



# STUDY ON SPATIAL FACTORS AND USER'S SATISFACTION OF COLLABORATION WORK IN COWORKING SPACES IN PENANG

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**Abstract:** *This paper aims to examine the case study coworking space design towards its users and provide understanding into the relationship between physical space features and its user's satisfaction towards collaboration in coworking space. The study employed direct observation, in-depth interview, questionnaire surveys as methods of data collection in the case study. analysis of findings demonstrates that physical spatial factors such as openness, variety and flexibility, privacy and distractions, proximity, personalization and territoriality are powerful for influencing user's satisfaction in the coworking space. The finding provides a deeper understanding of the relationship between physical space features of coworking space and its user perceptions of satisfaction in collaboration within the coworking space. The research insights in this study may help architects, interior designers and facility managers in making mindful decisions on the design of coworking space that are more meaningful to the users.*

**Key Words:** *Coworking Space, Spatial Factors, Collaboration, Satisfaction, Social Capital.*

## 1. INTRODUCTION :

Today, the increasing of use mobile technology has risen among the millennium, this allow professionals to work via mobile devices, such as: laptop, smartphone and tablets, making coworking space becoming increase popular and has been trending for the young adult entrepreneurs for the past few years. Coworking space is a space more than just as physical workspace which the users can access to a physical workspace and other various business amenities like Wi-Fi, storage, private phone booth, free-flow coffee, printers, scanners, meeting rooms, community events, dispatch service, conference facilities, mail handling and cleaning service by paying membership fees. Unlike typical office environment, that have formal structure involving managers and employees, whereby employees have well-defined work roles (D'Angelo, 2018). Coworking is expanding rapidly in Southeast Asia due to its fast-growing economies, along with the rapid development of e-commerce. As digital growth driven more Malaysians especially the millennials demanding flexible working culture, Malaysia is currently the second largest start-up ecosystem in the ASEAN region (Team, 2019). As Malaysian are now shifting towards the new-world concept of working in coworking space, coworking's developers need to create a sophisticated coworking environment. Workplace studies have long acknowledged the importance of the physical environment to workers however one type of work setting is still poorly understood is coworking space (Sanborn, 2015).

Based on the past studies available from other countries has proved and demonstrated spatial design significantly influences users' behaviour in coworking space, the design elements could have incorporated in a practical way to afford desired behaviour's in coworking space (Eric Prince Ondia, 2018). Thus, for this reason the focus on this study would be on examining and proposing basic references on spatial factors towards creating exciting coworking space in Malaysia. The study would look both the different factor in physical features of coworking spaces and its influence on users' satisfaction, social interaction, and collaboration. The objective of this study is to provide understanding into the relationship between physical space features of coworkspaces and its user perceptions of collaboration, and user satisfaction in Penang's coworking space. With the help through research on this study, it would be useful for architects, interior designers as well as facility managers when planning a positive environment for coworking space. Forming a



relationship between psychological with treats principles help to create an environment that will enhance health and wellbeing as well as collaboration and interaction among its users.

The contributions of this paper are:

- To provide better understanding on coworkspace spatial factors which would be more applicable for the coworking business in order to provide a new and interesting way for people to work in the increasingly mobile culture while benefit and sustains in today's market.
- To offer new understanding and allow improvement on the coworking space's design to the developers, interior designers, architects and facility managers on how to design and build effective coworkspaces and positive coworking environment in order to increase its users' satisfaction.

The identified research gaps above are SUMMARIZED:

- The importance of the physical environment to workers on coworking space setting is still poorly understand and is limited in Malaysia.
- Coworking business is now in the right climate to Malaysia's market while information related to coworking space is still under developed.
- Lack of developed information regarding to spatial factors of coworking spaces in Malaysia.

