

## Positive Impact on Form Design of Noisy Product to User Responses

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### Abstract

This project shares the output of how the positive impact on form design is discovered through the noisy product user's response. The method began by using the images combination between the vacuum cleaner and vacuum cleaner noise, where the data was collected from vacuum cleaner users in Shah Alam residential area. The findings revealed that a vacuum cleaner with an attractive form design can lessen the user's unfavorable reaction to its noise. However, the user must be familiar with the product since they have used it previously.

Keywords: Formgiving Design; Noisy Product, User Responses

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### 1.0 Introduction

This study shows the findings of an examination into the manner in which the positive impact of form design can be found through the noisy responses of product consumers. The analysis was conducted in order to better understand how this can be accomplished. The current problem, which was found in this study, is always related with the correlation between product form and product noise that is shared from the user input. This study discovered this correlation. Therefore, the purpose of this study is to determine if a consumer prefers a current and appealing form design even if the product is noisy. The measurement is based on the users' responses to the sample of noisy products.

This will be done in order to fulfill the objective of this project. The approach begins with the use of images of the vacuum cleaner as well as the noise that is created by the vacuum cleaner, where the data was acquired from people of the residential area of Shah Alam who make use of vacuum cleaners. According to the findings, a properly executed combination of product form will positively influence users in evoking cognitive (visual interpretation) responses to the design of the product through the users' aesthetic impression (attractiveness), semantic interpretation (function; utility; quality), and symbolic association (user's personal life). These responses can be elicited by the product through the users' aesthetic impression (attractiveness), semantic interpretation (function; utility; quality), and symbolic association (user's personal life). These reactions are brought up as a result of the appearance of the product.

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## 2.0 Literature Review

The form of the product has been confirmed to have the ability to communicate with its users by presenting an attractive design as a way of attracting the user's attention to approach the product. Moreover, form design can also communicate well with the users to use the product. Products that can communicate well with its users will reflect the quality image identity to the users (Bloch, 1995). The study on product design studies also show that the product design helps generate users' emotion and illustrate ideas to improve their lives (Jensen, 1999; Alessi, 2000).

A good form or design of a product will interact with the consumers. It will attract them to use the product and then provide quality usage experience for the consumers. When talking about pleasantness while using the product, there are a few products that have a modern design, but still lacking in providing a pleasant feeling to the users while using the product. Especially products that produce a *consequential sound* while functioning such as a vacuum cleaner and a hair dryer (Özcan and Egmond, 2009). *Consequential sound* disturbs the users' auditory and affects their mind response in a negative way. it may negatively influence the judgements of the users of the product such as they distance themselves from the product. The consequential sound of the product can also be recognized as noise. This is because noise refers to the same characteristics of consequential sound which is a loud, unpleasant, and unwanted sound.

The users' responses on the product are divided into three basic aspects such as: Cognition (cognitive), Affect (affective) and Behavior. The behavioral responses of the user are commonly distinguished in terms of approach and avoid the product. If the user is interested in approaching the product, the product has an advantage to be evaluated thoroughly in its overall design, utility and most importantly influence the users' purchase decision. While the avoid response might cause the user to ignore the product and consequently cause the user to not purchase the product. A product is considered to be successful if it can interest the user to approach and buy the product.

The focus of the project is on two areas: product form design and product noise. Product noise is intangible, whereas product form is tangible. A vacuum cleaner is a product that provides both positive and negative usage experiences to its users. A current and appealing design might bring a pleasant feeling to its users besides pleasing them through its function and appearance. But at the same time, it provides an unpleasant feeling to the users through its noise. Hence, this kind of product might reflect the users' responses conversely. In consideration of McGurk's (1976) "Effect" theory, the user's senses will attempt to acquire as much information about the vacuum cleaner as possible through its design (visual) and its sound (auditory). Then, their minds will attempt to combine what they have learned from both sources into a single decision, which could affect how the product's users respond.

