Project 3

TEACHING AID FOR ART TEACHERS

Abhijith KR
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Interaction Design
M.Des. 2015–17

Guide
Prof. Girish Dalvi

Industrial Design Centre

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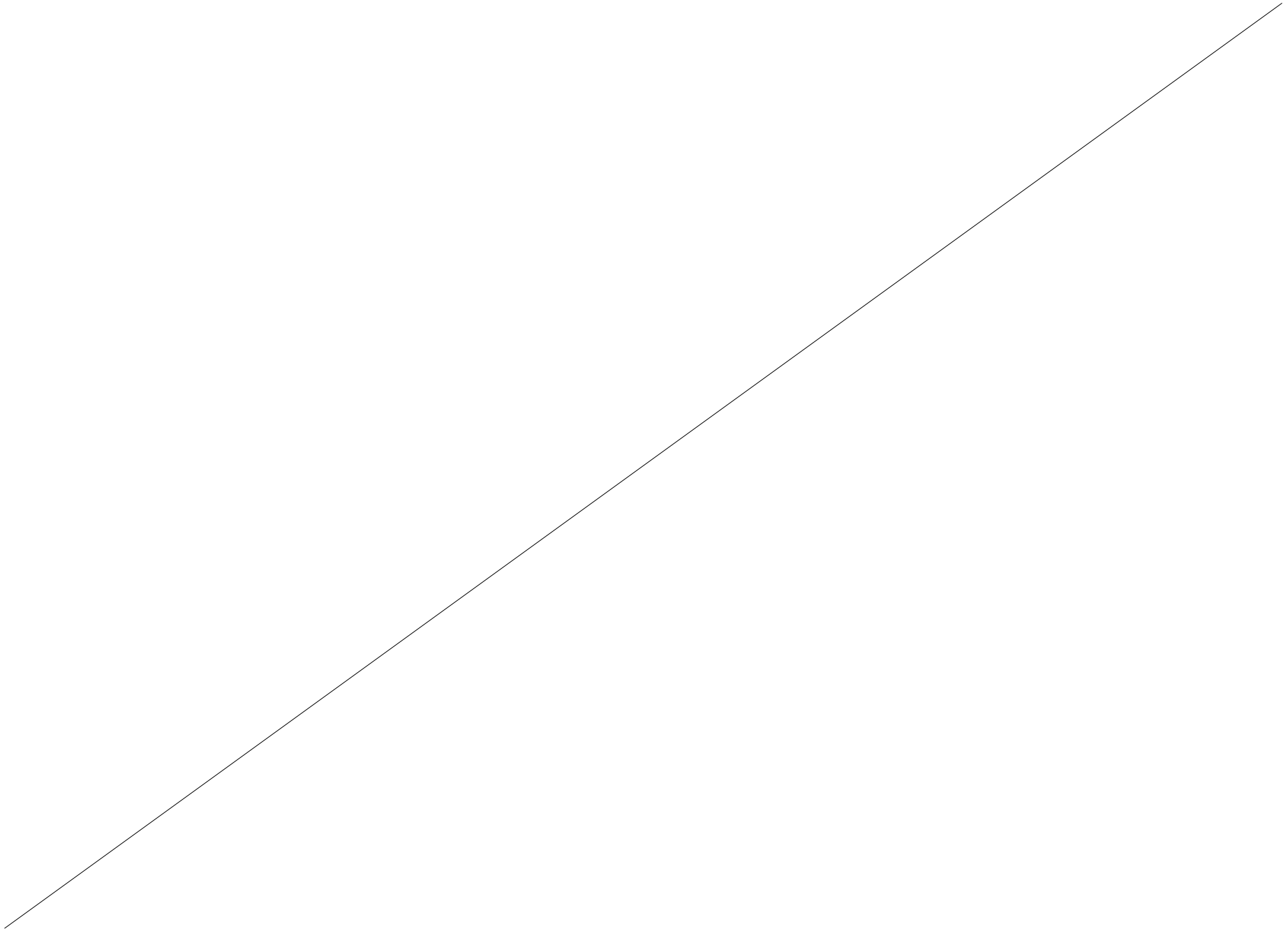


