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Quality Physical Environment in Paediatric Wards: Designer's Creation Versus Users' Satisfaction

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Abstract

Quality physical environment could contribute towards the creation of a healing environment. This paper, an outcome of an ongoing research on physical qualities of Malaysian paediatric wards investigated the design trend upon users' satisfaction. Two UK NHS evaluation toolkits were used to evaluate the quality of the physical environment and the users' satisfaction levels. Data collected involved paediatric wards in eight hospitals and respondents comprised of 215 nurses and 217 patients. Results revealed that the positive design trend was not in tandem with the users' satisfactory level. Lack of understanding upon users' needs is suspect in designing those wards.

Keywords: Quality Physical Environment; users' perception; Optimal Healing Environment; Quality of Life.

1. Introduction

Designers have been reminded for decades to understand about the users' needs, rather than relying on assumptions in their design process (Deasy & Lasswell, 1985). The cautionary reminder should be heeded

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especially when designing environments for children, who are more influenced than adults of the physical environment. This is crucial within a healing environment.

Healing was known by different approaches more than 2,000 years ago, termed as Complementary and Alternative Medicine (Huelet, 2003). A global interest towards creating the healing environment influenced the Health Ministry of Malaysia since the 1990s for a more child-friendly, cheerful and safe hospital (Mathews, 1999). "Healing environment" can be described as the physical and non-physical environments that support the recovery or the healing process. A conducive healing environment as established in the literatures helped paediatric patients to heal faster, reduced the length of stay in the wards and enhanced their quality of life. Previous papers presented, based on the authors' ongoing research pertaining to the quality of the physical environment in Malaysian paediatric wards had focused on various aspects pertaining to the healing environment. The present paper specifically focused on the users' – both staffs and patients - perception about the quality of the physical environment of those wards. The purpose being to depict the trend in the design of such wards, with the objective of identifying design factors that could impede the creation of a more conducive healing environment.

2. Literature Review

The literatures reviewed concerned the healing environment framework and users' perception in terms of healthcare environment.

2.1. Healing Environment Framework

The Samueli Institute based in United States, a medical research organization exploring the science of healing has developed the Optimal Healing Environment (OHE) and described it as "the social, psychological, physical, spiritual, and behavioral components of healthcare support and it can stimulate the body's innate capacity to heal by itself" (Ananth, 2008, p. 274). The framework involved two major parts - inner and outer environment which comprised of seven components namely *Developing Healing Intention, Experiencing Personal Wholeness, Cultivating Healing Relationship*, *Practicing Healthy Lifestyles*, *Applying Collaborative Medicine*, *Creating Healing Organization* and *Building Healing Spaces* (BHS) as shown in Figure 1.
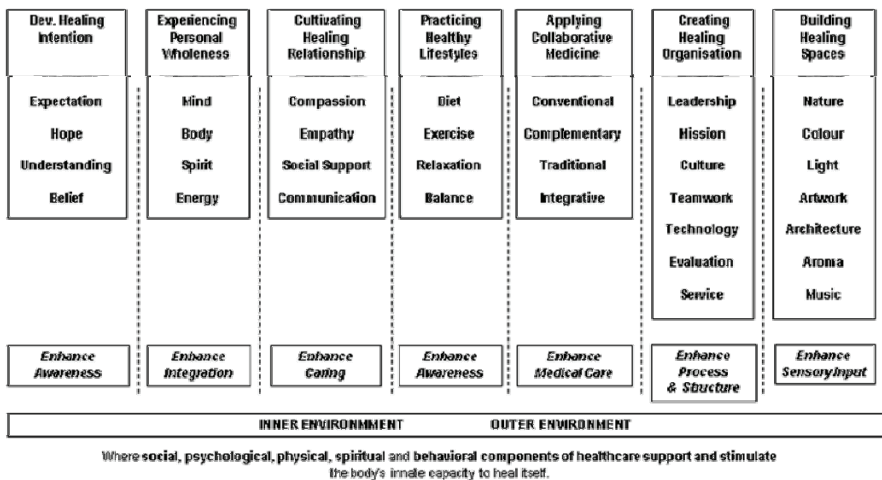

Fig 1: The Optimal Healing Environment (OHE) Framework. (Source: Sita Ananth (2008), Healing Environments: the next natural step, *Explore*, Vol. 4, No. 4, p. 274)

