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CHALLENGE OF TEACHING PRODUCT DESIGN IN MASTER COURSE WITH HETEROGENEOUS QUALIFICATION IN INDIAN CONTEXT

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ABSTRACT
Globalization has increased awareness of design profession in India. Initially design education started in premier technical institutions like IITs, IISc and specialized design school i.e. NID and had limited capacity. Entrance criteria being undergraduates in technical disciplines and highly competitive, these were out of bound for most aspirants. The type of design education practiced in these design schools created a big gap with common art education. PhD being qualification required to join these premier institutions, except NID, getting designers with academic bend of mind to be design educators are always in short supply. IIT Guwahati is the first to offer PhD (1998) in Design in India. With opening of the design education in India, more design aspirants are coming up from diverse fields such as fine arts, fashion design, architecture in addition to students with technical background and have created a new challenge. This created two distinctly different challenges: one to acquaint people with non-technical background with technical vocabulary and technical students to acquire skills of drawing, visualization and aesthetic sensitivity. This challenge is compelling design educators to evolve design teaching methodologies. One way being practiced in IDC, IIT Bombay is to have separate specialization to suit the back ground of the students and segregated Industrial design, Visual communication, Interaction, Film & Animation and Automobile design. Educational qualification for entrance is based the course requirements. The other one is specialization through projects and electives. This paper studies various issues regarding the above challenges and methodologies being evolved.

Keywords: Design education, art education, technical education, imagination and visualization, creativity

1 INTRODUCTION

Numbers of the design schools in India are increasing rapidly, compared to the early 90s, and
There are more than 20 design schools including government and private funded.
The selection of the student for Master of Design at Indian Institute of Technology in India is based on an entrance examination "Common Entrance Examination for Design". The eligible students appearing for this examination, are Artist, fashion designers, Architect and Engineers.
In general, the selected students are of mixed background of all four domains and hence, there is hardly identical response towards lateral thinking and vertical thinking, which is necessary for ideation and post ideation process of designing product. Moreover the students with technical background goes through rigorous training to get technical knowledge for four years and more; similarly the students with Architecture, art and fashion design background has to go through the architecture, art and fashion design studies for four years. So the students are always seen to have a typical approach to design product or solve design problems. One most important quality in problem solving desired in a designer is creativity. The Creativity amongst the students differs as their mind are already conditioned during their undergraduate training; students with technical background are always comfortable to work individually and some of the students from architecture, art and fashion design background are comfortable to work in groups.

Where is Creativity?
The answer is obvious: Creativity is some sort of mental activity, an insight that occurs inside the heads of some special people. But this short assumption is misleading. If by creativity we mean an idea or action that is new and valuable, then we cannot simply accept a person's own account as the criterion for its existence. There is no way to know whether a thought is new except with reference to some standards, and there is no way to tell whether it is valuable until it passes social evaluation. Therefore, creativity does not happen inside people's heads, but in the interaction between a person's thoughts and a socio-cultural context. It is systemic rather than an individual phenomenon.
The students with technical background are already set to think vertical and other background students are ideally set to think lateral. However, in product design both the thinking pattern are necessary to use from the stage of understanding the brief, ideation, and development of the ideas.

2 THE FOUNDATION STUDIES

The foundation of teaching design consists of core courses like elements of design, design method, form studies, product detailing, and ergonomics study etc.. The courses are structured to develop following qualities in students':

- To develop insight into design in space, time, and evolution of products.
- To develop courage to think and design creatively.
- Understanding of factors that directly or indirectly influence the product definition and its context
- To develop awareness of form, its experience and creation.
- Spatial analysis, spatial organization, depth illusion. Spatial composition in 2D & 3D space. 2D form transitions and radii manipulation.
- To develop creative conceptualization capabilities in form and structural integration and its implications to user society and the producer.
- Detailing plastic products while using processes like injection moulding, compression moulding, blow moulding etc. Detailing for fabricated products in sheet metal, steel tubes and channel sections, aluminium sheets and extruded sections of different materials.