Approval Sheet

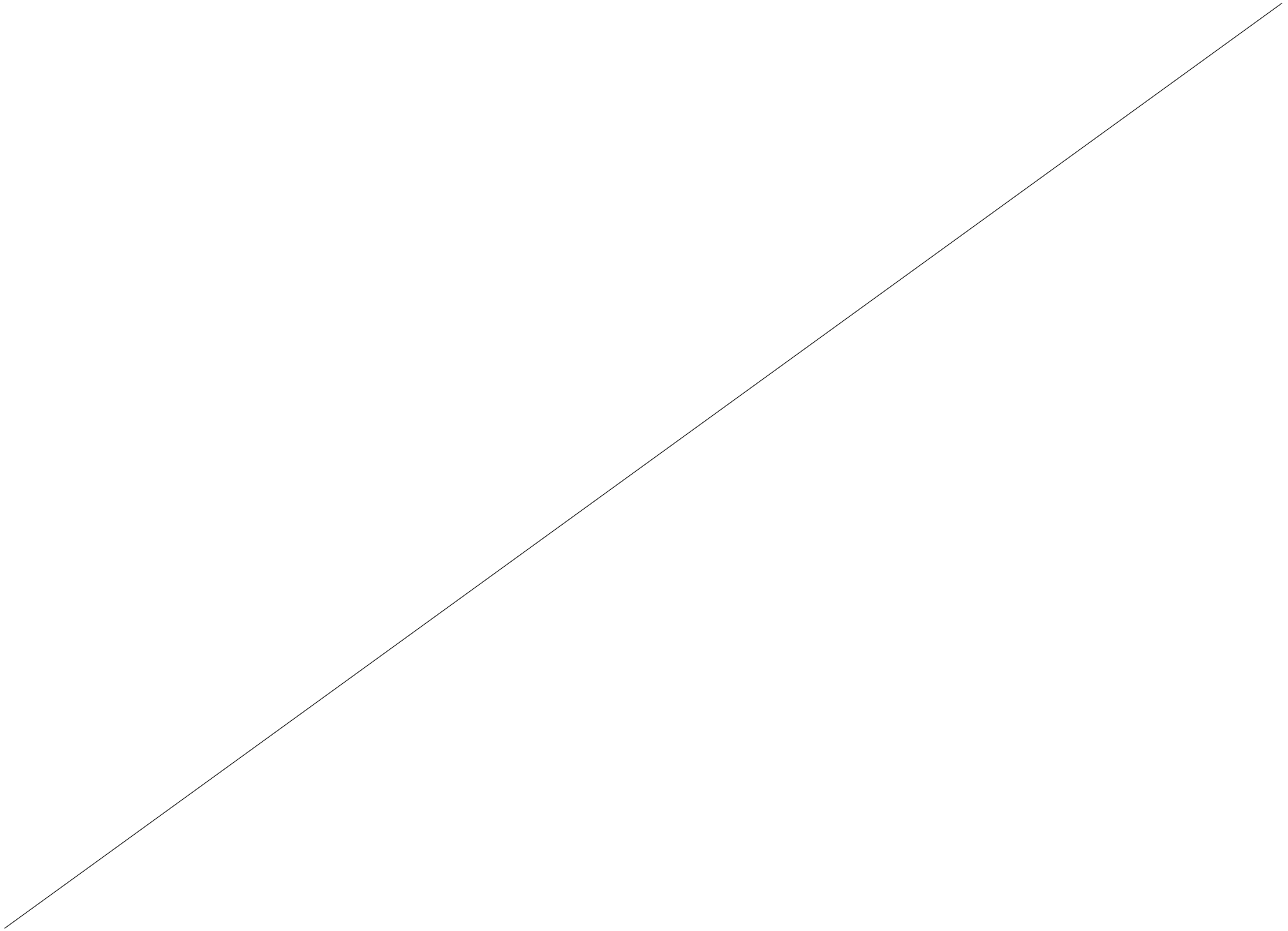
The Interaction Design Project III titled “Teaching Aid for Art Teachers” by Abhijith KR (Roll Number 156330003), is approved, in partial fulfilment of the ‘Master in Design’ Degree in Interaction Design at the Industrial Design Centre,
Indian Institute of Technology Bombay.

Guide

Chairperson

Internal Examiner

External Examiner



Declaration

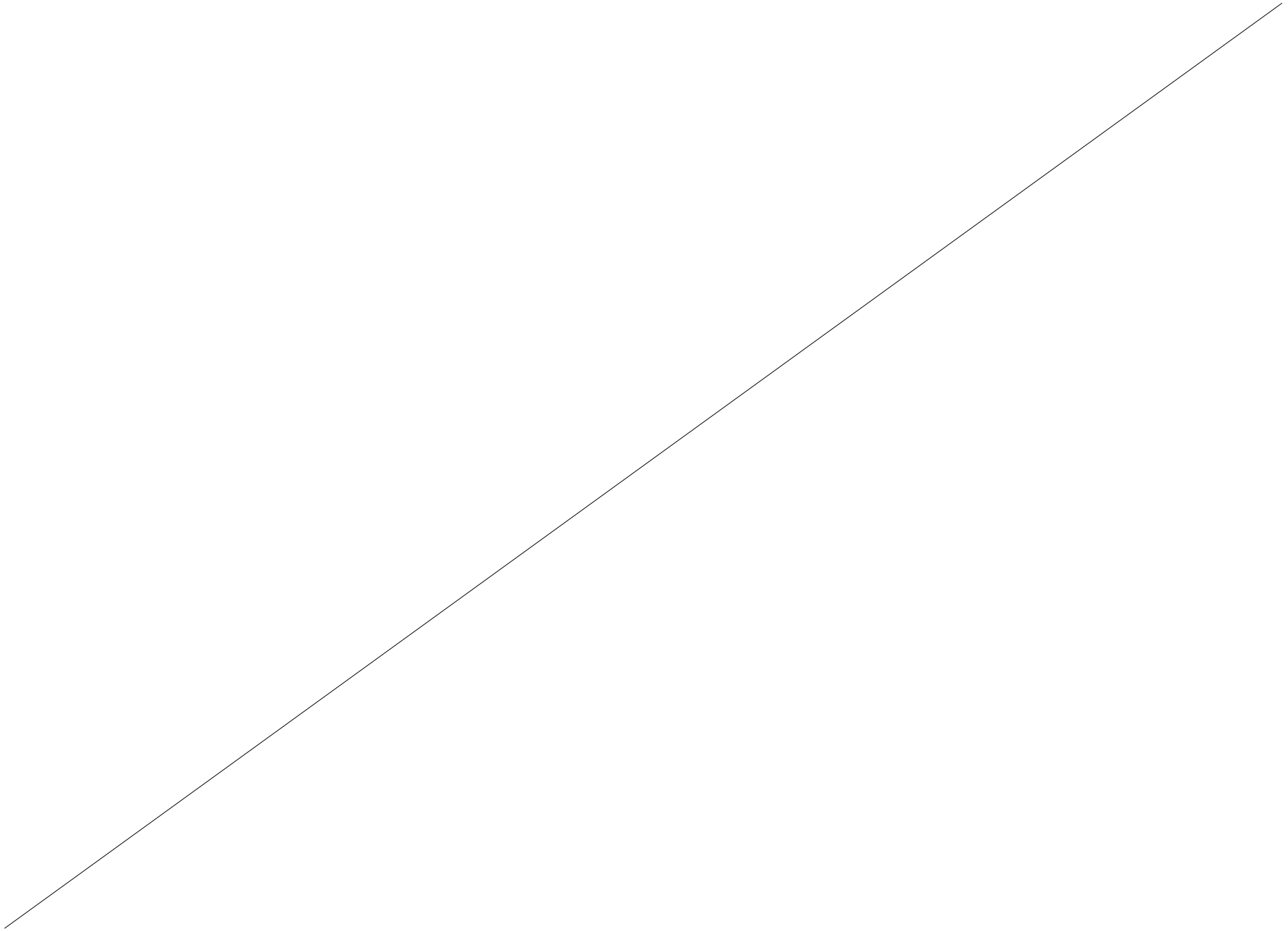
I declare that this written document represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources.

