace layout that was provided to the office occupant shown in the role-play was the standard layout design and sizes from EPU/MAMPU/JKR guideline....” (DWD01, design workshop03)

In relation to this, EX10 (expert interview) stressed that;

“... Normally the department that makes the request should come out with the furniture requirement in term of quantity, but not design. They can appoint consultant or get the furniture requirements from reliable agency such as EPU/MAMPU/JKR. Both head of department and consultant knows about the standard...” (EX10, expert interview)

DWD 02 and DWD03 elaborated type of furniture provided for the open plan office occupants. All semi/government offices in Malaysia were provided with the same workplace layout.

³⁹General order – Public Service Department of Malaysia standard guidelines and regulations.

“... Workers were provided with one table, one chair and one mobile pedestal. That is the basic, other than that is optional depends on what the management or head of department requested. That why most of the layout was not included with cabinet. Except responded no NE10 and NE11 were provided with cabinet. I believed that is sharing, but not individual used...” (DWD03, design workshop03)

“... Types of table also depend on request and budget. Some office was provided with L-shape/side return table (NE06, NE07, NE10 and NE11). The open plan office panel (OPS) are also optional. Most of the OPS now a day were supplied together with the table as a system that we called open plan office system as shown in NE01, NE06, NE07, NE08 and NE09 layout...” (DWD02, design workshop03)

“... The main function of the OPS is to allow wire management and most important is to divide worker into cubicle that makes the management easier to divide the workers into team or working group. In certain cases no panel provided if their workplace facing toward the wall where the power plugs was near too the wall (exp NE02, NE03, NE04, NE05, NE10 and NE11)...” (DWD03, design workshop03)

I asked DWD02 and DWD03 regarding the issue of ‘lack of control’ mentioned by the respondents. All respondents explained that they were not involved in any design ideas in developing their workplace.

As a result some of the workplaces were not suitable for their daily job task and their requirement that resulted with workers dissatisfaction in the current workplace. This statement was supported by Marhizah Abdul Razak⁴⁰ officer in Ministry of Finance;

“... We received many complaints regarding the ‘products’ that did not meet the requirements. This will influence the workers job performance in long run. The workers will use the furniture maybe up to 30 years. The workers should be provided with proper furniture design according to their job task. It should meet the requirements of safety and health...” (EX10, expert interview)

DWD01 and DWD02 commented that they were no attempts to involve user in workplace development in any level in Malaysia as mentioned in section 1.0. To date, there were no educational research and studies on this area in Malaysia. Dola and Mijan (2006) in section 1.2 also mentioned that, majority

⁴⁰EX10. Expert interview on 10 January 2011

of the public in Malaysia may have limited awareness and knowledge of their rights in planning.

“... Unlike building, we have post occupancy evaluation regulation to evaluate the building in every year. That is the ISO⁴¹ requirement but not for furniture or workplace ...” (DWD02, design workshop03)

“... No opinion taken from user to build up the workplace so far. As long the manufacturers and suppliers follow and meet EPU requirement standard requirement, it will be OK...” (DWD01 and DWD02, design workshop03)

Respondents' arguments in DW01 and DW02 were influenced by their personal perception without knowing the requirement and regulation of the office environment. It was supported by expert interview:

“... For me the workers must follow office rules. They come to office to work and not for chatting. They must accept what were provided by the management. Privacy is not the main thing in open space office concept. But the main reasons having an open space is to prevent workers to doing other thing. That is Malaysian office culture. The open plan office teaches workers to work as a team and trust each other. Unless she or he is decision a maker in the office. They need privacy to do their job and their decision maybe confidential...” (EX07, expert interview)

In contrast with expert (EX) opinion, participants in DW01 and DW02 (section 5.2.3) explained that the concept of privacy for the workers was to prevent the feeling from being monitored by their boss, work concentration and to limit eye contact between colleagues.

In earlier interview with EX05, EX08 and DWD03 (DW03) pointed that the offices should be provided with social space such as staff lounge for the workers to socialise although one of the experts EX07 did not agree with the idea.

⁴¹ ISO - International Organization for Standardization

“... The designers have studied about these problems. That why they come out with the ideas of Bürolandschaft, X and Y theory and invented the Action Office design. Command and direct...” (EX07, expert interview)

“... The manager should provide special space for the workers. So they can keep their entire personal thing such as shoes, cloth etc. in one place. We should provide changing room, staff lounge etc. The workplace provided is for working only...” (EX05 and EX08, expert interview)

“... Having a social space is one of a good solution. But it back to the basic. For me it's depending to individual discipline. Sometimes the idea is good, but the workers made it failed. We can design and provide many things to the office workers, but is it benefit to the companies? We cannot give too many luxuries for workers. They must understand their task in the office is to work...” (DWD03, design workshop03)

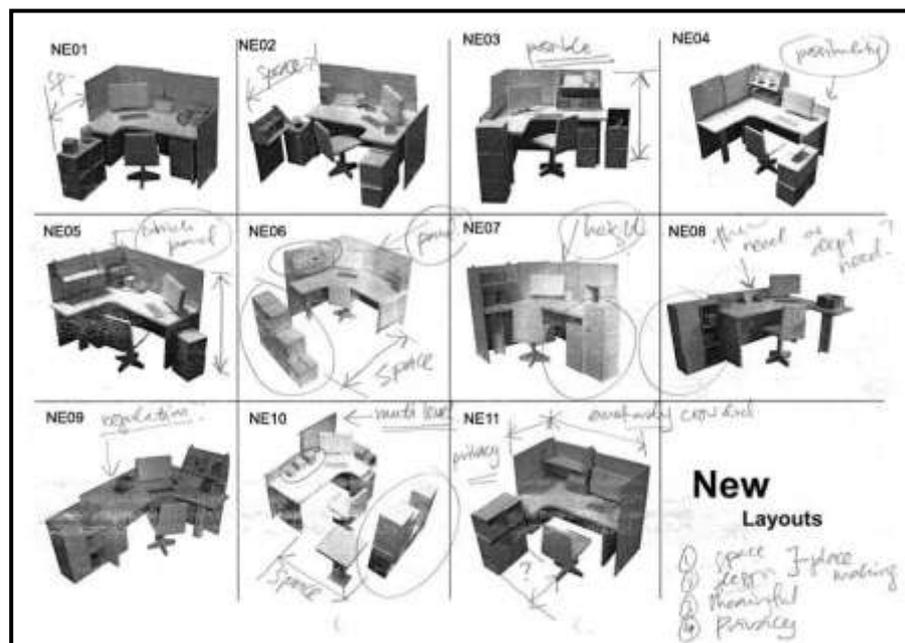


Figure 5.48: New Workplace Ideas by Non-expert Users

The **second stage**, of the design evaluation with designers (DW03) was to review the workplace design ideas by the office user (NE) (Figure 5.48) and in design workshops (DW01 and DW02 (Figure 5.49 and 5.50). The ideas from individual and design workshops were used to identify whether the process had created useful design concepts. The design activities showed how they implemented the concept of ‘personal control of space’ to personalise their

workplace according to their needs and aspirations. Design factors that revealed in stage 2, were used to develop the workplace in later stages.

DWD02 and DWD03 explained that there were many design factors that had to be considered in the design development (Figure 5.49 and 5.50);

“... The more we think about the need of the customers, the more challenging and interesting it will be. Purchasing department always think about cost, managers will cut cost, designer have to think the whole cost...” (DWD02, Design workshop 03)

“... User will be requested many things. As manufacturer we need to know to differentiate between user needs and dreams. The needs must be useful for the user and its company...” (DWD02, Design workshop 03)

However, in certain situation DWD03 explained that,

“... Design cannot fit to everybody needs and aspirations. The user itself must fit into the design...” (DWD03, Design workshop 03)

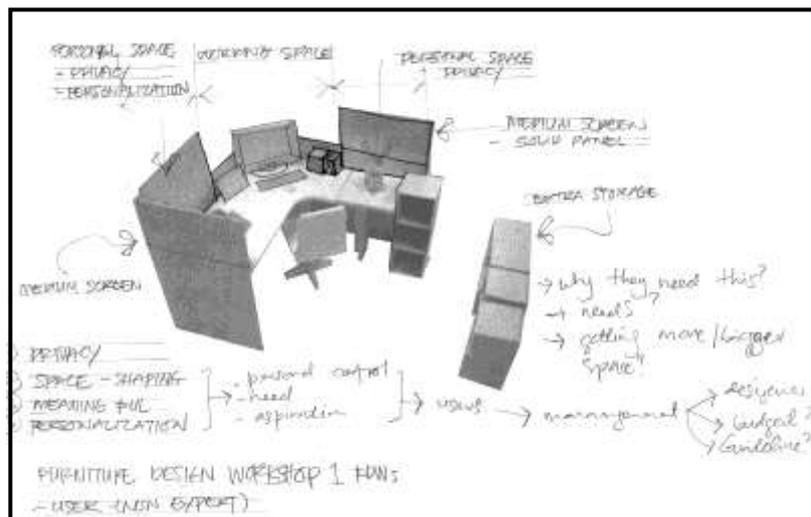


Figure 5.49: Idea in Design Workshop 01 (DW01)

“... The management (boss) will not allow this type of layout (refer to layout produced in figure 5.49 and 5.50). This is too comfort and privilege. Office is place for working. The places for us do our job task given by our boss. Not for leisured. Designer task are challenging nowadays, we must propose and give a solution that could meet the requirement of our stakeholder...” (DWD01, Design workshop 03)

they changed from steel to aluminium. Now the manufactures introduce standard size partitions which are 50mm width. Some parts are becoming standard part so all manufacturer can used it. (EX03, expert interview)

“... Normally in Malaysia customers will choose the lowest price. The design and trend comes later. The way of working and technology nowadays are different compare to ten years ago. So the design and trend should be different...” (EX05, expert interview)

“... Clients just follow the consultant. Everything depends on the designers. We can only change the layout within their working space. Not more than that. If we want to follow users’ needs we, need to do design development...” (EX09, expert interview)

“... Design revolution. Our government needs to think about this for future government workplace. Or else the workplace we remain the same and we will facing the same problem...” (DWD02, Design workshop 03)

“... MAMPU and EPU have their own requirement and furniture guideline. So we must develop that as well. The furniture manufacturers also have to think about this...” (DWD01, Design workshop 03)

“...We need to develop the workplace design and at the same time we can still maintain the size of the working area...” (DWD01 and DWD02, Design workshop 03)

Through the design evaluation by designer in DW03, revealed that there were three main factors that influenced the respondents and participants workplace design.

Though evaluation the designers concluded that respondents facing the issues of ‘lack of control’ that contributed to the factors of ‘personal control of space’ in their current workplace. In the role-play the respondents and participants built up their new workplace according to their ‘needs and aspirations’. What they needed were;

- a. **Privacy** that referred to marked the own territory;
- b. **Place making** referred to design as a whole system including, OPS, furniture configuration and storages;
- c. **Meaningful workplace** referred to personalisation. eg. personalised with belonging, ownership, sense of belonging

Example of privacy could be seen in almost all workplace configured by NE and DWs during the role-play with mock-ups. They constructed their office layout with medium height OPS. Except for NE08 and NE09 in figure 5.41 due to certain condition as explained in section 5.1.2.6 (NE08) and section 5.1.3.3 (NE09).

Some of respondents made place making to get bigger space in their current office for example NE10 and NE11 as discussed in section 5.1.2.2 and made total place making for their new workplace in DW01 and DW02.

All respondents and participants used personalisation to show their ownership and sense of belonging in their workplace by using their own belongings whether reflected to their office identity or themselves that contributed to meaningful workplace.

5.3.3. Design Development

Design development started after DWD01, DWD02 and DWD03 finished reviewing the workplace revealed from office users and previous design workshops (DW01 and DW02). DWD01, DWD02 and DWD03 also reviewed the guidelines provided by Economic Planning Unit (EPU) and opinions by experts with relevant knowledge, which were architects, interior designers, researchers, office managers and ergonomists regarding the workplace requirement.

“...We need to provide good solution for them (workers) and can be considered by the management and workable for designer. We need to maintain the sizes provided by EPU in the same time can meet the need of the user...” (DWD01, design workshop03)

“...it is impossible to change the working space. It will involve other factors especially the building and interior design. Workplace is only a component in interior. We have to redesign within the given space...” (DWD01, design workshop03)

“... Sometimes the customer will give you “rubbish ideas” but we should think it through. We can pick the good one. I think not only designer need to think and come out with an idea, but top management as well. Wrong layout and wrong office set will affect the job performance and

user satisfaction. This is not workers problem, but management problem... (DWD01 DWD02, design workshop03)

In the earlier interview with expert (EX), some of the expert suggested that;

“... As the designer and researcher we have to think about the user needs. We know that the space provided is limited. Instead of expanding horizontally we can think about expanding vertically. There are many spaces at the top that we can use. Table leg, partition table top can be multiple functions...” (EX05, expert interview)

“... The furniture has to be mass customization to meet the requirement of the user or otherwise we will remain to what we have now. Refer to the technologies we have in Malaysian industry, it is achievable...” (EX06, expert interview)

“... Future workplace should be modular type of furniture. It can be reconstructed form time to time. Maybe expensive, but the cost is less in long-term investment. We can expand the workplace rather than buy new furniture...” (EX07, expert interview)

Expert (EX03, EX05 and EX04) stressed that there were many workable design ideas suggested by the users that future designers should take into consideration.