2.1 Implication of Teaching Design

Today, the design teaching is still similar to what it was 20 years back. Difference is that earlier the students opting for design education were of only two backgrounds: the students with technical background comprising around 80% of total students and rest of the students with architecture background comprising rest 20% of total percent students. In fact both the backgrounds have certain level of commonality, which made the teaching simpler. However, at present with students coming from more diverse background of art and Fashion design joining design education, teaching design is becoming more complex. The response and the interest of the students differ from topic to topic, along with the different level of understanding. The students with technical background are more interested in material and process and product detailing and less in form studies; they are having difficulty to think lateral and connect the research to idea generation. Besides the students with architecture, art and fashion design background are more interested in form and less for detailing; these students are comfortable with new ideas but have less ability to develop the idea further. Such differences lead us to accept the challenge of teaching with certain questions, What factors are responsible for the heterogeneous background student's way of thinking? Whether the student's background is influencing the pattern of thinking? Whether the students' mind is conditioned already with their previous learning? What factors play important role to enhance creativity for all the students? What are cultural differences in designing between heterogeneous background students?

3 EXPERIMENTS

The To obtain possible explanations and answers to the above questions on what factors matters and which attributes play an important role, an observation was made on the response to assignments given to the students with heterogeneous background. The students were given assignments on different courses; they were observed and documented with the following evaluation criteria: the novelty of ideas, and the development of ideas.

4 METHODOLOGY ADOPTED

The design brief was prepared and provided to the students. They were observed and experimental data was collected from three experiments. Subjects of experiments were 12 students, between ages 22-25, out of which 6 students with technical background (5 male students and 1 female student), 3 students are of architecture background (out of which 2 students were male and 1 female) and rest three were with art background.

All students were enrolled for Master of Design at Instrumentation Design and Development Centre (that offers MDes. programme) in Indian Institute of Technology Delhi. The experiments were conducted as part of their course curriculum. Details of these experiments are given below:

Experiment1: The samples of oil can were chosen by consensus and discussion with design professionals, based on the commonly seen and the samples have problem of ergonomics. Samples consists of 1- oil can most commonly found with horizontal handle and another 4-oil cans with separate orientation of the handle as seen in the figure below with vertical having varying capacity and the last one with an inclined handle.

The samples of all oil cans were showed to the students and discussed regarding the various design aspects associated with it. Short brief was provided to the students and they were instructed to redesign the oil can, considering various design aspects including the functional and aesthetic values.

Figure 1. The sample oil cans showed to the students

Experiment 2: The next experiment was higher in complexity but with one focused area. The students were required to solve the ergonomics problems of climbing to the different level of berths in three tier compartment of Indian Railways' sleeper coach. The students were required to visit the field and observe the people climbing and getting down. Based on their observation and understanding, they were expected to suggest improved design for the same.

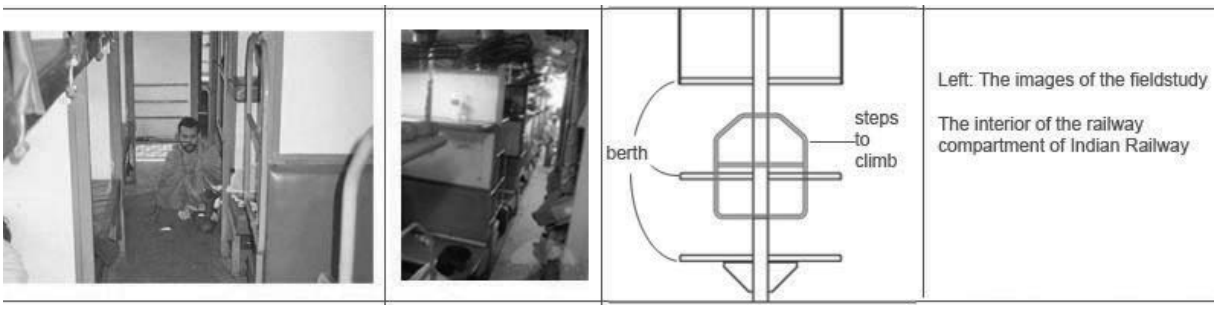

Figure 2. The images from the field study by the students about climbing to higher berth