## 2. LITERATURE REVIEW:

This study builds on the theory of sense of place and proxemics of space. The two theories emphasize the mutuality of people and environment:

### I. Sense of Place

David Canter (1977, 1997), has proposed a model which could help researcher and facility managers, architect, interior designer as well as developer to converts a space into a place with special behavioral and emotional characteristics for individuals (Hashem Hashemnezhad, 2013). In literature of architecture, interaction between human and place's concept and aspect, and the impact that places have on people has been presented. This theoretical model I is a complete framework which in it men feels places, percept them and attached meaning to them. By understanding the fundamental aspects of this framework, can be effective in assess the level of public attachment to place sand tendency of people to places (Hashem Hashemnezhad, 2013). In generally, interaction between humans and places is in three dimensions: Cognitive, behavioural and emotional. Firstly, cognitive interaction pointed to spatial perception, for instance, people know the environmental elements and use them to navigate their way. In behavioural interaction are mentioned to activities and functional relationship between people and environmental. Finally, in relation to emotional interaction, points to satisfaction and attachment to place (Irwin Altman, 1992). Sense of place is a concept which is changing a typical space to place with special behaviour and physical characteristic for certain people. It meant connect to place by understanding of everyday activities and symbols connected to it. Individual and collective values influence on a sense of place and also sense of place affected on individual behaviour and social values and attitudes.

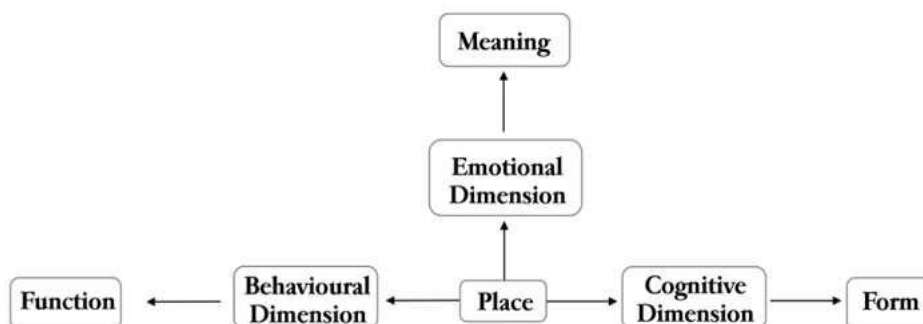


Fig. 1. Dimension of creating places (Source: Jorgensen,2001; Canter, 1977b)



## II. Proxemics of Space

The term Proxemics was authored by Edward T. Hall to mean the study of the means which individuals and groups communicate through their utilization of space (Communication Studies, 2015). Hall identified three categories of spaces related to spatial behaviours: fixed feature, semifixed-feature, and non-fixed spaces. Fixed-features are the permanent spatial components that articulate space, for example, walls, doors, and windows. Semi-fixed-features are the movable spatial components that define space, for example, furniture and movable partitions. Hall classified Semi-fixed-feature spaces as socio-petal and socio-fugal. Socio-petal spaces are those that tend to bring individuals together whereas, socio-fugal spaces are those that tend to keep individuals apart. Non-fixed space refers to the interpersonal distances individuals unwittingly keep during interpersonal relations. With regard to informal space, Hall identified four distances or zones in which people interact contingent upon the kind of relationship they share with others (ifioque.com, 2020). These distances are named intimate, personal, social and public distances (CReduction, 2020).

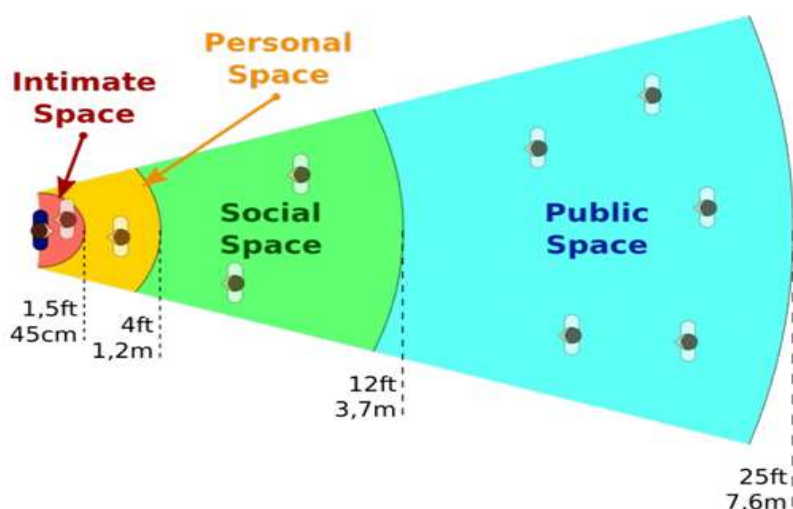


Fig 2. Personal Spaces in Proxemics (Source: (Jahnke, 2019))

The understanding of the above mentioned three types of spaces (fixed-feature, semi fixed feature, and informal spaces) is necessary to peruse the behaviour of the participants in coworking environments.

