

Significance of Attaining Users' Feedback in Building Performance Assessment

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Abstract. Generally, building is a structure that provides basic shelter for the humans to conduct general activities. In common prose, the purpose of buildings is to provide humans a comfortable working and living space and protected from the extremes of climate. However, a building usage is depends on the lifespan and the change of rate effected on their impact on efficiency of use. Hence, more attention needs to be emphasized on the performance of buildings as the changes are not static over time. This paper highlights the concept and requirements in evaluating building performance. Exploration on the concept of building performance is also addressed on the purposes of building performance and the link of performance towards the end-users and incorporating their feedback. It concludes that obtaining users' feedback is vital in building performance and the requirements of assessment must outline the performance criteria and mandates in such building.

1 Introduction

A building is not only provides structures to live in, but it supposed to address other vital key aspects [1]. Buildings, therefore, are generally important as they are the durable fixed assets enabling potential activities and tasks to be carried. Each building is unique and distinctive since it was constructed and developed based on various purposes, dealing with many objectives in terms of operation and management, and accommodates different occupancy patterns. Even two buildings of the same design at one location may have varying exposures, dissimilar subsoil conditions, and different access provisions [2]. The building may not in itself add value to the process, but it facilitates the process, and has the potential to cause process problems. To that end, cost reduction is a primary consideration for many building owners and occupiers [3].

However, a building usage is depends on the lifespan and the change of rate effected on their impact on efficiency of use. Hence, more attention needs to be emphasized on the change rate and performance of buildings as the changes are not static over time. The emergence of these changes are allied in the building's response towards internal and external factors such as climate, exposure and,

more significantly, internal factors such as use and maintenance [2]. As a commodity, building is not only an asset for investment and financial purposes, but also reflected in functional terms. In financial terms, over thirty per cent of many an organization's total asset value is highly related to the business premises [4]. This provides significant impact on buildings that were seen more as an enabler to the core business.

2 Definition And Concept Of Building Performance

As described in introduction, the overview of this paper reveals the concept of building performance. According to [5], difficulties can arise when a certain key terms produce different meaning and context to different people, that may also lead to misinterpretation. Therefore, defining vital keywords solicits in the concepts articulates a better understanding of the theories.

2.1 Definition of Building Performance

Building performance studies has been emerged into numerous objectives and aspects. The evolution of performance in building is growing due to the many factors, such as environment change and shifting building needs. The prospective of building performance in fulfilling the expectations of owners, designers, building operators and the occupants is enormous [6]. Hence, it is crucial to understand the term of "building performance". Inevitably, there is no single definition of terms accepted for building performance. Even though the term of "building performance" is simple, the specific definition is depends upon differing interests and widely requirements in buildings [7]. Building performance has been defined in BS 5240 as "behaviour of a product in use" [2,4,8]. Building performance as the ability of the building to contribute in fulfilling the functions of its intended use [9]. To gain a better understanding of the term, the description and definition of building performance were summarized as per Table 1.

Table 1: Summary on the definition of "building performance"

SOURCE	DEFINITION / DESCRIPTION
Amaratunga & Baldry [10]	A process of assessing progress towards achieving goods and services <u>efficiency</u> , quality of building outputs and effectiveness of building operations.
Abaza [11]	A permanent improvement in standard design practices among building designers and owners that results in higher <u>efficiency</u> and lower utility costs.
Eley [12]	".....future expectations of the organization and its users.....design/ build which uses the concept, akin to product provision, of <u>fitness for purpose</u> "
Clift & Butler [13]	"....denote the physical performance characteristics of a building <u>functioning</u> as a whole and of its parts"
William [9]	A building's ability to contribute to fulfilling the <u>functions</u> of its intended use.
McDougall et al. [3]	...the measurement involves the <u>efficiency</u> and <u>effectiveness</u> of an action. Efficiency and effectiveness relate, as concepts, to Best Practice (efficiency) — the pursuit of perfection of a given approach, and Best Value (effectiveness) — the pursuit of the most economic (in the widest sense) approach
Khalil [1]	An accomplishment, <u>fulfilment</u> , and achievement of a building in meeting the emergence objectives
Woods [14]	A set of <u>measured responses</u> of the building, as a system, to anticipated and actual forcing functions

From the above definitions, monotonous norms that can be found in building performance are generally related to efficiency, function, fitness and fulfillment. Hence, it can be summarized that the definition of "building performance" is the ability of a building to be operated at optimum efficiency and fulfill its function throughout the building life cycle.