2.2. Author's Research Framework

This research paper relates to the seventh component, the BHS which involved Nature, Colour, Artwork, Architecture, Aroma and Music. Being of architectural background, the authors felt that it was necessary to modify the BHS or Architectural component into Exterior and Interior environments as shown in Figure 2.
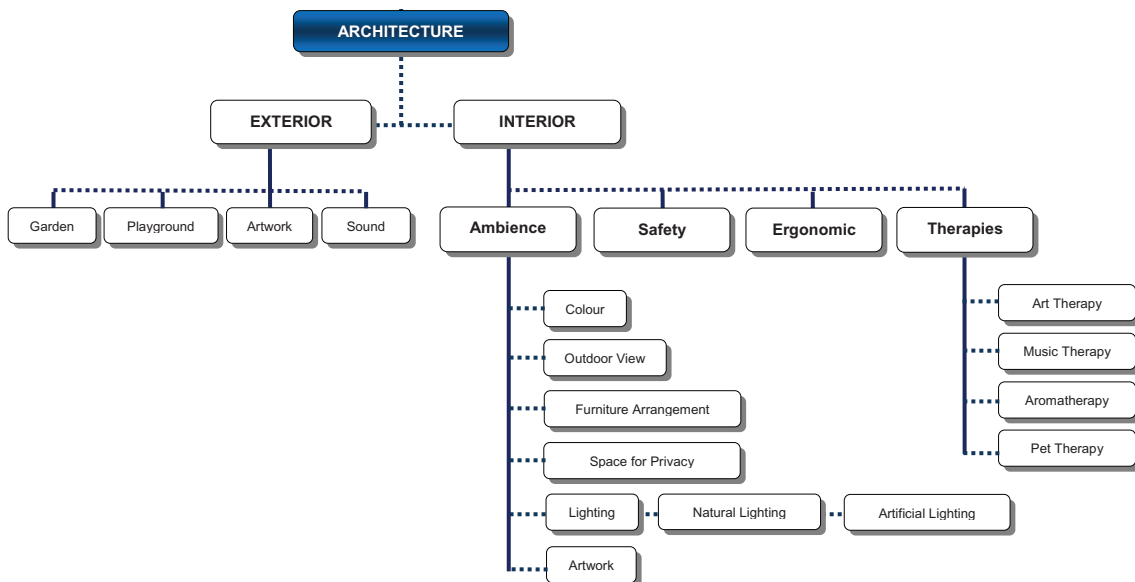

Fig 2: Authors' Modified Architectural Framework Based on the OHE (Ananth, 2008)

2.2.1. Exterior Environment

The importance of the garden, playground, artwork and sound of nature in contributing towards the healing environment has been reported in several literatures. The creation of a healing garden by providing a space of calmness and serenity promotes emotional relief of the users from their daily stress and anxiety (Vappa, 2002). The playground (Prevenslik, 2005), artwork (Eisen et al, 2008) and sound of nature (Vapaa, 2002), in integration with the garden do create a sense of welcome and benefits in particular to the paediatric patients by reducing stress and promote physical fitness during their play in the playground. As such, physical accessibility rather than just views to the area would be most welcomed by users.

2.2.2. Interior Environment

Interior environment is the environment which supports the creation of a healing environment and it comprised of features such as conducive ambience, general safety, appropriate ergonomics and therapies. Elements of the conducive ambience include appropriate colour scheme, outdoor view, furniture arrangement, space for privacy, lighting and artwork.

The integrations of proper colours and artwork play a role in the healthcare environment. It creates a dramatic environment which gives positive impact, relieve stress and distract illness from paediatric patients (Kellet et al, 2004). Colours also help to create cheerful and better environment (Hill, 2008). In relation viewing outside, patients who are exposed to nature would reduce stress, facilitate recovery from

illness and improve their moods. For example, patients warded in rooms with window helped patients to determine the time of day and weather outside and also enhance patients and family satisfaction and the overall quality of care (Phiri, 2003). Furniture arrangement creates positive moods amongst patients. For example, comfortable armchairs and a good bed support healing process in the healthcare environment. Furniture such as parent's bed and bedside equipment system would also reduce stress to both parents and staff (Smith et al, 2007). Creating effects of environmental "humanization" in paediatric hospital benefited patients on reduced stress (Bonaiuto et al, 2002). Single room occupancy allows private conversation to patients, experience of privacy, less noise and quality of sleep. Greater bedroom size enables the room to be multi-functioned and also promotes the well-being and the quality of life of patient and staff in order to produce a healing effect (Phiri, 2003). Natural lighting or daylight benefits on the psychological effects to patients. It gives an impact of daylight on patients' psychology and physical diseases to recover from illness faster (Phiri, 2003). Meanwhile, artificial lighting also plays a role in improving and increasing the productivity and health well-being by creating comfortable ambience and positive distraction in the healthcare setting, and increases the productivity among staff (Dutro, 2007).