## 3. METHODOLOGY:

To achieve the aim of this study, the study involved case study in Settlements coworking space located at Georgetown, Penang. Settlements coworking space is the largest coworking space located in at Georgetown with total 18,000sqft space area. Study began with direct observation, after direct observation in - depth interview with practitioners and questionnaires survey with the end users in coworking space were carried out hand in hand. Direct observation made it possible to note the activities people carry around, researcher play a role as a complete participant when conducting the observation in the Settlements coworking space. This method allowed the researcher to discover the meaning of the space to participants. In-depth interview is conducted with practitioners such as interior designer, interior architect and architect. The aim was to interview several industries related professionals including architect, interior architect and interior designers to gain their opinions and intention towards coworking space versus traditional office and how spatial factors in coworking space influenced users' satisfaction in coworking space were designed. Questionnaire survey was conducted with 40 users in coworking space. The key objective was to capture the collaborative and satisfaction of the users who visited the Settlements coworking space.

Data obtained through direct observation was connected with the data obtained through questionnaire survey to achieve a meaningful understanding of user's behavior in coworking space because with only direct observation does not reveal a user's emotional engagement with space. The result made it possible to draw conclusion about the associate between spatial features and users' collaboration and satisfaction in the coworking space.



#### 4. ANALYSIS & RESULTS :

##### Direct Observation

- **Openness:** Out of 18,000 sqft, 9,300 sqft of Settlement coworking space are devoted to open space.
- **Variety and Flexibility:** Settlements coworking space contains a wide variety of area at which users can work. There are two sets of eight seaters rectangular work desk, eight sets of four seaters round work desk, two sets of eight seaters bar height work desks and one set of twelve seaters long bar height work desk near curtain glass that overlooking the beautiful Georgetown city. These settings allow users to choose between stool seating and standing work positions. Two lounges area with sofas offer soft furniture with coffee table. There is also a relaxation area with greeneries, members can take a break by playing foosball and take a nap. There are also four private meeting rooms allowed users to have team discussion. Finally, there are private offices used by corporate offices. The space is very flexible, most of the furniture in the space can be rearranged and removed. The lounge area was very flexible too as all the armchairs and beanbags can be rearranged easily as it is lightweight.

