DESIGN TOOLKIT FOR SUSTAINABLE IDEATION

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ABSTRACT

The work proposes a card-based design toolkit for sustainable ideation in product development. The solution consists of two decks - the 'Problems' deck for identification of sustainable design issues and the 'Prompts' deck that provides prompts for tackling these issues. The toolkit abstracts data through user studies (interviews, peer-to-peer observations, market research, etc.) to understand the product design cycle and breakpoints in sustainable product design. To validate the design intervention, during the ideation stage, the user(s) picked up cards from the Problems deck that denote sustainable design issues posed by the product to the environment throughout its lifecycle. Thereafter, user would pick multiple cards from the Prompts deck denoting tools for sustainable innovation and ideated upon them. The prompts helped the teams to laterally and collectively target multiple sustainable design issues rather than focusing on individual problems. The toolkit promotes Design for Sustainability (DfS) by presenting sustainability as an opportunity.
Key Words: Design for Sustainability, Lateral thinking, Card game

1. INTRODUCTION

Introduction of sustainable solutions in product design cycle can be classified into three common discreet but erroneous approaches. One, sustainability is enforced for passable design, which creates only surface level solutions; two, sustainability is discussed in later stages, which makes the process expensive and three, sustainability is thought of after product disposal, which is extremely late for remedy. Apart from this, a study by BCG/MIT in 2015 finds that whereas 90% of executives find sustainability to be important, only 60% of companies incorporate sustainability in their strategy, and merely 25% have sustainability incorporated in their business model proving that there exists a knowing-doing gap in the sustainability sector.[1] The study further describes that there is unequal distribution of sustainable responsibility in businesses. The aim of this research is to develop a design intervention for overcoming this knowing-doing gap and promoting sustainable innovation and creation among businesses.

1.1. Problem Identification and Research Gap

The comparison between the various existing sustainability toolkit is as shown in Table 1:

[Table 1.1] Comparison of existing Sustainability toolkits

Toolkits	Learning	Understanding	Execution	Pros	Cons
The Cambridge Sustainable Design Strategy Cards	Awareness of terminologies	Complicated to learn	Multiple factors make it difficult to execute	Diverse and detailed	Possible that the user may become over dependant
Sustainable Design Tool Kit by Shift	Detailed description and examples	Simple	Usage is only described not initiated	Interesting to understand sustainable ideas	Very generic and vague details
Designing our Tomorrow business toolkit	Disjointed and very specific to business	Complicated and very specific to fields	Specific directions for tackling specific problems	Easy to use in particular cases	Over specialized

The existing solutions offer either business strategies for management or toolkits that are adopted by the management. The various issues being:

- The solutions are deployed very late into the product creation stage, therefore, they become non-iterative and non-lateral in problem solving.
- The solutions are very detailed or complicated, using the toolkit as an intensive process, which takes away the creative problem-solving capability, handicapping the user.
- The tools are extremely specialised, thus, being difficult in learning and not applicable universally.

1.2. Objectives and Scope of Work

The aim of the work is to introduce sustainability at the grass-root level, here, at the ideation stage, through tools that are adaptable, simple and non-coercive. The tools can act as benchmarks for sustainability as well as provide the designers with new prompts and openings to approach Design for Sustainability (DfS) by

- Creation of a tangible strategy or toolkit from business and alignment towards sustainability.
- The ability to customize the toolkit may include company's own brand values and sustainability outlook.
- Deployment of simple, affordable, portable, and easy to use toolkit, that does not overshadow lateral creative thinking and helps the designers to understand various modes to incorporate sustainability in the design solutions proposed by them.

2. METHODOLOGY

This segment discusses various methodologies and design tools to gather qualitative as well as quantitative data for creating the framework for the toolkit.

2.1. Research Methodology

The study was conducted for two objectives. The primary objective being to understand the working of a product design cycle and secondary to identify various breakpoints in sustainable products along with identification of multiple ways or directions for product refinement. The methods deployed for the primary objective are:

- Telephonic interviews, to understand various checkpoints in a product design cycle and the methods in which sustainable design was approached.
- Peer to peer observation and brainstorming, where the subjects were asked about the approaches and checkpoints in their previous employment as depicted in Figure 1.

1.MIT Sloan Management Review

[Figure 1] Peer to peer review in action

The second objective was fulfilled by carrying out market research, to realise various sustainability hiccups (pain points) and ways in which these lacunas are filled (prompts).