I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea, data, fact or source in my submission.

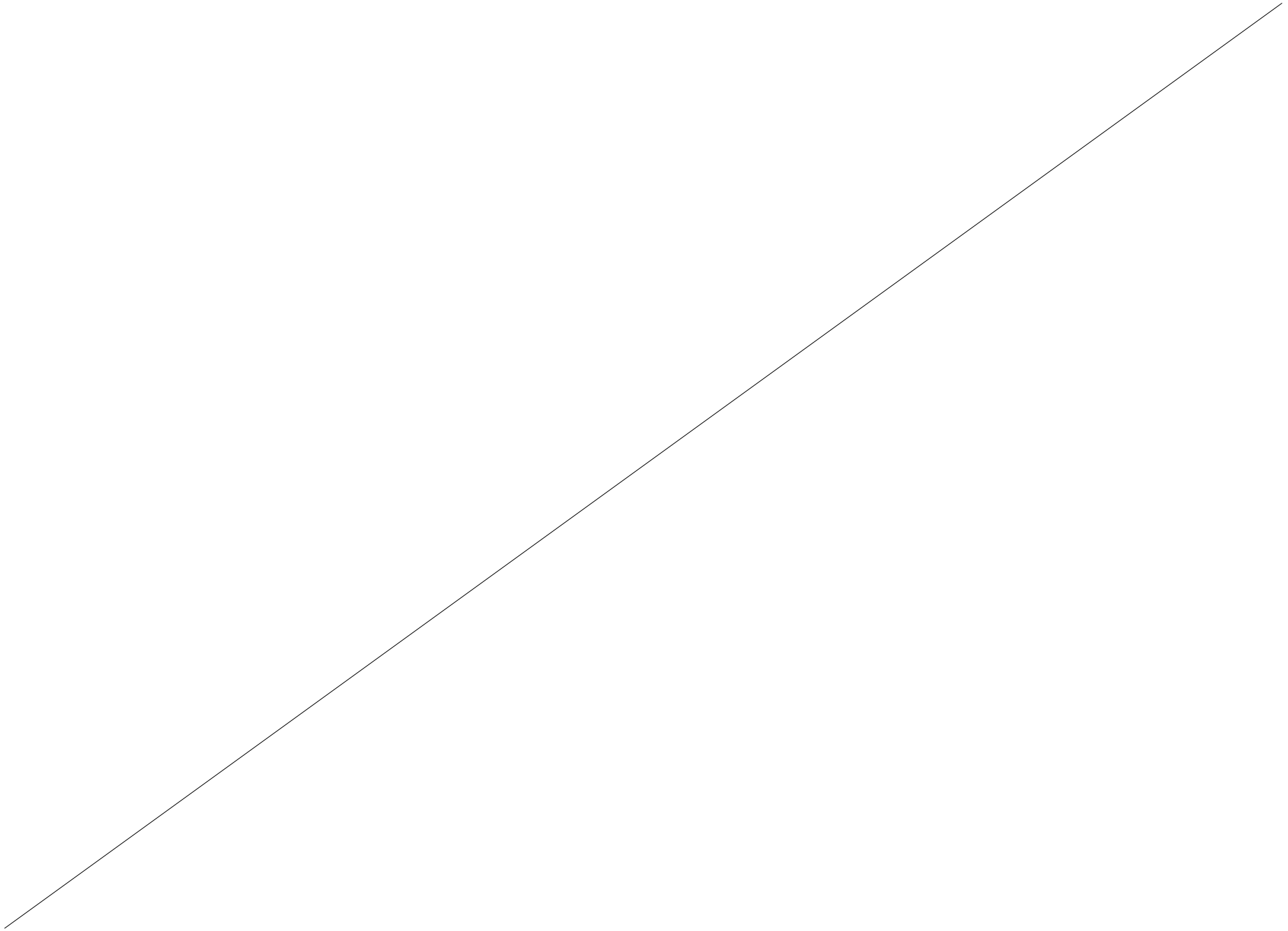
I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Name and Signature: **Abhijith KR**