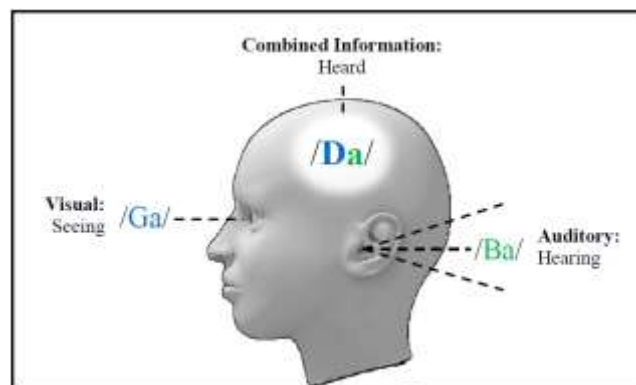


Fig. 1 : When our mind receives two sources of information from different sensory systems, the McGurk Effect occurs.  
(Source:) McGurk and MacDonald, 1976

### 2.1 Product Noise

The phrases "sound" and "noise" are not interchangeable. These terms are nearly synonymous in meaning, although the term "noise" is typically reserved for describing the specific context of sounds. The best method for differentiating the meanings of these words is to look up a dictionary to understand their underlying meanings. Several dictionaries' definitions of sound and noise are shown in the tables below.

Table 1. Merriam-Webster's Sound and Noise Definition

Word	Definition
Sound	"A particular auditory impression; The sensation perceived by the sense of hearing."
Noise	"Loud, confused, or senseless shouting or outcry; Sound; especially; one that lacks agreeable musical quality or is noticeably unpleasant; Any sound that is undesired or interferes with one's hearing of something"

(Source:) Merriam-Webster's Dictionary, 2022

The term "sound" refers to the specific information perceived by our auditory senses from the surrounding environment. Sounds have the ability to influence our minds to evoke a favorable and engaging response. For instance, the music playing in the background of a restaurant helps guests feel relaxed and at ease. Moreover, sound plays a significant role in directing our minds to produce a positive response upon hearing it. In addition, based on the various definitions of the word noise, it can be concluded that noise refers to the specific meaning of sound activities such as a loud cry, a clamor of shouting, harsh sound, and confused sound. All of these definitions

are concerned with describing the occurrence of unwanted sound. Additionally, "noise" refers to loud and unpleasant sounds that can be counted or uncounted by humans.

### 2.2 Product Form

It is essential to establish which terms should be used to describe the external body of the product that is visible to the user during evaluation. In addition, there are significant ambiguities over the definition of these terms, form and shape.

Table 2. Merriam-Webster's "Form" and "Shape" Definition

Word	Definition
Form	"The shape and structure of something as distinguished from its material. to give a particular shape to: shape or mold into a certain state or after a particular model"
Shape	"To give a particular form or shape to (something): to work with (a material) in order to make something from it"

(Source:) Merriam-Webster's Dictionary, 2022

Table 3. Hornby and Turnbull's "Form" and "Shape" Definition

Word	Definition
Form	"A thing that only can be seen / of something shape; arrangement of parts in a whole."
Shape	"The form of the outer edge of surface of something that has a particular form"

(Source:) Hornby and Turnbull's Dictionary, 2010

According to these dictionaries, "form" generally refers to the shape and structure of the external appearance (excluding color) of something visible to our visual senses. In contrast, "shape" refers to the overall effect produced by the outlines of an object or the external form of a structure.

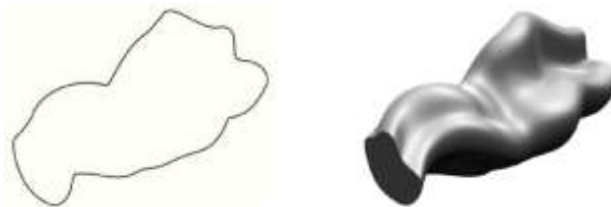


Fig. 2 : The Difference Meaning of Shape (Left) and Form (Right)  
(Source:) Hamid, Abidin and Abdullah, 2013

However, to describe the diverse meanings of these words, form can be defined as the outline (near contour) of the item with two dimensions (2D) of view; height and width. Otherwise, form indicates the volume of the thing in a solid state in three dimensions (3D), which comprises height, width, and depth Akner-Koler (2000).