“... Budget and the space constrain. If we still need more storage’s, so we might have to think to hide away the entire compartment somewhere within the space...” (EX03, expert interview)

“... We can design flexible partition that can move left and right. The storage can be hiding under the table...” (EX05, expert interview)

“... Been requested by the customer the design height adjustable partition using telescopic concept and can slide along the table. They can adjust the partition when they need privacy and when they want to communicate. That idea can be workable and still not exist...” (EX04, expert interview)

By taking all consideration in various aspect (ideas from EXs, NEs and DWs) DWD01, DWD02 and DWD03 started to construct a new workplace configuration (Figure 5.51)

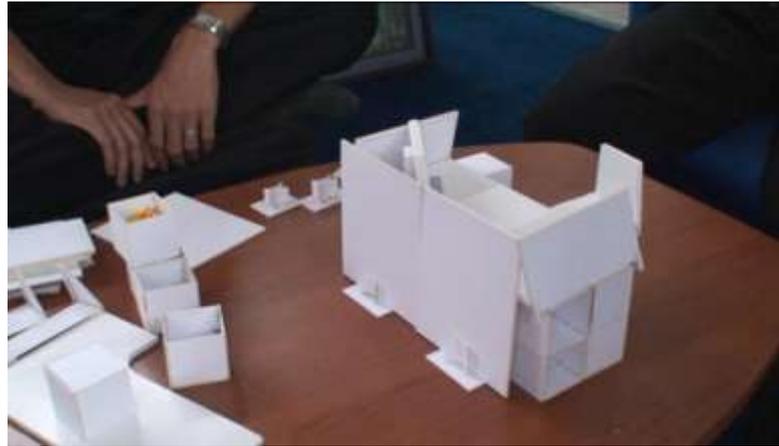


Figure 5.51: Design Development by Designers in DW03

“... Through my experience, one of the factors that contributed to stress is the partition. It is true they feel privacy, but in the same time it also makes them difficult to communicate with others and feel cramped especially when they have solid panel OPS...” (DWD01, design workshop03)

“... We can change to transparent panel for example glass. Providing with OPS means that providing working territory. Workers need their own territory in office. Although it is transparent users will feels their territory, emotionally. By providing transparent partitions is also providing better lighting and easy for the boss monitoring their staff working...” (DWD02, design workshop03) (Figure 5.52)

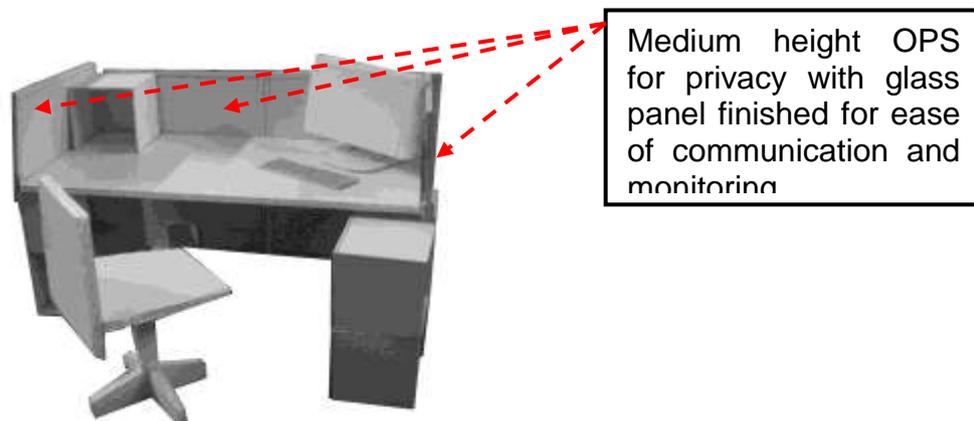


Figure 5.52: Idea Development by Designer-Privacy. Source Design Workshop03

*“... OPS and house fence is almost the same in concepts. Netting fence and brick fence is same, but gave difference experience. When we used net fence we can feel our space is big, we can see through, but in the same time we still have our territory. Compared to brick fence we cannot see through and we will feel cramped. It also prevents the feeling of ‘**Claustrophobia**’ by some office workers...”* (DWD03, design workshop03)

“... The OPS should be medium height screen. Eyes level height went we are in sitting position. Transparent partitions maximum one feet height from the table top to allow lighting. Not more than that otherwise it to high and the office space became congested. It just like working in a big space with many small rooms inside it. That is not open plan office system is all about. OPS are a system to promote team work and communication among office worker. The panels can be multiple finished to show uniqueness...” (DWD02, design workshop03)

Place making in this investigation was focusing on the workplace arrangement as a whole system. Place-making could be described as the process of creating environment that would attract people because they were pleasurable or interesting as explained in section 2.3.1.

Sundstrom et.al. (1982), Kupritz (2001) and Anjum (2004) in their research concluded that, desirable workplace should fit the needs and aspiration of its occupants that meet the requirement of the surrounding environment.

DW03 revealed that there were many potential spaces in worker workplace that were not fully utilized by the furniture designers. DWD01, DWD02 and DWD03 explained that furniture designer had to think actively to come out with a creative design solution within the limited space constraints (Figure 5.53)

“... Most manufacturers concentrated on table and open plan office system and neglected about the storages. Now they should focus on flexibility on layout and workplace configuration that cooperated with cabinet...” (DWD01, design workshop03)

‘... Instead of using table leg, we changed it into table structure. We convert it into storages under the table...’ (DWD01 and DWD02, design workshop03)

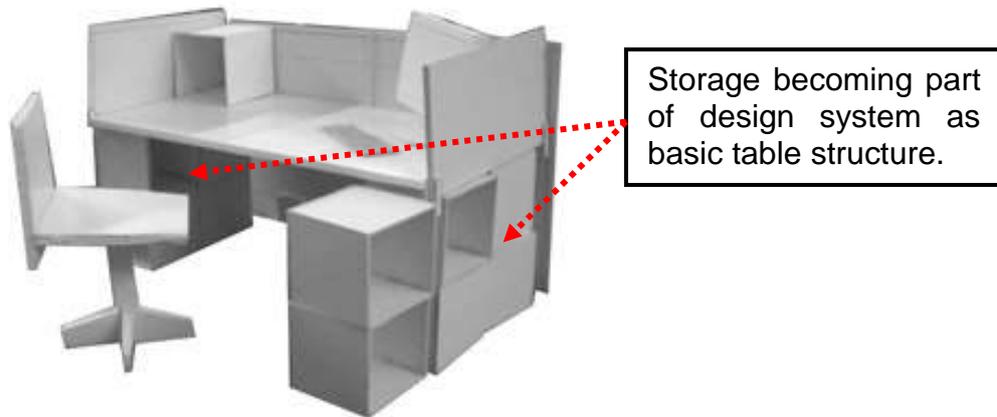


Figure 5.53: Idea Development by Designer-Table Structure. Source Design Workshop 03

“... One of the solutions is to convert the cabinet to become as table leg or drawer/pedestal. So we can fully utilize the space and maximize the storage. Part of the workplace design system...” (DWD01 and DWD02, design workshop03)

“... Everything should be changed to modular system. For example storage can be partition. So we can get extra storage under the table to bottom...” (EX09, expert interview) (Figure 5.54)

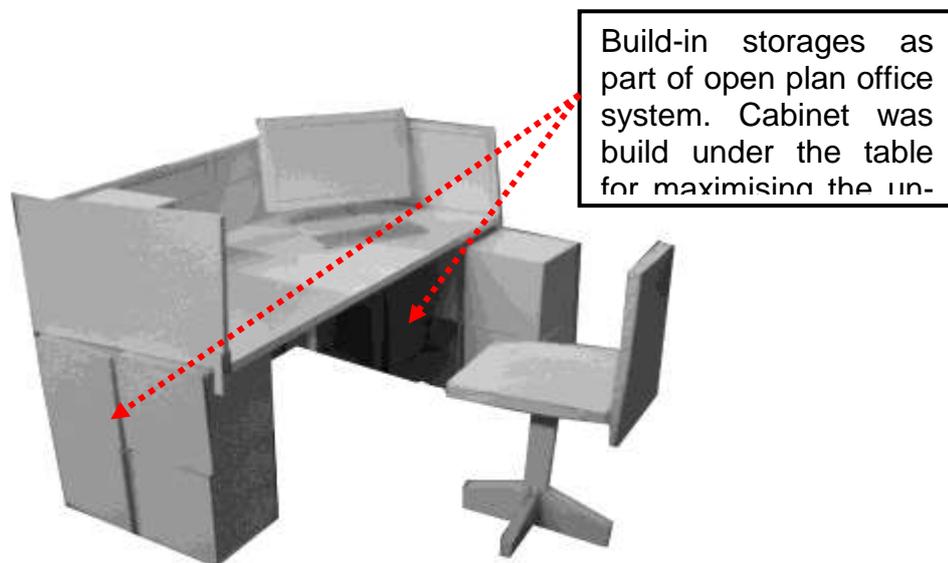


Figure 5.54: Idea Development by Designer-Modular System. Source Design Workshop 03

“... We changed the side-return table (Figure 5.55) into mobile pedestal (drawer). The workplace will become L-shape...” (DWD01 and DWD02, design workshop03)

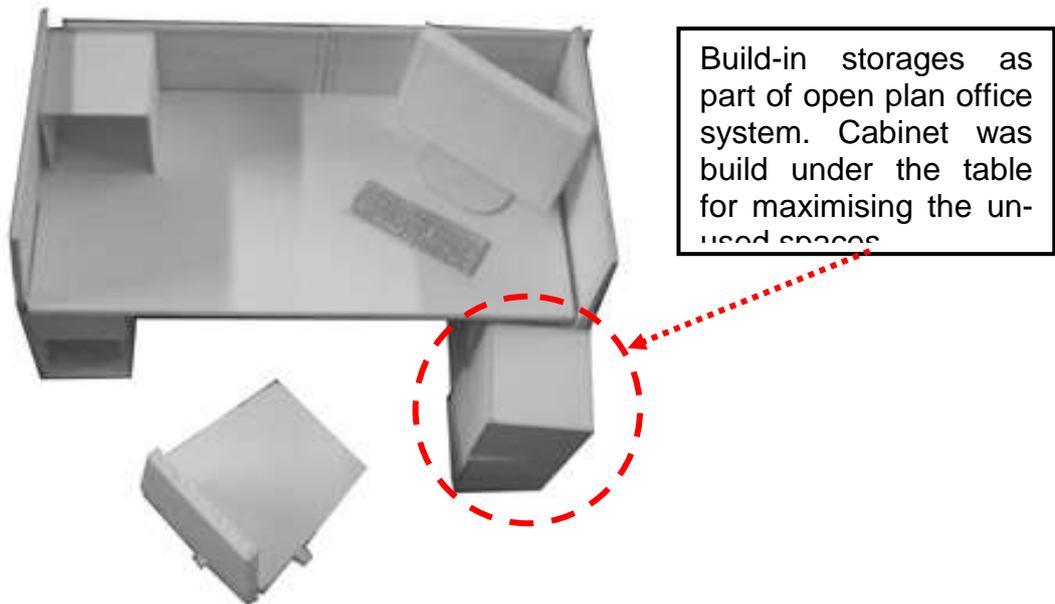


Figure 5.55: Space Utilization. Source Design Workshop 03

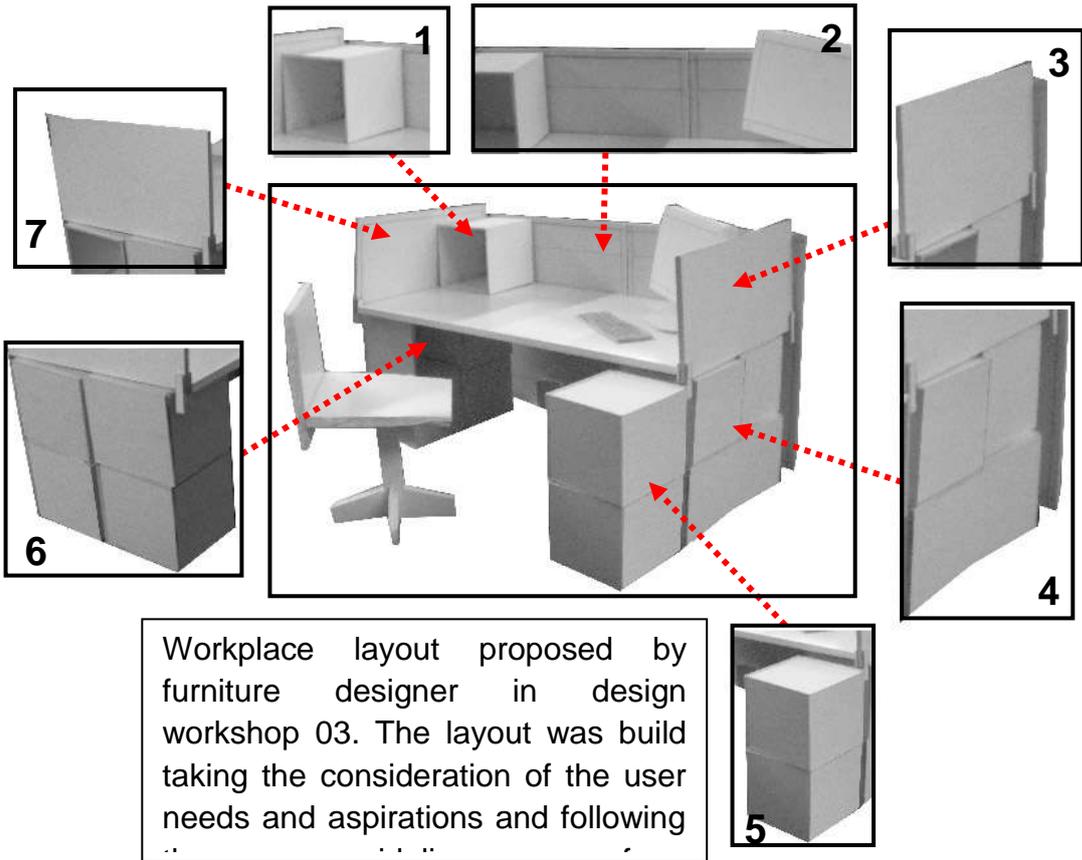


Figure 5.56: Idea by Designer in DW03

Table 5.3: DW03 Design Proposal (Figure 5.56)

No	Description
1	Display shelves - for extra storages and to display personal belonging for personalisation on the table
2	Front OPS –medium height - glass panel for ease of communication and monitoring.
3	Side OPS – Hanging medium panel – to allow them to communicate during working and personal control of space and privacy
4	Table leg as part of workplace design – as cabinet or extra compartment
5	Mobile pedestal as part of workplace design – as side table for extra working space
6	Table leg as part of workplace design and open plan office system – as cabinet or extra compartment under the table
7	Side OPS – Hanging Medium screen panel – to allow them to communicate during working and personal control of space and privacy

5.3.4. Summary of Findings in DW03

5.3.4.1. Designers role in design

- Designers (in this context) could easily identify participants' needs and aspirations by looking at evaluating the design ideas in NEs, DW01 and DW02.
- Designers could easily identify ideas emerged from the design workshops
- Designers agreed the roles of designers were not only to provide design, but also to provide design solution.

5.3.4.2. Design Evaluation

- The first stage of design combination of opinions between professional designers.
- Seeking for new design ideas and possibilities.
- Designers evaluated (according to the themes) whether the DW01 and DW02 had created useful design concepts.
- Designers evaluation to define considerable design factors that could be used to develop new workplace layout in the next role-play with mock-ups stage(workshop by designer)

5.3.4.3. Design Development

- Designers in DW3 used ideas from participants in DW01 and DW02 as factors in designing.
- Ideas from participants created more design opportunities for designers.

- Designers retained the existing space size (square meter per person) by following the policy makers' guidelines.
- Designers suggested to develop the workplace vertically (potential space) instead of horizontally.
- Designing with modular concept.