Roll Number: 15 633 0003
Interaction Design



To *Kalyani*



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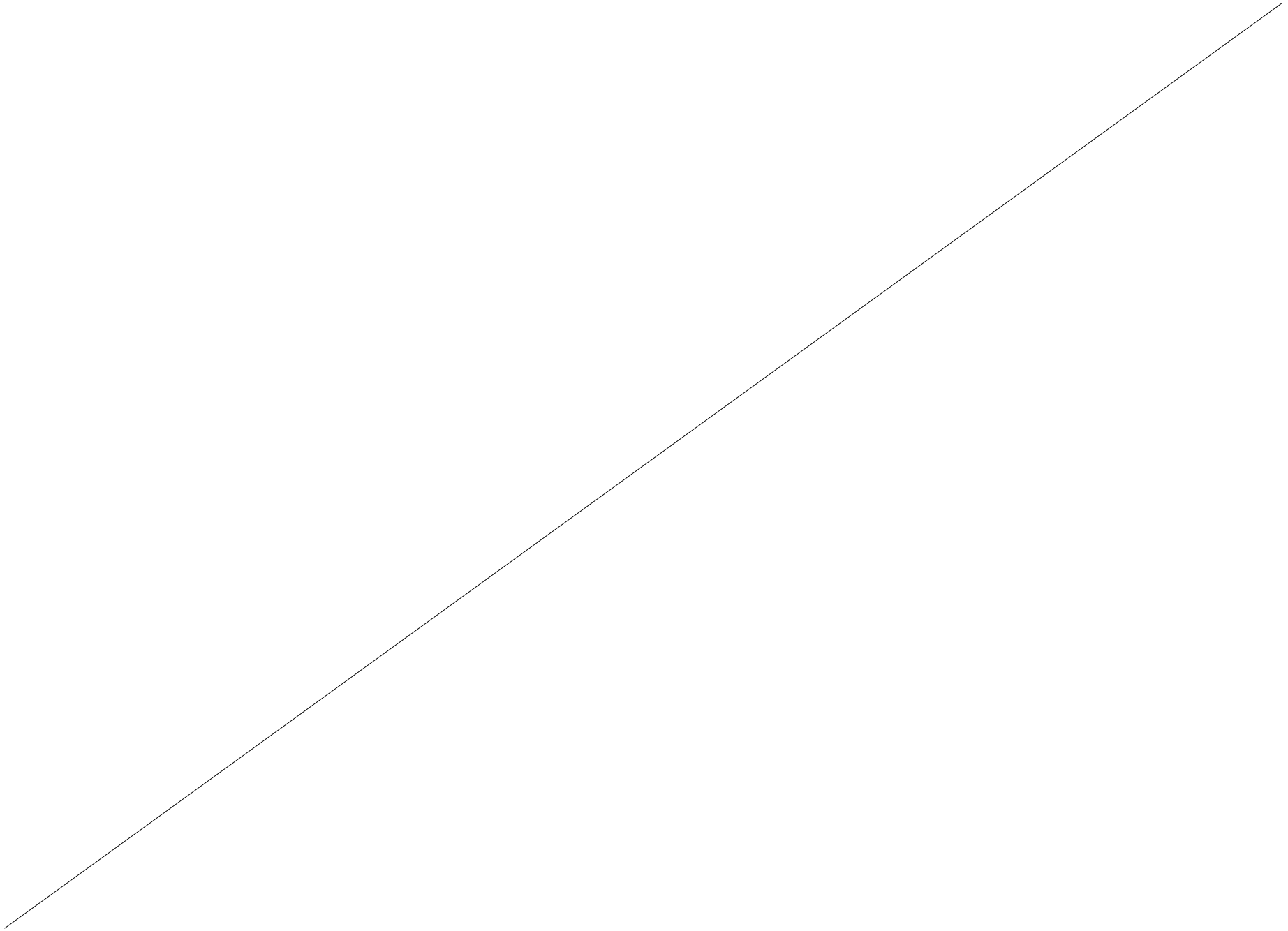
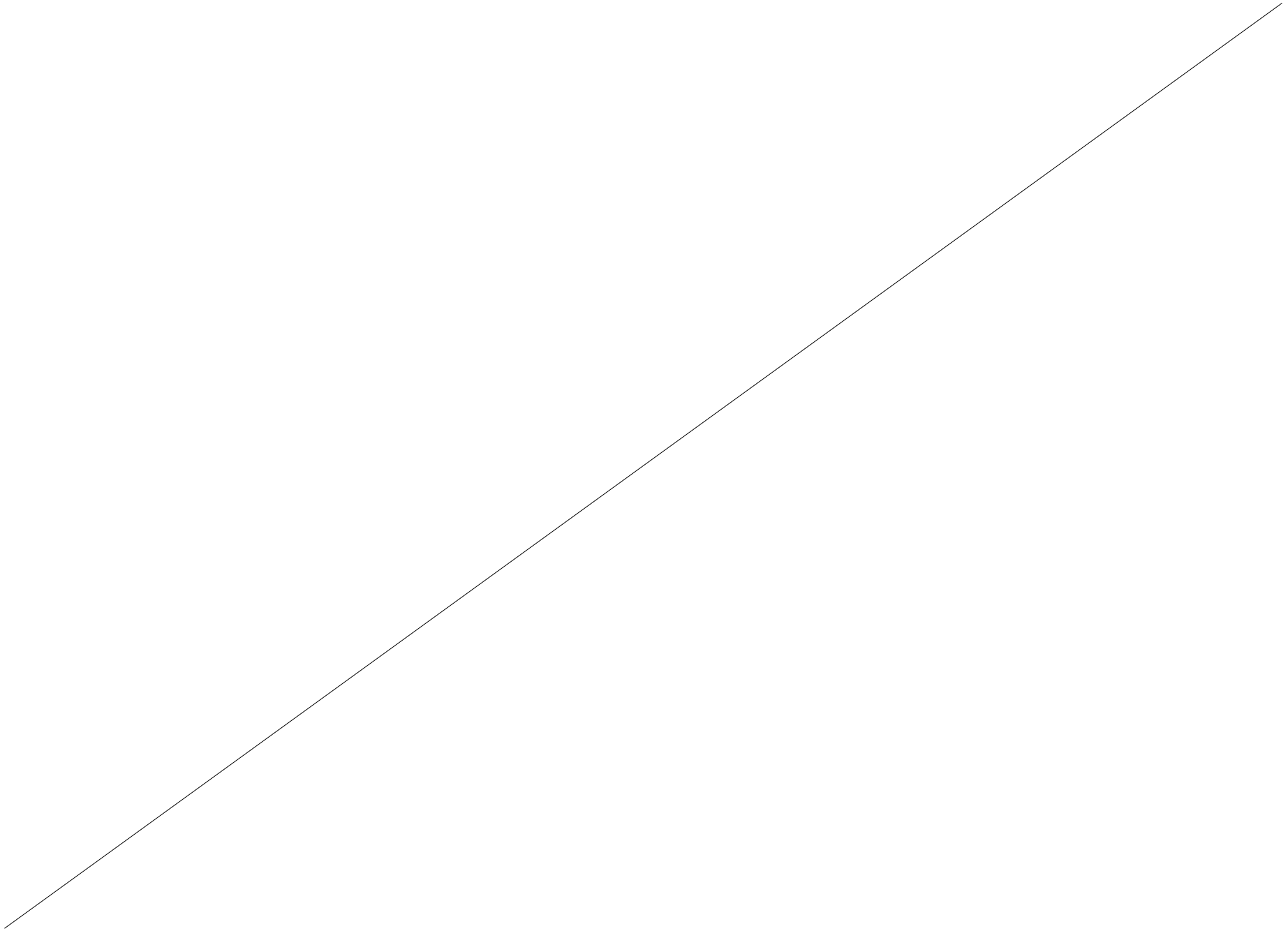