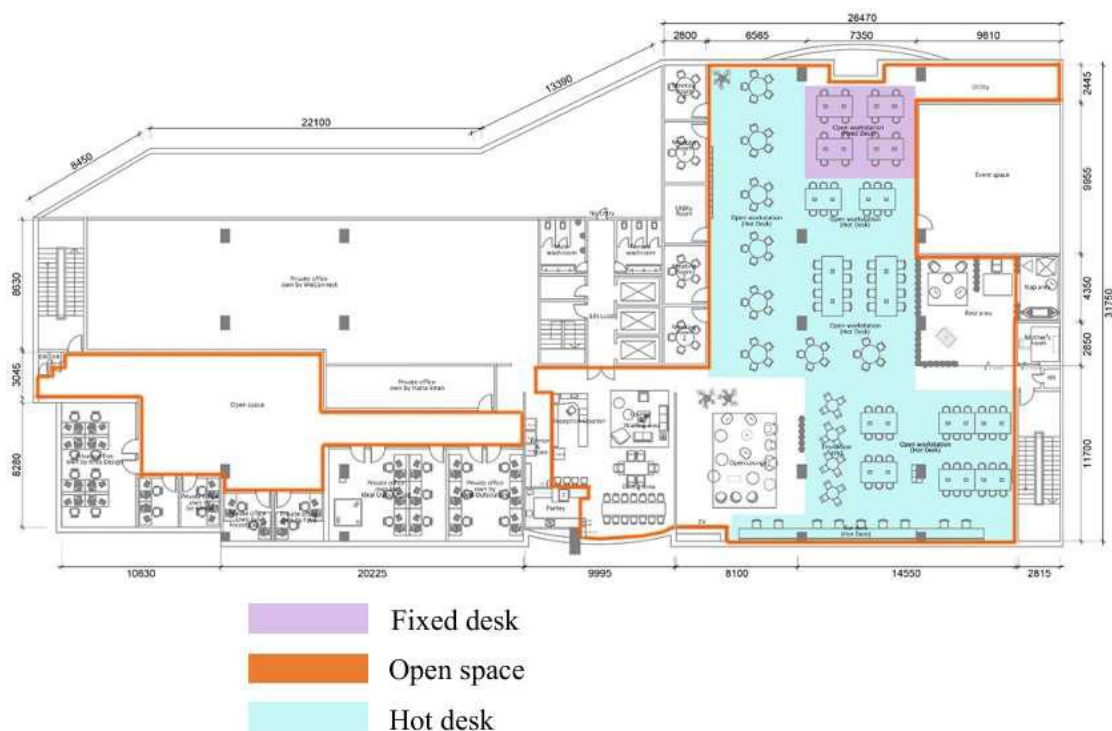


Fig 3. Layout of the case study coworking space (Source: author)

- **Personalization and Territoriality:** Settlements coworking space is non-territorial, though users often have a few preferred work locations. However, users will temporarily add items to their chose workstation and then remove these at the end of the day. The most common form of temporary personalization are laptops, mugs, notebooks and carrying bags.
- **Proximity:** Physical proximity the important factor for social interaction in Settlements coworking space. Advice-seeking and advice-giving were also very common activity. When users wanted advice, the first approach was often to move their chair slightly away from their workstation and ask the nearest fellow worker. This almost always resulted in a response, either with the necessary advice. The advice was sought and received in a casual way during the interaction.
- **Privacy and Distraction:** During the observations in Settlements coworking space, users would leave their workstation when a phone call came in; at times, their rush made as much disturbance in the space as the call ringing in. The level of concern users expressed for the disturbances caused by their own phone calls could be interpreted as a prediction of how much they feel disturbed by phone calls that others take. Phone calls issue was a determine one throughout the observation period.





### In-depth Interview

Throughout the conversation with practitioners, they pointed out that most people choose coworking space over traditional office was due to the flexibility of working hours, cost effectiveness, spacious open office with flexible spaces and sense of community. Spacious open office, sufficient meeting rooms, and well-organized pantry with refillable coffee and tea were the important spatial features that must have in the coworking space, especially the pantry, it was believed that pantry could become a social space that bring interaction to people from different departments. All the experts think that variety and flexibility played an important role as this is the key factor which promotes collaborative and interactive to the users. Most practitioners think that open space office will enhance interactive and collaborative as it creates more opportunities for connection and collaboration with other users within the space it will also indirectly promote interaction and communication as there is no hierarchy status unlike the traditional office. However, the downside of open office causes distraction as conversation can be overheard and user’s movement can be quite disturbance to the introverted personalities. Insufficient of privacy is also another issue they pointed out when working in open office space. Additionally, coworking space offers fun and flexible spatial arrangement and promotes independence and freedom of working solo culture compared to traditional office. This indirectly promotes the concept of work-life balance among the coworking users.

### Questionnaire Survey

A total of 40 survey respondents was managed to collect. Below is the analysis done according to the gathered information’s:

#### Openness:

Table 1. Results of users towards Openness in the Coworking Space

	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
The size of workstation in open space office is reasonable for individual and group work.	0 (0%)	0 (0%)	4 (10%)	13 (32.5%)	23 (57.5%)
It is possible to carry out collaborative work in open space office when I need.	0 (0%)	0 (0%)	0 (0%)	22 (55%)	18 (45%)
It is possible to carry out conversation in circulation area without standing people way.	1 (2.5%)	0 (0%)	6 (15%)	23 (57.5%)	10 (25%)

The result showed that openness in coworking space did enhance the interaction and collaboration among the users. Users can easily find a space for group or individual task whenever they needed and conversation is always able to carry out without standing people way. The findings were an indication that openness in Settlements coworking space plays an important part in enhance user’s collaboration and interaction.

