SPACE ORGANIZATION IN PERAK MALAY TRADITIONAL HOUSE

ANALYSIS OF SPACE ORGANIZATION on PERAK MALAY TRADITIONAL HOUSE

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ABSTRACT

The Perak Malay Traditional houses are one of the relics that should be appreciated due to their space organization uniqueness which is not present in today's modern houses. The study of the house's space organization should highly be given attention for future generations to discern. The issue is there is minimal approach on appreciating the space organization and there is even no concern of its benefits if applied in the construction of modern houses today. Indeed, in an orientation before the construction of a residential house, the role of the environment including culture, way of life, especially the occupants of the residence are taken care of by a craftsman. Discussion between the host and the craftsman is an important aspect before the residence is established. Space requirements are the most in the architecture of a traditional Malay house, a space was born as a result of the activities of society, by gender requirements in addition to the comfort of concern with the residential environment. Space requirements are common in almost every traditional Malay house in Malaysia but there are differences in orientation, climate, environment and local culture that trigger the use of a space. The purpose of this study is to pass knowledge to the future generation in order to appreciate the relics house. For that, the objectives of this research is to analyse the spatial organization design and architecture of a traditional Malay house with Perak state based on the space functional diversity through research on the role of space during
performance of activities. This paper employs a qualitative research adapting the observation on-surrounding and the house's interior space. Besides, sketches on house spatial pattern, joinery detailing and joinery construction were some of the approaches that have been applied to obtain the data. To strengthen data acquisition, interviews with target groups like village heads or local house carpenters were made. The data were analyzed and the sketches were illustrated in diagrams to interpret the pattern of findings. The results strengthened the characteristics of the interior spatial organization for Perak house traditionally do influence the environment, society, cultural customs, beliefs and religions.

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Keywords: Environment, Traditional Malay House, Space, Socio-Culture
INTRODUCTION

Perak's traditional Malay houses have been famous since long ago with their long roof architecture known as 'bumbung Perak'. But now, Perak is increasingly losing this legacy. However, nowadays there are many researchers studying these relics. It shows the existence of awareness to know the special features of this house. Initially, an architecture exists with its activities and environment. After going through the site selection process with the cooperation of the craftsman, the sketch is completed by including space in the residence. It is found that one of the most important elements in the formation of an architecture is the concept of space. Not understanding the concept of space, means that architecture cannot function properly. Spaces traditional Malay house is formed to cover the human activities with regard to the relationship with the environment, customs, culture, religion, social and economic occupant (Abdul Halim Nasir and Wan Hashim Wan Teh 1997).

The interior design features of the Perak house are undeniably unique. Each of the spaces carries their own uniqueness. The uniqueness of this Kutai House is in terms of the fineness of the carvings found on the doors, window openings, walls and its various uses of mortise. It is also reinforced by the old story that has been stored for a long time in relation to the history of construction and the occupants of the house.

Furthermore, the house’s spatial organization has been created based on occupant needs and associated with the environment surrounding, cultural activities and religion. In that sense, this research benefits the young generation in order to appreciate this relic's house. Therefore, the objective to be achieved in this paper is to analyse the spatial organization design and architecture of a traditional Malay house with functional diversity and to research the role of space during performance of the activities in that space.
LITERATURE REVIEW

Environment

Many researchers found the role of the environment is very important before the building process of a Traditional Malay House (TMH) custom design space is done. This is because space is highly dependent on the orientation of the home position (Halim Nasir, 2010, Mastor Surat 2012, Yuan, 1981, Zulkifli Hanafi, 2012). In traditional Malay custom home residential gateway shall overlook the main entrance. Paddy fields are the main agricultural activities, in addition to planting rice and vegetable growing. Apart from the route from the rice fields, the other main route is the river road, facing the rice fields because these two positions are the route and also the source of livelihood of the people at that time. According to Abdul Halim Nasir (2010), the river is the water transportation route and a place to connect with a boat, canoe and source of livelihood. Position resources are important in the formation of space for TMH. From the direction of the river flow, it indicates the position of the porch of the house, where the farthest end is the holiest area just as the upstream position is usually clean and pure (Norhasandi Mat, 2019). This end space is usually synonymous with a sacred and sacred space such as a prayer room, a place to recite prayers, a place to place the corpse during the funeral prayers. The position of the end of this house is normal. While the area downstream of the river is a lower area more influential to the space for activities, discussion conversations between family members.