Abstract

Primary art education in India is troubled by lack of infrastructure and insufficient teachers. The syllabus loses its effectiveness while being translated into classroom instruction. Children produce artwork that lacks character and is monotonous. This dearth of variety can be attributed to an absence of divergent thinking and ineffective systems supporting such thinking. We propose a design-led intervention in the form of a prompt generation tool as a step towards building better support systems and effecting change in teacher outlook. The prompts present familiar objects in unfamiliar situations. These help children think beyond the obvious, trying to deal with the situations presented. Our focus was on achieving rich variety in art produced by children. The preliminary evaluation of our tool shows promise.



1 Introduction

1.1 Background

Over 30 million children in India attend classes 7th and 8th, with 6.7 million teachers teaching in secondary (classes five to seven) schools.[1] Of these, art, craft, dance and theatre teachers are called specialist teachers. A number of Indian states have cut down on the number of specialist teachers appointed to fill the vacancies of retiring teachers, as well as fresh appointments. Many of these schools are resource constrained. As a result, primary art education in government schools in India suffers from inadequate infrastructure and insufficient number of teachers. Children have limited access to technology-driven art learning tools. The schools are unable to allot enough class hours with art teachers. In most cases, the hours they get are not enough to complete exercises comfortably. There also exists a mismatch between the art education syllabus[2, 3] and how it is taught in classrooms.

1.2 Motivation

Drawing as a tool to think has the potential for dealing with real-world problems.[4] We wanted to find out how formal education equips a young generation to think, by training them in art. We concentrated on the role of the instructor and how she brings in a mindset of creative and free thinking to the classroom. Previous encounters with art produced in classrooms had convinced us that for some reason, children were not being trained in this act of art as problem solving. Our interest was in finding what design can do to reinforce in children a spirit of using art as a thinking tool.

1.3 Earlier Work

1.3.1 Primary Research: Overview

Our previous research focussed on how the art education syllabi in government schools are translated to classroom instruction. The project report discussed the teachers' outlook to teaching and professionally practising art. Among other things, they saw exhibiting artwork as a major incentive for anyone to produce art. It also revealed the teachers' conceptual models at work, when it came to evaluating the students' output. Though they considered conceptual clarity important, their discussion of 'good' pieces were all about the children's skill and the perfection in execution. In addition, the project offered an overview of teachers' concerns, a list of subjects they taught across classrooms, techniques they invented and employed and their conception of the value of art. The teachers are dissatisfied with the lower status ascribed to art education and the limited time they get to spend in class. Inspite of this, many use ingenious methods to teach (one teacher taught human figure drawing with matchsticks).

Appended to this report is our research paper, *Blackboards and Basic-shape Landscapes: State of Art Education in India*. (Page 73 onwards)

Primary Research: **The Diversity Problem**

We visited schools in Maharashtra and Kerala and spoke to art teachers during our earlier research. Apart from the infrastructure and administration related troubles, we observed that the artwork students produced lacked diversity. For a given exercise, they resembled each other. Most artwork reflected no local or cultural foundations and stuck to a generic version of objects and settings depicted devoid of contextual detail. Despite the rich variety in culture and environments, the lack of such diversity in the artwork should be baffling. Therefore,

We will see in the Nai Talim discussion (next page) how important contextual awareness and response to it are important to grooming children to be well rounded individuals.

addressing the need for systems to nurture rich variety in art and incorporating local context becomes an area ripe for design intervention.

We attribute the similarity in drawing output to a lack of divergent thinking. Children are not encouraged to think differently enough to be able to produce work that reflects their individuality. They are conditioned to draw in certain specified ways to facilitate quick evaluation. There seemed to be three factors influencing the absence of variety. The first is the children's lack of confidence in their own experiences. They were reluctant to draw from their immediate surroundings and everyday experiences. The second is a culture of following a prescribed norm which is put in place by teachers who use 'observe and reproduce' techniques to teach art. The norm defines classroom exercises—still-life arranged a certain way, certain specific topics copied from guidebooks, etc. Children are made to copy a drawing the teacher makes on the blackboard and are then assessed for their skills alone. The third factor is exam-centred education, where a standard, easy to evaluate output at the end of each exercise is expected and encouraged. For teachers, such output is less time consuming to evaluate, as compared to conceptually and formally diverse artwork. These three factors work in tandem, often feeding off each other.

1.3.2 Secondary Research

We trace discussions detailing the trouble with institutionalised thinking to earlier works on education and philosophy.
This section discusses a selection of books, research papers and articles that deal with an ability of thinking differently and its dependence on instruction.