5.4. DESIGN WORKSHOP DW04 – REFLECTION BY DESIGNERS AND USERS

Design workshop 04(DW04) was the design reflection between designers and users. Design workshop 04 involved discussions between participants in DW01, DW02 and professional designers in DW03. DW01 and DW02 were to gain groups' ideas. In DW03, designers reviewed the users' design ideas which emerged from the design workshops and came out with their design ideas. DW04 open discussion between users and designers was conducted to explore participatory design process of specific workstation (Refer chapter 3, section 3.6.3).

The aims and main activities in design workshop DW04 were:

- i. Discussing about design workplace revealed in DW01 and DW02
- ii. Discussing about design workplace proposed by the designer in DW03.
- iii.

Design workshop 04 started with DWD01, DWD02 and DWD03 elaborate the main issues which emerged from the design workshop 01 and 02 (Figure 5.57).

“... Refer to the workplace design in DW01 and DW02. Users have divided their workplace into three sections and each section has different height and type of OPS. To standardize the OPS, we decided to attach different types of panel finished. For personal and working section we used solid panel OPS so people cannot see you while you are working and resting. To allow you to communicate with other, glass panel OPS will be used at the side left of right of the workplace. We are also thinking of adjustable height OPS design that could be workable...” (DWD01, DWD02 and DWD03 in design workshop 04)



Figure 5.57: Discussion between Designers-Users in DW04

“... The workplace layouts in DW01 and DW02 showed their aspiration according to your work task and needs. From here we can see many design ideas and opportunities. Meaningful workplace is more toward the users’ emotions, what you feel, your experience and how you created your workplace layout...” (DWD01 in design workshop 04)

Continuing, DWD02 and DWD03 explained the workplace design proposal that was produced by the designers in design workshop 03. (Figure 5.58)

“... Since most of participants complained about limitation of space, our opinion is to expand the workplace vertically instead of horizontally. When we discuss about office environment development, the main factors that have to be considered is space constrain...” (DWD02 in design workshop 04)

“...Since the users need a lot of storage, (referring to the pictures) instead of using normal table leg, we proposed to change the table leg as storage. The storage becomes as part of the table design. Space under the table is fully empty and unused. We can design a compartment to keep personal belonging...” (DWD02 in design workshop 04)

“... This is not the final design, but these are the proposals by the designers. The design ideas were emerged by evaluating the workplace design by the user in the early stages. Ideas from user that created design opportunities for the designer in developing new workplace...” (DWD03 in design workshop 04)

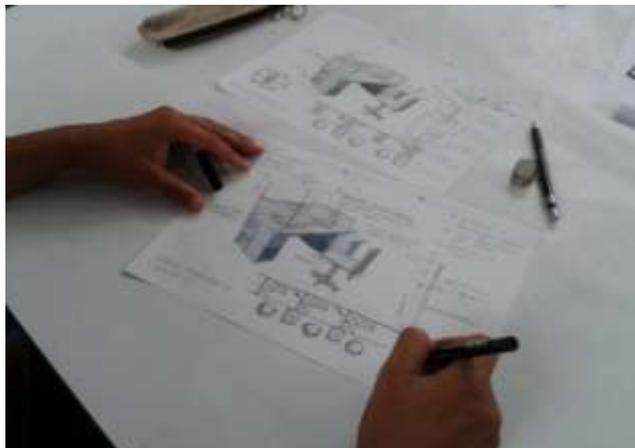


Figure 5.58: Design Development by Designer (DW04)

In design workshop 04 (DW04), the users’ participated to give their opinion and discussed on workplace design that had been proposed by designers (Figure 5.59).

“...For me this is ‘Ruthless’ proposal...” (DWS02 in design workshop04)

“... For me the design is acceptable, but I don't feel comfort with the storage under the table. It is difficult the take and put stuffs there...” (DWO03 in design workshop 04)

“... I agree with you. Maybe we can use pedestal with caster wheels, so we can pull in and out the pedestal every time we need to take something from there. Just like an idea from an expert interview EX04, or we can place the stuffs or filing, book, etc. that seldom used so we don't have to bend down every day...” (DWD02 in design workshop04)

“...We have no choice due to space constrain, the idea of having storage/cabinet under the table is a very good concept...” (DWS04 in design workshop04)

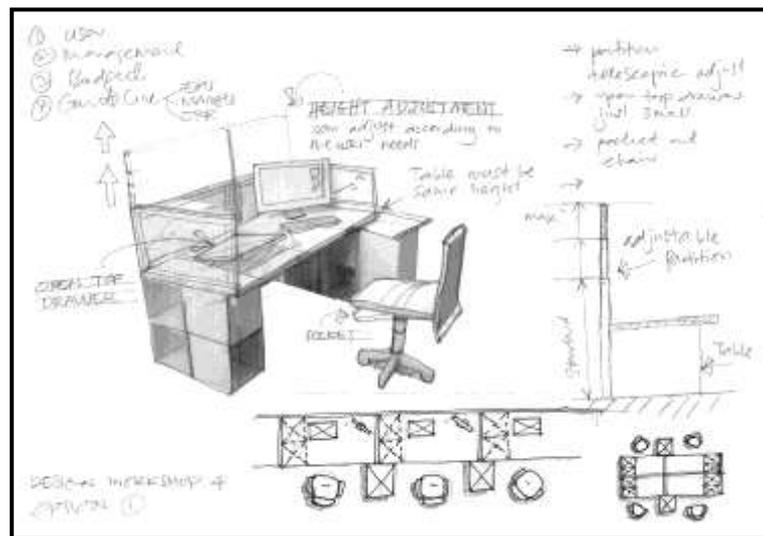


Figure 5.59: Discussion between Designer and Participants (DW04)

Thus, many of the participants agreed with the design proposal and stressed on some total design changes.

“... I like this workplace concept, but I think the compartment under the chair is not very practical. To put something under the chair is impossible. Office chair is mobile that why they put caster wheel at the bottom so easy to us to move. If we added a compartment it will make it heavy and difficult to move...” (DWO02 in design workshop04)

“... If we want to implement this concept we must redesign the chair. Not a big compartment like a boxes maybe just like a small pocket. We need total design improvement...” (DWS01 in design workshop 04)

“... As we mention earlier, we are looking for privacy in workplace and that is our priority...” (DWS05 in design workshop 04)

“... I don't really care about the design. It's OK for me. As long I get some privacy and more storage. Big or small workplace is the same. We still have to

do our job task given every day. Nothing difference. (DWO01 in design workshop04)

“... It's better to have modular system furniture. So we can decide and do it ourselves DIY concept...” (DWO05 in design workshop 04)

Reflecting to participants comment, DWD01 and DWD02 started to explore more design ideas. These were proposed by giving more options to the participants that related to their discussion.

“...we understand what the user needs and aspirations. Some of their workplace now is small. That is the main problem they did not follow the standard due to space constrain. All these depend on the manager. We as designer have to fully utilise the space provided to fulfil the user aspiration. (DWD01 and DWD02 in design workshop 04)

“... Another option is to have open top compartment on the table. (Figure 5.60) The same design in Malaysia secondary school table. Space under the table top is fully empty and unused. We can design a compartment to keep personal belonging...” (DWD01 and DWD02 in design workshop 04)

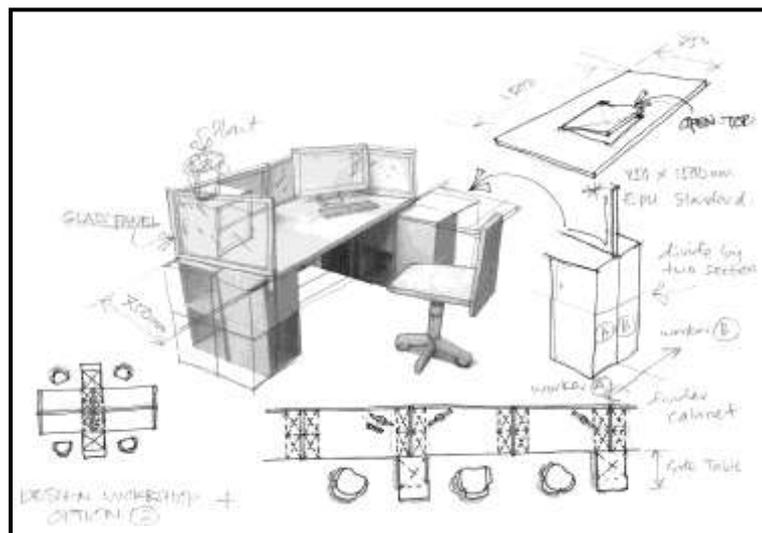


Figure 5.60: Idea Sketches by Participants in DW04

“... As for table, it is impossible to provide L-shape table for general clerk, unless EPU willing to change the furniture guideline. So what we can do is, instead of having a side table we can use mobile pedestal as a side table. What we need is to provide higher pedestal the same level with the working table...” (DWD01 in design workshop 04)

Additionally, DWS03 also gave her ideas for designers in design development. She realised that there were lot of potential spaces in developing the workplace vertically.

“... Since we can develop the workplace vertically, meaning that we can use the space until up to the ceiling...” (DWS03 in design workshop 04)

“... In that case we can attach the rack, cabinet and storages at the top and not limited only under the table. I think that is more suitable. It is much easier to take thing at the top rather to bend down under the table. We can use hanging cabinet and attached to the partition...” (DWS03 in design workshop 04)

DWS03 radical idea was adopted by designers;

“... I think that can be considered. We can build a pole up to the ceiling and attached the storages at the top. We have many unused space at the top...” (DWD03, design workshop 04)

“... We have the space from floor to ceiling. That is a big space. We have at least ten to twelve feet areas from top to bottom...” (DWD01 and DWD02 in design workshop 04)

“... In the same time we can fulfil users’ needs. Sharing space/cabinet concept is the best solution...” (DWD01 and DWD02 in Design workshop 04)

In design workshop 04, the issue of meaningful space was not highlighted by the designers in their proposed workplace. Their points of view regarding the meaningful spaces issue were similar with the previous researcher as discussed in my contextual review section 2.3 and discussion in section 5.1.3.4.

“... Meaningful workplace concept is very subjective. Office occupants could make their workplace become meaningful for them in many ways. The office occupant that makes it happens...” (EX01 in expert interview)

“... The most importance is how to increase productivities in the good working environment, comfort and conducive. It will influence the users’ satisfaction...” (DWD02, design workshop04)

“... Although they have long hour of working they will not feel stress if they have a good and comfort workplace that meet their needs. By having good design workplace will makes the workers working with their own will not force from the top management...” (DWD01, DWD02 and DWD03 in design workshop04)

“... Normally only the higher post/level staff will stay back in office because they have a very comfort workplace but not for the low rank office workers. It is time to do total development in office furniture...” (DWD01 and DWD02 in design workshop04)

“... Place making is crucial. Good design workplace will solve many problems. User satisfaction will contribute to meaningful workplace...” (DWD01 and DWD02 in design workshop04)

Reflecting to that DWS04 stressed that, she had her own way to make the workplaces became meaningful;

“... Workplace design will always looked formal with highly control of environment. Formal space makes my mind feel cramped. I need something that makes me feel relax. I would like to have a hanging tray to put a small plant and display my own belonging...” (DWS04 in design workshop 04)

DWO01 and DWO03 proposed their ideas;

“... It can be achieved in many ways depend on individual. That why when we developed our workplace we just provide some space to allow the user to personalise the workplace...” (DWO01 in design workshop 04)

“... If possible the OPS itself can be as an aquarium. So I can keep my fish (Laugh). Good environment will motivate me to come to work and to release stress and make it more meaningful to me...” (DWO03 in design workshop 04)

In my observation in DW04 generally participants in DW01 and DW02 was satisfied with the layout design developed by the designer in DW03. They commented that;

“...although we have our own aspiration we also need to consider about other factors such as cost, space and EPU guidelines...”

“... we agree with layout proposed by the designer. It we get this kind of layout in our office today a lot of problem can be solved. The users know why, but the designers know how....”

Through the design activity I found that the participants in design workshop 04 could collaborate to reach an agreement to come out with a design proposal. This was the useful design process that was not implemented by furniture designer in practice (practice-led refer section 2.1.3). The design process gave the opportunity for the user to participate in design process and this process could create a good relationship and understanding between user and designer. Refinement of the design through the design workshop 04 had created useful design ideas and opportunities.

5.4.1. Summary of Findings in DW04

- Creating active discussion between designer and user to seek for agreement in developing the workplace layout.
- Giving participants opportunities to engage and participate into the design process in real situation.
- Refining the design through open discussion and creating useful design ideas and opportunities.
- Active participation by users revealed more design ideas.
- Designer could quickly explore insights into user needs and aspirations without needing to do a complex observational study.
- Collaborating (non-expert and expert) in the design process to reach an agreement to come out with design proposal.
- Building user-designer connections in practice (practice-led).

5.4.2. Conclusion from Role-play with mock-ups

The results of the role-play with mock-ups with the non-experts respondents (office workers) from government and semi-government could be summarised in conclusions as follows;

From the role-play with mock-ups, respondents' dissatisfaction with their current workplaces due to the changes of their everyday job task. The interviews revealed that, the increase of staff in every two years in the department had changed the office landscape that made it congested and limited in terms space that resulted in frustration. There was a situation where open plan office occupant experiencing a situation where they had to share a small space with large number of people.

The role-play also revealed several issues of contributing to 'Lack of control' in the workplace; unchanged environment, irrelevant design, discomfort, no privacy and a decrease of safety, had given them the idea that the situation should be overcome by designers in their future office development. Additionally all respondents admitted that the workplace design had changed due to the development of technology that had influenced the way people

work in the office. The workshops indicated that the engagement of user and designer in this way was able to produce valuable design knowledge. In contrast, straight forward interviewing without mock-ups was much less productive. This could be seen and explored in my early practical work, connecting with user (section 4.1).

'Lack of control' in current workplace had influenced the users by rearranging their current workplace to get 'personal control of space' and to mark their own territory. Further, the users continued to get control of their workplace by showing their aspiration for a new workplace. Place-making, sense of belonging and privacy were the main criteria in the design workshops that they felt would contribute to a meaningful workplace.

Through discussion and role-play with mock-ups with individual and groups in the previous sections revealed a number of factors that were relevant to furniture designers and an understanding of users' needs and aspirations might be beneficial to designers and manufacturers in developing new workplace. In summary, this section explained the practical work of user engagement in furniture development.

In addition, these methods aimed to provide useful data for researchers and designers, and it could be implemented by designers in enabling them to understand the factors that influenced the office worker toward their office environment.

5.5. METHODOLOGICAL FINDING FROM THE FIELDWORK

The research was conducted to assist designers in how to engage users in their projects/design process that could reveal new ideas and design opportunities in developing new design for future use. The participatory design approach, which was the role-play with mock-ups, was used direct with the user (individual and design workshops) to reveal their needs and aspirations. I anticipated that these outcomes would be beneficial to designers and academician who would have the interest in the theory of design activity according to their own research context. Below I had

identified the methodological finding from the fieldwork and the reflection of the methodology implemented in my main data collection.