2.2 The Concept and Requirements of Building Performance

Each building is unique and distinctive since it was constructed and developed based on various purposes, dealing with many objectives in terms of operation and management, and accommodates different occupancy patterns. Since not all buildings are change in the same rate, the relevant building stakeholders had to focus on how buildings were designed, built and the operations are fit for purpose [15]. The fact is that most buildings are too complex to be evaluated on various aspects and characteristics. Therefore, how to ensure that buildings are able to be sustained throughout its life span? The answer to that question would seem to raise several arguments among building experts. To assess how well a building is behaving overall and in the long term, a more holistic approach is needed. This is where building performance evaluation (BPE) can play an important role.

Building performance as an attractive concept which is not only benefit the designers and users, but also for the long term benefit of those concerned with the built environment [4]. The basic concept of building performance has been emerged in various issues, characteristics with various objectives. The performance concept involves BPE that combined with recommendations for improvement and it is used for feedback and feed forward regarding the performance of similar buildings [4]. It denotes the comparison of client's goals and performance criteria against actual building performance, measured both subjectively and objectively. As depicted in Figure 1, the performance concept is an act of evaluation, performance measures are compared with appropriate performance criteria and a conclusion is reached on how successful the building performance has been [16]. The following figure illustrates the benefit and values of building performance concept behind the goals and objectives of clients.

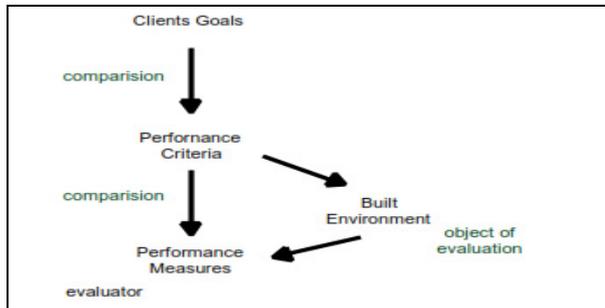


Figure 1: Building Performance Concept [4,16]

The notion of assessing building performance is to understand how the building meets the design, function, capability and technical objectives. The performance measurement of a building is firstly summarised in terms of the background of the building and the scope of performance assessment [3]. Building performance remarked as an important aspect that reflects the issues arise in building operation and address varying uses placed on all buildings. The performance concept in the building process views buildings as dynamic entities and indicates a comprehensive attitude towards the management of buildings [4]. Therefore, the assessment of building performance serves as a valuable tool that has great potential for decision makers at both strategic and operational levels. As illustrated in Figure 2, the concept of building performance address a comprehensive evaluation that much related to operational level, that can be a feed forward cycle as decision making tools for stakeholders.

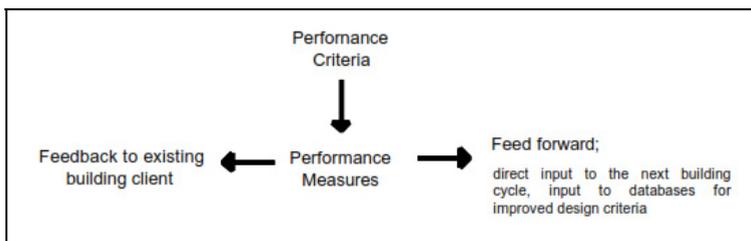


Figure 2: Building Process and the Performance Concept [4,16]

The above figure shows how performance is measured and compared to criteria, thus the valuation results are used as feedback to improve the evaluated building performance. Hence, the planning, programming, design and construction of future buildings can be improved through the feed forward of evaluation results. This is mutually depends on the requirement and purposes of evaluating building performance, that is specifically prioritized as the main character in building performance concept

3 Why Needs Building Performance Evaluation (BPE)?

Building performance is evaluated for many reasons and purposes. Ideally, the aspects that need to be thoroughly assessed depend on the evaluation purposes. The reasons are prone towards achieving sustainable buildings and prolong the optimization of its provision of service operations. The key issues to cover in building performance also includes health, safety, security; issues addressed by building codes; functionality and guideline materials; and also the social, psychological, cultural aspects of building performance [17]. To ease the understanding of building performance concept and its requirement, the following table shows several literatures that articulated the requirements and purposes of evaluating building performance, generally applied for all type of buildings.