Experiment 3: In this experiment, products involved motion. Students were required to study the lower part of a swivelling executive chair and work on the detailing of the parts. The students were required to dismantle an existing chair, study and draw the same and then they had to do detailing with creative approach.

5 PRELIMINARY ANALYSES OF THE EXPERIMENTAL DATA & ITS RESULT

Results of the above experiments were compiled from the collected data and are presented below in a comparative table. However, no attempt has been made to validate the results using statistical tools. As mentioned earlier, the sample size was limited to a total of 12 subjects in all the experiments.

Experiment1:

In this case, idea was to find out how the heterogeneous students are responsive to the new ideas and the form of the products.

Table 1. Comparison of the experiment 1

Group	Novelty of idea	Aesthetic	Problem Solving	Idea Development
G1 (Students with Technical Background: 6 nos)	The students were unable to create a new idea	Aesthetic value of the results were common	Some students were able to solve the ergonomics problem	Idea development was impressive
G2 (Students with Architecture, Art and Fashion Design Background: 6 nos)	The students were able to create new ideas	The students were able to design impressive form.	The students were creative enough to give another dimension to the product	The development of idea was quite poor.

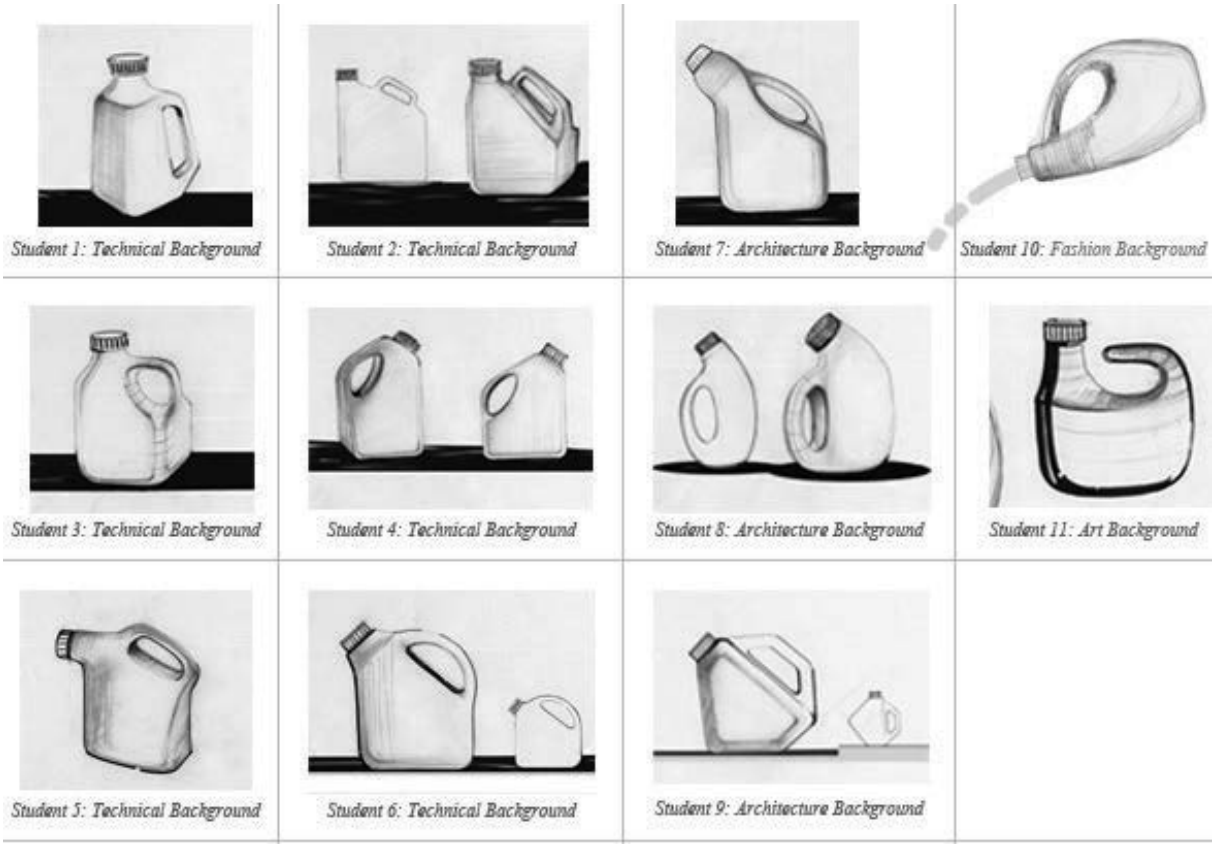

Figure 3. Product designed as a Result of the experiment 1