5.5.1. Using Mock-Ups as a Tool

When designing this method that included role-play with mock-ups, my main concern was that it would lead to just 'playing' instead of designing activities as questioned by Lemons et al. et al. (2010) who explored the use of LEGO in engineering design.

In my early practical work, I used interviews with office workers to stimulate discussions to explore user needs and aspirations in their workplace, but respondents found it difficult to explain these issues. Frequently, they struggled to describe ideas in terms of the existing furniture as discussed in section 4.1. To overcome this problem, I started to use mock-ups as a tool to explore users' ideas and engage them in the design process as adopted by Ehn and Kyng (1991) and Mitchell (1995).

In my main data collection (individual and groups) mock-ups had helped users and designers to predict the reality and imagine the future possibilities. Respondents and participants used the mock-ups to ensure the layout design should fit their needs and aspirations. This was the place making process that had been explained in chapter 2 sections 2.3.1.

Mock-ups encouraged active and enhanced user involvement, unlike traditional specification documents as revealed in my main data collection process in section 5.1 to section 5.3.

Ehn and Kyng in their research have discussed the used of mock-ups in design activity. They explained that;

'Certainly we did not invent the ideas of using mock-ups. Kids have always been good playing with mock-ups. It is hard to imagine human life without these kinds of game'. (Ehn and Kyng 1991:173).

‘Most inspiration (in relation to mock-ups) comes from industrial designers. One example is the use of ergonomic rigs. This is a mock-up environment in which designers and users together can build mock-ups of, for example, a future work station. Several alternatives can be designed and the users can get hands-on-experience’. (ibid:174)

As mention in section 3.6 and explained in 4.3.1, most of the respondents were from non-design background. By using mock-ups, individuals and groups, were able to explain their problem in their current workplace and conceptualized their needs and aspirations for new workplace design. This is expanded in section 5.5.4.

Lemons et. al. (2010: 304) in their research in using mock-ups, explained that, building and evaluating their physical model helped engineering students understand the differences between real behaviour/action and conceptual models used to predict that behaviour action. (In his research, students were used as relatively naive participants, similar to the office workers in my context).

Lemons et al. suggested that, a constant process of experience, observation, conceptualising, testing ideas, receiving feedback and re-evaluation, provided a fruitful framework for design thinking with mock-ups which I had adapted in planning this task.

Respondents/participants confirmed the value of the mock-ups process, eg:

“... This is better for non-designer who doesn’t have any design knowledge. Users sometime difficult to explain their needs, but it is easy to perform rather than explain. It is almost real to actual thing...”
(NE01, non-expert)

“... I like this method because we can see it in three dimensions (3D) rather than on paper. Using mock- ups is much clearer. We can change and rearrange the mock-ups. We can overcome the problem of communication between designer and customers/users. The user can show their needs and aspirations easily. Although it is not perfect, the most importance is to reveal users ideas and what they have in their minds in general...” (DWO05, design workshop 01)

“... Users are not same as designer. They don't know how to explain the situation in design words. Using mock-up we can easily perform our daily job and shows our ideas for new layout. Mock-ups are just like sketches, but in 3D...” (DWS03, design workshop 02)

To make sure the respondents and participants focus on discussion rather than the mock-ups appearance as explained by Rahman (2010), the visually neutral format that was explained in section 4.2 was used. The format was designed in such a way to engage the respondents and participants to concentrate on building the workplace rather than discussing aesthetic aspects of the mock-ups.

“... The mock-up is white at least we can see the basic form of the layout. That is important. Otherwise we will discuss about colour or materials etc...”(DWD02, design workshop 03)

“... This is the appropriate method for designer to communicate with user. Basic plain mock-ups are easy to handle, simple and fun. Although the mock-ups are not 100% accurate, but we can evaluated the basic ideas. The process is much faster. We can save a lot of time in designing and meeting it also could prevent miss- communication between user and designer. (EX04, expert interview)

“... I like this method because we can see it in 3D. Previously, designer dealing with customer in 2D sketches. It was built in white colour and using 'LEGO' concept that was easily understandable. We can change and rearrange the mock-ups. A tools of communication between designer and users...” (DWO01, design workshop 01)

My analysis identified that mock-ups could be most useful in early stages of the design process. This was the process to achieve place-making (section 2.3.1) toward meaningful workplaces (section 2.4). Mock-ups provided hands-on tools for gaining data to be used in improving the workplace and provide a physical focus for users to verbally express their needs and aspirations. This was despite the relatively low functionality of the mock-up units and the fact they could be seen as a type of game-playing (Lemons, 2010) which may be culturally undervalued as a productive activity for adults.

1. they encouraged hands-on experience. Everybody had the competence to use them.
2. they were understandable, users could easily identify and predict their layout almost in real situation.
3. they were workable, easy to handle and fun to work with.
4. they were mobile, cheap and easy to use. The role-play in the modules could be reused and conducted many times without using big investment, efficient and easy to be upgraded.
5. users could predict more easily and imagine new workplace designs physically and emotionally (layout design, surrounding environment, sizes etc)

5.5.2. The Advantages of Implementing Role-Play with Mock-Ups

The results of the role-play with mock-ups with individual and in the design workshops were treated as a single body of data in the analysis. The study findings in section 5.1, 5.2 and 5.3, revealed that role-play with mock-ups was a productive tool to explore the office workers' needs and aspirations in the Malaysian setting and also with some UK users from the pilot study. By using mock-ups all respondents and participants in design workshop groups could easily reveal their current problems and contribute design ideas that created useful design opportunities for designers in developing new workplace designs.

Lack of control was a dominant theme among users. Mock-ups did only help to reveal it, but also allow users to delve into the problems. It had the capability to explore the issues of 'lack of control' in current office (limited space, frustration, no privacy, design, dissatisfaction etc). How users' deal with their current situation by taking control of their personal spaces (personalisation, place making, sense of belonging and communication)? How the participatory design approach, role-play with mock-ups was used to explore users' needs and aspirations for new workplace? For example from the transcriptions, it could be seen that, in design workshops DW01 and DW02, once mock-ups were in use, participants who had been reticent, became more active in contributing ideas to the discussion. Many design

ideas were revealed once the participants started the role-play with mock-ups compared during their early discussion (section 5.2.2).

Using mock-ups as tool could easily facilitate the participants to communicate among group members and quickly sought for ideas agreement. This example of feedback in DW01 and DW02 explained the advantages of using mock-ups:

“... Although mock-up is a low technology approach, but I think it is easy to understand. We can observe in 360 degree. Sometimes non designer cannot imagine the layout will look like when they see it on paper. The users can easily give their opinion and changed it directly. Maybe in the future we can add colour in the discussion to make it more realistic...” (DWD02 in design workshop 04)

“... They don't have to explain in detail. We already know what the users want by looking the layout. Simple, faster, easy to understand what the user needs and they have in their mind...” (DWD01, design workshop 03)

“... The users have different level of design knowledge compared to designer. They don't have design knowledge to explain about design principle eg. balance, form, space, shape etc. It is understandable and we can communicate, discuss ideas and seek for agreement easily by using 3D mock-ups...” (DWD01 in design workshop 04)

The participatory design approach, role-play with mock-ups was discussed in my chapter 2 section 2.5.2. Mitchell (1995) elaborated that, the used of mock-ups enable non-designers to participate directly in the design process.

Supported by Ehn and Kyng (1991) research revealed that mock-it-up is a successful way of envisioning the future work situations that have four main advantages 1) encourage hand on experience, 2) understandable, 3) cheap and 4) fun.

In relation to this, Lemon (2010) and Yazid (2010) explained that building mock-up can help user to investigate and predict between the real behaviour by using conceptual design. It is part of an open-ended problem offering opportunities for creative thinking and help design skill.

5.5.3. Engagement with User

Several approaches by many researchers had been used in attempt to engage user in designing. For example, using questionnaire, interview, observation, 2D computer aided design etc. However, traditional medium such as two dimensional scale drawing was difficult for many non-designers to understand. (Ehn and Kyng (1991), Mitchell (1995), Lemon (2010) and Yazid (2010), Rahman (2010)).

The research had similarities with previous work by Rahman (2010), who created a framework working with stakeholder and seemed to work effectively in both United Kingdom and Malaysian context (section 3.3). Rahman used 2D images of household product to investigate cultural migration from traditional rural life to an urban industrial setting, where 3D mock-ups were used as research tools to explore users' needs and aspirations for new workplace.

Rahman (2010:191) explained that, to connect with the participants, an understanding between user and designer needs to be considered. In this research interviews and mock-up training session were used to build an understanding and connection with users (individuals and groups).

There were three main groups in this research (non-expert(NE), expert(EX) and design groups(DW)) as elaborated in section 3.6, each was approached differently.

Through my past experience working with user (section 1.1), there were many rules concerning government agencies in doing this research. The application for data collection took about six months for approval. Due to time constraints, most of respondents in NE and DW groups were recommended from my local contacts, colleagues, manager and friends as described in section 4.3.1.1.

Design workshops were also divided in three main groups; office users, design students and designers, as implemented by previous researcher. For

example Ehn and Kyng (1991) and Mitchell (1995) used opinion from user, Lemon (2010) and Yazid (2010) opinion from design students and Yazid (2010) and Rahman (2010) used opinion from experts. These groups formed a balance in opinion that was elaborated in my research findings.

There was no formal source that could lead to appropriate respondents. In this research, all of the respondents volunteered comprising from several semi/government agencies and the sample expanded by using snowball technique.

They were interviewed outside, but near their workplace such as at staff lounge or they were invited to the research lab in UPM where they were interviewed in a conducive office setting.

Most of the expert respondents were recommended by my professional and academic colleagues and they were directly contacted (4.3.1.2). EX was involved in the research field (e.g, design lecturer, office management and ergonomist) was approached easily due to same research understanding and the importance of research area. EX that involved in manufacturing and furniture design were willing to contribute their knowledge to seek for new design opportunities and to develop for future workplace design in Malaysia. Expert tended to speak either fully in English/Malay language or they mixed both languages (section 3.6.2).

During the design workshops, I recognised that by working together with the users in the role-play with mock-ups (eg section 5.1 and 5.2) contextual review (section 2.4.4), and by using my own past experience engaging with users in Malaysia (section 4.1), had enabled me to respond to users discussions and recognised their situation. This approach was also used with Bayer and Holtblatt (1999), they sat with the office occupants in their workplace to get the actual situation of office environment (eg. How they work, what they do, needs etc).

It might be necessary for future researchers to have an experience working/engaging with the users in order to become familiar with the office working culture or environment in their target market. Through my experience during the role-play with mock-ups in the pilot study and main data collection, the researcher was the key person to provoke the users to reveal their needs and aspirations. As explained by McCracken (1998), the investigator is an instrument in data collection. The investigator cannot fulfil their research without using their own experience.

In the interview, the questions were only a guideline and the topics of discussion were developed during the sessions. Without any understanding of any office furniture, it was difficult for researcher to gather data from users or experts. For example, designers needed to understand the office regulation, the workplace requirements that some of them were not published in any reports or books in Malaysia. Rahman (2010) in his research found that, it was relevant to recruit local people that had undergone preliminary training as researcher to help to overcome the obstacle of working in unfamiliar environment.

5.5.4. Respondents Participation

From my early practical work (4.1) and pilot work (4.1.1), I experienced there were some difficulties during the interview with office occupants. The discussions about design were limited since the respondents were non-designers as explained in section 4.3.1. Some of the respondents and participants were also have the difficulty in understanding the function of the mock-ups during the role-play.

Therefore, the weaknesses of the research approaches were the main obstacle to the respondents to get active in the design activity.

From there, I recognised the need to develop a social interaction technique to inspire active participation. After a short interview and project briefing by the researcher, I created a mock-up training session to establish a connection between the designer and the stakeholders (section 3.2.3.3.2). The activity

seemed successful when the respondents started to use the mock-ups as a tool for communication rather than a passive responses and lack of interest during the interview session. They started to reveal their ideas and build their argument about the research topic.

The mock-up helps the respondents to overcome their ignorance in design and started to share their interests. This had created a 'bridge' between researcher and user. This could also be conceptualized as tools for communication between designer and user providing a shared visual language.

The mock-ups facilitated the communication and created an engagement between the designers and office users. This introductory phase was important to establish connection and enable respondents to develop further discussions.

"... Mock-ups facilitate and promote to active participation among group members. Active by doing..." (DWS05, Design workshop 02).

"... It's easy to perform rather than to talk. Mock-ups persuaded the respondents to voice out and get active in the role-play. Participating by doing..." (DWO02, Design workshop 01).

'If the future users also actively participate in design, the mock-ups may be truly useful and a proper move toward a change reality. But are mock-ups really professional design artefact? Yes, they are'. (Ehn and kyng, 1991:175)

According to Rahman (2010), by developing these similarities and sharing commonalities, knowledge barriers between designers and participants were broken down as this eased the process of communicating with them. Thus, in his research he found that relationship between the researcher and the respondents had to be creatively crafted and manipulated to serve the interest of good qualitative inquiry. These factors required judgement, background knowledge and sensitivity on the part of the designer or researcher (section 6.2.1).

5.5.5. Environment for the Research – developing Office Workplace in Malaysia

The process of creating Malaysian workplace design was still ongoing as discussed in section 2.5.4. Since Malaysia is a developing country that has been adopting American and European ways of working since independence in 1957(section 2.5.5).

In my main field work, I focused on open plan office occupant as my case study since all government/semi government offices (section 2.5.5) were implementing open plan office system concept.

They were sitting in the large space and divided into small cubicles with different job task as stated in table section 4.3.1.1.

Through my evaluation, Malaysian office workers implemented similar ways of working, since most of the public offices used the same General Order from Malaysia Public Service Department. All Malaysian government/semi government offices practising similar office culture and facing the same working issues (section 4.4.2).

Through my field work, All Malaysian government/semi government offices used “office landscape” concept that was introduced in Germany by the Quickborner Team in 1950 and X and Y theory that was developed by Douglas McGregor (refer section 2.2). Office workers sat in their workplace for years in their tenure without improvement. This was revealed in my interview with NE in my main data collection (section 5.1.1) as a result they felt ‘lack of control’ and started to get ‘personal control of their space’.

Through my contextual review (section 2.5.4), interviews and discussions with designers in design workshops (section 5.3), expert participants reported that Malaysia still used the guidelines that were established during the colonial era and they were endorsed in design books published in Malaysia. Although MAMPU, JKR and EPU were established after independence (55 years ago),

the influences from the British were still present in Malaysian office development. This emerged during my interview with experts.