...kids will take a chance. If they don't know, they'll have a go... They're not frightened of being wrong. I don't mean to say that being wrong is the same thing as being creative. What we do know is, if you're not prepared to be wrong, you'll never come up with anything original—if you're not prepared to be wrong. And by the time they get to be adults, most kids have lost that capacity. They have become frightened of being wrong... And we're now running national education systems where mistakes are the worst thing you can make. And the result is that we are educating people out of their creative capacities.

Picasso once said this, he said that all children are born artists. The problem is to remain an artist as we grow up. I believe this passionately, that we don't grow into creativity, we grow out of it. Or rather, we get educated out of it.

→ *Ken Robinson, TED 2006*

Peripheral Reading

Reading Marjorie Sykes on Gandhi's Nai Talim,[5] we find mention of why local context is crucial in the upbringing of young boys and girls; how true education is gleaned from the immediate environment and not necessarily through textbooks. It emphasises the role of school in learning life skills, and approaches education as a means of problem solving early on in pupils' lives. The curriculum at Nai Talim as Sykes explains it is experimental, moulded by the needs of the school and its immediate environment. In that sense, it is truly in response to the demands of their specific situation that the children learn. For example, they learn money management when the need arises, and farming techniques as they cultivate their own food. The model does not suggest how one might replicate it in an urban setting, nor does it talk in detail about scaling this model to a larger number of students—the reality in most government primary schools.

In *Education and the Significance of Life*,[6] J. Krishnamurthy dwells on the fear of discontent and spontaneity that sets in pupils hearts as they start worshipping success. He touches upon our common concern of being able to think, and deems it necessary to bring about right education. He calls for the understanding of self in order to deal with the fear of failure; it is only those who are flexible enough, free from set patterns of thought that truly succeed in living.

We have all learned most of what we know outside school. Pupils do most of their learning without, and often despite, their teachers. Most tragically, the majority of men are taught their lesson by schools, even though they never go to school.

→ *Ivan Illich, Deschooling Society*

Ivan Illich, in *Deschooling Society*,[7] expands on this theme, discussing how we mistake schooling for education and confuse learning to be a result of teaching. Education used to be seen as a lifelong affair, where the person learns from working through life. What he calls the 'bourgeois discovery of childhood' has put an end to that system,

replacing it with silos (schools) where learning is institutionalised and less human.

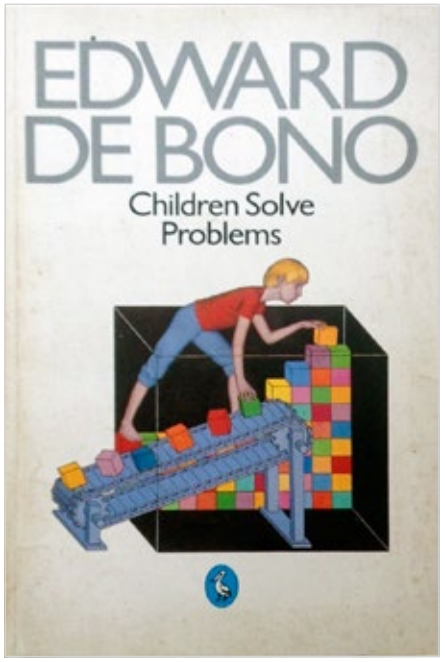
When computers entered rural schools, for instance, guess who held the mouse? Upper-caste boys. Technology wasn't an intrinsic leveller or a bulldozer to archaic structures: It just gave people new, improved tools to be lovely or horrible to each other in all the old ways.

→ *Anand Giridharadas, Taking a Tire Iron to Techie Triumphalism, NYT Book Review (2015)* [9] *of Kentaro Toyama's Geek Heresy*

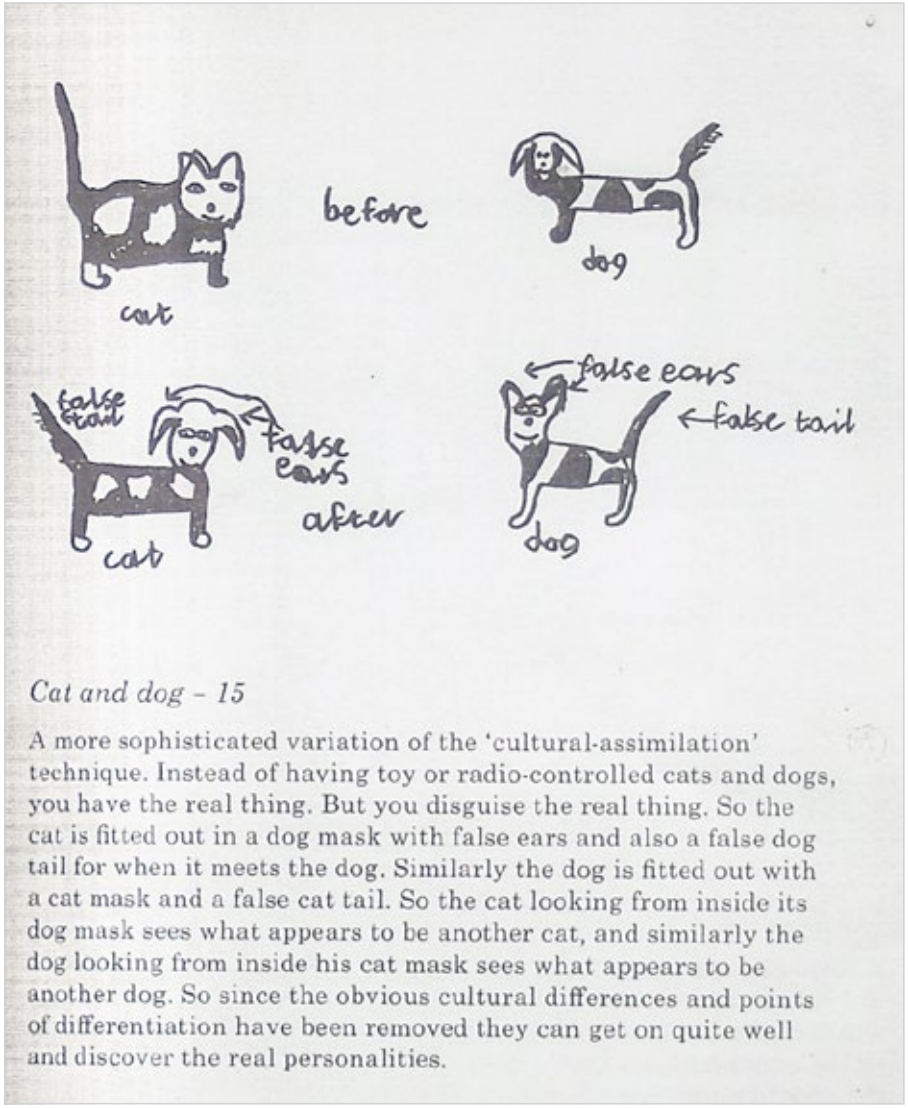
Most of us consider technology to be a great leveller of differences and a very effective medium for bringing in fresh perspectives for looking at existing problems. It turns out, a technology-led solution is not a silver bullet either. As Joyojeet Pal, et al. discuss[8] in a paper on Computer Aided Learning in Developing Regions, simply introducing technological interventions do not always produce the effects they promise in culturally complex environments. Such propositions need to take into account existing conceptual models at play, social customs, and in our case, the financial background of students.