Table 2: Summary of concept/requirements and purposes of BPE

ASPECTS IN BPE	DESCRIPTION OF ASPECTS	SOURCE(S)
Concept/ Requirements in BPE	• Building Users/ Occupants	[2]–[4], [13], [14], [16], [18]–[32]
	• Feedback from users or occupants	
	• Client’s goal	[2]–[4], [6], [16], [20]–[22], [26], [30], [31], [33]
	• Performance Criteria	
	• Performance measures/evaluation	
	Efficiency and effectiveness	([3])
	Help to fine tune building performance and reduce energy consumption	[34]
	Explore design changes that provide incremental improvement measured against single criteria such as reduced energy consumption and or improved thermal comfort.	[35]
	As an integral part of the planning and controlling cycle - it was among essential issues for the effective implementation of a facilities strategy.	[36]
Purposes of BPE	For better matching of supply and demand, improved productivity within the workplace, minimisation of occupancy costs, increased user satisfaction, certainty of management and design decision making, higher returns on investment in buildings and people.	([24])
	As negotiating instruments among stakeholders at various phases of the building procurement process.	([6], [26])
	To solve problems on “real-world research” such as predicting effects, robust results and developing services towards client oriented	Robson, C. (2002) as cited in [37]
	To credibly account on how well a building achieve its purpose at any time during its useful life	[14]

4 Attaining Users’ Feedback and Its Significance

Within the understanding on imposed society towards the implementation of building evaluation, the goal of such assessment is to ascertain how well the building serves the needs of the occupier. At the same time, identification of any major deficiencies based on the performance factors in its overall performance able to be collected. Key performance factors, as summarised by McDougall et. al. [3], can be attained by obtaining accurate measures and record the findings as a lesson learned to adjust the relevance of certain aspects. Lesson-learned is generally obtained from mistakes, arising issues and problems that appear in buildings, so that those mistakes are not repeated for current management

or future development. The question is how to acquire the “lesson-learned” and what will be the suitable medium to perform actions from “lesson-learned”?

Lessons learned are retrieved from the building users or occupants that could be used to improve the fit of the existing and be fed back into design research and programming of the next building [38]. Lesson-learned is feasible to be established from the feedback or responses of building users, which significantly experience the impact from the occupied buildings. Sinopoli [39] states that the feedback from people using a building, whether they are office workers, shoppers or teachers is invaluable input to building operations or the design of the next building. This is gradually enhanced through the changing needs of the users and not only depends on the suitability of the building orientation and facilities towards the users. As defined by Bordass [31], ‘feedback’ is a process of learning and understanding from valuable information and responses in a current building situation. The instrument for users’ feedback can be obtained through individual/focus group interview or questionnaire survey. In simple words, the understanding leans from what people have informed, thus create actions from the information and improve from the actions. Without a feedback loop, every building and its systems put together in new ways, with potentially unpredictable outcomes [38]. In building performance, it is vital to incorporate users’ feedback to postulate the improvement that can be established for the building.

To improve building performance overall in a changing market, the industry and its clients need to identify opportunities and pitfalls by means of rapid feedback [33]. This is allied to the concept of building performance which feedback in occupancy stage able to meet client’s goal and objectives in the preliminary stage of building development. Feedback from occupants’ satisfaction has represented a key performance indicator that may replace some other building partial indicators [28]. Significantly, this indicator reveals a very close relationship between the social aspects of sustainable development (in terms of health, comfort and well-being) and economic or financial considerations. Therefore, in the development of performance measurement systems, the importance of a feedback loop has long been established [3]. It is undoubted that there is much study has shown an increasing awareness on the direct impact of responses gathered from the feedback of building users. However, learning from feedback is not yet embedded in many processes affecting the procurement and use of buildings [40]. In building performance, one of the barriers to perform such evaluation includes reluctant of occupants to be participated and this somehow worsens the need of feedback. Hence, effective feedback needs to be addressed as to ensure that the information was comprehensive and lies on the performance criteria.

5 Conclusion

The above literature demonstrates the overall performance that includes the building’s appearance, evaluative quality, the meanings and evaluative responses that may convey to the users. As a summary, the building performance concept has been an evolutionary process. Therefore, all relevant stakeholders need to understand the key performance factors in a building. It is vital to incorporate users’ feedback to postulate the improvement that can be established for the building. In Malaysia, collecting feedback in completed and occupied buildings is not a routine; especially when there’s argument arises on the cost and time that will imposed to obtain such information. As supported by [31], feedback is not routine in the industry because there are many barriers and not enough drivers. The similar experiences were found in developed countries such as US and UK, having some barriers not only relates to the time and cost, but also other factors such as management, client, and users’ participation. The construction industry is often slow to learn from its completed projects, particularly how they perform in the hands of their users. To overcome the barriers, the priority of evaluation must be enhanced on suitable performance criteria, suitable techniques and right methods that enable the result of improvement to be successful.

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