

 <b>INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI</b> <b>SHORT ABSTRACT OF THESIS</b>	
Name of the Student	: SUPRADIP DAS
Roll Number	: 156105015
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Name of Thesis Supervisor(s)	: Prof. Amarendra Kumar Das
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### SHORT ABSTRACT

The furniture industry's innovation culture is shifting towards democratic design by internalizing the production process. Designers, product developers and engineers work together in a prototyping space to transform a concept into a real product, considering the prototype as the boundary object amongst different domains and stakeholders to foster innovation processes. Given design students' future endeavours in the aforementioned work environment, prototyping activity is an integral part of design education to improve the immature mental model of novice designers. In contrast, teaching prototype-driven design innovation is not that simple, as it is tacit knowledge. Furthermore, prototype-driven design innovation is difficult for novice designers, as prototyping is the main activity. Simultaneous thinking and making tend to be complex activities for novice designers. This research seeks to develop tools to support novice designers in thinking and model-making, emphasizing furniture design. An extensive literature review on prototyping culture, novice designers' mental models and requirements for prototyping were used to arrive at the specifications for developing tools. 'Design heuristics for furniture design' (DHfFD) as a catalyst for thinking and 'Tool for Model Making' (TfMM) as a catalyst for making are two different tools developed in this research. The toolsets have been developed from an analysis of the characteristics of 650 award-winning furniture (chair) designs and published compendium of well-known successful designs and introduced in the form of cards. A total of 86 DHfFD cards and 65 TfMM cards had been developed. This research extends its investigation to analyze the acceptance and effectiveness of the tools with novice design students. Students have enthusiastically accepted it to generate more diverse concepts and models with appropriate materials and processes. This study correlates DHfFD with more alternative concepts and TfMM with the quality of the appearance model in furniture design. This research integrates evidence, methods, and perspectives from cognition and design, correspondingly providing a pedagogical recommendation to use DHfFD and TfMM to overcome prototype-driven design innovation issues in furniture design among novice designers.