“... We still don't have Malaysian standards. Most of the dimension came from either USA or UK. We get the guidelines from Economic Planning Unit(EPU). Who verify the criteria and decided it was unknown because there are no architects working in EPU. Their job is only planning...” (EX07, expert interview)

“... When we compare the dimension between UK and US it seems to be almost the same. Our anthropometric size should be different because our people are smaller than people in UK and US. That why Japan has their own anthropometric dimensions...” (EX09, expert interview)

“... I think the manufacturers are influenced by Europeans because all the design concepts come from Europe. They just change the materials according to Malaysian markets. I think the guidelines were used since British conquered Malaysia hundred years ago...” (EX02, expert interview)

During the interviews, most experts especially furniture designers, interior designers and architects were only concerned about guidelines without taking users social and cultural factors as consideration in developing workplace (section 5.3.1 and 5.3.2).

“...We have a handbook provided by the government. We just follow the guideline provided by EPU. No more than that...” (EX07, expert interview)

“...We don't do any interview with the office occupants to explore what they want and their needs. We just follow the project brief and recommendations from the clients normally by their boss...” (EX09, expert interview)

Malaysia has its own office culture for example personalisation, tendering to organise space etc as revealed in section 5.1.3. None of the designers were interested in social and cultural aspects. The Participatory design approach was able to unblock the process, thus encouraged designers to think beyond the restriction area (section 5.1 and 5.3). Malaysian designers needed to go

beyond other function requirements of key dimension. Arguably, it was time for Malaysia to establish its own Malaysian Standard.

“... Not all Malaysia designers willing to compete with other international designer. They just a follower not trends setter. The ways people work in office were changed rapidly every year due to the change of the technologies, IT etc. The design should be developed to suit current office needs...” (EX06, expert interview)

In my field work, most of experts were positive on the potentials of developing Malaysian design workplace.

“... For me we should revise all the guideline/procedure in developing our office according to Malaysian sizes. Malaysian anthropometric is different compared to UK. Then we can develop our own Malaysian workplace...” (EX08, expert interview)

“... Seating, table and the whole workstation should be designed to last long. Static and dynamic dimension should be implemented. That is the most important requirements in office furniture...” (EX03, expert interview)

“... Most of the owner of the furniture factories did not know about Malaysia anthropometric dimension. This is the role of designers. They must have the awareness. And for me Malaysian designer must have their own design society should discuss and come out with Malaysian standard according to Malaysian population. All the design requirements should be centralised under the design society...” (EX11, expert interview)

Through the design works with users and designers (section 5.1, 5.2 and 5.3 and 5.4) in the fieldwork, they revealed, there was still a lot of efforts had to be conducted with the users and policy maker in Malaysia in order to develop the Malaysian workplace. Many potential ideas and design opportunities emerged during the role-play with mock-ups (section 5.1.3) that could contribute for better workplace design.

This research was conducted to explore the needs and aspirations of office workers as stressed in my knowledge contribution section 6.2. As mentioned in section 1.0, there were no academics research and studies on this area in Malaysia.

5.5.6. Understanding Office Culture

Before conducting the interview and the role-play with mock-ups, it was important for the researcher to have relevant knowledge including respondents' background and open plan office environment. In the participatory design work with office workers, I was able to develop an understanding of Malaysian office environment, for instance, the professional culture described above, was useful for many designers undertaking such work. The development of cultural insights is discussed below.

Through my past and present experience as professional designer and researcher (section 1.1), and through my early practical work (section 4.1), I have been able to establish effective communication and interaction skills with users and experts. Since I was working with non-expert, it was important to me to understand their every day working culture, job tasks and their behaviour in their workplace. According to EX01;

“... The non-managerial staff not used to give opinion. They just come to work and do their task...” (EX01, expert interview)

This was able to be identified in the beginning of my role-play with mock-ups in section 5.1.1.2., the office occupants explained that they did not have the authority in giving the opinion during the office development. This was the same situation with non expert users in design workshop 02 which came from the same group (office worker).

Most of the NEs were sceptical in the beginning, especially when they were questioned involving their office environment and workplace (section 3.6.1.2.). For example NE01 felt worried to voice out her dissatisfaction about her colleague. Reflection to this, all NEs remained anonymous as agreed by all respondents and participants (section 3.2.2.6).

“... Some staff is too bossy because they are senior in that office. I hope they don't know what we discuss today...” (NE01, non-expert interview)

“... People are not allowed to go in the office space, but I can show you my workplace (using mock-ups). Not because this workplace is not good, but this is truth about our workplace...” (NE03, non-expert)

All NEs mentioned that this was the first time they were interviewed by designer/professional regarding their workplace and involved in design process in developing their new workplace. Their workplace layout had always been changed without their knowledge. They were also not given the opportunity to give opinion.

“...although I can be considered as one of senior in this office, until now I don't have any authority to give opinion...” (NE06, non-expert)

“... only our manager have the authority to give opinion and decide for us. As a worker we have our needs, but we don't have the opportunity to give ideas...” (NE01, non-expert)

“... This workplace is congested and not comfort. We have complained and give some opinion how to rearrange the workplace to my head of department, but no action taken...” (NE08, non-expert)

Through my main data collection I observed that, most respondents and participants started to give their opinions when they were asked about their problems in their current workplace and their needs and aspirations in their new workplace.

During the role-play with mock-ups, all sub questions were derived according to the respondents' interests. For example, some of NEs were particular to have a personal space to sleep (section 5.1.2.5) and some of NEs were concentrating on place-making that they believed could improve their working environment (section 5.1.2.2). They used the mock-ups to articulate their needs and aspirations.

As mentioned by Bowen (2007) in his investigation (chapter 2 section 2.5.2), people find it hard to articulate what they need if they do not know what they can have. The use of low technologies mock-ups with users was to develop an understanding of their needs.

Although I have involved in office furniture as designer and researcher (section 1.1), only when experiencing the actual situation (pilot research section 4.1.1 and fieldwork section 5.1, 5.2, 5.3 and 5.4) I could determine the actual current situation of the office culture especially involving the non-managerial staff, especially on how to engage them in my data collection. Understanding their needs and aspirations enabled me explore their insight.

Through my observation in design workshops (section 5.3.5.4 and 5.5), users created many useful design ideas and opportunities for designers to develop future design furniture/workplaces.

‘Clients repeatedly tells us that most significant thing to do is put the designer in front of the user’. (Bayer and Holtblatt, 1999).

Further, Bayer and Holtblatt stated that, experience sitting with customer, will change designers’ perspectives and appreciate what the issues are and why they matter. Working together with users could help designers to understand the users working culture that led the designers to form their research approach and facilitate them to engage with users for their data collection

Amri (2010), professor and social scientist in Malaysia stated that, 80% of Malaysian workforces are educated up to the secondary level of school, since the nature of Malaysian education is exam-oriented and not focusing on critical discussion. The best way to engage the user in research is to “Knowing by understanding them” (ibid:2010).

“...difficult to predict what they want, unless we have ability to approach them to makes them to voice out...” (EX06, expert interview)

“... we always built up a barrier between people starting from our early education. Teacher with student, student with lecturer, manager with workers etc. The best way to understand them is not only understand what they need but also how they behave...” (EX01, expert interview)

Detail explanation (section 4.3) with research technique in section 3.5 and 3.6, enabled me to recognise the appropriate approach to engage with users

to participate in the investigation. Dola and Mijan (2006) in their research regarding sustainable planning in Malaysia explained that, participation could encourage intellectual development, appreciation of multiple characters of the society and reduce the command and control mode of the decision maker.

Thus, Dola and Mijan found that this could be done through providing the opportunity to the public to participate in a decision-making process. The objectives of this research approach (section 1.4) were to provide methods for designers to engage users in design development as explored in chapter 5.

This indicated that it was not only the final design solutions which emerged from this research that were valuable, but also the productivity and impact on staff morale which resulted from consultative intervention.

5.5.7. Enhancing Connection between Designer and User

In my early investigation, I observed that office workers were struggling to express their problems and ideas during the interview (section 4.1). Therefore I started to use mock-ups as a tool to communicate with users. In this investigation I found that, the implementation of role-play with mock-ups helped to reduce the communication gap between the designers and users. It also helped the designers to engage with users' speculative thinking about the design problem. As highlighted by Ehn & kyng (1995), Lemon et al. (2010), Rahman (2010) and Yazid (2010), artefacts are important tools for communication between designer and participants and also among group members in design work (section 5.5.1).

With an understanding of the office culture in the early stages (section 5.5.6), had facilitated me to understand the users (individual and groups). Each group was approached with different techniques.

For example each role-play with mock-ups (individual and groups) started with interview and mock-up training sessions (as explained in section 3.6.1.1 and 3.6.3.2) to gain understanding and to establish connection. The questions in

this session were evolved according to their response and issue arose during the role-play with mock-ups activities. In my main data collection (eg. section 5.1) the designer played an important role to assist and facilitate users during each mock-up sessions.

In design workshops DW01 and DW02, the participants not only used mock-ups to establish connection and seek agreement between groups, but the method brought them together as a larger team rather than set them apart (section 5.2.2).

Similarly in Mitchell's (1995) The Jordan project, each family in the project worked with a design team consisting of an architect and social workers to develop individual house designs. The clients were shown a kit of modular scale model furniture and elements such as wall, doors, and windows. During the mock-up sessions, the architect assisted and facilitated the clients in assembling the mock-ups and enacting everyday activities with the mock-ups.

Yazid (2010) demonstrated that user participation could change and improve this relationship between user and designer in a Malaysian context. He used an approach of 'Planning for Real®' where participants and designers used scale landscape mock-ups in design planning.

It was suggested that the role-play with mock-ups was able to overcome the lack of altering to demonstrating the user needs and aspirations. This process had both engaged the designing process with users (section 5.1 and 5.2) and produced productive design ideas (section 5.4).

5.5.8. Methodological Conclusion

This research revealed that designers were not able to predict the future design once it came to a product that involved users' needs. Through a participatory design approach, the designers could identify useful design factors that could be implemented in developing new workplaces.

Rahman (2010) in his research mentioned that, research that involved users understanding cannot be gained in studio work and it required an engagement with stakeholders.

Further, Bowen (2007) stated that, there is an important opportunity to use mock-ups, not only simply as agents for critical reflection, but more instrumentally within human-centred design activity as “creative probes” to explore a novel problem context.

As with Lemon et al (2010), I found that the mock-ups work as three dimensional sketches for non-designers who lack of drawing skills. The process to produce a layout was taking a similar span of time in producing 2D sketches by designers in 03 and 04 workshops.

McCracken (1988) and Yazid (2010) stated that, it is essential for designer to developed good skill to adopt this research approach/method (chapter 3 and elaborated in chapter 4) to understand the needs of the users as well as the requirements from policy makers. This had involved; establishing connection among users (section 4.3 and 5.5.3), using appropriate method to engage users (section 3.6 and 5.5.1) and choosing suitable tools in the role-play with mock-ups (section 3.5.2.3, 3.5.2.4 and 3.5.2.5). These factors were crucial to designers to make sure this method was able to be successfully implemented.

These could be seen in sections 5.5.3, 5.5.4, 5.5.5 and 5.5.6, a proof that although a designer has experience and industrial practice in local furniture production, he or she still needs to understand their own design scenario to prevent wrong estimation of the users’ beliefs and daily practise. Only by experiencing through the whole design process (pilot research section 4.1.1) and fieldwork (section 5.1, 5.2, 5.3 and 5.4) will enable designers to overcome these design issues.

McCracken (1988) explained that, in qualitative research the investigator serves as a kind of “instrument” in the data collection and analysis of data.

The investigator cannot fulfil qualitative research objectives without using a broad range of his or her own experience, imagination and intellect.

In this research, I had introduced the participatory design, role-play with mock-ups approach in developing furniture/workplace in Malaysian context and how to engage users in design development (elaborated in chapter 3 and 4). This research also had demonstrated and proved the potential roles of role-play with mock-ups as a tool for users and designers to express their ideas in design practice.

The study intended to find out whether using role-play with mock-ups directly with users would allow designers to quickly become aware of arising issues without the need to do a complex observational study (as stated in section 1.7). Observational study was less likely to gain new insights as it would be normative in terms of observing normal behaviour and practices. My approach had an intervention which allowed participants to go beyond normal practices environments and scenarios. It was thus a much more pro-active design approach.

It is suggested that this approach is able to be developed continuously by other researchers and disseminated through teaching in design schools, also be implemented in Malaysia design practise.

CHAPTER 6: CONCLUSION

6.0 INTRODUCTION

This final chapter brings together a discussion of the outcome and consequences of the research and some recommendations for future research. It explains how designers may be able to use the understanding of user needs and aspirations to develop new workplaces by allowing place-making and personalisation to occur. Finally, it proposes future research and an approach for future designers that want to adopt role-play with mock-ups in their work.

6.1. SUMMARY OF THE RESEARCH

Chapter 1, in the context of Malaysian office furniture and design, the importance of understanding users' needs and aspirations when developing a new office environment was explained. I proposed to investigate how designers using a participatory design process can employ understanding of personalization, meaningful and place making to develop office furniture in Malaysia and elsewhere.

Chapter 2, I reviewed the development of office environments since 1900s and in Malaysia since independence in the 1950s. I introduced the location of the study with the main issues focused on workplace development and the concept of place versus space in developing modern offices in Malaysia. This chapter ends up with the review of participatory design including approaches that involved mock-ups as a tool to enable designers to communicate with users. Participatory design approaches are not common practice in Malaysia and very new in the Malaysian context and this research indicates new possibilities for Malaysian designer, however my review indicates that the approach developed in this research may be useful in wider field of office and furniture design.(Objectives i and ii)

Chapter 3, described my research methodology and methods that were employed for this research. This chapter contained a strategic discussion on how the research methodology was developed. It discussed how to explore the techniques of users' engagement, and how the inquiry involved direct engagement between user and designer. I introduce the technique of role-play with mock-ups as tools to engage users in the design activities. (Objective iii)

Chapter 4, I described the data arising from the research and techniques employed in my practical work, for example methods for selecting participants and engaging them in role-play. I described the chronology of the research and the narratives from the respondents regarding their current practice and their needs and aspirations toward new development of their future workplace. Further in chapter 4, I elaborated in detail how the data in the main data collection was managed, analysed and coded into keywords and finally were divided into themes. (Objective iv)

Finally, in **Chapter 5**, I synthesised the main issues that emerged from the themes and explored the empirical evidence with analysis of interviews conducted with a range of key informants. At the end this chapter, I explained the method for designers arising from this investigation and proposed some guidance for researcher/designers interested in developing and conducting similar work. This approach was developed and grounded in a Malaysian context, but can be implemented especially in other developing countries by adapting to their own local context. (Objectives iv, v, vi and vii)

6.2. KNOWLEDGE CONTRIBUTION OF THE RESEARCH

This investigation was aimed to expand design guidance for designers to develop furniture that allows place-making to occur according to the users' needs and aspirations as stated in section 1.6. The research had identified and tested a relevant method of users' engagement in developing new workplace design. It had explored and demonstrated the usefulness of role-play with mock-ups as a tool for users to express their needs and aspirations. It also had confirmed that mock-ups function as a potential tool to enhance communication between users and designers, showed that a participatory design approach was suitable for this kind of research as well as established the effectiveness of the participatory approach developed. An important finding in my research had proven that by using role-play with mock-ups directly with the users, it allowed the designers to quickly become aware of arising issues without the need to do a complex observational study.