#### Variety & Flexibility:

Table 2. Results of users towards Variety & Flexibility in the Coworking Space

	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
There is good variety of work spaces in this coworking site.	0 (0%)	0 (0%)	3 (7.5%)	17 (42.5%)	20 (50%)
There are enough types of places for different collaboration and meeting needs.	0 (0%)	2 (5%)	2 (5%)	22 (55%)	14 (35%)
I can always find a place to carry out without distraction when I need it. (For certain types of conversation or collaboration).	0 (0%)	3 (7.5%)	5 (12.5%)	15 (37.5%)	17 (42.5%)



The result showed that Settlement has good variety and flexibles spaces to suit for specific task which contributed to the users' collaborative. Settlements coworking space did pay attention towards the variety of spaces in the workspace. The variety and flexibility of spaces did have positively impact on the users' interaction and collaboration work. Even though some of the spaces have lowest usage among the users, but it did act as an important part on enhancing overall variety and flexibility to the coworking space as well as users' interaction and collaboration. Therefore, the findings of variety and flexibility spaces of the Settlements coworking space had positive impact on the overall environment.

### Privacy and Distraction

Table 3. Results of users towards Privacy and Distraction in the Coworking Space

	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
I feel lack of privacy when carry out work in open space office.	1 (2.5%)	7 (17.5%)	6 (15%)	19 (47.5%)	7 (17.5%)
I feel distracted by people's voice from meeting rooms/spaces near workstations.	2 (5%)	5 (12.5%)	2 (5%)	21 (52.5%)	10 (25%)
I am distracted by people who are talking in common area (etc: pantry / printer / open space/ corridor / lounge)	2 (5%)	1 (2.5%)	3 (7.5%)	25 (62.5%)	9 (22.5%)
I don't want to carry out conversations with colleagues or other members in common area because it will disturb people working nearby.	3 (7.5%)	3 (7.5%)	5 (12.5%)	24 (60%)	5 (12.5%)

The result showed that the openness in Settlements coworking space will causes lack of privacy and distraction to the users. Users are easily distracted by all the activities around in open place office, this includes chatter among co-workers, client calls, and any other movements in distance. These physical overloads that result is disturbing.

### Personalization and Territoriality

Table 4. Results of users towards Personalization and Territoriality in the Coworking Space

	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
I prefer to do my work on workstation rather than in other spaces (etc: dining/ lounge/ rest area)	4 (10%)	3 (7.5%)	1 (2.5%)	20 (50%)	12 (30%)
I prefer to work on the same work desk / spot every day (or nearby).	4 (10%)	5 (12.5%)	3 (7.5%)	18 (45%)	10 (25%)

Result showed that the users of Settlement coworking space are territorial by using the same workspace often by siting the same desk every day. As cowork spaces do not offer much personalization as an assigned desk in a traditional office, the users in Settlement coworking space tend to territorial the workspace by sitting at the same work space or sport every day.

### Proximity

Table 5. Results of users towards Proximity in the Coworking Space

	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
The arrangement and furnishing of open office support collaborative work and interaction there.	0 (0%)	2 (5%)	4 (10%)	23 (57.55%)	11 (27.5%)



The arrangement and furnishing of pantry/dining/ lounge support collaborative work and interaction there.	2 (5%)	5 (12.5%)	2 (5%)	21 (52.5%)	10 (25%)
The combination of spaces in this coworking space supports my collaboration with other members.	2 (5%)	1 (2.5%)	3 (7.5%)	25 (62.5%)	9 (22.5%)

Result showed that the combination of spaces in Settlements coworking space as well as the arrangement and furnishing of open office, pantry and lounge do support user’s collaborative and interaction.