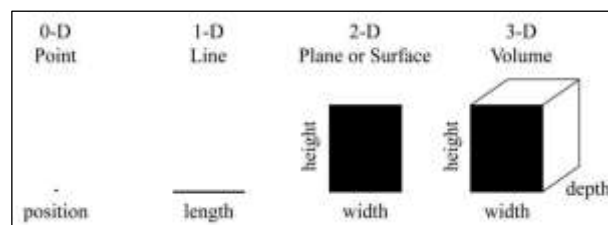


Fig.3 : Four Basic Visual Elements  
(Source:) Akner-Koler, 2000

In the process of designing the shape, these four visual aspects each bring their unique set of attributes to the table. The reason for this is that each of these visual aspects has the capacity to generate the shape, texture, and form of the object, as well as finally reveal the significance of the form itself (Abidin, Sigurjónsson, Liem and Keitsch, 2008). The beauty of product form is communicated through its shape design such as aerodynamic shape, streamlined shape and others. Any shape features of the product form that can attract human attention through its beauty is categorized as aesthetic form.

### 2.3 User's Response

User expectations are affected by the product's visual appeal and are subsequently reevaluated. Therefore, the most difficult aspect of designing a successful product look is generating the form of the object. Many consumers lean toward items that have smoother curves and lines. They said that smooth curves and lines give things a contemporary feel and give the impression of higher technology (Creusen

and Schoormans, 2005). They concluded that the product's contemporary styling would be well received. Analysis of user reactions revealed that rounded forms and curved polygons are more well received than their angular counterparts. This is due to the fact that people are more prone to perceive angular and sharp shapes negatively and feel frightened by them (Hamid, Abidin and Abdullah, 2013).

The responses of users to products are derived from the design's communication processes. The communication of design includes how the designed product is introduced to customers or consumers and how they perceive it. However, designers are able to influence these responses through the products they create (Crilly, Moultrie, and Clarkson, 2004). The responses of users to a product can be categorised into cognitive, affective, and behavioral components (Bloch, 1995; Crilly, Moultrie, and Clarkson, 2004).

Cognitive responses are the evaluations generated by the design of a product based on information obtained through the user's senses, particularly their visual senses. Through the evaluation of their senses, users form opinions about the goods, including its quality (Crilly, Moultrie, and Clarkson, 2004). Affective responses are the emotional responses induced by a product, since its design can trigger a variety of feelings in users, including admiration, disappointment, amusement, and disgust (Desmet, 2000; Desmet, 2003). Behavioural response is how people feel when they use the product, which is shown by how they act when they use the product. This response is also affected by the cognitive and emotional responses that came before it (Bloch, 1995). Approach and avoidance are two common ways to describe how people act when they use a product.