The findings in chapter 5, confirmed that this approach was workable and has been implemented in Malaysian design practise and also to other designers in their own research projects. I anticipated that these outcomes would be of interest among design academics and researcher who are interested in design methodology for their own professional practice.

6.2.1. Contribution to Design Practice

This research had introduced and explored participatory design approach to develop office furniture for designers in practice (section 2.1.3). As elaborated in section 5.1, 5.2, 5.3 and 5.4, designers were able to use understanding of users' needs and aspirations to develop new workplace. Participatory techniques with mock-ups were able to support this, for example by giving users a tool to explore and explain their experience and needs. Advisable for designers in this setting to equip themselves with research skills as explained below.

McCracken (1988) stated that, a researcher serves as a kind of 'instrument'. They cannot fulfil qualitative research objectives without using a broad range of their own experience, imagination and intellect in way that are various and unpredictable. My analysis of the practical work (section 5.1, 5.2, 5.3 and 5.4) provided this guidance for designers/professionals who are interested to adopt this approach in their work. This was established through a triangulated observation of a successful outcome in actual circumstances and commentaries made by the participant.

- i. Developed users knowledge-engagement through experience (this can be seen in my pilot in section 4.1.1 and practical work in section 5.1) in order to familiarise themselves with users' office culture. It would allow the designer/researcher to approach users more easily and understand real situation of the subject under discussion (section 5.5.3).
- ii. Developed skills and tools to communicate with respondents (after facing difficulty in my early practical work (section 4.1), mock-ups were introduced as tools to communicate with user). It would facilitate users to reveal and explain their design ideas (Section 5.5.1, 5.5.3 and

- 5.5.6). As mentioned in section 3.6 most of the participants were non-designers and have a limited knowledge in designing.
- iii. Initiated organised approaches in reviewing results, mock-up sessions and visual analysis to ensure they would reflect productively in participatory sessions. Observation skills in the practical work would facilitate designers to identify whether the role-play with mock-ups had revealed potential design ideas (section 5.3 and 5.4).
 - iv. Established a good rapport between users and designers in the early stage of the design work was necessary to allow users engagement in role-play with mock-ups sessions (section 5.5.7). This was able to be developed by having mock-ups training session in section 3.6.1.1 and 3.6.3.2.
 - v. Sought ways (for example interview and mock-ups training session in section 3.6.3.2) to reduce the gap between designers and users. It would make the users feel attached in the research project and feel comfortable to communicate with the researcher (and 5.5.7).
 - vi. Developed an evaluation and design practice process to identify the key factors and the main theme in the observation (Section 2.1.3 and 4.4).
 - vii. Data gathered from this study or by others who implemented the same approach would be able to be shared and re-used in accordance to the previous methodology in facilitating other design processes.
 - viii. The use of role-play with mock-ups directly with the user allowed designers in design practice to quickly become aware of arising issues without the need to do a complex observational study (section 2.1.3).

6.2.2. Contribution to Design Research

The method of this research was similar to Mitchell's (1995) role-play with mock-ups as tools in main data collection and the work by Rahman (2010), on interaction between users, product and environment in design process in Malaysian context as discussed in section 2.5.2. This research combined and developed these two approaches in generating design ideas and opportunities that may add to current understanding of design research methodology in developing office workplace.

- i. Mock-ups provided tools of communication for designers and users in this context. (section 5.5.1)
- ii. Combination of methods and designing approaches (contextual in chapter 2, research framework in chapter 4 and 5, and practical work in section 5.5.1, 5.5.2, 5.5.4 and 5.5.6) revealed the users insight creative thinking.
- iii. Implementing role-play with mock-ups in design activities as tools for designers/researchers to explore new design opportunities for future design work (section 5.4)
- iv. Designer applied their insight or 'tacit knowledge' in designing (section 5.1 and 5.2) and communication in creative design process to promote to users with new design approach. (section 5.5.3)
- v. If relevant issues (through contextual review (chapter 2), self-experience (section 4.1), practical work and introduction of participatory through a verbal/visual briefing (chapter 5), this could trigger users' needs and aspirations that would stimulate active user participation. (section 5.5.5 and 5.5.6)
- vi. Involvement of experts also potentially allowed dissemination of good practices and information about users back to industry.
- vii. More channels of communication were introduced to design process. (e.g. role-play with mock-ups, design workshops and interviews) (chapter 5)
- viii. This technique was useful, workable and quickly accessible for designers in Malaysia or other developing countries when they work alone (eg role-play with mock-ups, individual and design workshops in chapter 5)

6.2.3. Contribution to Design Education

Lemons (2010) explained that, understanding the design process is important in order to understand and implement effective teaching of design course. In this study, I had introduced the role-play with mock-up as a tool to assist designer to gain data by working alone without going through observational study which could be time consuming, expensive and difficult to set-up in

terms of agreement by participants and organisations. This approach could be interesting for lecturers/educators who would want to introduce it to their design students. As a lecturer in one of the Malaysian universities, I found that many students (especially students in year one and two) had difficulties in designing their projects especially when they needed to do field work that involved end users. Obviously Lemons suggested that effective learning often begins with a person carrying out a particular action in a particular setting, reflecting on the effect of the action, attempting to understand those effects, and then modifying actions to accommodate new ideas. Role-play with mock-ups would facilitate design students to;

- i. Learn about the process of research along with certain research practices (5.5.1, 5.5.2 and 5.2.3)
- ii. Apply research methods to their design problems (5.5)
- iii. Execute and express their ideas. (section 5.5.1)
- iv. Visualizing the design problem. (section 5.5.2)
- v. Predicting the product in real situation. (section 5.5.1 and 5.5.2)
- vi. As tool to investigate the user needs according to the specific environment (5.5.7)
- vii. Gaining data without having complex research training (5.5)

6.3. REFLECTION for PRACTITIONER, RESEARCHER and EDUCATOR

The research had enabled me to propose a systematic guidance for designers and design researchers using an appropriate technique in design research as elaborated in chapter 5. My expectation was that this investigation would help designers, researchers and educators to identify appropriate approach on how to engage users in their practical work through the context similar to the one I had investigated. The combination of contextual inquiry (chapter 2), research framework (chapter 3 and 5) and implementation of participatory design role-play with mock-ups (section 5.1, 5.2, 5.3 and 5.4) formed a triangulation towards the objectives of the investigation (section 1.4). Rahman (2010) found that, ample space should be given to designer/researcher to be creative in manipulating a situation in which the outcome of the research may end up closer to the objective of the study.

This research had also demonstrated and proposed a process of how designers could involve users in understanding design problem and creating new ideas. This research process was developed and refined through the research project and finally formed a methodology for design practice (chapter 4) that could be implemented and relevant to any designers/researchers/educators with similar research interests. In this research I used office furniture as my case study but, this methodology could also be adapted for different contexts and different design cases. As I mentioned earlier in section 1.7 the research conducted was to help designers in how to engage users in their projects/design process in developing new design for future uses.

My research methodology took a step back, In relation to Mitchell and Lemons. I did the refinement within the circle process (figure 6.1) (refer figure 2.2 in section 2.1.2). The process involved an expert, non-expert and design workshops activities to produce larger data and more design opportunities.

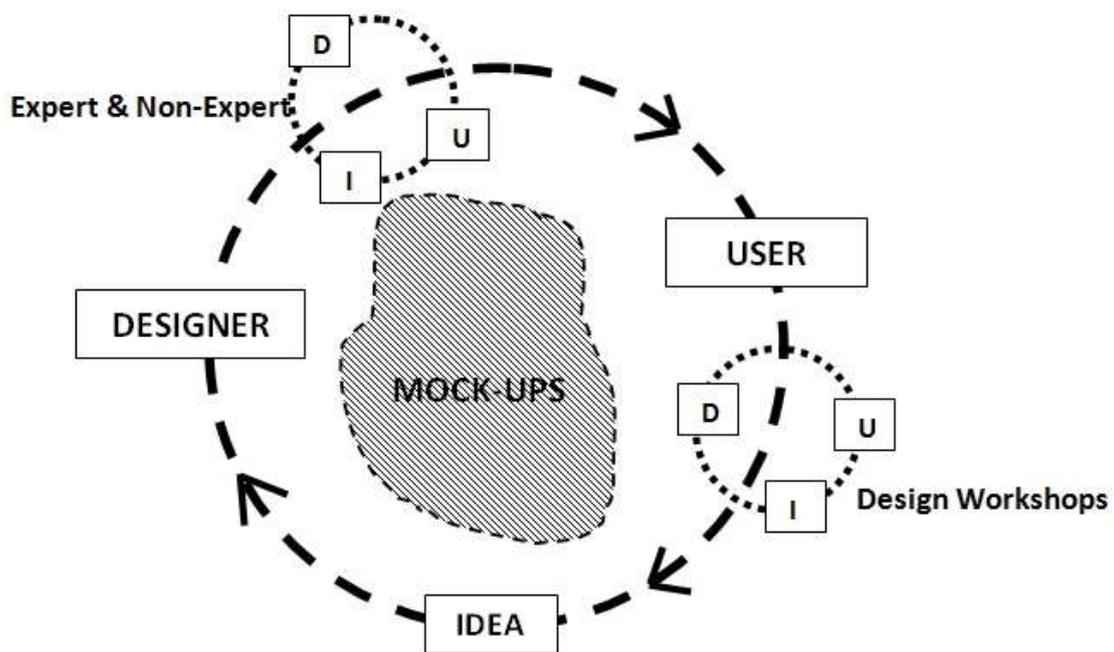


Figure 6.1: My Research Method as Participatory Design Approach, Role-Play With Mock-Ups

In this section, it shows that the research was aimed to produce guidance for designers are keen of role-play with mock-ups approach and also to be adapted by other researchers that wanted to implement this approach in their research project. My research methodology provided the outlines on how designer could understand the needs and aspirations of the users and engage them in design process to reveal design opportunities. Finally, I will summarise my role-play with mock-ups methodology and suggest how this approach is able to be implemented in other/wider design field.

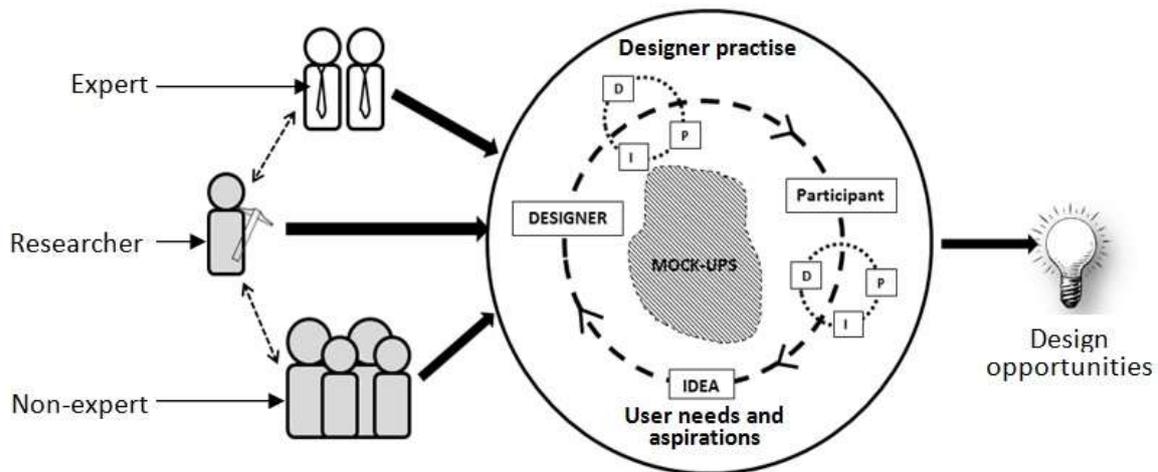


Figure 6.2: Role-Play with Mock-Ups Approach to Inform Ideas

The design approach in figure 6.2 illustrated a triangulated understanding of researcher (creating a method for my research), non-expert (needs and aspirations); expert (design and requirement in real practise and how they could be engaged in creating new design ideas. The outer circle is the participatory design approach activity in the design process and the inner circle is the role-play with mock-up activity that employed in this research context to inform ideas. The process had created the social enquiry listed in my research objectives in section 1.4 and this approach was generalised to be adapted to other/wider design field. I created a tool to connect the participants, engage and employ them in the design process.

Figure 6.3 develops the concept in 6.2 and illustrated how the method could be implemented to meet designer/researcher needs. It consisted of four design stages.

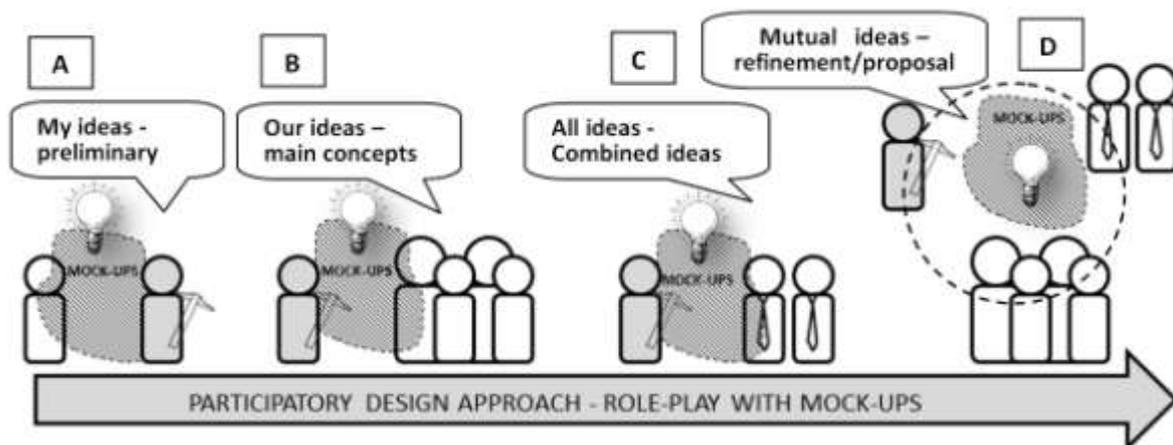


Figure 6.3: My Method to Foster Ideas

- A. **My Ideas** - Early understanding and user-engagement between users and researcher to analyse users' current experience in their everyday practice (section 5.5.3). The role-play with mock-ups process was to create themes/keywords in the contextual inquiry of the research. The role-play with mock-ups created the outset ideas in the design process. Users could directly involve in demonstrating ideas of their workplace (section 5.5.1).
- B. **Our Ideas** - Evaluation and development activity by focus groups to foster mutual agreement in creating design ideas. Role-play with mock-ups had created active discussion and revealed new ideas beyond participants thought in the earlier stage. Participants could discuss, modify ideas and predict the situation in almost real situation during the design process (section 5.5.4).
- C. **All ideas** - Reflection from experts regarding ideas from users. Experts evaluated users' design ideas and analyse whether the process revealed useful design opportunity. Along the design process, the design ideas were developed with a number of limitations which must be noted. Using role-play with mock-ups, experts merged/combined users design proposals with their professional practice to produce possible design solution (section 5.5.1).
- D. **Mutual ideas** - Non-expert and expert (assisted by researcher) performed in the role-play with mock-ups in design workshops to seek for mutual agreement. This was the process of design refinement and to create

useful new design ideas. Effective design involvement by participants during open discussion led not only to better ideas/design proposals, but it was a *win-win* situation to satisfy all groups (section 5.5.7).