**Satisfaction with Collaboration in Coworking Space:**

Table 6. Results of users towards Satisfaction with Collaboration in Coworking Space

	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
I am learning from other members in coworking space.	3 (7.5%)	9 (22.5%)	5 (12.5%)	16 (40%)	7 (17.5%)
I am learning from events or classes in coworking space.	13 (32.5%)	14 (35%)	7 (17.5%)	5 (12.5%)	1 (2.5%)
I always accomplish my individual tasks efficiently.	0 (0%)	0 (0%)	6 (15%)	22 (55%)	12 (30%)
It is easy to get help from other coworking members for my work.	1 (2.5%)	7 (17.5%)	10 (25%)	13 (32.5%)	9 (22.5%)
I have a clear picture of the expertise of the staff members of the coworking spaces.	6 (15%)	5 (12.5%)	6 (15%)	16 (40%)	7 (17.5%)
I always have the information I need for my work from the staffs.	0 (0%)	1 (2.5%)	4 (10%)	25 (62.5%)	10 (25%)
I feel well-informed about the current activities in the coworking space.	1 (2.5%)	7 (17.5%)	6 (15%)	19 (47.5%)	7 (17.5%)
I am always informed in time for any new changes in the coworking spaces.	2 (5%)	5 (12.5%)	2 (5%)	21 (52.5%)	10 (25%)
I am always feeling free to express self-identity in the coworking spaces.	2 (5%)	1 (2.5%)	3 (7.5%)	25 (62.5%)	9 (22.5%)
I exchange information frequently with other coworking members through face-to-face communication.	3 (7.5%)	3 (7.5%)	5 (12.5%)	24 (60%)	5 (12.5%)
There is a strong trust between other coworking members and me.	0 (0%)	3 (7.5%)	6 (15%)	22 (55%)	9 (22.5%)
I have strong commitment to being a member of this coworking space.	1 (2.5%)	2 (5%)	5 (12.5%)	27 (67.5%)	5 (12.5%)



I feel working here is beneficial to the development of my business/ company.	0 (0%)	3 (7.5%)	7 (17.5%)	22 (55%)	8 (20%)
I have made valuable business connections when working here.	4 (10%)	9 (22.5%)	7 (17.5%)	15 (37.5%)	5 (12.5%)
I find work-life balance when working here.	1 (2.5%)	0 (0%)	2 (5%)	23 (57.5%)	14 (35%)

The results show that respondents show great satisfaction with collaboration in coworking space as majority of the respondents answer the option “agree” for most of the factors. Settlement coworking space supports users inherit value of social capital, and users are satisfying with the collaboration with others users, as it allows networking to happen naturally and unexpectedly by provide space for individuals to work together. Besides that, Settlements include variety of area built for socialization and productivity has promote and improve team bonding. These space settings have allowed professional team have more opportunity to interact on a regular basis without feeling forced.

## 5. DISCUSSION :

The findings from the survey on Settlements coworking space, showed that few spatial factors of the coworking space had more significant impact than others based on how the users interact and feel within these factors. This showed different degree of satisfaction that influenced within each of the spatial factors according to the level of agreement users attached to these influences. Even though the result showed different level of agreement between each spatial factor, still these spatial factors all work together to engaging users inherent the value of social capital and form a positive coworking space environment that support interaction and collaboration to the users. The findings from the survey on Settlements coworking space, showed that few spatial factors of the coworking space had more significant impact than others based on how the users interact and feel within these factors. This showed different degree of satisfaction that influenced within each of the spatial factors according to the level of agreement users attached to these influences. Even though the result showed different level of agreement between each spatial factors, still these spatial factors all work together to engaging users inherent the value of social capital and form a positive coworking space environment that support interaction and collaboration to the users.

One of main reason people join coworking space is the appealing of variety and flexible of space and sense of community. According to the study there were significant impacts of physical spatial factors on the coworking environment and users’ interaction and collaboration experience. Below is the recommendation to create a positive coworking space environment:

**Open space:** Open space office that free from walls or barriers to ensure visual connectivity and allowing for a great deal of natural light to enter the space. Open plan office will enhance interactive and collaborative among the users as it creates more opportunities for connection and collaboration with others within the space. Although open office is design to enhance interaction, however open plan office does not allow workers to have much privacy or personal space. Interaction and noise can be quite disturbance, this includes conversation from other workers, phone ringing and phone conversations, and movement of other users. However, this can be overcome by creating a multi-zoned office space, with areas for open collaboration and other areas for private concentration. The recommendation for the ideal coworking space is an activity-based workplace design that meets the desire for collaboration, social interaction, need of privacy and concentration. Besides that, open office also helps balance introverts and extroverts to thrive in the space and keeps the coworking space running to its best capacity.

