

Developing relevant design tasks

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Research over the last two decades in India has repeatedly indicated the benefits of Design and Technology education (D&T). Design thinking and problem-solving activities encourage students to plan, imagine, explore, draw, make and much more. Educationists have highlighted the inclusive aspects of D&T, as it provides a conducive atmosphere for a heterogeneous student population to engage with real world problems. The design process is iterative and includes gathering information about the users, defining a design problem, investigating it further, making exploratory idea-sketches and thinking of possible solutions. Further, it provides an opportunity to develop skills like problem-solving, visuospatial reasoning, collective cognition, collaboration and communication. However, students are likely to benefit more when the process can be aided with an appropriate design task and guided instructions.

This article briefly explains the various considerations we took in order to develop a few design problems for middle school students. In doing so, the element of interest becomes an important consideration for engagement with the activity. Students tend to engage more in a task when they have an opportunity to express their thoughts, think both creatively and critically and take ownership of their work.

To begin with, we chose the theme of environment and topics related to generating awareness about the same to develop design problems which would be novel and engaging. Being located in Kerala (one of us) and accustomed to floods during monsoons helped us ground our first design problem. The second scenario was that of an eco-friendly homestay.

Following are examples or some of the design problems we developed for students based on the above scenarios:

1. Designing a house in a flood-prone area: In this activity, students will be introduced to different problems one faces in their home during floods. The students are made aware of a flood-prone area by giving information about the same after which the scenario, challenges and the design brief is presented through the diary of a child, Divya.

Part 1: After reading Divya's diary, one can notice a number of issues faced by residents during floods.

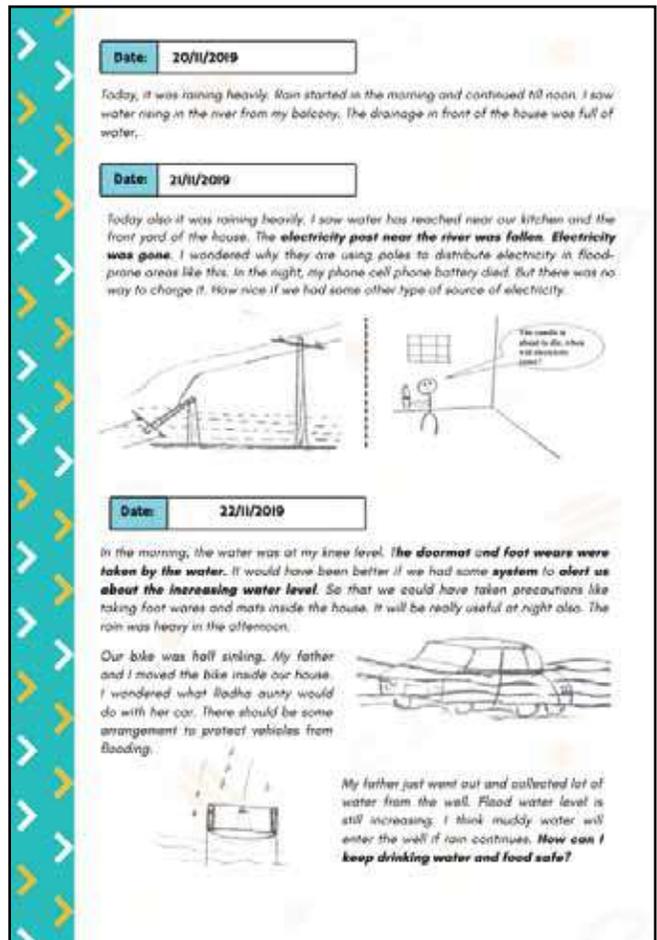


Image 1: Design problem for flood-prone house, presented in the form of a child's diary.

What issues have you noticed? Consider one or two problems and think about solutions. Your solutions can be as creative as possible.

Part 2: Divya's neighbour's house collapsed in the flood. Divya and her friends are very sad and are determined to design a house that is flood-resistant. With this new design, they want to address some of the problems they face during floods, such as the ones highlighted in the diary. Suppose you are Divya's friend and she has asked for your help. Design a new house with the features you have added in it to solve at least a few flood-related problems. Describe these in detail and with the help of drawings. (You are welcome to even consider more than two problems to address in your design solution).

2. Rock the Walk: A hypothetical homestay called Niwara was used as a plot to describe the features of a homestay and present design challenges. Girish and his parents run a homestay and they have separate visitor rooms, kitchen and flower nursery, connected by paths. Students have to help in designing unique interaction spaces with activities to bring about more interaction between guest families in the above-mentioned paths.