Figure 6.3 illustrates how the role-play with mock-ups became productive tools at every stage in my research context. I conducted the role-play with mock-ups with each group to create (NE diagram A), to investigate the past, present and future needs. The mock-ups were useful tools and I could easily gain users' insight without having to go through a complex observational study and they also contributed to data gathering process in my methodological finding in section 5.5.

The research had explored data from various contextual sources (section 4.3) to create guidance for future designers. Three main groups formed a balance opinion as explained in section 5.3.3. This process was important to enable designers to explain in detail especially with regards to the data gained from the role-play with mock-up activities (section 5.1)

To date, there have been no methods of user-engagement in developing furniture design in Malaysia (section 1.0). This study showed that this research approach was workable in Malaysian design practise. The process was not just focused on designing a product, but it was also a process of understanding the users' needs and aspirations that contributed to the progress of the research. Moreover, it enhanced the connection between designers and users (section 5.5.7). The research experiences and process gained in this research had enabled me to understand the technique of user-engagement in design processes.

In this research I used a participatory design approach role-play with mock-ups (individual and groups) in my data collection (elaborated in section 3.6). It made me become more alert and responsive in conducting systematic design process.

Technique and knowledge (chapter 3 and 4) and practical work in chapter 5 had answered the question 'how may designers create furniture that allows meaningful place-making in modern office to occur' by providing guidance for future designers. The combination of creative knowledge design (chapter 3) understanding in user-

engagement activities (chapter 5) and implementation of methodology (chapter 4) had enabled me to produce a relevant technique in design research. This research could be developed continuously by other designers or researchers, and disseminated through publication and teaching by Malaysian future designers.

6.4. SUGGESTED GUIDELINES/RECOMMENDATION

A project applying a role-play with mock-ups methodology consists of:

- i. Appropriate mock-ups size has to be selected according to the research context to facilitate role-play with mock-ups sessions;
- ii. Colourless mock-ups to ensure participant focus on layout making rather than discussing wider topic;
- iii. 'Anonymous' item also can be used to represent design (e.g. boxes, miniature item etc)
- iv. Each role-play with mock-ups (individual and groups) has to start with mock-ups training session to inspires active participation;
- v. At the beginning of the session, (individual and groups) are given a short brief of information regarding the research undergoing and their task in the session;
- vi. Participants (individual and groups) who are selected according to their willingness and able to give opinion according to the research context;
- vii. Minimum one hour of role-play with mock-ups with non-expert to provide ample time (stage A);
- viii. A series of three, one hour discussion workshops - two groups with users and one group with designers (stage B);
- ix. Minimum of five participants, with a group of users in design workshops;
- x. Minimum of two designers, in design workshop with designers (stage C);
- xi. Researcher has to participate and facilitate all the participants in all role play with mock-ups sessions (individual and groups)
- xii. All session must be recorded (audio and visual) for later review;
- xiii. Participants in each session (individual and groups) must come out with a set of design layout for further review;
- xiv. The final design process, a design workshop combining all three series of design workshops to refine the design proposal (stage D)

- xv. The final outputs of the role-play with mock-up sessions are workplace layout that creates guidance 'opportunities for designers' and to understand how to engage user in their data collection in designing future product (workplace for this context).

6.5. OPPORTUNITIES FOR FUTURE RESEARCH

This study identified, refined and evaluated a process of participatory design using role-play with mock-ups in the context of the design of furniture for the office environment, more specifically trialling this method with Malaysian public sector workers. Until now my particular methodology has been untested in the furniture design process. It is important to improve the techniques used especially in the aspects of the method that involved engagement between users and researchers/designers (section 5.5.7) and other methodological factors listed in section 5.5.

Another possibility for future research is to investigate further the implementation of role-play with mock-ups in the new office developments. The understanding of users' needs and aspirations and requirements by policy makers should be the main consideration (as revealed in design workshops 03 and quotations from experts in chapter 5)

My plan for future research is to carry out a larger scale piece of research that will involve various sectors that include government, semi government and private sector in Malaysia. The study will involve both users and higher management staff/decision makers. This project will be able to be implemented through future design education projects and my individual project research. Different presentation formats can be explored by combining other research methods developed by other researchers as mentioned in section 2.5.2.

This research method can be expanded and focused in users more specific demography, that includes social classes, gender, ethnic groups, level of education, type of work and type of office environment. This will benefit the office managers/decision makers and office management in understanding their workers.

Policy makers will benefit from drawing upon these methods leading to providing useful guidance towards developing standards for designers, manufacturers and office sectors that are responsible in developing office environment/workplace. This approach allows a speedier response that is valuable when the designer/researcher is not allowed direct access to the office environment due to confidentiality of the office work or particular office rules. This approach had given me the advantages in approaching and engaging users in data collection.

Such guidelines and standards will benefit Malaysian design through encouraging scenarios and practices that contribute to improvements on office environment in Malaysia and other developing countries that is able to contribute to the productivity of workers and quality of their working experience in the future.

BIBLIOGRAPHY

Abras C., Maloney-Krichmar, D., Preece, J., (2004). User-Centered Design. In Bainbridge, W. Encyclopedia of Human-Computer Interaction. Thousand Oaks: Sage Publications. P1-13

Amri S. (2010). Utusan Malaysia ms 30, 31 disember 2010

Anjum N., Ashcroft R. and Paul J., (2004). Privacy in the Workplace Design. The Design Journal. Vol 7 Issue . pg 27-39

Awang M., (1996) Malaysian Household Furniture: A Study of Design Preferences and Consumers' Selection Principles

Baldry C., (1999). Space- The Final Frontier. Sociology Vol 33. No 3. Pg 535-553.

Basit T.N., (2003). Manual or Electronic? The Role Of Coding In Qualitative Data Analysis. Educational research vol 45 No 2 summer 2003. Pp 143-154.

Becker F., Quinn K.L., Rappaport A J., & Sims, W.R (1994). Implementing Innovative workplace: Organization Implication of Different Strategies. Ithaca, NY. Cornell University International Workplace Studies Program.

Becker F. and Tenessen C.M., (1995). Social Connectivity in the Mobile Workplace. Cornell University International Workplace Studies Program. New York State College of Human Ecology.

Beyer H. and Holtzblatt K., (1999). Contextual design. Interactions Volume 6 , Issue 1 (Jan./Feb. 1999). Pp 32 - 42

Black A., (2007). User-Centred Design, Design Council, available from: <http://www.design-council.org.uk/en/About-Design/Design-Techniques/User-centred-design> accessed 30.12.2011]

Bitner M.J., (1992) Servicescapes: the Impact of Physical Surrounding on Customers and Employees. *The Journals Of Marketing*, Vol 56. No2 (apr 1992) pp 57-71.

Biernacki P. and Waldorf D., (1981). Snowball Sampling. *Sociological Method and Research*. Vol 10 No 2 November 1981. Pp 141-163.

Boote D. N., and Beile P., (2005). Scholars before Researchers: On the Centrality of the Dissertation Literature Review in Research Preparation. *Educational Researcher*, Vol. 34, No. 6, pp. 3–15.

Brown G., (2009). Claiming a Corner at work: measuring employee territoriality in their workplace. *Journal of environmental psychology* 29(2009) 44-52

Bowen, S. J. (2007). Crazy ideas or creative probes?: presenting critical artifacts to stakeholders to develop innovative product ideas. In: *Proceedings of EAD07: Dancing with Disorder: Design, Discourse and Disaster*, Izmir, Turkey, 11-13 April2007. shura.shu.ac.uk

Budd, C., (2001). The office: 1950 to the present. *Work spheres: Design and Contemporary Work Styles*, pp. 26–35. New York, NY: The Museum of Modern Art

Brunia S. and Gosselink H., (2009). Personalization in non-territorial offices: a study of a human need. *Journal of Corporate Real Estate*. Vol. 11 No 3, 2009. Pp 169-182.

Brennan A., Chugh J.S. and Kline T., (2002) Traditional Versus Open Plan Office Design: a longitudinal field study. *Environmental And Behaviour*. Vol. 34 No. 3 2002. Pp 279-299

Bringer J. D., Johnston L. H. and Brackenridge C. H., (2006). Using Computer-Assisted Qualitative Data Analysis Software to Develop a Grounded Theory Project. *Field Methods*, Vol. 18 No 3 August 2006. Pp 246-266

Bryman A., (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research* Vol(6). Pp 97-113

Chales K.E. and Veitch, J.A. (2002). Environment Satisfaction In Open Plan Environment: 2. Effect of workstation size, Partition Height and Windows. IRC-IR-845. April 2002.

Chan C. Y. (1987). Post Merdeka. Kuala Lumpur Malaysia. Kuala Lumpur, Persatuan Arkitek Malaysia (PAM).

Chin K.K., (1981). Sejarah Malaysia. Petaling Jaya. Fajar Bakti

Carey J. W., (1995). Intercoder Agreement in Analysis of Responses to Open-Ended Interview Question: example from Tuberculosis Research. Cultural Anthropology Method 8(3).pp1-5

Crabtree C., (1998). Ethnography in Participatory Design. Proceeding of the Participatory Design Conference 1998, Seattle Washington, 12-14 November 1998. Pp 93-105.

Creswell J. W., Hanson W. E., Clark-Plano V. L. and Alejandro (2007) Qualitative Research Designs : Selection and Implementation *The Counseling Psychologist* . pp 236-264

Creswell J. W., William E., (2010). Research Design Qualitative and Quantitative Mixed method Approach. SAGE publishing London UK.

Cresswell T., (2004). *Place*. Wiley-Blackwell; annotated edition. UK

Collins A., Joseph, D. and Bielaczyc K., (2004). Design-Based Research:Clarifying the Terms. Introduction to the Learning Sciences Methodology Strand The Journal of the Learning Sciences, Vol. 13, No. 1, pp.15-42

Deasy D.,Flannery P. and Rhea D., (2001). Using Research to Foster and Predict Successful Innovation: The Resolve Office System. Design Management Journal summer 2001. P50-57

Denscombe M., (2008). Communities of Practice: A Research Paradigm for the Mixed Methods Approach. *Journal of Mixed Method Research*. Vol 2 Number 3. July 2008. Pp270-283.

Dinc P., (2009). Gender (in) different in private offices: A holistic approach for assessing satisfaction and personalization. *Journals of environmental psychology* 29(2009) pg. 53-62

Dola K. and Mijan D., (2006). Public Participation in Planning for Sustainable Development: Operational Questions and Issues *ALAM CIPTA, Intl. J. on Sustainable Tropical Design Research & Practice*, Vol. 1 (Issue 1) Dec 2006: pp. 1-8

Dortins D., (2002). Reflection on phenomenographic process: interview, transcription and analysis. In A. Goody, J. Herrington and N. Northcote (Eds). *Quality conversation: Research and Development in Higher Education* (vol 25, pp 207-213). Perth. HERDSA.

Duval C.L., Charles K.E. and Veitch J.A., (2002), Open Plan Office Density on Environment Satisfaction. Institute for Research in Construction (IRC) report RR 150. 27 September 2002. National Research Council of Canada.

Ehn P. and Kyng M., (1991). Cardboard Computer: Mocking-it-up or Hand-on the Future.pgs 169-196.

Edelson D. C., (2002). What We Learn When We Engage in Design. *The Journal of The Learning Science*, Vol 11 No 1 (2002) pp105-121.

Fern E. F., (1982). The Used of Focus Group for Idea Generation: The effect of group size, acquaintanceship and moderator on respond quantity and quality. *Journal of Marketing Research* vol. 19, No. 1(Feb 1982), pp 1-13.

Fisher G. and Ostwald J., (2002). Seeding, evolutionary growth, and reseeded: enriching participatory design with informed participation. *Proceedings of the*

Participatory Design Conference (PDC 2002). CPSR, Malmo" University, Sweden, pp. 135–143

Fisher T. and Mottram J., (2006). Researching the Research Culture in Art & Design: The Art and Design Index to Theses

Foth M. and Axup J., (2006). Participatory Design and Action Research: Identical Twin or Synergetic Pair? Proceeding of the Participatory Design Conference 1998, Vol II, Trent, Italy, August 1-5 2006. Pp93-96

Gaver B., Dunne T. and Pacenti E., (1999) .Cultural Probes. Interaction January + February 1999. Pp 21-29

Gershenfeld J.C., (2006). The Human Side of Enterprise: Annotated Edition. New York. Mc Graw Hill.

Geer J. G.,(1991). Ended Questions measure "Salient" Issues? Public Opinion. Quarterly Vol. 55. Pp 360-370.

Gieryn T.F., (2000). A Space For Place In Sociology. Annual review. Social 2000.26:463-496. Uni of Washington- health and science library.

Gregory J., (2003). Scandinavian Approaches to Participatory Design. International Journal of Engineering Education. Vol 19, No. 1.pp 62-74.

Grudin J. and Pruitt J., (2002). Personas, Participatory Design and Product Development: An Infrastructure for Engagement. Participatory design conference 2002 proceeding. Malmo Sweden.

Hart C., (2001). Doing a Literature Search. SAGE publication. London UK

Harrison S. and Dourish P., (1996). Re-Place-ing Space: The roles of place and space in collaborative system. Proceeding ACM conference of Computer supported corporative work(CSCW96). P67-76. New York ACM

Haynes B.P., (2007). The Impact of the Behavioural Environment on the Office Productivity. *Journals of Facilities Management*. Vol 5 No.3 2007. Pp 158-171.