**Variety and Flexibility:** To retaining the users in coworking space is to ensuring they feel supported by the space. This can be achieved by designed with the correct variety of working tasks and providing the appropriate combination of spaces where users will need over for the course of their working day or week. The recommendation was to providing combination spaces including: open office, pantry, formal and informal private meeting room, phone booth and access to shared amenities. This will lead to member’s satisfaction when the coworking spaces can support most of the member’s tasks.

**Proximity:** Proximity has the power to bring together coworkers from different departments who may not otherwise communicate much, therefore distance is important in proximity. Facility managers could provide spaces with shared





amenities such as pantry, dining area and common area to turn physical proximity to social proximity and lead different direction users in the coworking space to the same direction.

**Privacy and Distraction:** The downsides facing while working in the coworking space is probably being easy hearing of other members within the space. Most respondents in this study recognized the usefulness of overhear informal information, however they also found noises can be distracting. This distracting quality is not limited to the phone conversations but also unpredictable traffic noise from the other users within the coworking space. The recommendation to cowork spaces that want to minimize distraction and improve privacy should provide semi-private areas for members to take phone calls for instance phone booth and nook.

**Personalization and Territoriality:** Another possible downside to coworking spaces is the low ability members can personalize their work areas and marked certain portions of the territory. However, members can choose to where to work themselves by selecting one that appeals to their personal preference. The recommendation to cowork spaces that want to creating an appealing atmosphere that will attract members, is to provide high windows that allow as much as natural light shine in to the space. Art and place were also source of a great enjoyment. Providing arts and plants is an affordable way for coworking spaces to provide elements that will increase members' satisfaction in long term.

## 6. CONCLUSION :

The findings from the survey on Settlements coworking space, showed that few spatial factors of the coworking space had more significant impact than others based on how the users interact and feel within these factors. This showed different degree of satisfaction that influenced within each of the spatial factors according to the level of agreement users attached to these influences. Even though the result showed different level of agreement between each spatial factor, still these spatial factors all work together to engaging users inherent the value of social capital and form a positive coworking space environment that support interaction and collaboration to the users. The findings from the survey on Settlements coworking space, showed that few spatial factors of the coworking space had more significant impact than others based on how the users interact and feel within these factors. This showed different degree of satisfaction that influenced within each of the spatial factors according to the level of agreement users attached to these influences. Even though the result showed different level of agreement between each spatial factor, still these spatial factors all work together to engaging users inherent the value of social capital and form a positive coworking space environment that support interaction and collaboration to the users.

## 7. SUGGESTION :

Privacy and distraction are always an important subject for open planned workplace and coworking spaces. Recent study is not in agreement as to whether or not to increased interaction and collaboration is worth decrease in privacy and focused work. There are conflicting findings on recent studies about benefits of increase interaction and collaborations costs more harm due to decrease of privacy area. It can be due to demographic factors or magnitude of collaboration/privacy that causes these conflicting findings. Future study can focus on this spatial factor alone to perform a deep dive study into this topic. The future study can study what is the optimum noise level value for the certain demographic coworking space user. The finding of this research is to provide a standard reference for coworking space in Penang. Hence, future research that will perform deeper study on each spatial factor for different demographic and location of coworking space in Malaysia will be helpful in create a more detail understanding of spatial factor effect on coworking space in Malaysia. This will be useful data to develop a standard design guideline for coworking space in Malaysia. With such well-studied design guideline, a proper design coworking space can be built or modify to suit Malaysia coworking space. Ultimately, with great coworking space that strengthen social capital, we hope coworking space will not just be a typical sharing office but to help improve the competency and economy of Malaysia.

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