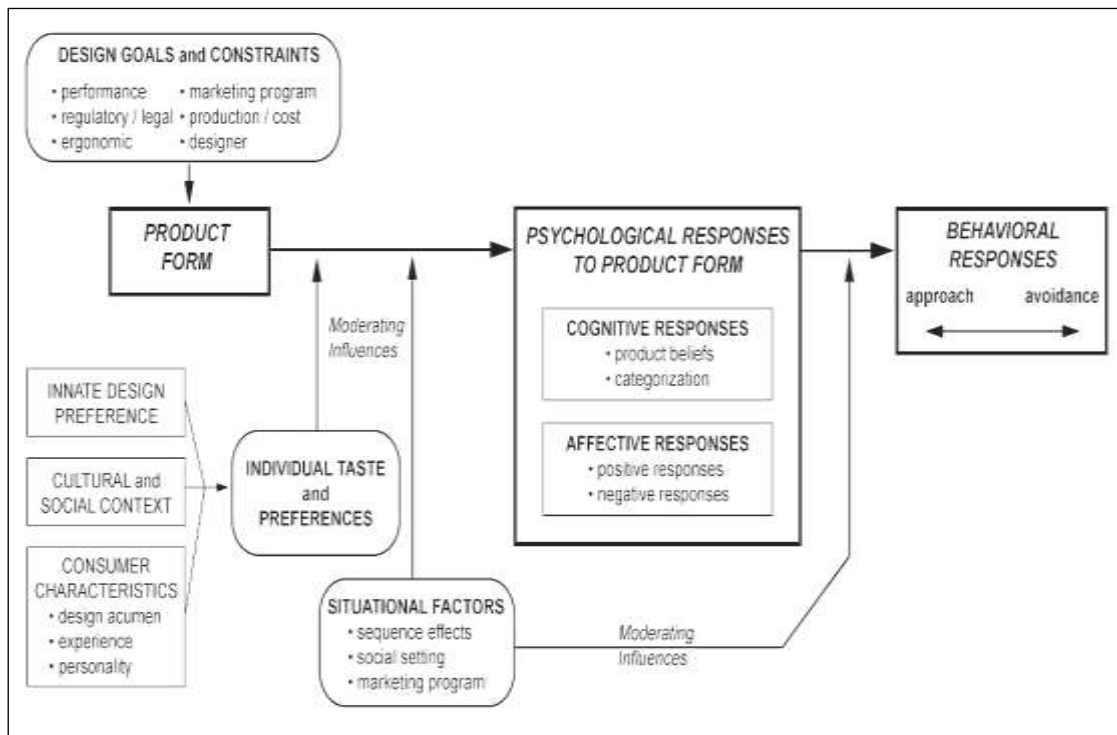


Fig.4 : A Model of Consumer Response on Product Form  
(Source:) Bloch, 1995

The word "approach" means that the user is interested in the product, while the word "avoid" means that the user is not interested in the product. Marketers often hope that users will be interested in their product when they approach it. If the user wants to buy the product, it's good for the product to be thoroughly evaluated on how it looks, how it works, and, most importantly, how it might affect the user's decision to buy. While the avoid response might make the user ignore the product, which would mean that the user would not buy it. A product is successful if it makes people want to come up to it and buy it. But when cognitive and affective responses are involved and the users are not happy with the product after using it, for example because it rattles or is too loud, the product could be subject to product abuse, such as the user hiding the product (Bloch, 1995; Crilly, Moultrie, and Clarkson, 2004).

Indeed, a negative emotional response triggered by an unsatisfactory auditory experience will have an unfavorable effect on consumers' product evaluations (Lyon, 2000; Egmond, 2008). A product may also drive people to distance themselves from it if it elicits a negative reaction and perception from users (Bloch, 1995).

### 3.0 Methodology

The main purpose of this study is to determine whether the design of the product can attract the users' attention more than the product noise itself. However, this study does not include a deep analysis of the product noise characteristics, such as the decibel level of noise or the type of sound waves. The identification of the shape, design, and noise level of the vacuum cleaner is all based on the responses of the respondents. However, the researcher only selects married couples as target respondents. This is because, married men and women have a larger alternative on life instrument purchasing decisions compared with an unmarried individual (Waite and Gallagher,

2000). The study focuses on specific terms that have been studied, which are product noise, product form, and consumer response. Two variables have been identified to represent the general research mapping, which are the Independent Variables (IV) and Dependent Variables (DV).

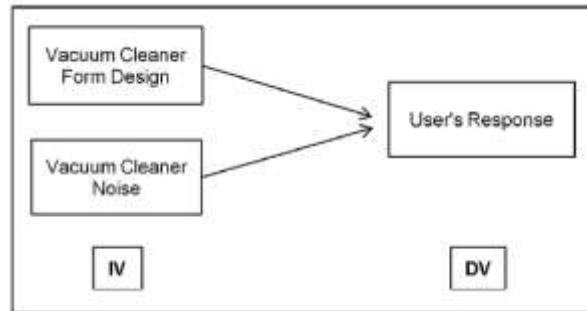


Fig.5 : Theoretical Framework of the Research

The study has outlined and structured the interview and data gathering approach. In addition to keeping respondents on track, the goal of this technique is to ensure that respondents grasp the information provided to samples. There are four product samples for responders to analyse and select. As illustrated in Figure 6, respondents must undergo this procedure before to being allowed to answer the questionnaire or be interviewed. Before respondents can complete the questionnaire or be interviewed, there are four procedures that must be completed. Moreover, the respondents' responses would vary based on the product they selected previously. The respondents must evaluate each of the four sample products.

