

## Comparative Study of Psychophysical and Expert Models of Naturally Based Landscapes

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**Abstract:** Intriguing landscapes ignite the preferential consciousness of man for its assessment. Theories of landscape aesthetics has since been under scientific scrutiny with focus on what determines landscape preference. Among these are the Psychophysical and expert based models. The former highly accepted among the researchers in the studies of landscape preference relied on public participation while the latter which is found to dominate the environmental management practice required trained professionals. Both paradigms recognise the biophysical features of a landscape as attributes for assessment. The paper therefore presents practical considerations in adopting and applying these paradigms, especially in terms of theoretical background, criteria for testing and measurement and the strengths and weaknesses of these schools of thoughts. This is found imperative for researchers to understand before consideration of suitable landscape approach in landscape studies.

**Keywords:** Psychophysical, Expert, comparative Naturally Beauty Landscape.

### 1. Introduction

Brown (2004) observed that, for a long time, the methods used by students of landscapes, notably Landscape Architects and Geographers were, highly individual, consisting of procedures developed through personal experience and often moulded by idiosyncratic interests and values.

It has also been asserted that, an important reason for this methodological Babel has been the lack of attention to theory, resulting in method being developed without adequate consideration for the nature of humans, their activities or their aesthetics response (Brown *et al.*, 2003). In short order, a proliferation of landscape assessment techniques appeared based upon a number of different conceptual approach though with little agreement about how to assess landscape value (Wolf, 2005). The understanding of landscape ecology required a good sense of scenic quality assessment which are mostly determined via various landscape attributes like landform, types of water features or density of vegetation. This tends to give a well informed decision on the scenic beauty of different landscapes (Kaplan and Kaplan, 1989). In the assessment of scenic beauty of landscapes, the public insight is germane for a well-informed landscape management practices of high ecological value because the public are the frequent user of the landscapes. However, several studies emphasized that landscapes with natural settings are more preferable than the landscapes with human interference (Gobster 1999; Salaudeen, 2012). This justifies the fact that landscape with natural elements received high preference as compared to landscape with human interference (Kearney *et.al*, 2008). Several studies have confirmed that a well landscaped building with natural landscape elements is associated with monetary value. In Europe, America and even in the Asian countries, there are building regulations that are mandatory for development to provide certain percentage of the total built up area with open space and green areas to provide better

environment to the end users and the general public. The work of Arriaza *et al.*, (2004) affirmed a strong relationship between scenic value of landscape with visible vegetation, water elements, natural views, and mountains on the horizon etc which have been confirmed by several other studies that further emphasized the importance of tourism (Jamilah, 2011; Manohar, Ahmad, Azizi and Jamilah, 2008).

## 2. Criteria For Evaluation of Landscape Assessment Models

Bureau of Land Management (2000) suggests four criteria used in the evaluation of landscape assessment models. These criteria - validity, reliability, sensitivity and utility - have been used in the assessment of various approaches to landscape assessment. **Validity** is the relationship between what is measured and what is purported to be measured. For example, there is assumed to be a valid relationship between IQ and intelligence, and in the context of landscape, between topographic relief and scenic quality. **Reliability** is the consistency of results from repeated measurement; if a test given under similar condition does not yield similar results, it is not considered reliable. **Sensitivity** is the ability of the technique to measure actual differences; if the test is not able to measure a difference we know to exist, such as between a park and a garbage dump, we should doubt its sensitivity. **Utility** determines whether the test yields findings that can be used for what is intended; a measurement that does not show what landscape element can be managed will not be useful for managers, no matter how valid.