Designer of children's hospital should consider facility design such as safety and ergonomics in order to meet the users' satisfaction. Tips and safe handling for children should be provided because children are constantly at risk to falls and injuries during their stay in the hospital (Warda, 2005). Effective ergonomic design by creating a home-like environment would reduce stress among patients and parents in terms of safe patient handling (Joseph, 2006).

Alternative therapies such as art therapy (Camic, 2008), music therapy (Routhieaux and Tansik, 1997;), aromatherapy (Vappa , 2002;) and pet therapy (Braun et al, 2009) have been revealed to aid healing and widely integrated into the healthcare environment.

3. Research Design

3.1. Strategy

Post-Occupancy Evaluation (POE) was chosen as the strategy for the study. Overall, paediatric wards in eight Malaysian hospitals located in both urban and non urban areas were involved. To depict the design trend of the wards, the main criterion for the selection of the hospitals chosen was the year it was built which represented the design of each of the last three decades - the 1980s, 1990s and 2000s as shown in Table 1. Due to the confidentiality agreement, name of the hospitals could not be revealed and thus coded with the first two alphabets, followed by the location in brackets with "U" indicating "Urban" and "NU" as "Non-Urban", and followed by the year it was built. One was built in the 1980s, another was built in the early 1990s, three others were built in the late 1990s while the other three were built more recently within the last five years.

3.2. Methodology

The methodology for data collection involved documentation, personal site visits, evaluation toolkits and questionnaires. The documentation involved in-patient data, floor plans of the wards and authors' photographic evidence from the site visits. The in-patients data acquired from the hospitals' record departments consisted of information about the patients' demography, length of stay and type of sickness (diagnosis). For the present study, the data for 2009 was used as the basis for analysis. Th photographic evidence taken by the authors included different corners and spaces to visualize the ambience of the paediatric settings.

The evaluation toolkits used were of UK's NHS, namely the AEDET (Achieving Excellence Design Evaluation Toolkit) Evolution and ASPECT (A Staff and Patient Environment Calibration Toolkit) evaluation toolkit (DS Estates and Facilities, 2008a &b).   The AEDET Evolution was used to evaluate the physical environment through a series of statements which consisted of three main areas namely Impact (Character & innovation, Form & materials, Staff & patient environment, Urban & social integration), Build Quality (Performance) and Functionality (Use, Access, Space). The AEDET forms were filled up by the authors based on their personal on-site observation of the physical environment of the wards. The ASPECT Evaluation toolkit, which evaluated users' satisfaction levels has been tested upon more than 600 research projects. For the purpose of the present study, it was transformed and modified into survey questionnaires. Respondents involved users of the paediatric wards which included – patients / carers, nurses and other staffs. Overall, the survey involved 215 nurses and 217 patients as tabulated in Table 1. In investigating the patients perception upon the physical setting of the wards, floor plans were used to locate the beds in relation to the position of the windows and doors. This could synchronise with the particular users' response pertaining to issues such as the influence of view to outside, natural lighting, ventilation and accessibility to outside.

Table 1: Hospitals involved based on the year built and number of respondent

	HOSPITALS	YEAR BUILT	AREA	RESPONDENT (STAFF)	RESPONDENT (PATIENTS)	
1	KG	1985	Urban	27	23	
2	IP	1991	Urban	30	28	
3	KJ	1999	Urban	26	27	
4	PA	1999	Urban	24	30	
5	SG	1999	Non-Urban	28	29	
6	SD	2005	Non-Urban	26	29	
7	AG	2006	Non-Urban	27	29	
8	SB	2007	Non-Urban	27	22	
	Total Respondent			215	217	2

3.2.1. Procedure

Consent from the *Ministry of Health* (MOH) and approval from the *National Medical Research Institute* (NMRI) was first obtained through formal applications with support from each of the hospital's Director and Paediatrician. Preceded by initial briefings about the setup of the hospitals, representatives from the hospitals accompanied the researchers during the site visits and provided responses to spontaneous general enquiries about the physical environment of the wards. Permission was further granted to obtain the in-patients data from the Hospital Record Department.