Figure 1. Site Environment of Tok Se Indera Bongsu, Kg. Aji, Bota house
Source: Norhasandi Mat,(2010)
As indicated in Figure 1, usually the orientation and overview plans of Malay villages in Perak the position of TMH in the past is near in front of the river, land contours slightly higher than the level of the river so that it is protected from interference waters and so on. In the past, there were small roadways that connected the neighbourhood residences so that the residents could easily meet each other. While at the back there are TMH gardens or orchards where they make a living or gardening as a source of income other than hunting animals and so on (Yuan, 1997).

Sometimes this area is to serve guests, including a discussion of administrative and customs (istiadat). The environment has an important role in the construction of spaces opening in the traditional Malay house, with windows on the building, the doors provide comfort in the room with the trees that surround TMH and cool the rooms that house the wind blowing in through the windows and doors. Traditional Malay houses have design elements that cater to sunlight passive, one design on domestic superior resistance to hot humid climate that has a shade, a lot of openings for the flow of air in and out, the interior layout is open, piled, the height of the ceiling height and the use of building materials lightweight that does not deplete heat (Zulkifli Hanafi, 2012). From this influence, it is observed that all heritage houses choose the style of stairwells or columns, hollow, where the floor is high above the ground and that is a way to reduce moisture from the ground as well as providing air circulation in and out (Abdul Halim Nasir, 1985).

In terms of the residential location of the study house that is facing the Perak river, in the area of Kampong Aji Bota Kiri, this strategic location houses a position of almost one hundred meters from the Perak river and makes it easier for the host to use the river as the main vehicle, as well as a livelihood. At some instances the hosue located by the river was used as a stopping area. For instance, Tok Alang Baginda's house was visited by the state chief to stop for a while. Until now, this house has been taken as a foster home by the Interior Architecture Department of UiTM Perak, see Figure 3 photo.

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Religious

The orientation room at home of TMH in the context of a highly emphasized of Islam and focus the differences between men's and women's room (Syed Ahmad Iskandar, 2001). Public space and private space are the separation between the sexes. Normally the front room TMH is like the porch, which the porch is a specialization of public space for men, a meeting place between friends, relatives and neighbours all take place in the living room. If there are people or close relatives, new family members will also take part in the reunion. In the context of sending food if there are guests from outside and not from close relatives, the young and teenage girls will only send the food to the entrance of the mother's house only. The mother house is a central house space with a high roof construction suitable for ventilation and comfort as well as a peep window for women or young and teenage girls to watch from inside the house. Mother's house space, which caters especially for women to limit their ‘aurat’ or hijab (Abdul Halim Nasir, 199), Yuan, 1985, Mastor Surat, 2013).

In terms of mixing space women will use the back passage or at the kitchen door or interval to ride home. Kitchen space is indeed a space specially made for women and not men. If we look deeper, Malay culture has been pretty structured in line with the concept of Islam and the Sunnah of the Prophet, especially in the field of architecture (Mohd Sabriza’a,
2019). According to Mastor (2012), our ancestors used to build houses based on the concept of Islam very well. This clearly showed the Malay formerly specialized in producing prosperous residence for the occupants. The important role played by humanitarian factors in the formation of a prosperous life can be seen in the previous architectural heritage. The formation of each space, architectural details or design of their living space is a factor that is closely related to the prosperous aspects of the life of its users (Syed Ahmad Iskandar, 2001).

