- **Name of the study:** Optimal Graphic Representation - Can images (similar to symbols) be used as an appropriate graphic representation (in online environments) for making information accessible to people with intellectual and cognitive disabilities?
- **Year:** 2026
- **Type of research:** Research
- **Catalog Number:** 890-671-2022
- **Authors:** 'Michlol' unit, Shalem Foundation.
- **Research Authority:** Shalem Foundation.

Abstract

This study was carried out by 'Michlol'- the Assessment and Measurement Unit of the Shalem Fund

This study was conducted as a follow-up to a survey that examined Characterization and examination of cognitive accessibility needs of people with intellectual developmental disabilities in the public sphere>>, which was carried out by Michlol – the research unit of the Shalem Foundation, with the assistance of the Israel Institute for Cognitive Accessibility (2023). The survey findings indicated that signs and images in public spaces constitute a key means that assist people with intellectual and cognitive disabilities in navigating and understanding the information required of them. In light of these findings, the need arose to examine whether images could serve as an effective alternative to symbols for the purpose of making information accessible for this population.

The purpose of the study was to examine whether images are as effective as symbols as a graphic representation for people with intellectual or cognitive disabilities, by comparing the time required to identify terms presented as a symbol versus as an image. The study involved 114 adult service recipients over the age of 21, with mild intellectual disabilities or cognitive disabilities, from day care and employment settings in the Jewish community.

In a computerized questionnaire, each participant was presented with eight terms: four nouns (bus, cinema, television, and pool) and four verbs (run, lift something heavy, be happy, and no smoking). Each term was presented once as a symbol and once as a picture, and the participant was asked to indicate the appropriate graphic representation from four options. Reaction times were measured automatically. Reaction time analyses were conducted on

correct answers only, and comparisons were conducted using t-tests for dependent samples. In addition, differences in response times by gender, age, and reading ability were examined.

The study findings paint a consistent and clear picture. The correct recognition rates of the terms were high in both modes of graphic representation, such that most terms were correctly identified by approximately 78% to 99% of participants as both symbols and pictures. When comparing reaction times among the entire sample, no significant difference was found between the time to identify the symbol and the time to identify the image in seven out of eight terms, and the effect sizes were negligible to small. This means that for most of the terms tested, images were identified at a speed similar to that of symbols constructed according to the standard.

The only consistent exception is the term cinema, where the image had a clear and noticeable advantage over the symbol in both the correct identification rate (84.2% compared to 51.8%) and in identification speed, with an average difference of more than five seconds. This advantage was maintained across both genders, all reading levels, and both age groups. This finding suggests that a specific symbol may be less understood or less familiar than a picture of the same concept itself.

Subgroup analyses by background characteristics revealed a pattern similar to that of the entire sample, alongside significant point differences. In the term pool among women and in the term television among those who cannot read and among participants up to the age of 40, an advantage in the speed of recalling the image is evident. The only significant difference in the opposite direction, an advantage for the symbol, is found in the term lift something heavy among those aged 40 and over.

With regard to the research question, the overall findings indicate that images were recognized by the participants with a level of accuracy and speed that is no less than that of symbols, and in one term they even significantly exceeded them. In other words, no advantage was found for using symbols over using images in the digital space. Since the use of images is more accessible and cheaper and the introduction of artificial intelligence has expanded the possibilities for easily creating images, the issue of using images for the purpose of making information accessible takes on new validity and significance. The research findings are expected to assist in making decisions regarding the use of images for cognitive accessibility purposes in online environments, as well as serve as a basis for formulating guidelines for selecting optimal images.

Keywords

Cognitive disability | Information accessibility | Symbols | Images | Online environment.

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