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### Integrated Design Process: A Study on Integrated Design Teams

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#### ABSTRACT

Since 2009, Malaysian Institute of Architects (PAM) and the Association of Consulting Engineers Malaysia (ACEM) have formulated the Green Building Index (GBI) to enable green grading and certification of Malaysian buildings. The Malaysian government has also shown support through the many incentives for the implementation of GBI. Sequentially, creating a green building design is not only by minimizing the destructive impact on the environment, but it also needs to remain practical, economical and comfortable for use. Therefore, the importance to look into integrated green building design is the responsibility of the design team that works hand-in-hand throughout the entire process, as well as considers each aspect of a building in an integrative and holistic manner. The purpose of this paper are: (1) to investigate the perception of the design teams on the integrated design process (IDP), (2) to analyze the interpretation of IDP by the design teams via experience, knowledge and practice, (3) to determine the factors that influence experience, knowledge and practice with regard to IDP.

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### INTRODUCTION

When elements in a building take on different functions, that's a clue that we're doing integrated design [1]. In April 2009, Malaysian Institute of Architects (PAM) and the Association of Consulting Engineers Malaysia (ACEM) formulated Green Building Index (GBI) to enable green grading and certification of Malaysian buildings. Since its inception in 2009, it has been applied and expansion has been continued alike for residential, commercial buildings and even manufacturing buildings. The Malaysian government has shown support through the many incentives for the implementation of GBI [2]. Sequentially, creating a green building design is not only by minimizing the destructive impact on the environment, but it also needs to remain practical, economical and comfortable for use. Therefore, the importance to look into integrated green building design is the design team that works hand-in-hand throughout the entire process, as well as consider each aspect of a building in an integrative and holistic manner. This paper will shed some light (1) to investigate perceptions of design teams on the integrated design process (IDP), (2) to analyze design teams interpretations on the IDP via experience, knowledge and practise, (3) to determine factors that influence experience, knowledge and practice with regard to IDP.

#### Methodology:

A series of focus group consisting of 20 participants with 2 different design teams interviews/discussion sessions were conducted to collect qualitative data on the different individual background, profession and project experience. The formation of focus groups was based on experience, knowledge and practice differences such as architects, engineers and consultants. The level of experience, knowledge and practice affected the different meaning of perceptions, interpretations and influence factors among teams during IDP. All data obtained were transcribed and the research findings were divided into three parts.

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## RESULTS AND DISCUSSION

### (i) Design Team's Understanding of IDP and Other Related Issues:

Experience, knowledge and practices play an important role in IDP. A past study by Nazirah, Siti Marina and Zarita suggested that individuals with higher educational level are likely to become more sensitive and have high awareness and understanding towards certain matters [3]. We found that focus group participants showed their ability to discuss matters and associate themselves in understanding IDP, and it can be divided into two aspects. The first aspect involves positive elements, whilst the second aspect involves the relevance of mixed elements in their discussions towards IDP. Majority of participants in the architect, engineer and consultant groups tended to relate their understanding of IDP as positives elements.

Danny (Architect 1)	Jimmy (Engineer 2)	Ho (Architect 2)	Hakimi (Consultant 1)
"Environmental elements in the integrated design building began to focus more on the functions and that is why we are doing the integrated design".	"The repeating system set up previously is in those conventional buildings. Therefore, in order to change repetitious process is by doing integrated design".	"Integrated design is the way where we can look out on innovative and better solutions".	"Although integrated design seems like a new concept currently, it is actually a timeless concept and has existed since thousand years ago in the history of human architecture".

**Fig. 1:** Participant's Understanding of IDP and Other Related Issues (Positive Comments)

Haliza (Engineer 1)	Wan (Consultant 2)
"An integrated design process will let the team firstly to focus more on the architectural form rather than others. However, it does get down in some cases such as non functioning design. That is why assembling the right team is important".	"It is not easy to get a high performance building with the conventional building design, but it is not easy to form an integrated design team as well. However, it is easier to get a high performance building design later".

**Fig. 2:** Participant's Understanding of IDP and Other Related Issues (Mixed Comments)

Overall, it can be seen that the focus group participants could provide various responses of positive and mixed of comments suggesting there are correlations between their experience, knowledge and practices with their understanding of IDP. Fig 1 and Fig 2 explained theirs' mixture of perceptions about IDP.