Custom and Culture

Space is a part of any traditional cultural habitat presenting their ideas about space and habitat about daily activities and events in community groups that involve the use of space whether in official events or not (Abdul Halim Nasir, 1997; Mastor Surat, 2013; Ahmad Marzukhi Monir, 2007; Yuan, 1981). This space unites the community in the event of 'khenduri khendara’, tahlil ceremony, wedding and even death. In the custom event, the foyer space is a place to discuss. For example, in Negeri Sembilan the foyer space situated at the base location near the entrance is to discuss customary matters, such as engagement, marriage, circumcision and others, while the foyer end room is a sacred or clean place of the religious person (Ustaz), reciting prayers, the place of customary wedding ceremonies, funeral prayers. In addition, in the custom of Negeri Sembilan it is a place where the ceiling is placed like a cloth hanging on the ceiling that shows the position of people based on rank in the society. According to Raja Ahmad Nafida (2007), the mother's house space is a special space for women such as giving birth, bathing unhealthy family members on the rare floor, because this area is covered it is not visible from non-family members, during the bride's wedding is placed in the mother's house room, before the marriage ceremony the groom is not allowed to enter because in Malay culture they have yet to be categorized as family members.

Material

Various ceremonies that are commonly performed during construction according to Noor Faizah Aziz (2008), include ‘Beramu’, ‘Mematikan Tanah’ and ‘Menaiki Rumah’. The purpose is to keep the people involved in the construction of the house to meet expectations, to avoid disaster and not to be disturbed by "forest guards". The equipment used in this
ceremony contains features that have meaning and values in Malay culture. According to Abdul Halim Nasir (1997), the place to build a house, the house orientation, the type of wood that is not good as a home are also underlined and influenced by the Malay tradition. Construction dimension is also believed to determine the good and bad of a house measured using the owner's limbs such as height and height, as well as measurements based on the number of 'rafters' and 'beams'. The height of the house refers to the height of the body of the man (husband), while the size of the house is the size of the hand of the woman (wife) (Noor Faiza Aziz, et. al., 2008). In TMH there are several types of columns with a specific name and function. In TMH, the front steps, the steps, how to tie a rope ladder is said to contain a specific meaning. Bendul is called the customary limit, because the limit of male guests is allowed to enter when there is no men in the house during the visit.

**Tiang Seri**

Room or home teater poster is the real identity of TMH. The process of erecting a pillar has its own ritual, usually the position of this "tie pole" is in the middle of the house. It is the main pillar; before the construction of this pillar various rituals are done to give encouragement to the host, blessings and prosperity to the house session (Abdul Halim Nasir, 1997). There is a ritual before raising the pillar where under this pillar are placed items in the form of money, gold, hair and various materials that are felt to give encouragement to the whole house from various calamities and receive blessings from god.

**Roof Design**

There are variations of the shape of the roof for TMH, it depends on the location of the area but on the habit namely long roof (gable roof), limas roof (five ridge roof) (Norhasandi Mat, 2010). In addition, there are several variations of roof design with certain style depending on the region such as bumbung lontik, bumbung gajah menyusu and bumbung limas potong Perak, Even, when there are differences in terms of design among all the traditional houses in the Malay world, generally all of them are harmonious synchronization with nature and mankind (Raja Nafida, 2007). Almost all architecture styles in the Malay world feature stilted or piled dwelling, with
tall and open interior as well as opening.

**METHODOLOGY**

The aim of the study is to analyse the design of Malay traditional houses with unique values and aspirations. The research studies of the design are based on a number of factors and characters that make Perak Malay house architectural designs have their own identities. In order to achieve the objective, the methodology of the research is related to the collection of data that were obtained through observation on site in four days. The four days observation were done alternatively due to constraints in terms of volatile rainy weather to measure and take pictures as observations. It involves observation on the front, side view of the house, and most importantly the position of the interior space of the house, sketches on existing traditional house, detail jointing in construction, literature were based on previous studies such as PhD researcher who makes kutai house as a topic of study, the researchers and paper on Perak traditional houses with TMH and Malaysia traditional architecture, interviews were conducted based on the standard of questions that have been made and focused on the target group such as heirs of the house, during family gatherings, village heads, local historians who understand the position of the study house, a senior local homemaker and knew the origin of the house in his neighborhood. In addition, the researchers also took relevant photographs of the houses. Besides, the literature review on the topic of study was obtained through theses, journals, articles, books and others and have been documented from reliable resources to meet the objectives of the study. This paper only discussed the main design characteristics of Tok Abu Bakar Alang Ketak and Tok Sedara Bongsu Malay traditional house design and highlighted especially on the spatial organization. The reasons for the selection of these two houses as a case study because both houses of this study fulfilled the criteria which are it still has an owner, always taken care of by the host this makes it easier for the researcher to study because no one occupies this house. This facilitates the researcher to go in and out of this house. The house age criteria that is over 100 years have a high historical value but are still well preserved. The house is a foster home to the Department of Interior Architecture and Kutai as well as UiTM Perak in general. It is used as a reference for Perak house standards for researchers from within
and outside the state.