Observation from Experiment 1: The students with technical background were designing the can almost similar to the samples shown and with less sensibility towards form; however the students with Architecture, art and Fashion Design background were able to shift from the sample designs and also were interested to look for additional value.

Experiment 2: In this case, idea was to find out how the heterogeneous students are responsive to the problem solving and new ideas.

Table 2. Comparison of the experiment 2

Group	Novelty of idea	Aesthetic	Problem Solving	Idea Development
G1 (Students with Technical Background: 6 nos)	Ideas created to simplify the problem.	Negligence towards aesthetic aspects.	Ergonomics problem were solved with minute changes	Development was as it was before
G2 (Students with Architecture, Art and Fashion Design Background: 6 nos)	Identification of problem were lacking and the ideas were impractical.	Not to the mark	completely new approach but they created another few problems	The development of idea was quite poor.

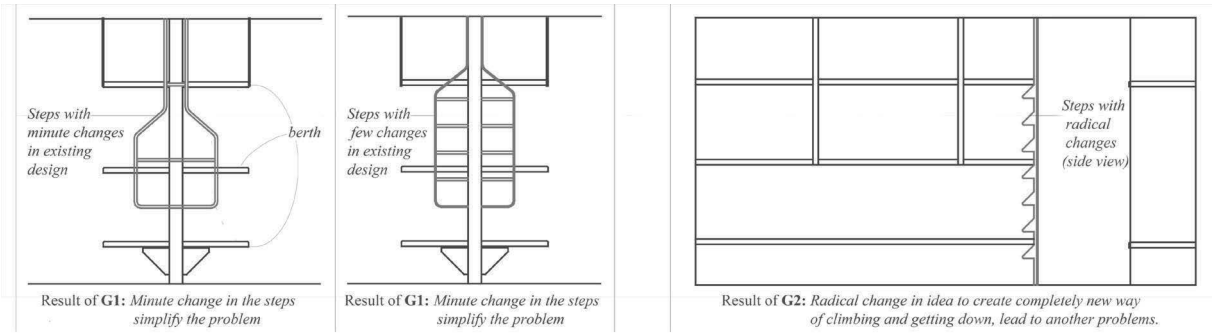

Figure 4. Result of the experiment 2

Observation from Experiment 2: The students with technical background attempted to solve the problem with slight changes to the existing design, on the basis of applied ergonomics. However, the students with Architecture, art and Fashion Design background attempted to solve the problem with very new idea, but without considering the ergonomics factor and the user interaction with the same.

Experiment 3:
In this case, idea was to find out how the heterogeneous students are responsive to the product detailing with a very creative approach.