### (ii) Experience, Knowledge and Practices of Design Team:

Malaysian Green Building Confederation (MGBC) revealed that Malaysian professionals have the highest level of knowledge and interest regarding integrated design [4]. In order to ensure the evolution of integrated design, the 10th Malaysia Plan (2011-2015) has taken serious effort and initiatives by introducing the AFFIRM (*Awareness, Faculty, Finance, Infrastructure, Research and Marketing*) framework [5]. indication shows positive and mixed attitudes by the focus group participants on issues relating to IDP. In actual fact, majority has taken initiatives from their own experience during practicing IDP.

Positive	Hakimi : "I'm going to do a better job with seniors architects and engineers in integrated design. By doing so, we will know what the clients wants and also truly understand the clients need. It will look more visible for the clients" (Consultant 1)
	Jimmy : "IDP is a linear process between architect, engineer and consultant that take months before proceeding with it. Sometimes, it is quite shocking when the whole discussion is about the design only. Most of the time you have to re-do a lot of things or think of another system" (Engineer 2).
	Danny : "The difference of conventional building is that they don't need to go through IDP. They can just do it as usual in the conventional way. But for integrated design, you have to know what is the process and so forth or you are getting off for that" (Architect 1)
Mix Comments	Fazley : "My experience during IDP compared to the traditional planning process is quite complex, but it is good to move from a good to be a better situation. Everyone is competing to practice IDP and I also have to be competitive enough in this industry" (Architect 2).
	Jun : "Malaysia is still lacking of integrated design consultant and it is quite difficult to implement IDP. Except when the negative experience appears, I need to be positive, strategize my overseas experience and adapt it with project team" (Consultant 1).
	Ho : "Malaysia has just started with the integrated design in the year 2009 compared to Europe, which has been practicing it a long time. Although awareness of integrated design comes later, but it is good than never. The sustainable practice is most important especially for young architects and designers" (Architect 2).
	Wan : "Malaysia has just came out with the Green Building campaign in order to achieve 75,000 meter square by the year 2015. But, compared to other foreign countries, Malaysia still have to learn more by doing more research and development, and recruiting experts" (Consultant 2).

**Fig. 3:** Participant's Positive and Mixed Comments on Experience, Knowledge and Practice

From the data obtained from Fig 3, it seems that all focus group participants showed proactive comments on the attitude and individual responsibility to play their respective roles towards integrated design and in order to achieve success during IDP regardless of their different experience, knowledge and practise. However, contradictions and problems still occur during IDP among design team members.

(iii) *Factors during IDP:*

Guidelines by the Centre for Sustainable Buildings and Construction show that design teams use various sources to obtain information, which creates influences as factors [6]. In this context, the background of different individuals is a factor that can influence IDP. From the data gathered in Fig 4, all participants in the architect, engineer and consultant groups indicated that most of the information on integrated design were influenced and obtained through reliable consultant's advice, past experience, knowledge and practices of previous project rapport.

Danny (Architect 1)	Wan (Consultant 2)	Haliza (Engineer 2)	Ho (Architect 2)
"We take the plan, discuss it with one another in team members, repeat the process again and again, present it to clients, keep changing plans and systems, but that is where experience and knowledge count in the early stages of IDP	"There are many team members that I need to deal with such as the architect, the engineer and the designer, but the fact is, all of us work together as team members by sharing our experience and knowledge. So, assembling the right team is the most influential factor in IDP. Good team good work, but if things turn around, then it might be difficult to achieve the project objective".	"It is all about risk. It is a collaborative process so the most important aspects are trust, knowledge and own expertise to be combined together, besides part of the leadership and ability to co-operate and collaborate with each other in a team during IDP".	"Be with a team that can understand the vision and objectives of the project. That should be enough for the team and just enjoy during IDP".

**Fig. 4:** Participant's Comments on Influence

*Summary:*

It was found that individuals' level of experience, knowledge and practice impinged on the different meanings of perceptions, interpretations and influence factors among team members during IDP. The discussion on the Design Team's Understanding of IDP and Other Related Issues showed that all participants were able to provide positive and mixed views to exhibit clear understanding and knowledge on IDP during the discussion. On the question related to Perceptions Experience, Knowledge and Practices of Design Team, the majority of the participants within and across the groups exhibited proactive mindsets, whereby they see that in fact, they have taken initial of their own experience and knowledge in practicing integrated design during IDP. As for the Influence Factors during IDP, all focus groups indicated that most of the information on integrated design were influenced and obtained through reliable consultant's advice, past experience, knowledge and practices of previous project rapport. The findings highlighted the fact that there are correlations between the individuals' demographic with the factors on experience, knowledge and practice and this does affected the design teams perceptions and interpretations regards to IDP.

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