The location of this house is close and it is facing the river which is the main route and this house used to be a place where the Sultan would stop to rest for a while. This further strengthens the researchers’ selection criteria to use the house as a case study house.

The results of the field survey of the researcher provide a plan design, side view. Data from previous researchers are also used as a guide for analysis. Findings from previous researchers are used as data to aid writing. The limitations of this research were it only used observation on traditional Perak houses that have been selected, namely the house of Tok Senara Bongsu (KUTAI) and the house of Tok Abu Bakar Alang Ketak (TABAK). According to Norhasandi Mat (2010) these two houses are also known as Rumah Bumbung Melayu Perak a (RBMPa) from the point of view of the facade architecture and interior space. In addition, the limitation also was based on the environmental context as well as the relationship with the architecture, customs and culture, and not forgetting the religion that play the role of space as well as architecture. The role of architecture must not not involve building materials; the elements in the traditional residential structure of the house that are most important are the pillars, especially the pillars that will support the construction of the roof. Variations in the shape of the roof in traditional houses are also given priority.

RESULTS AND DISCUSSIONS

Rumah Limas Bumbung Perak and Kutai House

‘Rumah Limas Bumbung Perak’ and ‘Kutai’ House is between the TMH available in Perak state, most of the houses are facing the river Perak Houses orientation because the river is a highway or called ‘jalan air’ a contact from one place to another, it was the Rumah Limas Bumbung Perak (RLBP) facing façade towards the river, please refer to Figure 2.
The river is also a source to move the economy of the locals and the surrounding area. In this finding we can see that the house is indeed facing the river, the river has an important role such as transportation, food and daily use. It serves as a link between villages and small towns as shown in Figure 3. In this review we take an example of Rumah Tok Abu Bakar Alang Ketak (TABAK) position of floor plans; it has a porch. To our knowledge in the orientation of TMH custom home beranjung is someone's home that has a stable economy position. Normally, the house in its designed has an ‘anjung’ and ‘serambi’, ‘rumah ibu’ and ‘dapur’.
According to Mohd Sabrizaa Abd. Rashid (2017), Makala, Kutai house a sample study using Tok Sedara Bongsu was used is a residence that has the same orientation look (figure 6 photo no 1 the elevation of the house facing the river) where in ancient times the people and the king would normally stop over. For example, Sultan Yusuf 1, which who was the 27th Sultan of Perak stopped over to rest. Then, the Sultan of Perak and his entourage often used Sungai Perak as a main route from downstream to upstream areas for hunting or visiting his regions. Wan Chu shared a memorable moment, as narrated by her grandfather, that was when the young prince of Sultan Yusuf once enjoyed himself on a swing inside the house. This incident took place when the Sultan and his entourage stopped by to rest. As observed in Figure 6 base pic. 1 the main stairs to go up are made of hardwood as it is exposed to the sun and rain, with the construction of small windows on the front wall giving a view to the front. Pic. 3, shows view on the side, where there is a staircase to the kitchen. Usually this staircase is used by women if there was a ceremony and so on. There is a difference of space between men and women in the context of privacy as well as gender and mahram, according to pic 4, 5 is the mother's house room there is a small floor and pic 5 is the kitchen space, In the kitchen space there is a dish rack space that is left out because it gives the impression of a kitchen system that was based on the environmental system. The system gives space to the dishes that are placed on the shelves quickly dry with wind circulation and sunlight on the sloping design makes kitchen utensils dry quickly. Pic 6, 7
position of the pole of Kutai house with a height of 3 feet from the ground level with each pole is given a stone base as to give resistance to the pole from preventing soil moisture and termite attacks. For pic 8, 9 is a wall position with a low window construction with a lattice on the opening that is horizontal window openings.