Foveal Reading: Children Solve Problems

Edward De Bono's book, *Children Solve Problems*[10] has been of invaluable help in the construction of our exercises and activities for class. *Children Solve Problems* discuss the results from nine exercises in art De Bono ran as a design project for the educational journal 'Where.' In the introduction, he lauds children as creative, lateral thinkers. "They are genuinely more fluent with ideas," De bono says. He is concerned with how education deteriorates this thinking ability. The problems posed in the book follow different lines of thinking, from political thought to dealing with magnitude to moral judgements. The drawings show remarkable thinking ability, especially when coupled with written explanations. Looking at the way children solve problems, according to De Bono, is the best way to understanding how they think. He extrapolates this thought to discuss how children's thinking is different from how adults think.



↑
Edward De Bono, *Children Solve Problems*
Image from eBay user uniquestuff111



Cat and dog – 15

A more sophisticated variation of the 'cultural-assimilation' technique. Instead of having toy or radio-controlled cats and dogs, you have the real thing. But you disguise the real thing. So the cat is fitted out in a dog mask with false ears and also a false dog tail for when it meets the dog. Similarly the dog is fitted out with a cat mask and a false cat tail. So the cat looking from inside its dog mask sees what appears to be another cat, and similarly the dog looking from inside his cat mask sees what appears to be another dog. So since the obvious cultural differences and points of differentiation have been removed they can get on quite well and discover the real personalities.

Many people ask me why I seem to prefer drawings to words as a thinking medium for children. There are several reasons. Young children are not always very good at expressing their ideas in words and it would be a pity if their ideas were to be restricted by insisting they use words… With a drawing, the whole idea is visible all at once and you can work at it with addition, alteration, modification, change, etc… Finally, there is the fact that children from disadvantaged backgrounds are often handicapped when it comes to the use of words.

→ *Edward De Bono,*
Introduction to Children Solve Problems

The book is a must read for anyone working in the domain of children and creativity. One can spend hours just looking at the drawings in detail.

←
Making a cat and dog stop fighting, from *Children Solve Problems*.

Many of our artwork evaluation schemes are built on insights from the book. Some prompts in the book have served as templates for building our prompts. For example, the ‘stop a cat and dog fighting problem’ (see opposite page) is described as a political problem. The variety in responses can be measured by the variety of relationships children build, between the two animals, their trainers and objects around them. It is hard to come by a copy of the book these days; most of his oeuvre available on bookshelves having been taken over by the more prescriptive ‘Lateral Thinking’ series of books he wrote in his later years. Luckily, we had access to a disintegrating 1984 edition in our library.

All literature we discussed so far view education institutions in the form they operate today as not the ideal places for a person to mould herself into adulthood. Teachers have come to accept their roles as mere instructors rather than active practitioners of their crafts. Very few of the teachers we met have art practices outside of the classroom.

1.4 **Summing Up**

The recurring concern we encounter in texts discussed above is the inefficiency of schools as places for exploratory learning, where there is no fear of failure. There is also an emphasis on experiential learning, where classroom activities are closely related to the students’ immediate environment and community. Our research show that teachers acknowledge this disconnect, but are largely unable to counter it owing to resource constraints—there are very few repositories critically discussing local artists and their work, and the ones available are not easily accessible.

We argue that diversity in artwork is linked to children's ability to think on their own. While 'observe and reproduce' addresses mastery of skill and technique, continued emphasis on it diminishes children's independent thinking ability as they climb the education ladder.

