

## **ABSTRACT**

Designers often use complex information to synthesize design concepts (Cross, 1994; Earl et al., 2004). User's anthropometric data is one such type of data that a product designer needs to consider during the product ideation process. However, the anthropometric data required to design the different kinds of products for different age groups are not readily available, especially for developing countries like India. Also, hand ergonomic consideration in children's products design has often not received sufficient attention which impacts their performance (Valikhani et al., 2016). For ease of use of children's products like tiffin boxes, water bottles, cricket bats, jam bottles etc. the design process will require hand anthropometric parameters like hand length, hand width, grip strength and pinch strength. The author could not find any hand anthropometry data for Indian children in published literature. Thus, this thesis has first collected anthropometric data from 2461 Indian children between 6-17 years on 9 anthropometric dimensions. The anthropometric data was collected by visiting 71 schools in National Capital Region and students participated on voluntary basis. Hand dynamometer, pinch gauge, measuring tape, weighing machine were used for measurements and the data including palm impression was recorded on a calibrated information collection sheet. As expected, the comparisons among genders within same country showed significant difference on all measured parameters. Comparison with other countries within same age and gender groups showed Indian anthropometric dimensions significantly different as compared to countries like USA, Sweden, and Saudi Arabia. This significant difference in dimensions indicates that using available anthropometric dimensions from other countries for product development in India could lead to inappropriate sized products.

Further, the author observed that while designing products, the creative designers use tables of anthropometric data which they often struggle to use. Therefore, this thesis has developed a design assistance system with an aim to assist product designers in designing children's products. The design assistance system uses soft computing techniques based on the children's anthropometric data collected as part of this thesis work. The developed design assistance system was then used by 30 designers. It was observed that the soft computing-based design assistance system was found to be much useful to the designers. The system helped save time and made the design thinking process more efficient.