The structure of the use of space in the Kutai house is divided into private space, namely the bedroom and also the room used by the girls to sleep and special activities for women. While the space outside the room is a common space for the use of men such as car parties. Figure 7 is the measurement of the size of the porch space; it is calculated from the way the men sit, facing the meal where the position of four men are facing each other. For the outer porch there are three dishes at a time. For the measurement of the size of the porch space, it is calculated from the way the men sit facing the meal where the position of four men facing each other. For the outer porch there are three dishes at a time. While the central foyer room can accommodate as many as six dishes and as many as twenty-four people during certain events such as prayers during the thanks giving ceremony and others. While the porch for women can accommodate up to twelve people when there is certain occasion, such as meal.

Figure 7. Description in The Form of Plan How Outdoor Space (Public Space) Mother’s House to be Used for Feast Ceremony.
Source: Norhasandi Mat (2010)
The position of women in the same space is still separated by the construction of curtains so that there is a separation between the congregation and also male and female guests. According to Syed Ahmad Iskandar (2001 as cited in Norhasandi Mat, 2010), the size for the position of four men is calculated equal to one mat size. The size is added to form the size of the porch space. One of the formulas for space to cater for four people to sit is six feet by six feet.

The Spatial Organization

Front Part

Anjung and Serambi - The front room of the Limas Perak roof house has a main staircase at the a serambi and anjung. According to Mohd Sabrizaa Rashid (2019), the staircase is used to go up to the front room of the porch house for the use of the host and the guests to relax, while enjoying the view outside through the windows. The open space without walls has a fox fence about one foot above the floor level. It is sparse flooring using 2 ½ wide wood stacked at a distance of 1 inch each. The floor of this space has a height of 5 feet above ground level. The porch space connects the main staircase with a higher porch space with 3 stairs.

This foyer is semi-formal and more relaxed, so the porch is a formal space. This room is usually attached with a main door made of hardwood with a traditional latch system without hinges. Five long windows are
decorated with translucent carved window heads and are lined with fox fences. This porch is a formal space when receiving guests. If the guest porch had a relaxed atmosphere, the guests are welcomed to sit on the porch with appropriate manners because event of eating and drinking will take place in this room.

![Figure 8. House of Tok Sedara Bongsu, Kg. Aji, Bota drawing](source: Mohd Sabrizaa Abd Rashid (2017))

The design for this area is small, and it is located at the front of the house, it is nearer to the door leading into the main house (rumah ibu), while the ‘Veranda’ in Rumah Kutai (ref. Plan, Section A-A, C-C, D-D figure 8) stretches along the first and second pillars since this area is often used to have discussions and receive visitors. Discussions were often held at this area since it was a residence of the village head. Thus, many villagers held gatherings with him at this house or to be more specific, the veranda. Those who sit in this area will sit and face each other while leaning against the wall. There are three openings at the veranda, one window is round with carved panels and grill and another one is a full-length window decorated with carvings. The third opening is the main entrance door for the front area of this house.
Middle Part

Rumah Ibu - There is an opening space in this mother's house and it is the largest space in the residence of Tok Abu Bakar Alang Ketak’s house. This space has a high ceiling opening and a bedroom is usually placed there too. The privacy space for the host is in the room of this mother's house if there were guests present they need to seek permission of the host to enter the room. Ref. Figure 9 All the windows found in the mother's house are long window and padar musang there is a decorative element of the window head on top. All the windows found in the mother's house are long windows and padar musang, there is a decorative element of the window head on top. The dividing wall between the outer space and the bedroom is an 8-foot-high dividing wall with decorative elements of translucent perforated carvings.