## 3. Contributions, Strengths and Weakness of the Landscape Assessment Models

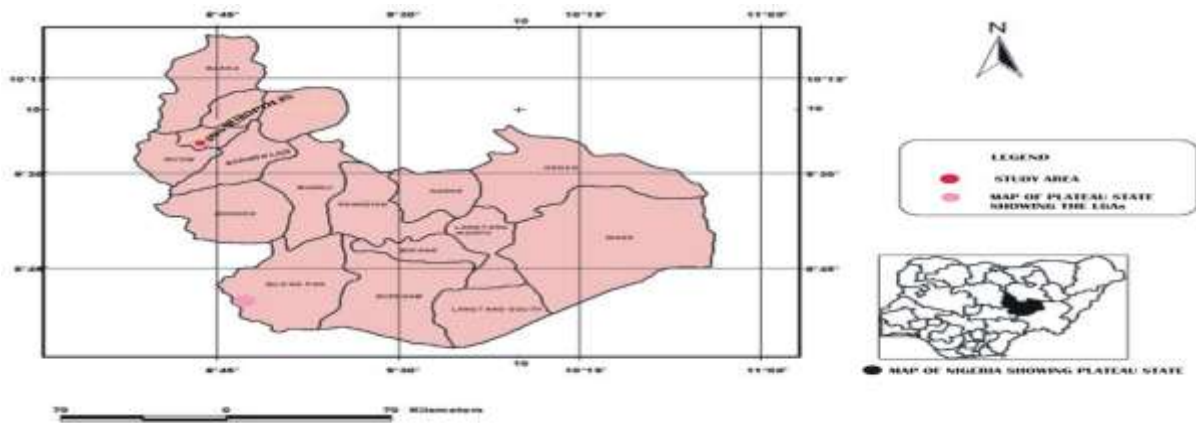
The **expert model** provides a description of the landscape from the viewpoint of the professional designers, planners, or managers. Descriptions are derived from artistic or ecological principles and tend to include those attributes of the landscape that (i) are within the technical training of the respective professions and that (ii) can be manipulated through design,

planning, and management decisions. It is generally assumed that at least some training in art or ecology is necessary for a person to appreciate landscape aesthetics fully, and there is some caution about incorporating the views of the general public, who may lack such training. The **psychophysical model** provides a means of predicting which landscape dimensions will be associated with public perception of scenic beauty. These associations are derived from ratings by the general public obtained from controlled, experimental manipulations of landscape views, or landscape surrogates or simulations. There seems to be an assumption that the psychophysical techniques will be able to tap the underlying psychological processes behind perceptions of aesthetic, which are more basic than artistic or scientific training. The landscape variables, as in the expert paradigm, are usually selected with reference to specific planning or management needs such as species or size composition of forest cover or the area amount of surface water, forest vegetation, and meadow within a specified landscape. The **cognitive model** provides an understanding of people's judgements of scenic beauty. It is similar to the psychophysical in that it draws upon statistical analyses of public responses. It differs, however, in that it does not usually emphasize physical landscape attributes or variables that are directly manipulatable by designers, planners, and managers. Rather, studies within this paradigm tend to search for meanings associated with landscapes. The qualities emphasized as important, such as complexity, mystery, degree of naturalness, and prospects and refuges, are decidedly influenced by human cognitive processing. The **experiential model** provides descriptions of the processes of interaction between and among individuals, groups, and landscapes. The unit of analysis for the experiential is the human-landscape interaction, unlike the cognitive, which focuses on the human, or the expert and psychophysical, which emphasize landscape features. Also, unlike the other approaches, experiential research emphasizes the importance of varying modes of experience, including the nature of activity, the degree of awareness of the landscape, the social and cultural context, and the purposes to be achieved. It also recognizes

that, there is a wider range of landscape values than merely the aesthetic, and seeks to place these when values in balance.

Many of the strengths and weakness of these assessment models are apparent from earlier discussions in this context. The **expert and psychophysical models** have been most used by environmental decision makers and managers. They rate high on utility because they specifically address those attributes and characteristics of the landscape that can be manipulated. In many cases, these techniques have been developed in close cooperation with environmental agencies (such as Bureau of Land management). The **cognitive and experiential models**, which have been of less interest to environmental managers, have tended to resist translation into landscape design or management. In many of the **psychophysical and cognitive studies**, a great deal of care has been taken to demonstrate that the measures are valid and reliable. Procedures are usually consistent and the information is presented in ways that enable replication and generalization. The data provide decision makers with some indication of the amount of confidence they can have in the findings. The **expert and experiential approaches**, on the other hand, are more subjective and idiosyncratic, and are often not amenable to rigorous statistical analysis. As

a result, reliability and validity cannot be measured in the usual psychological sense. Sensitivity, in terms of the ability to detect real differences in meaning and value, is probably greatest in the **experiential model**. This approach probes most deeply into individual interactions with the landscape. However, much of the information may be highly personal, making it difficult to generalize to values held by a larger public. Both the **cognitive and psychophysical** have “give up” some of that sensitivity in return for applicability to wider public or general human valuers. It is uncertain just how sensitive the expert model is. Often the expert eye is apt to detect differences that are not perceptible to people without ecological or artistic training. On the other hand, many of the expert rating scales are ordinal (value ordered) and differences between valued landscapes may be difficult to clarify. As stated earlier, the **psychophysical model** relies heavily on stimulus-response assumptions that originate in psychology, especially from the tradition of behaviourism. It is at this point that landscape perception research becomes involved in one of the oldest controversies in the social sciences. This dispute rests upon the degree to which external environmental factors can cause specific types of human behaviour and effect (perception).