2.2. Observations and Design direction

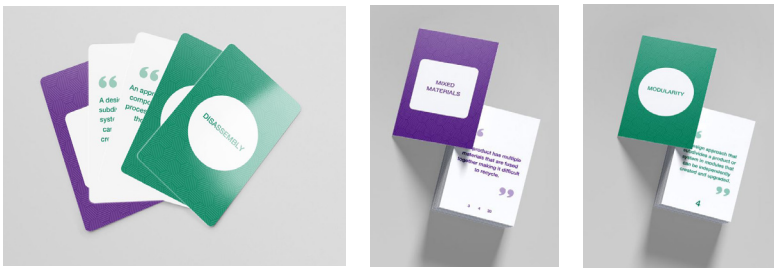
The methods underlined the requirement of team thought while generating sustainable ideas. Lateral thinking is crucial for sustainability and a toolkit can introduce interaction, simulate creativity and maintain ideation in the spectrum of sustainability.

3. DESIGN

The research generated a pipeline to fulfil the demands in ideation for sustainability. The need for an intervention that promotes sustainability while guiding lateral thinking led to the creation of a toolkit that provides a creative intervention.

3.1. Concept Framework

After understanding various lacunae of sustainable product design and its approach to solution, a toolkit for sustainable product design was developed. The toolkit was divided into two categories - the 'Problems' and the 'Prompts'. The intervention targets the designers in a firm, who directly take part in product creation at the ideation stage of product development. Targeting the designers in the company is another way to garner sustainable creation, as sustainability is not just the responsibility of management.

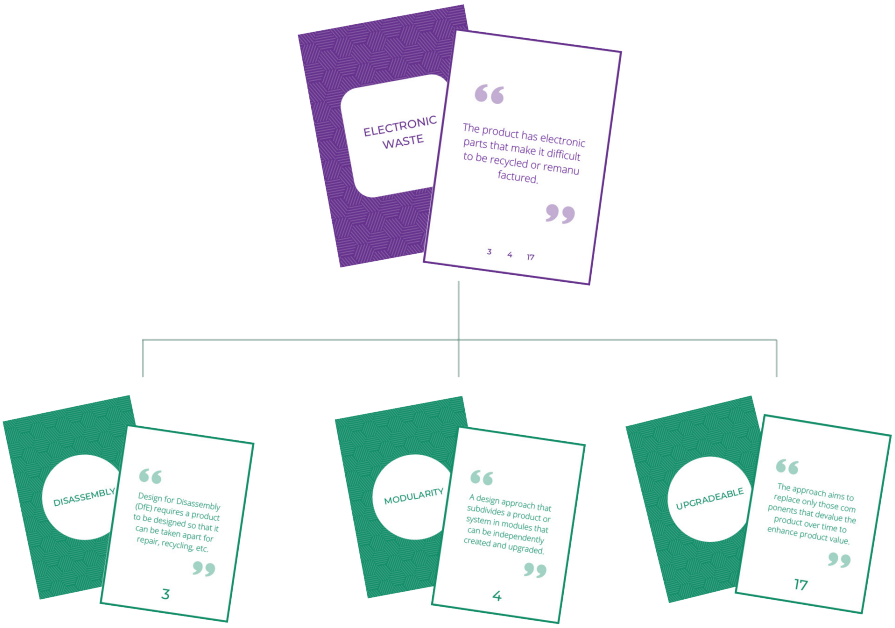


[Figure 2] Cards from toolkit, purple deck for problems and green for prompts

The toolkit includes 40 cards, 15 problems (in purple) and 25 prompts (in green). All these cards include the option of customisation, so that the toolkit is closer to the company's values. Each card has two sides, one includes the title phrase and other its explanation to aid in understanding. For the purple cards, numbers at the bottom correspond to the three most viable design directions from the prompts deck as shown in Figure 2.

3.2. Proposed Ecosystem

In a conventional product design process, designers research, brainstorm and define the problem statements. Post design problem selection, the environmentalist team alongside the design team selects various problems that arise in the product from the purple deck and hands them over to the designers for ideation. The designers then choose random prompts from the green deck and ideate while keeping the prompts at the root of the concept. The designers can subsequently ideate on multiple prompts, adding on their own, as and when required. The system is not rigid and therefore the company may define their own interventions. An example of multiple prompts corresponding to a problem is shown in Figure 3.



[Figure 3] Multiple prompts corresponding to a single problem to generate variety in ideation

4. TESTING

The following segment elaborates on the procedure of testing and validation of the proposed toolkit. Physical prototypes were created for conducting the experiments. The collection of feedback and insights from the participants have been further discussed in detail within this segment.

4.1. Exercise

A short exercise was designed to validate and test the impact of the proposed concept in the actual design process. The exercise consisted of two rounds of ideation – first, without the use of the toolkit and the next round with the toolkit. Twelve participants (including 2 facilitators) were selected from within the Design Discipline of PDPM IIITDM Jabalpur and were grouped into two teams of six members each for the exercise. These participants included students from the third and fourth year of the Bachelors of Design programme, who have worked in well-known design firms and institutions while working for their capstone projects or internships and have experienced the design process adopted by the industry. Further, keeping in mind the use scenario of the toolkit, the exercise was conducted during the ideation phase of an ongoing Product Design course, wherein students were to redesign existing or develop innovative product-based solutions.

