Augmented Reality-based ecolabel model for environmental awareness

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Abstract. The purpose of this research is to develop Augmented Reality-based ecolabel model for environmental awareness. This research and development were done in Jakarta, the capital city of Indonesia. The product of this research is augmented reality called ecolabel on the Android Smartphone having eight logos to give environmental awareness to the consumers. This product giving the consumers some 2-dimension information containing accurate, fast, verifiable, and not misleading information related to environmental aspect of the certain products. This product should be supported by sticker as marker to turn on augmented reality. Consequently, the society will be more appropriate in making decision to choose the product used. Revision on the basis of expert validation reaching 3.67 from maximum score 4 is that pictures given to the nine logos in this product should be added more to provide more examples to the consumer. The conclusion of this research is that Augmented Reality-based ecolabel model for environmental awareness is already valid.

1. Introduction
Preservation of environmental functions is a series of efforts to maintain the continuity of the carrying capacity and environmental capacity. Ecolabel can affect consumer purchasing behavior to be environmentally friendly purchasing leading to concern about surrounding natural environment [1,2]. Ecolabel consisting of knowledge, belief, value perception and environmental concern is formed to transmit green product messages [3]. Satisfying natural curiosity, environmental awareness, and strengthening pro-conservation values stimulate individual environmental education [4-6]. Environmental and ecolabel knowledge are positively associated with consumer attitude towards environment [7-9]. Natural basis, conservation, sustainability, benefits to local, and awareness predict individual environmental education [4]. Ecolabel plays an important role to actively encourage green
consumption [10]. Implementation of Augmented Reality can improve green consumption awareness of electronic devices in order that individuals can learn energy consumption of electronic devices used at home and offices [11]. Augmented Reality is increasingly utilized in the tourism industry [12]. The characteristics of Augmented Reality consisting of environmental embedding and simulated physical control can improve consumer cognitive fluency and improve consumer product attitude [13]. Augmented Reality can create more meaningful consumer-brand relationships [14]. However, most of previous studies didn't combine ecolabel with Information and Communication Technology (ICT) specifically with Augmented Reality.

2. Methods
The goal of this research is to develop Augmented Reality-based ecolabel model for environmental awareness. This research conducted Research and Development involving needs analyzing to collect some information related to Augmented Reality-based ecolabel model for environmental awareness. Data collected consists of validation instrument for Augmented Reality-based ecolabel model for environmental awareness. Descriptive quantitative technique was used to analyze data.

3. Results and discussion
This research will combine ecolabel logos printed on environmentally friendly products and are loaded with the meaning of environmental awareness by using Augmented Reality for the transmission of various information and understanding provided to public through fast, accurate, verifiable, and not misleading access to environmental aspects of the products. Consequently, environmental maintenance can be sustainable. Making a scan on this android phone starts from making a marker (card).

Scan on this android mobile phone starts from making a marker application (card) used as a medium to help bring up objects in the Augmented Reality application (seen in Figure 1). Markers are created using Adobe Photoshop CC 2015 imported to Vuforia to get the license key. License key in this application is needed in order to connect the data in Vuforia with Unity 3 D. Marker displays information from logo a (recycled) and logo b (packaging container) (seen in Figure 2). Then we can click on the word ‘product samples’ on the marker logo a (sustainable goods) and logo b (packaging containers) bringing up examples of daily products commonly used by consumers (seen in Figure 3).

![Figure 1. Logo for marker.](image1)

![Figure 2. Markers displaying information from logos.](image2)
Figure 3. Product examples of logo a and logo b commonly purchased by consumers.

From the marker logo, the public as consumers get environmental awareness indirectly through mobile android. Integration in environmental awareness, as a source of learning assisted by Augmented Reality information technology for the needs of community as consumers. Consequently, the community will be more careful and thorough in making decision to choose product to be used. The public is given an understanding of the right product selection to use. This selection is not only determined by price and quality, but also environmental consideration having a smaller impact. Consumers should not choose products having a short life cycle being able to reduce environmental quality life. Therefore, the transmission of various information related to environmental awareness can be done optimally.

Validation expert result reached 3.67 from maximum score 4 showing that this Augmented Reality-based ecolabel model for environmental awareness was already valid especially for content, marker, and 3D object. Revision based on expert validation is that pictures given to the eight logos in this product should be added more to provide more examples to the consumer.

4. Conclusion
The conclusion of this research is that Augmented Reality-based ecolabel model for environmental awareness is already valid to give environmental awareness to the consumers in Jakarta in Indonesia leading to concern about surrounding natural environment.

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