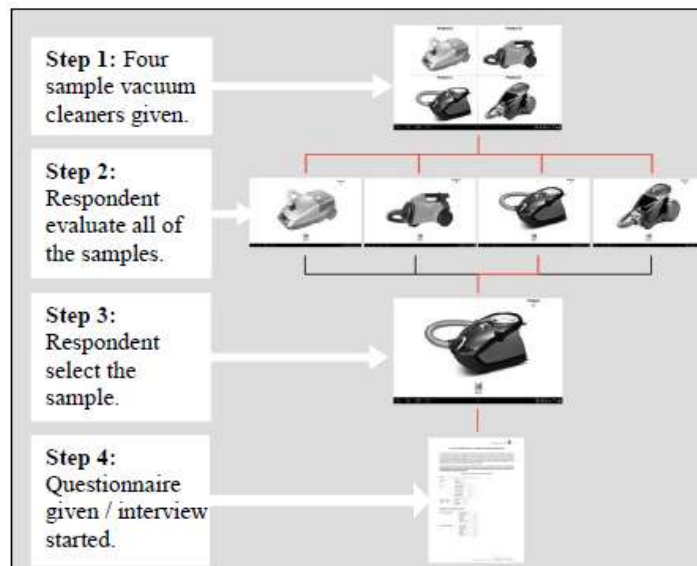


Fig.6 : The Procedure for Collecting the Data

#### 4.0 Findings

The findings of this study focus on answering the research questions.

*“Does the attractive product form help to reduce the users’ negative responses to noisy product?”*

When the consumer encounters an appealing vacuum cleaner that generates a distressing (loud) noise, their perception of the noise is altered slightly. The aesthetic design of a noisy vacuum cleaner might alter the user's impression of the vacuum's noise. This is because the vacuum cleaner's attractive design (a modern and simple appearance) serves to highlight the product's benefits by making it appear technologically and performance-advanced, as well as pricey and branded. In addition, the consumers are aware that the vacuum cleaner's loud noise is irritating and unable to deliver pleasure to their hearing. Due to the looks of the vacuum cleaner, the consumers did not mind the loud noise in this instance. They believed that the loud noise indicated that the vacuum cleaner had high suction (appearance).

#### 5.0 Discussion

Nevertheless, the noise from the products does not only influence human hearing and their responses negatively, but sometimes positively. Still, to evoke positive responses through the product's noise requires the user's knowledge of the sound and the product itself.

example, the loud noise of the vacuum cleaner is acceptable as long as the user believes the vacuum cleaner is working properly. Their beliefs might be influenced by the design of the product itself. It can be seen that each design of the product has a different kind of value to the user, and these values also depend on the users' personal expression in the design of the product. A modern design will influence the users to evoke a positive perception towards the product's technology and quality. At the same time, if people believe in the technology that the product offers, it might also change how they react to the noise it makes.

In addition, the study also discovered an unexpected user's response to the noisy product. Users would behave positively towards the attractive design of a vacuum cleaner, such as always keeping it clean and using it properly. But if the noise of the vacuum cleaner is unacceptable and at the same time it has a very good design, the user might not use the vacuum cleaner. However, the user still kept the vacuum cleaner and properly packed it back inside its box before putting it in its proper place

## 6.0 Conclusion & Recommendations

Through this answer, it can be concluded that the user still values the product even if they find it difficult to accept its flaws, especially if the user likes the way it looks. In summary of the user responses, the loud and noisy sound emitted from the attractive and appealing vacuum cleaner form design (apart from color) makes the user think that it is the result of the good build of the product, high vacuuming power and good vacuuming technology. On the contrary, when the same noises are paired with the plain and inexpensive vacuum cleaner form design, the user's response is almost the opposite. The user thinks that the noise emitted is a sign of the inferior quality of the technology inside the product. However, the user did not deny that the product still has vacuuming effectiveness.

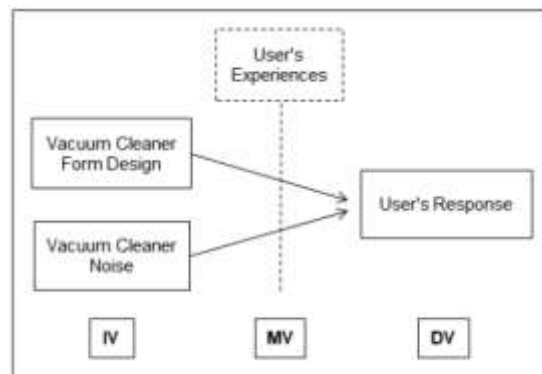


Fig.7 : Enhanced Theoretical Framework of the Research

As conclusion, an attractive form design of the vacuum cleaner has the ability to reduce the user's negative response to its noise. But it requires the user to be knowledgeable about the product through their experience with previous products.

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