In rumah Kutai according to Mohd Sabrizaa Rashid (2017), this area has one room in this house which was once called “bilik anak dara”. True to its name, this room was where all young teenage girls gathered. All activities
take place here and there is one room for the married women. Activities that take place in this room also include work for women such as weaving mats, making baskets, as well as spiritual events such as prayer, reciting the Quran. This room is illuminated by a full-length window opening which enables natural morning light to illuminate the house, particularly the main space.

Rumah Selang - The interval house or middle house is the space that connects the mother house and the kitchen house. It houses the second staircase and the second entrance to the TABAK house ref Fig.10 pic. no. 1 the layout plan orientation shows the layout of an anjung, main house and kitchen area to highlight the separate space for man and woman at Tabak house. Usually, the stairs in the interval house are used for women to enter the house, where the feast of women will be served in the middle space, like men who are served on the porch. Its position is near the kitchen makes it very suitable for that function. The design of the main staircase with the second staircase is almost the same for the Tabak house. While in the study house of Tok Se Indera Bongsu also there is a staircase on the left side of the house, it connects the kitchen space from below with 3 steps and connects with 2 steps to the kitchen door. This is quite low when compared with the lounge. The space is to cater for the activities done by women as well as a link to the kitchen.

![Figure 10. House of Tok Abu Bakar Alang Ketak drawing](Source: Mohd Sabrizaa Abd Rashid (2019))

**Rear Part**

Kitchen House - The backyard houses has space for cooking activities, a dining room and a back staircase. The tobacco house also houses a toilet space at the back of this. Most build a bathroom or toilet space as additional
space compared to the original they need to go to the well or to the river for the purpose of bathing, washing etc. This is an additional element built of brick and connected to the kitchen space, there is also another Limas Bumbung Perak which houses a kitchen space that is not adjacent to the toilet. Toilet construction is placed on the stairs of the kitchen to go down. It is built separately from the backyard for the sake of religious continuity between the less clean space such as the toilet and the clean space such as the kitchen where to prepare food it needs to be separated. Rumah Kutai Tok Se - Indera Bongsu, on the other hand, has a kitchen space with space to place dishes, plates and cups. Suitable for window construction with carved grille. This room is filled with women preparing food for the family as well as crowded events. The toilet construction is not included in this part; it is built separately from the house building lying in the back.

CONCLUSION

In the whole house TMH - with regard to the statement above, the characteristics of the interior space is a space resulting from Rumah Bumbung Melayu Perak a (RBMPa) designs are influenced by factors that make up the days and give uniqueness to the design of the house and the interior space RBMPa. From the design of the house, the most prominent appearance of the house mothers are given the maximum attention because all the elements of a TMH style home mom are put in this style. Environment, society, cultural customs, beliefs and religions are factors
associated with the factors of time because at that time the space system is very much driven by the location of their placement. In addition, for security factors it also has a role in causing space design to be placed in a high position so that the occupants of the house can be protected from all threats animals and great floods.

On the whole the space in this Traditional Perak House has similarities, but there are differences in function on the ‘Anjung’ and ‘Serambi’, while its activities are the same. When looking at the side of the stairs, it is quite different from viewing p directly to the porch space and there are stairs that are covered with the construction of L-shaped stairs that lead up to the house. Besides, there are openings that will illuminate each and every room in the form of windows and windows also are different because the activities may be the same but the nature of usability and the function of the space is different. In addition to the shape of the window there may be the will of the host and the soul or exploitation of the work of the builder to form a ‘Tingkap’ or ‘Jendela’ form to suit its function. The whole formation of this space occurs from the influence of different environments, as well as the contour pattern of the surface of a place that forms a dwelling house. The formation of space for the traditional house of Perak also emphasizes the division of space according to gender activities as well as the requirements of Islamic law where the space is separated according to privacy, cultural and religious needs.

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REFERENCES


Zulkifli Hanafi (2012), Towards a Sustainable Built Environment in Malaysia. Sustainable Design: Learning from Traditional Malay Architecture. Universiti Sains Malaysia,