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Importance of cognitive ergonomics in packaging design

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Introduction

Packaging protects the product while also promoting its identity (Suzianti et al., 2015). During the product purchasing process, the consumer is making decisions while looking for a variety of products that are classified in the same product category (Kuvykaite et al., 2009). While serving other functions such as ensuring the security of the product (Bozhkova, Spiridonov & Shterev, 2017), packaging is crucial for drawing consumers' attention and delivering the product's content (Wang & Chou, 2010; Chind & Sahachaisaeree, 2012). Packaging plays a significant role in daily life and has the potential to impact people's quality of life. There are basic human factors that must be considered when designing packaging: physical abilities, mental abilities, personality and mood as well as cognitive processes. Neglecting these factors can have expensive design repercussions in terms of both financial cost and consumer performance and discomfort. Poorly designed packaging can lead to product spillage and waste, and at worst, physical injuries. This is followed by the need to expend time and effort to deal with the consequences, as well as the financial cost of having to repurchase the product. Almost inevitably frustration occurs, which is amplified and made worse by successive problems, potentially generating emotional anxiety and a negative state of mind. Failing to open and use packaging has some of the most significant psychological repercussions on consumers' quality of life, leading to a loss of autonomy and low self-esteem (Theobald & Winder, 2006).

Cognitive ergonomics

Cognitive psychology is a branch of psychology that explores a wide variety of mental processes and enables us to comprehend how our brains retrieve information from the outside world, how we attempt to make sense of this information, and ultimately how this information affects our behaviours, such as when we are faced with product packaging that we wish to purchase, open, and use (Karwowski, 2005). Cognitive ergonomics is the study of how well a product's use matches the cognitive abilities of its users. Cognitive ergonomics focuses on the effects of mental processes such as perception, memory, information processing, reasoning, and motor response on interactions between people and other elements of a system (Karwowski, 2005; Hollnagel, 2003; Karmakar & Chowdhury, 2022).
Rather than being a design discipline, cognitive ergonomics is a knowledge base for designers to use as guidelines to ensure optimal usability of a product. Attention, information processing, sensation, perception, affordances and predictability of human errors are the most relevant aspects of cognitive ergonomics that relate to how we chose and use a product, areas that can teach us how to improve the design of packaging (Figure 1). (Theobald & Winder, 2006).

Figure 1

Aspects of cognitive ergonomics explaining consumer-packaging interaction

Sensation and perception

The initial step in our retrieval of information from the outer world is through sensation, which refers to the immediate response of our sensory receptors, located in our ears, eyes, nose, tongue and skin. As soon as we receive input from any of these senses, higher order cognitive processes jump into action, and we 'perceive' this input. Perception is the interpretation of stimulations from surrounding environment (Karmakar & Chowdhury, 2022; Theobald & Winder, 2006).

Attention and information processing

Our sensory systems are actively gathering overwhelming amount of information coming from environment. To handle or manage this amount of information, we require a selective focus (attention) to certain amount of information since we possess only limited cognitive resources and thus have a finite attentional capacity. Cognitive processes differentiate between controlled cognitive processes, which are carried out consciously and intentionally, and automatic cognitive processes, which are not under conscious control. that we can finish them without paying attention. Therefore, attention, as a part of cognitive process, is important for choosing information of interest and processing huge amount of information, particularly when it comes to distinguishing a product packaging from rival products (Pathak, 2014).

Perceptual affordances

Affordances provide strong clues to the operation of things: handles are used for lifting and carrying, while lids are used for opening (twisting). When affordances are utilized, the user knows what to do just by looking: no pictures, labels, or instruction is required. When it comes to the consumer-packaging relationship, consumers must be able to pick up a packaged product and open it without having to think about how to open it or even where to begin opening it. Affordances should lead the consumer subconsciously to the correct conclusions in terms of opening the products quickly, easily, and safely (Theobald & Winder, 2006).

Human errors

Errors in human behaviour are classified into two types: slips and mistakes. The difference between the two is that mistakes are committed on purpose, usually due to a mistaken belief that what the person is doing is correct. Slips, on the other hand, are the result of automatic behaviour, which occurs when an individual's goal is correct but there is an error in carrying out the actions required to achieve the goal (Theobald & Winder, 2006; Karmakar & Chowdhury, 2022).

Verbal and visual stimuli of the packaging

According to Kollöffel (2012), consumers tend to rely on information that can be presented either as verbal or visual stimuli.

Visual stimuli

According to Solayoi & Speece (2007), visual stimuli comprise the product design through graphics (e.g. colour, typeface, images) and structural elements (e.g., shape, size, and materials) (Pathak, 2014). They attract attention, evoke sensory expectations, affect perception, and transmit and communicate the companies' messages and its underlying meaning (Chrysochou & Grunert, 2014; Underwood, Klein & Burke, 2001). Visual stimuli have the ability to produce emotions and related physiological responses, they are associated with the emotional component of the decision-making process and those stimuli are often noticed prior to verbal packaging information (Underwood & Klein, 2002; Becker et al., 2011).

Verbal stimuli

Verbal stimuli include information about the product, its attributes and the packaging technology. Packaging technology transmits information about e.g. the degree of environmentally friendly material. It is essential to provide a balanced amount of information on the labels since insufficient information might be inaccurate and misleading, while too much information might cause confusion, misuse, misunderstanding, and indifference (Grunert, 2002; Silayoi & Speece, 2007). Additionally, too much information may cause cognitive overload due to limited information processing capabilities (Chrysochou & Grunert, 2014).

Conclusion

The packaging gives an opportunity to attract and influence potential consumers. Besides being the first impression consumers obtain of the product, packaging is also the last impression before the final purchase decision. By incorporating cognitive ergonomics in packaging design, consumers' attention can be drawn to the product, and ultimately, they could be persuaded into purchasing it. Even more importantly, if the packaging design is in line with the cognitive abilities of the consumer, it will ensure a good user experience, affecting the brand's leadership potential. Cognitive ergonomics ensures that a product's use corresponds to its users' cognitive abilities by utilizing visual information clearly and effectively, allowing the packaging to be used intuitively and easily. The cognitive ergonomics of packaging assists the target demographic in meaningfully understanding and distinguishing one brand from another, as well as associating themselves with the product.

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