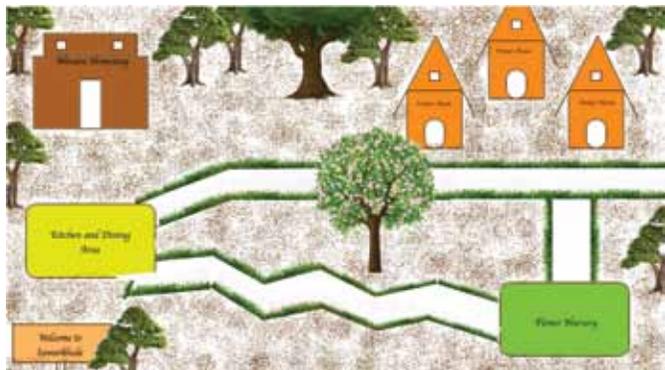


Image 2: Rock the walk design problem

3. Spice holder design: The Niwara homestay provides lodging and dining facilities for people and also at times allows guests to cook in their kitchen. The hosts have noticed some issues with multiple people handling the kitchen equipment, such as the spice box, and are keen to think of novel solutions. So, the students are required to design a spice holder which will be easy to handle, ensures that spices are recognizable and helps avoid mixing and breakage.

Reflections

The design problems presented above are a result of multiple iterations and frequent testing with students.

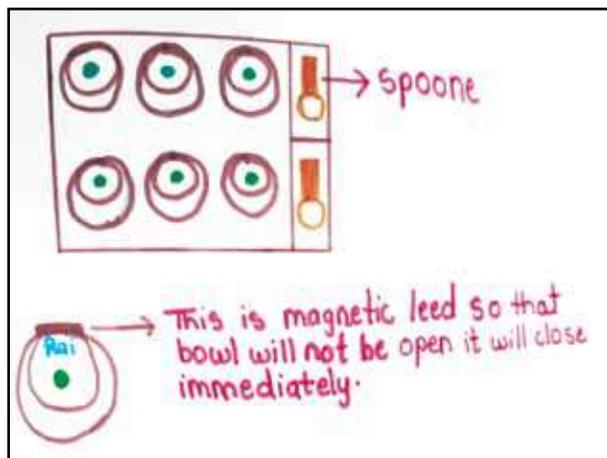


Image 3: Student's drawing of spice box design

These have scope for further improvement. While developing the design briefs and presenting them to students, we realized that we needed to focus on some specific aspects of the design brief in order to make it more open-ended and child-friendly. These are as follows:

Relevance of the theme and scope: Even if the theme is broad such as environment-consciousness, the design problem should be focussed and achievable. When the problem is set in a real-world situation, it motivates students to solve that problem as it is propelled by real life experiences and specific contexts. For example, a design brief about a house in flood-prone areas is based on the problems that one faces due to flooding. Considering these problems, children empathize with the people residing in such areas and have to think about creative solutions and design a house in a flood-prone area. Similarly, for the 'designing an eco-friendly homestay' design brief, we had to narrow our scope and give a focussed design problem. The generic design brief yielded student drawings showing a typical house structure with additions of solar panels, farms, waste segregation model, etc., (Image 4) which did not lead to any unusual ideas.

Presentation of the problem: Students may be presented with a design problem in many different ways like storytelling, illustrations, puzzles, comics, etc. One must choose the format and medium based on the theme, expected outcomes and feasibility of the presentation medium. In our case, the problem of designing a house for flood-prone areas was presented through the diary of a child (Image 1) who faced a flood situation at her home describing the challenges and design opportunities. Similarly, designing a spice box for the kitchen of the homestay



Image 4: Student's drawing depicting generic homestays.

was a focussed task presented as a hypothetical scenario of a family running a homestay with pictures and illustrations. In both cases, a detailed scenario was presented which highlighted the design challenges and gave an opportunity to students to comprehend the problem and think of solutions.

Testing with students: Our journey in developing a design problem for students involved, breaking it down into more achievable outcomes, communicating it in a simple language, engaging with peers to refine the problem, testing some design problems with students and then asking students their opinions about the problem. Each of these aspects were repeated over time and the design problem was refined in a cyclic approach. We also made many changes such as simplifying the language to make it more child-friendly and keeping the presentation of the design brief, crisp, short, and visually appealing.

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