

# Cultural ergonomics in interactional and experiential design: Conceptual framework and case study of the Taiwanese twin cup



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## ABSTRACT

Cultural ergonomics is an approach that considers interaction- and experience-based variations among cultures. Designers need to develop a better understanding of cultural ergonomics not just to participate in cultural contexts but also to develop interactive experiences for users. Cultural ergonomics extends our understanding of cultural meaning and our ability to utilize such understanding for design and evaluate everyday products. This study aims to combine cultural ergonomics and interactive design to explore human–culture interaction in user experiences. The *linnak* is a typical Taiwanese aboriginal cultural object. This study examined the cultural meaning and operational interface of the *linnak*, as well as the scenarios in which it is used in interaction and user experiences. The results produced a cultural ergonomics interface for examining the manner in which designers communicate across cultures as well as the interweaving of design and culture in the design process.

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## 1. Introduction

Taiwanese culture is a multicultural blend of traditional Chinese with significant East Asian influences, including Japanese, along with Western such as American, Spanish, and Dutch influences. Taiwanese aboriginal people also have a distinct culture. Among Taiwan's aboriginal tribes, each has a unique culture and style that can be identified from its sculpture, textile fabrics, webbing, leather crafts, and pottery. Tribes can also be identified by the applied functions of architecture, everyday objects, tools, ceremonial equipment, weapons, or decorations (Chen, 1961; Lee, 2000, 1982; Liu, 2007; Shu, 1998). Taiwanese aboriginal crafts and products have a primitive style that reveals beautiful and powerful features of both art and utility in daily life. Utilitarian objects are constructed with a primitive form that serves a basic function as well as a natural decorative pattern (Cheng, 2005; Hsiao, 2007; Hsu, 2004). With its beautiful and primitive arts and crafts, Taiwan aboriginal culture has great potential to enhance design value and gain recognition in the global market. To preserve aboriginal culture, it is necessary to study its cultural characteristics and transform them into modern products (Lin, 2007; Lin et al., 2009; Wu et al., 2005, 2004).

Recently, user experience has gained popularity and has come to be broadly applied in human product interaction design. *Interaction* is a design method that constructs relationships between user experiences and product properties to design products that fulfill a user's desired experiences. Desmet and Hekkert (2007) mention that experience is not a property of the product, but rather the outcome of human–product interaction, and the results depend on the temporal characteristics and product experiences that the user brings to the interaction. Interactional design has shifted its focus from usability and cognitive ergonomics to the affective and interactive experiences of users.

This study combines cultural ergonomics and interactional design to explore human–culture interaction in user experiences. The *linnak* (Fig. 1) is a typical Taiwanese aboriginal cultural object that has the potential to be transformed into a contemporary design for the current consumer market. The cultural meanings of “working together” and “sharing with each other” in the design of the *linnak* are valuable for enhancing its usage in everyday life (Lin, 2007, 2009; Lin et al. 2009). However, the contemporary consumer market may need a new form of *linnak* suitable for modern lifestyles. Therefore, this study analyzes the cultural meanings and operational interfaces of the *linnak*, as well as the scenarios in which it is used in interaction and user experiences. The results present an interface for examining the ways in which designers communicate across cultures, as well as how interactional design

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Fig. 1. One type of *linnak* (left) and drinking situation (right).

and culture are interwoven in the design process.

The objective of this study is to propose a cultural ergonomics framework and to analyze the *linnak* as a case study with regard to the conceptual framework. A broad overview of the research process is depicted in Fig. 2. Based on the user-tool-task model and *linnak* scenarios, a framework for cultural ergonomics in product design is proposed. In addition, this study employs a systematized and scientific method to study the cultural ergonomics of the *linnak* as a case study. Finally, the *linnak* is used to demonstrate how to design cultural products.

### 1.1. Cultural ergonomics in the user-tool-task model

The successful integration of ergonomics and industrial design will produce aesthetically pleasing, functionally superior products. The user-tool-task system design model (Fig. 3) was proposed by Kreifeldt and Hill (1974) (Lin and Kreifeldt, 2001). Fig. 3 details the various influences and interactions in a user-tool system and emphasizes the threefold nature of the design: user, tool (product), and task; the two interfaces of the user-tool manipulation interface and the tool-task engagement interface; and the various

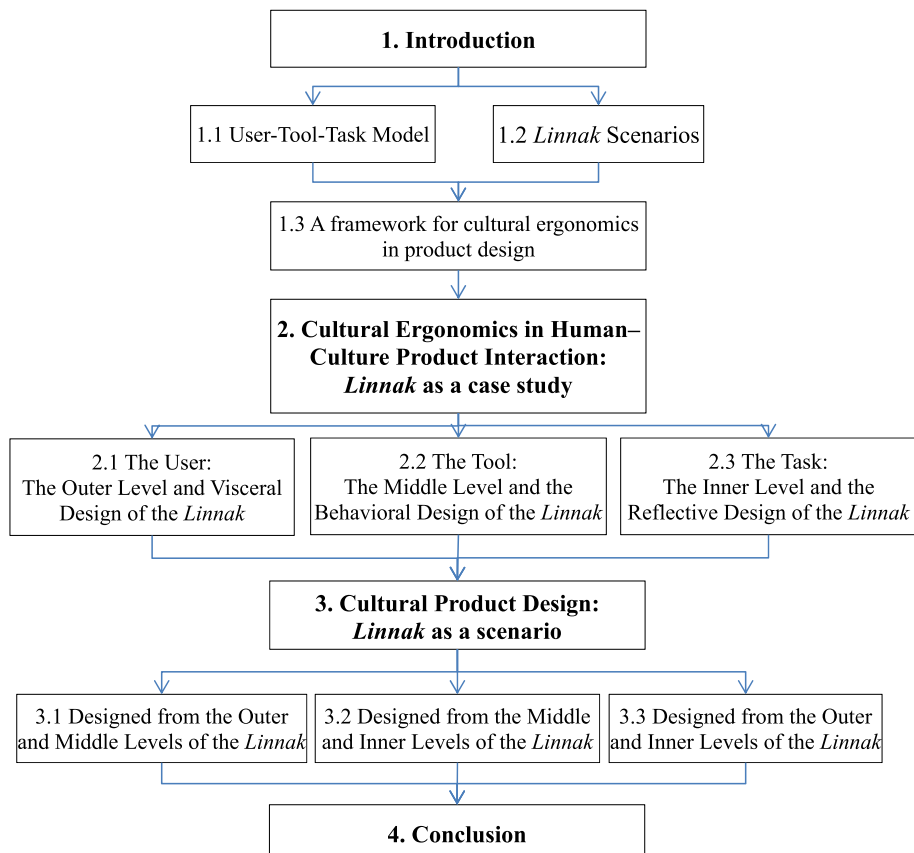


Fig. 2. A broad overview of the research process.

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