Data collected involved personal on-site observations, and photographic documentations about the facilities provided and of the ambience. The *AEDET Evolution* forms were then filled. Visits to the hospitals were done once and lasted about 4 hours per hospital. The researchers briefed the respondents about the purpose of the study and two different sets of questionnaires for thirty respondents were then distributed to staffs and patients accordingly. Responses of the questionnaires were then collected after a

period of two weeks. Floor plans of the wards were obtained within three to four weeks from the MOH's appointed services and maintainance company, Radicare Sdn Bhd.

3.2.2. Limitation and Delimitation

Limitation for this study involved time constraint in obtaining approval from MOH and NMRI. In-patients data obtained were delayed due to the confidentiality of the data which had to be screened by the administrative officer before being released. While some of the data obtained were incomplete, for example, missing names and patients registration numbers. In addition, the hardcopy data received had to be transformed into softcopy for the data analysis. Questionnaires feedbacks involved co-operation from the parents, for example, they were more concerned with the wellbeing of their sick children rather than responding to the questionnaires. The delimitations focused on data retrieved upon paediatric patients of the 3-6 years old age group and confined to 28-40 bedded hospital wards.

4. Findings and Discussions

4.1. The AEDET (Achieving Excellence Design Evaluation Toolkit) Evolution

The data collected from the AEDET was analysed to compare the design quality trends amongst the wards. The weightage for the best score is "6" while the poorest score is "1" A score of "3" was considered the average. Overall, the AEDET analysis showed a positive design trend of the hospitals built since the last three decades. Except for the older KG (U)-85 and IP(U)-91 built before 1992, all post-1991 hospitals built scored above average in all the three main areas (Impact, Build Quality, Functionality) analysed, with the more newer AG(NU)-06 and SB(NU)-07 scoring above "4" in all areas. Amongst the eight components of the main areas analysed, only "Use" had not shown any significance improvement in trend, although being evaluated still as above average.
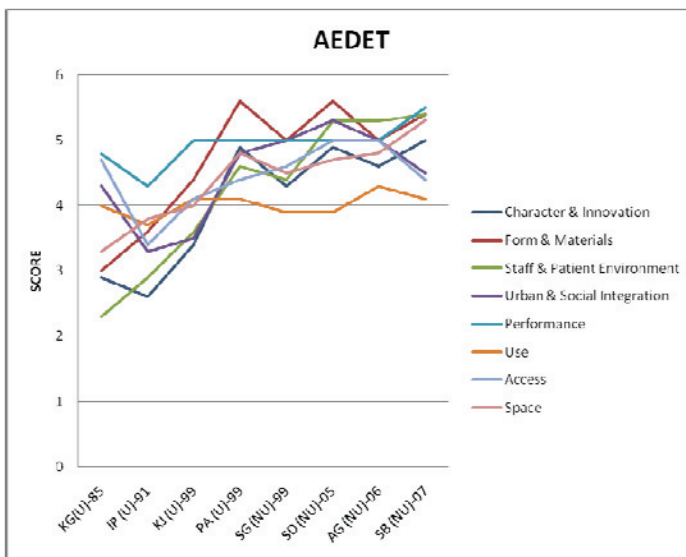

Fig 3: The AEDET (Achieving Excellence Design Evaluation Toolkit) Evaluation - Summary of Findings

