

# The effect of Icon Formats on Recognizability of Traffic Signs

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## Abstract

Thirty-two per cent of Indonesia's traffic accidents were caused by misperception (inability to understand) the traffic signs. As suggested by previous studies, the icon/symbol format taxonomy is an essential factor that determines the icon recognizability. Thus, a suitable format of a road sign symbol will minimize the drivers' load of information processing. This study conducted a recognizability test on 28 traffic signs in Indonesia, consisting of image-related, concept-related, semi-abstract, arbitrary, and dan combined formats. Image-related icons presented a pictorial representation of an object or an action. Concept related icons visualize a concept that is not represented in concrete images. Arbitrary icons do not have an apparent reference to their intended meaning but become meaningful only through convention and education. Semi-abstract icons combine image-related and concept related or arbitrary elements. In the combined icons, the graphical elements are combined with textual elements (i.e., words or abbreviations). Quantitative parameters used in this study were response time and response accuracy. The participants consisted of eight men and eight women. Participants had an age range of 19-24 years with a mean age of 21.56 (SD=1.59). Besides, each participant had a driving license and normal or corrected-normal visual acuity. The average response accuracy and response time for all 28 icons tested in this study was 41% and 6.4 seconds, respectively. The one-way ANOVA test showed that the road sign format significantly affected the response time and response accuracy ( $p < 0.05$ ). On average, combined icons have the fastest average response time (i.e., 5.92 seconds) and highest respond accuracy (58.72%) compared to other formats. On the other side, the arbitrary icon has the lowest recognizability rate compared to other formats with mean response time was 7.86 seconds and the mean accuracy was only 19.37%. This result suggested the need for better designs of several traffic signs in Indonesia.

## Keywords

Image-related, response time, response accuracy, and road safety

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**Dyah Santhi Dewi.** Dyah was graduated from an undergraduate program of Industrial Engineering from Institut Teknologi Sepuluh Nopember. She pursued her master dan PhD education at The University Of New South Wales, Australia. She is now an assistant professor in the Industrial and Systems Engineering Department of Institut Teknologi Sepuluh Nopember. She is a member of the Ergonomics and Work Systems Design Laboratory. Her research interests are Human Factors in Product and Service Design, Human Factors in Industrial Work Systems, Product and Service Cost, Occupational Safety and Health. She is a member of IEA (International Ergonomics Association) and PEI (Perhimpunan Ergonomi Indonesia).