UNIVERSITI TEKNOLOGI MARA

A STUDY OF THE EFFECTIVENESS OF ADAPTING FUSED DEPOSITION MODELLING (FDM) IN INDUSTRIAL DESIGN PROCESS

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ABSTRACT

The principal objective of this study is to assist Industrial Designers to improve the quality of prototype and design process through the recommendation of guidelines from an industrial design perspective. The approach adopted in this research was a study of the process of producing prototypes using different FDM machines by three selected organisations. Two phases of data collection were employed in this study: literature search and review (Phase One) and case study (Phase Two). Case studies included semi-structured interviews with senior staff directly involve in industrial design process. With this, a set of detailed descriptions of effectiveness of adapting FDM in industrial design process were obtained. FDM machines were chosen for comparison because at present it is one of the successful technologies to produce a prototype, representing with non-toxic materials, easy to process, simple, accurate and fast. The case studies focus on six important factors derived from Peschges (1999) research: 1) Preciseness, 2) Surface Quality, 3) Cost Corridor, 4) Time, 5) Suitability for Geometry and 6) Practical Features. The findings showed that they produced durable prototype, which are smooth surfaced and complete layer, thin layer, with cost savings and reduce build time, as well as wide suitability for geometry, practical features achieved by improving surface quality through sanding, polishing and painting the prototype. This thesis concludes that FDM machine model Quantum is the best machine to fulfil the requirements of quality prototype produced. Finally, it is hoped that this research will benefit any individuals or organizations involved in industrial design process.