4.2. The ASPECT (A Staff and Patient Environment Calibration Toolkit) - Users' Satisfaction

4.2.1. Responses from Staff

The ASPECT which evaluated satisfaction levels amongst the staffs were divided into four main categories: - *View to Outside*; *Nature & Outdoor*; *Comfort & Control*; and *Staff Facilities,* with several additional aspects per category. Altogether, 215 staffs responded to the questionnaires. Overall, the analysis revealed that the majority of the staffs were not satisfied with the majority of the categories in the oldest KG (U)-85 and surprisingly, in the newest SB (NU)-07, as shown in Figure 4(a). This does not seemed to correspond with the evaluation of AEDET, which indicated a positive trend over the last three decades. The staff seemed to be most satisfied with the older KJ (U)-99, followed by the newer AG (NU)-06.
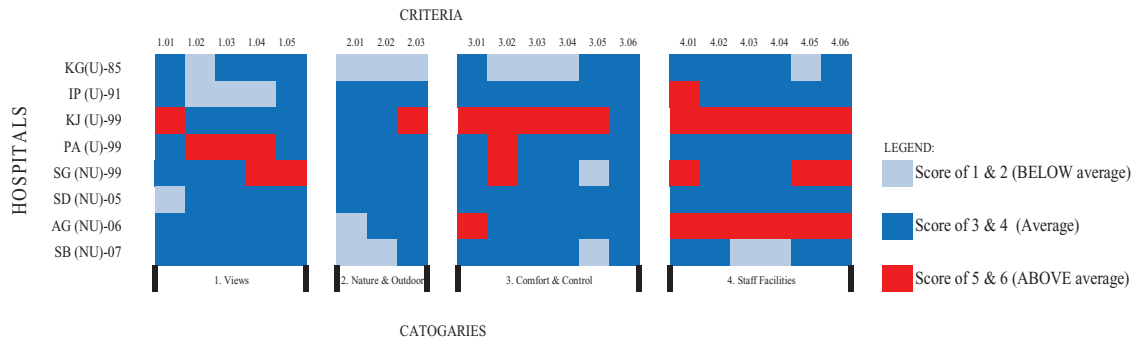

Figure 4(a): The ASPECT (A Staff and Patient Environment Calibration Toolkit). Summary of Findings (Staffs, N=215)

4.2.2. Responses from Patients (Parents/Carer)

Similar to the first three categories that involved the staff, additional categories of the ASPECT for the patients (parents/carers) included *Privacy, Company & Dignity; Legibility of Place; Interior Appearance;* and *Facilities for Users.* Altogether, 217 users responded to the questionnaires. Overall, as compared to the staffs, the users' satisfaction level again seemed not to correspond more with the AEDET as shown in Figure 4(b). Amongst the users, the most satisfactory hospital was PA (U)-99 rather than the newer hospitals.
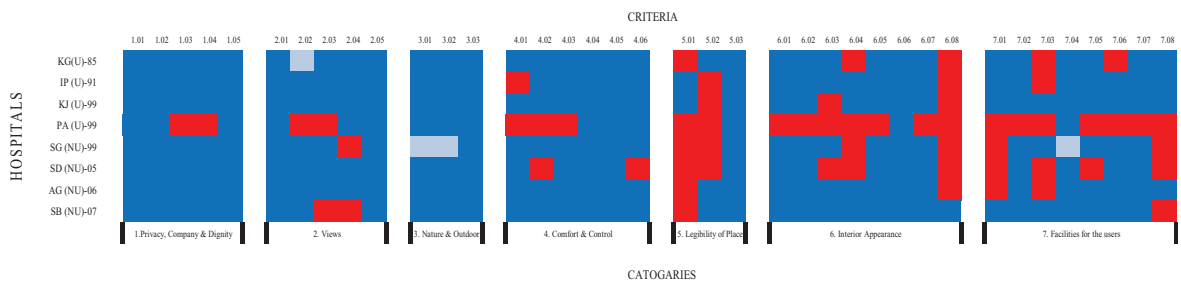

Figure 4(b): The ASPECT (A Staff and Patient Environment Calibration Toolkit). Summary of Findings (Patients, N=217)

4.2.3. Correlation between AEDET and ASPECT

Evaluation for the AEDET and ASPECT were done by different evaluators, - the AEDET Evolution by the authors, while the ASPECT by the users, hence the possibilities of discrepancies in the scoring. This was further revealed with the most satisfactory hospital chosen by the staffs, KJ (U)-99 and PA(U)-99 were amongst the most highly rated in the ASPECT analysis by the users. Nevertheless, as mentioned earlier, both the authors are of architectural background, hence of similar disciplines with the designers of the hospitals built. Both factors seemed in agreement in the positive design trend for the betterment of the users. However, the ultimate users felt otherwise.

5. Summary and Conclusion

There exists a positive trend in the design of the physical environment of paediatric wards in Malaysian hospitals over the last three decades. However, the positive trend is not in tandem with the satisfactory levels of both the users – staffs and patients. The resultant 'mismatch' of assumed quality physical environment created with users' unsatisfactory levels could indicate that users' needs are still not thoroughly understood by designers. Thus, it is suggested that the design brief used for the creation of the physical environment should include a thorough understanding of the users' needs, rather than based on assumptions by the designers.

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Special Note

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