**FIG. 1:** Map of Nigeria Showing Plateau State and Map of Plateau State Showing the Local Government Areas

*Source: Obembe (2009).*

## 4. Case Study

### 4.1 Federal College of Forestry, Jos

To validate certain landscape attributes, the work of Salaudeen (2012) was reviewed by presenting the results of an assessed scenic preference of network of the Campus of Federal College of Forestry Jos, Nigeria (Plates 1 - 6) by applying the expert based model using the following landscape attributes:

depth of view,

(2) viewing road proportion and

(3) viewing open meadow proportion

The Expert model applied the basic principles of art, design, ecology, and resource management with objective point of view of experts pulled from the department of Architecture of the University of Jos, Nigeria to adjudged scenic beauty of the road network with a view to generate a statement of the landscape quality of the road network. The Reliability Test according to Bureau of Land Management (1980) determined the consistency of the expert judgments based on the three attributes. Results indicate high levels of consistency among judgments with each of the coefficients of the attribute over 0.89 (high internal consistency). Salaudeen (2012) adopted the approach of Bureau of Land Management (1980) using a total of 16 slides as surrogates of landscapes sceneries for expert judgment on the scenic beauty of the road network. Each slide was independently assessed by each experts based on their knowledge and previous experience in line with the landscape attributes mentioned.

#### 4.1.1 Result

The results affirmed a significant correlation between the landscape attributes of the road network of the Campus of Federal College of Forestry Jos and the landscape preferences of experts. Besides, the expert judgment is essential, since the attributes have specifically focused on the subject of art and design, which requires high skilled observers.



Plate 1



Plate 2



Plate 3



Plate 4

## 4.2. Jos Wildlife Park

This research has specifically taken the work of Laing (2006) to further investigate the validity of using certain landscape attributes for psychophysical based model. Through a pilot survey, there was a correlation between scenic beauty preference and pre-experience education. Both experiment and test were in consonance with the work of Clamp (1999) which coincides with the allusion that ecological aesthetics link natural landscape to scenic beauty. The survey which involved several training sessions was conducted at the Jos wildlife park, Plateau State, Nigeria (Plates 5 – 8). A total of 16 students were randomly selected from the department of Horticulture and landscape Architecture of the Federal college of Forestry, Jos as participants in the training. They were partitioned into 4 subsets out of which only 3 subsets were exposed to the training sessions and 1 was purposely left untrained as presented below. Justification for the choice of this category of participants was not unconnected with their levels of “pre-experience” education in forest ecology.

- Subset A - No Training at all
- Subset B – Trained only
- Subset C - Trained with success stories only
- Subset D - Trained with success stories of video clips and a walk on site

### 4.2.1 Result

Result indicates that subset *D* (Trained with success stories of video clips and a walk on site) has the highest ratings of the site hence with the greatest positive effect on perceptions with one exception. The research evidenced a strong correlation between preference and knowledge/experience in the study of ecologically blessed natural landscape especially when done on the spot as earlier posit by several evidences of studies (Gobster, 1999; Fairweather and Swaffield, 2000; Daniel 2001; Wolf, 2005). Besides, practically engaging the non-experts in nature walks and other demonstration walks can as well lead to better understanding of the ecological processes of certain ecosystems and the sustainable management practices expected and of course that which is involved (Pierskalla *et.al*, 2007).



Plate 5



Plate 6



Plate 7



Plate 8

## 5. Conclusion

The Psychophysical and Expert models have been greatly used by environmentalists and the like as elucidated in this work. Each approach carries its own weight and merit and thus, choice of selection must best fit to the theoretical framework of a research. The scenic beauty assessment methods suggest here are specifically concerned for nature based landscapes. Literature review also shows the importance of conducting a pre – testing or pilot test. Perhaps, this should be considered in all the studies of scenic beauty assessment of nature based landscapes. This explains that the results of the test can further improve and guide ones' research instrument for establishing valid and reliability results. It is important to know whether a model emphasizes theory or applications which have been practically stressed in this research. The expert and psychophysical models as eluded here have been geared towards the needs of environmental decision makers with more attention to applications. However, the public may also participate in the exercise. Interestingly, a case study suggests that the public with good ecological knowledge or education on the subject assessed would positively influence the result of assessing the nature based landscape. It is found that their preferences for natural environment received high scenic judgements. Nature walk is perhaps, a practical educational exposure, since the practice provides in situ environmental knowledge to observers with zero professional background. Besides, selection of relevant landscape attributes is also essential to enable the introduction of more relevant attributes that can be associated with the preservation of scenic beauty of nature in future development. It is expected that the outcome of this work will serve as a guide for the choice of models in future landscape research.

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