Hippel E. V., (1986). Lead User: A Source Of Novel Product Concepts. *Management Science*. Vol, 32 No. 7, (July 1986).pp 791-805.

Holmlid S., (2009). Participative, co-operative, emancipator: from participatory design to service design. Pp1-13.

Hooker M.H., (2003). A short history of Malaysia NSW. Allen & Unwin

Hutchison A. J., and Breckon J., D., (2009). Using QSR-NVivo to Facilitate the Development of a Grounded Theory Project: an account of work example. *International Journals of Social Research Methodology*. Pp 1-20

Hunt B., (2001). sustainable placemaking forum: keynote speech by, Managing Director of HTA Architects Ltd, 22 February 2001.

Ivankova N.V., Creswell J.W. and Stick S.L., (2006). Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice. *Field Methods*, Vol. 18, No. 1, February 2006. Pp 3-20

Jackson K. M. and Trochim W. M. K., (2002). Concept Mapping as an Alternative Approach for the Analysis of Open-Ended Survey Responses. *Organizational Research Methods*. PP307-338

Jennifer Lai, Anthony Levas, paul Chou, Claidio Pinhanez and Marisa Viveros (2002) Bluespace: Personalizing Workplace Through Awareness And Adaptability. *International journal of computer studies* (2002) 57,415-428 doi:10.1006/ijhc.1028. pp415-428.

Ji-Ye Mao, Vredenburg K., Smith P. W. and Carey T., (2005). The State of User-Centered Design Practice. Communication of the Association for Computer Machinery(ACM). March 2005/Vol. 48, No 3. Pp105-110.

Joseph Kramer, Sunil Noronha and John Vergo (2000) A User-Centered Design Approach to Personalization. Communication of the ACM. August 2000/vol 43. No 8. Pp 45-48.

Kaulio M.A., (1998). Customer, Consumer And User Involvement In Product Development: A framework and a review of selected methods. Total quality management, Vol 9, No 1 1998, 141-149.

Kensing F. and Blomberg J., (1998). Participatory Design: Issues and Concerns. Computer Supported Cooperative Work 7. Pp 167-185.

Kensing F., Simonsen J. and Bødker K., (1996). MUST- a Method for Participatory Design. Proceeding of Fourth Biennial Conference on Participatory Design. 13-15 Nov 1996, Computer Professional For Social Responsibility, Palo Alto CA. Pp129-140.

King R., (2008). Kuala Lumpur and Putrajaya: Negotiating Urban Space in Malaysia. Singapore, NUS Press

Kimberly D. Elsbach(2004) Interpreting workplace identities: the role of office decor. Journal of Organization Behaviour 25. P99-128

Kitzinger J., (1995). Introducing Focus Groups. British medical Journal, Vol. 311, No 7000(Jul. 29, 1995), pp 299-302.

Knobel L., (1987). Office Furniture. pg 104-105. London, Unwin Hyman Limited.

Peter Dormer(1993) Design since 1945. London. Thames & Hudson.

Kupritz V., (2001). Aging Worker Perception About Design And Privacy Needs for Work. Journals of Architectural Planning Research18:1(Spring, 2001). Pp 13-21

Leady P. D. and Ormrod J. E., (2010). Practical Research: Planning and design 9th edition. Pearson, Edu. Inc Publishing, New Jersey USA.

Lee Y., (2006). Design Participation Tactics: Redefining User Participation in Design. The Helen Hamlyn Research Centre, Royal College of Art, London, U.K. Pp 1-15

Lemons G., Carberry A., Swan C. and Roger C., (2010). The Benefit of Models in Building in Teaching Engineering Design. Design Studies 31(2010). pp288-309

Lindheim R., (1985). New Design Parameters for Healthy Places. Place Vol 2 No 4(1985). Pp17-27.

Lohr V.I., Pearson-Mims C.H. and Goodwin G.K., (1996). Interior plant may improve worker productivity and reduce stress in a windowless environment. Journal of Environmental Horticulture, 14, 97-100.

Long R.J., (1987). New Office Information Technology: Human and Managerial Implication. London. Croom Helm Ltd.

Maher A. and Hippel C.V., (2005). Individual Differences In Employee Reactions To Open-Plan Offices. Journal of environment psychology 25(2005). Pp 219-229

Marcus F. and Jeff A., (2006). Participatory Design and Action Research: Identical Twins or Synergetic Pair? Proceedings Participatory Design Conference 2006: Expanding Boundaries in Design 2, pages pp. 93-96, Trento, Italy.

Mankin D., Cohen S.G. and Bikson T.K., (1997). Teams and technology: tensions in participatory design, Organizational Dynamics; 26: 1 1997; pp. 63-76

McCracken G., (1998). The long interview: qualitative research methods. London. a sage University press.

McGregor D., (2006). The Human Side of Enterprise. New York. Mc Graw Hill.

Miller N.G., Erickson A. and Yust B.L., (2001). Sense Of Place In Workplace: The Relationship Between Personal Object And Job Satisfaction And Motivation. *Journals of interior design* 27(1), 35-44

Mitchell C.T., (1995). Action, Perception and the Realization of Design. *Design Study* Vol 16 No 1 January 1995. P4-28

Muller M.J., Wildman D. M. and White E. A., (1993). Taxonomy of PD practices: A Brief Practitioner's Guide. *Communication Of The ACM*. June 1993/vol36, no 4. Pp 24-28.

Muller M,J. and Druin A., (2002). Participatory design: The third space in HCI. In J. A. Jacko and A. Sears (Eds.)(2002). *The Human Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*, Lawrence Erlbaum, Mahwah, NJ, 2002, 1051–1068.

Morgan D. L. and Spanish M. T., (1984). Focus Group: A New Tool for Qualitative Research. *Qualitative Sociology*, 7(3) Fall 1984. Human Science Press. pp 253-268.

Myerson J., (2008). About: Workplace Design. Helen Hamlyn Research Center at Royal College of Art

Myerson J., (2008). Welcoming workplace. Designing office space for an ageing workforce in the 21st century knowledge economy. Helen Hamlyn Research Center at Royal College of Art. P1-20

Nasir R., (2011) A Study of The Kelantan Malay Cultural Landscape: Recent Trends and Future

Noordin F. and Jusoff K., (2009) Level of Job satisfaction amongst Malaysian Academic Staff. *Asian Social Science*. Vol 5 No 5 May 2009, pp 122-126.

Papanek V., (1973). Design for Real World: Human Ecology and Human Change. Bantam Book. London

Padgley O., (2007). Capturing and Analysing own design activity. Design Study 2007, pp 463-483.

Peponis J., (1985). The Spatial of Factories. Human Relation Vol 38, Number 4, pp 357-390

Perry M. and O'Hara K., (2003). Display-Based Activity in The Workplace. proceeding of Interact 03, Zurich Switzerland 2003. Pp. 591-598

Pertubuhan Akitek Malaysia (2007) Architectural Heritage: Kuala Lumpur – Pre-Merdeka. Kuala Lumpur, Malaysian Institute of Architect.

Pink S., (2008). Ethnography: An Urban Tour: the Sensory Sociality of ethnographic place-making. SEGA Publication . <http://www.segapublications.com> Vol 9(2). Pp 175-196.

Prieser W.F.E., (1995). Post Occupancy Evaluation: How to make building work better. Vol 13 number 11. MCB University Press. ISSN 0263-2772. P19-20

Rahman R., (2010). Ph.D Thesis: Desining for Cultural Migration. Sheffield Hallam University UK

Raymond S. and Cunliffe R., (!997). Tomorrow Office: Creating Effective and Humane Interiors. New York. E & FN Spon.

Riratanaphong C., (2006). Flexible Workplace: Benefit and Concern in Facilities Management. Journal of Architecture, Planning Research n Studies Vol 4(2) 2006. Fac of Arc n Planning Thammasat University. Pp 41-52

Redström J., (2006). Toward User Design? On the Shift from Object to User as the Subject of Design. Design Studies Vol 27 No 2 (march 2006) pp123-139

Reeves T.C., Herrington J. and Ron Oliver R., (2005). Design Research: A Socially Responsible Approach to Instructional Technology Research in Higher Education. Journal of Computing in Higher Education Spring 2005, Vol. 16(2), pp96-115.

Rust C., (2004). Creative Method for Unlocking Consumer's Tacit Knowledge. Practical tools for designing experiences

Rust C., (2004). Design Enquiry: Tacit Knowledge and Invention in Science. Design Issue: Vol 20 Number 4. Pp 76-85.

Rust C., (2004). Investigating Our Future – How designer can get us all thinking.

Rust C., (2005). In the Eating: Grounding the validation of investigation designing in the experience of stakeholders.

Rust C., Whiteley G. and Wilson A., (1999). First make Something: Principled, creative design as a tool for multi-disciplinary research in clinical engineering. Proceeding of 4th Asian Design Conference, Nagoya Japan. Oct 1999.

Rust C. and Whiteley G., (1998). Analogy, Complexity and Holism – drawing as 3-D Modelling. Art and design Research Journal, No 6 Autumn/winter 1998. Pp42-46

Rylander A., (2009). How Does Workplace Mean – Contrasting manager-Designer-User Perspectives. 8th European Academy of Design Conferences 1st-3rd April 2009. Pp 387-391

Schlosser J., (22, march 2006). Cubicles: The Great Mistake. Fortune magazine 22 2:03

Scheiberg S.L., (1990). Emotion on display: the personal decoration of work place. American behaviour scientist. Vol 33 No 3. Pp 330-338.

Schneider B., (1987). The people make the place. Personnel psychology Personnel Psychology. Vol 40(3), Fal 1987, 437-453.

Shimp T.A. and Sharma S., (1987). Consumer Ethnocentrism: Construction and Validation of the CETSCALE. Journal of marketing research, Vol 24, NO 3 (Aug., 1987) pp. 280-289.

Simonsen J and Kensing F., (1997). Using ETHNOGRAPHY In Contextual Design. Communication Of The ACM. July 1997/Vol, 40, No 7. pp 82-88.

Stappers P.J. and Visser F.S., (2007). Bringing Participatory Techniques to Industrial Design Engineer. International conference on Engineering and Product Design Education. 13-14 Sept 2007, Northumbria, New Castle Upon Tyne. UK

Steers R.M., Mowday R.T. and Shapiro D.L., (2004). The Future Of Work Motivation Theory. Academy of management review Vol 29. No 3. pp 379-387

Spagnolli A. and Gamberini L., (2005). A Place for Presence. Understanding the Human involvement in Mediated Interactive Environment. Psychology Journal, Vol 3 Number 1. Pp 6-15

Stedman R.C., (2002). Toward a Social Psychology of Place: Behaviour From Place-Based Cognition Attitude And Identity. Environmental and Behaviour Sept 2002; Pp. 561-581

Stock W.A., Benito J.G. and Lasa N.B., (1996). Research Synthesis: Coding and Conjectures. Evaluation and Health Profession, Vol. 19 No 1. Pp 104-117.

Sundstrom E., Town J.P., Brown D.W., Forman A. and McGee C., (1982). Physical Enclosure. Type of Job and Privacy in the Office. Environment and Behavior 14(5). Pp 543-559

Szasz A., and Meuser M., (1997) Directions in Research and Theory Environmental Inequalities: Literature Review and Proposals for New. Current Sociology July 1997 Vol 45(3). Pp 99-120

Tashakkori A. and Creswell J. W., (2007). The New Era of Mixed Methods: Journal of Mixed Methods Research 2007.pp3-7

Taylor E. and Steele S., (1996). Collecting Evaluation Data: Direct Observation. Programme development and evaluation, Direct Observation: An overview of source and method. Pp1-8

Tuan Y.F., (2008). Space and Place: the Perspective of Experience. Minneapolis. University of Minnesota Press USA

Veith J.A., Charles K.E., Farley K.M.J. and Newsham G.R., (2007). A Model of Satisfaction With Open Plan Office Condition: COPE field finding. Journal of Environmental Psychology. 10.1016/j.jenvp.2007.04.002

Vischer J.C., (2007). The Concept Of Environmental Comfort In Workplace Performance. Ambiente Construido, Porto Alegre. Vol 7 no 1.pp 21-34.

Visser F.S., Lugt R.V.D. and Stappers P.J., (2007). Sharing User Experience in the Product Innovation Process: Participatory Design Needs Participatory Communication. Creativity and Innovation Management, Vol 16 Number 1 2007. Pp35-45

Wells M.M., (2000). Office clutter or meaningful personal display: the role of office personalization in employee and Organization well-Being. Journal of environmental psychology. 20,pp 239-255.

Wells M.M., Thelen L. and Ruark J., (2007). Workplace Personalization And Organization Culture: Does Your Workplace Reflect You And Your Company. Environmental And Behaviour. Vol 39 No 5. 2007. Pg 616-634.

Wells M.M. and Thelen T.L., (2002). What Does your workplaces say about you?: the influence of personality, status and workplace on personalization. Environmental And Behaviour Vol 34 No 3. 2002. Pg 300-321.

Whiteley N., (1993). Design for Society By Nigel Whiteley 1993. Reaction book ltd London

Whyte W.F., Greenwood D.J. and Lazes P., (1991). Participatory Action Research. California, SEGA Publication Inc. Pg 20-21.

Yazid Y., (2010). Public Participation In The Urban Landscape And Park Development Process In Kuala Lumpur: Planning For Real In Datuk Keramat Lake Garden

Zalesny M.D. and Farace R.V., (1987). Traditional Versus Open Offices: A Comparison Of Sociotechnical, Social Relation And Symbolic Meaning Perspectives. The Academy of Management Journal, Vol. 30 No 2 (jun, 1987) pp 240-259.

Federal Territories and State Government of Malaysia. <http://www.malaysia.gov.my>. Retrieved on 11 September 2011.

First Malaysian Economic Plan 1966-1970 report
Second Malaysian Economic Plan 1971-1975 report
Third Malaysian Economic Plan 1976-1980 report
Fourth Malaysian Economic Plan 1981-1985 report
Fifth Malaysian Economic Plan 1986-1990 report

World maps. <http://www.worldatlas.com/webimages/country/asia>. Retrieved on 12 September 2011.

Malaysian Territories and state government. <http://malaysia.gov.my>. Retrieved on 12 September 2011.

Department of statistic, Malaysia. <http://statistic.gov.my>. Retrieved on 08 October 2011.

Kuala Lumpur City guide. <http://kualalumpurcityguide.com>. Retrieved on 18 October 2011.

Economic Planning Unit (EPU). <http://epu.gov.my/first>. Retrieved on 18 October 2011.

Perbadanan Putrajaya: <http://www.ppj.gov.my/portal>. Retrieved on 19 October 2011.