For the first round of ideation, each of the teams was allotted 30 minutes to ideate on multiple concepts to incorporate sustainability in their products. At the end of this round, participants were asked to describe their struggles and limitations during the process. The second round of ideation for 30 minutes involved the use of the designed toolkit. The teams were asked to first identify the sustainable design issues pertaining to their products from the Problems deck. After identifying the problems, the teams were once again asked to ideate on sustainable design concepts but with the help of cards from the Prompts deck. Each team member had to pick out random cards with prompts and ideate on concepts with the prompt acting as the design direction. At the end of the round, the participants were asked about their struggles during ideation and also how the toolkit had affected the process as compared to the previous round.

4.2. Observations

The insights from participants at the end of each round of ideation alongside the observations made by the facilitators of each team creates the groundwork for the validation of the concept. At the end of round one of ideation (without the cards), participants stated that it was difficult for them to generate a variety of concepts that diverge from the obvious interventions for sustainability such as the use of renewable materials or the 6R concept. Moreover, they also pointed out that it was difficult to ideate while keeping sustainability at the root of ideation. The facilitators observed that the concept generation process was being governed by the concern towards the feasibility than the variety.

At the end of round two of ideation (with the cards), participants pointed out that the Problems deck helped them in identifying precise directions for the problem solving. Also, the Prompts deck helped the teams to think laterally and come up with almost twice the number of concepts generated previously with much less effort, without focusing on the end results. Facilitators stated that the toolkit provided the participants with a broader view for ideation and also helped kickstart conceptualization, making the activity not only more enjoyable but also which would work well with the design process in the industry. However, the facilitators observed that the cards within the toolkit were exhaustive and the participants might also become dependent on the toolkit for ideation. Process is showcased with the help of Figure 4.

[Figure 4] Designers selecting out problems(left) and discussing prompts(right)

5. RESULTS AND DISCUSSIONS

The following segment discusses the results and discussions in regards to the observations from the exercise performed for validation and also addresses the feedback from the blind peer review.

The following results can be obtained based on the observations made from the exercise:

- There is a distinct variation in the quality and quantity of concepts generated while using the toolkit as opposed to the conventional procedure.
- The toolkit helps users to ideate laterally creating diversity among concepts thus paving way for sustainable innovation.
- The toolkit also acts as a concise database for DfS concepts and sustainable design education.

The context the cards were tested in and the outcomes have been discussed previously. However, the cards could not be tested in other contexts such as one in which the participants have no knowledge of DfS, or one where the participants have experience using other tools for sustainable design. The proposed toolkit focuses on aiding in sustainable ideation and lateral thinking and can be used by novice users as opposed to other card/prompt based DfS strategies that contribute to the development of a sustainable solution unique to the problems that a product poses and are elaborate, time consuming as well as require some experience with the toolkit itself.

6. CONCLUSIONS

The toolkit essentially targets at bringing sustainable product creation down to the root level of design ideation following the "Attitude to Action" concept. The toolkit also aims at complimenting two of United Nations Environment Programme's sustainable development Goals, i.e., number 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) and number 12 (Ensure sustainable consumption and production patterns) for the year 2030 by creating a pathway to sustainable product innovation.[2]

BIBLIOGRAPHY

1. Conard, B. (n.d.). Some Challenges to Sustainability. Sustainability, 5(8), 3368-3381. Retrieved February 25, 2019, from http://dx.doi.org/10.3390/su5083368
2. David, K., Kruschwitz, N., Haanaes, K., Reeves, M., Fuisz-Kehrbach, S.-K., & Kell, G. (2015). Joining forces: Collaboration and leadership for sustainability (pp. 1-31). MIT Sloan Management Review 56.
3. Kiron, D. (2012). Sustainability nears a tipping point. Strategic Direction, 28(7). Retrieved February 24, (2019), from http://dx.doi.org/10.1108/sd.2012.05628gaa.012
4. McLennan, J. F. (2004). The Philosophy of Sustainable Design. Ecotone Publishing.
5. Publications, U. N. (2018). The Sustainable Development Goals Report 2018.
6. Waage, S. A. (2007). Re-considering product design: a practical "road-map" for integration of sustainability issues. Journal of Cleaner Production, 15(7), 638-649. Retrieved February 25, 2019, from http://dx.doi.org/10.1016/j.jclepro.2005.11.026
7. Walker, S. (2012). Sustainable by Design. Routledge.

2.UNEP sustainability goals for 2030