Table 3. Comparison of the experiment 3

Group	Novelty of idea	Aesthetic	Problem Solving	Idea Development
G1 (Students with Technical Background: 6 nos)	The students were able to create new ideas.	Aesthetic was secondary for their idea.	students were able to solve the material and manufacturing problem	Idea development was perfect
G2 (Students with Architecture, Art and Fashion Design Background: 6 nos)	The students were able to create new ideas; some ideas were with sense of humour.	Great sensitivity towards aesthetics	The students tried to solve the problem with creativity and aesthetically	The development of idea was not up to the mark in terms of practicality.

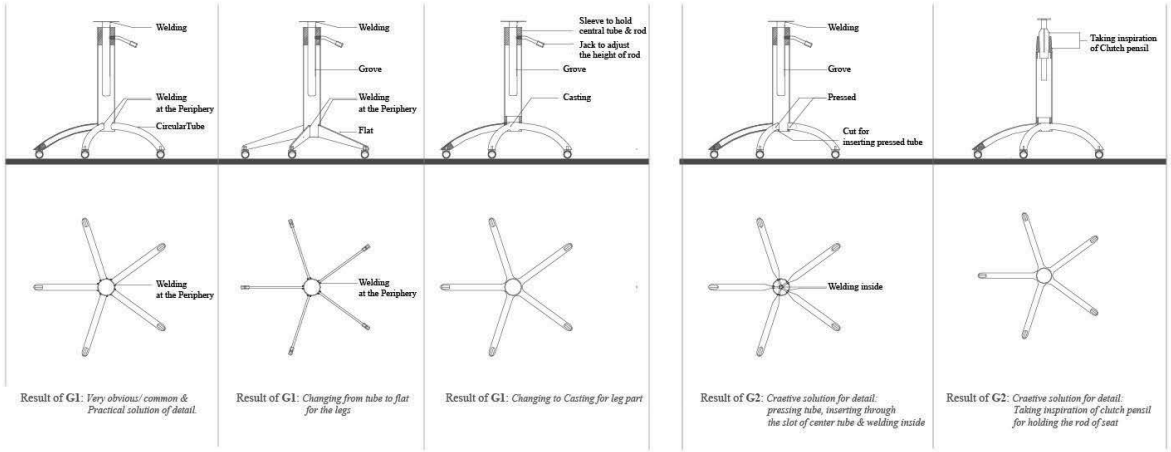

Figure 5. Result of the experiment 3

Observation from Experiment 2: The students with technical background were sensitive enough to solve the problem on the basis of Material and manufacturing. However, the students with Architecture, art and Fashion Design background attempted to solve the problem with creative approach and with aesthetic sensitivity.

6 DISCUSSION

Interpreting the difference between the creative thinking of all the subjects with one assignment where the ideas are merely based on the visualisation often leads to mistakes in decision making due to a lack of information. In experiment 1, it was observed that the students in group 2 are more comfortable to design with new ideas with great level of visualisation. However, in experiment 2, the students in group 1 were able to solve the ergonomics problem with small changes and with better understanding, In experiment 3, the students in group 2 were able to use their sense of humour while creating ideas and the students in group1 were more concerned with material and manufacturing process and shown less creative approach.

7 CONCLUSION

Although it may not be appropriate to draw very conclusive conclusion based on above three experiments and its result, it is found that this pattern is mostly prevalent in MDes education in India. Designers graduating from NID without technical background are observed to have flair for form, aesthetics etc., whereas designers graduating from IITs are good in technicality, functionality and medium in aesthetics sensitivity and are involved in engineering product design. In contrast to these designers graduating from IISc is observed to be strong in engineering aspects but did not make an impact in terms of aesthetically pleasant design.

Thus based on above results and observation, it is required that, students with different background need to be provided with courses that enhances their capability in area they are lacking, e.g, extensive work in visualization, sketching and forms for engineers and materials and processes for non-engineers.

Actual implementation based on above findings in the Department of Design, IIT Guwahati has bridged the gap to certain extent. More effort is required in this direction.

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