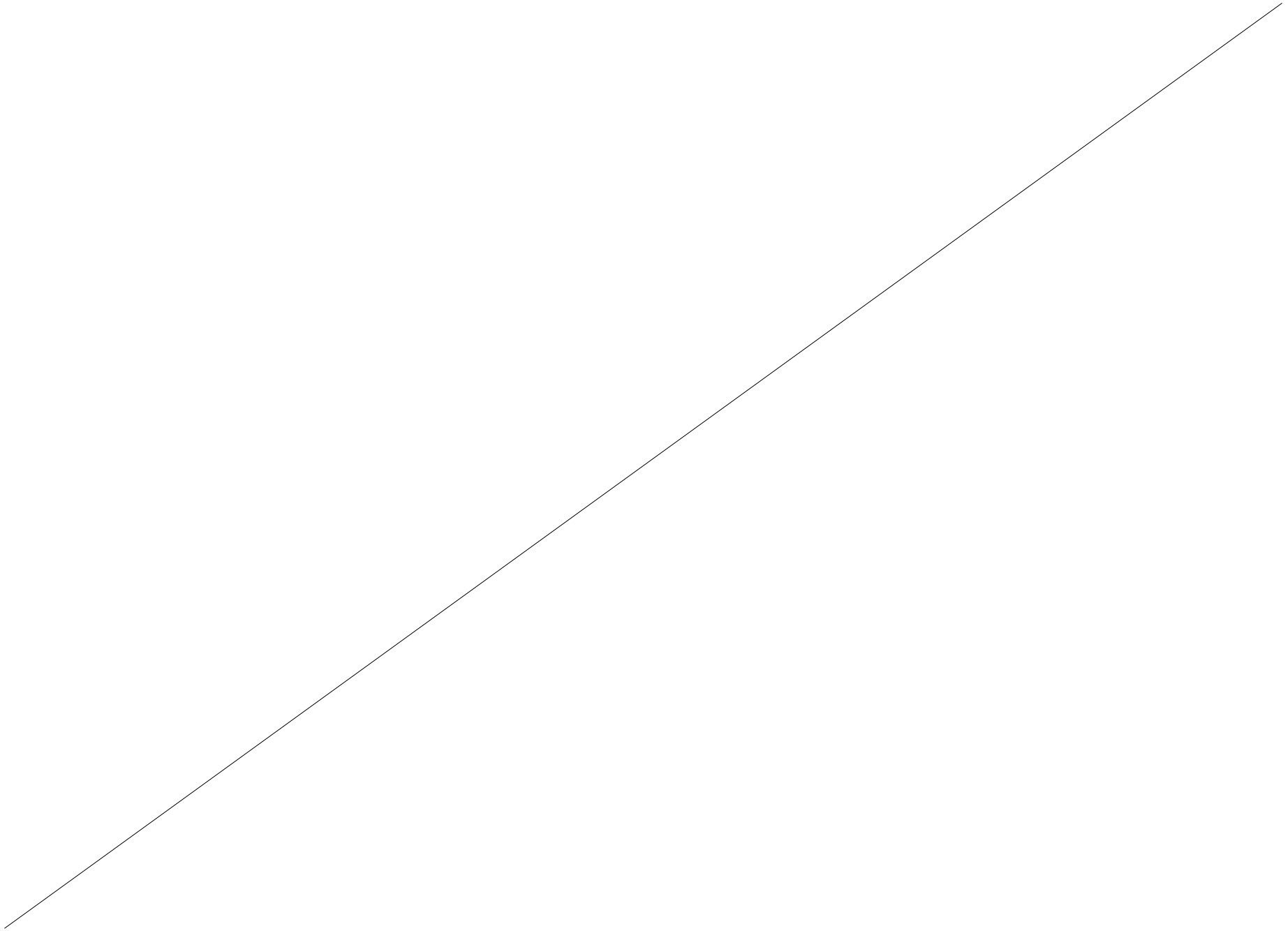
Our research and observations from the field point to the existing systems having failed the students and they end up being unable to produce original, diverse artwork in response to a given problem. We further theorise that it is the instruction methodology and the teachers' mindset that needs a change in direction to enable students to see every drawing as an opportunity to exercise their imagination. It is clear from teachers' comments on the infrastructure and resource-related problems they face that such a change ought to exert very little strain on established ways of teaching and evaluation.

A culture of 'observe and reproduce' and a fear of straying far from expected norms have reduced variety in the artwork children produce in classrooms. This lack of variety is an indicator of a lack of divergent thinking. There is a need to help teachers make art exercises more enjoyable and help children think freely and in as many different directions as they are capable of, without fear of failure. The evaluation criteria also needs to be rethought, based on the diversity goal. The discussion brings us to the design brief, discussed next.

2 Design Brief

The solution must address the
lack of diversity in students' artwork
such that it exerts very little strain
on established practices.

It must then positively affect the thinking
process of the students and teachers.



3 Areas of Intervention

3.1 Concerns

An artwork can be looked at—and evaluated—from different perspectives. For instance we can look at the concepts it embodies and the skill with which it is produced. These are not exhaustive lists of ways of looking at art, but is a convenient subset to limit the scope of our discussion to. We acknowledge that judging art is subjective and don't claim objectivity in the ways we use.

The question of whether it is appropriate to judge an artwork's merits based on skills (as opposed to concepts) was raised during initial stages of the project. The consensus seems to be that "skills are essential to be taught to beginners, concepts are equally important." The understanding that it is not an 'either/or' situation convinced us that within the scope of the project it was not possible to dwell on this choice of priorities. This led us to concentrate on the issue of monotony we observed in the artwork children produce. We looked at the factors influencing this absence of original, diverse approaches to see areas to focus on. The crippling workload on the teachers and the inescapable concern of economic viability were also taken into account before deciding a direction that made the least demands on them.

3.2 Possible Solutions and Directions

There are conventional and alternative ways of addressing the problem. Conventionally, teacher training course, handbooks and guides exist. They promise intense, unwavering focus on the topics they discuss, bringing together people of similar interests and invaluable experience together, advancing their trade. Most such interventions seem to have failed to make a difference. Alternatively, there are online forums, social

media platforms that enable discussion and sharing within teacher communities. We saw that these also have seemed to miss the diversity problem. Of the many ways to address the issue, we felt that an effective tool will have to operate in the classroom and offer the potential to expand to include existing communities.

3.3 Approaches

The research findings had suggested many avenues for design intervention, of which we first chose to concentrate on two project ideas. One was a forum for art teachers to form local, contextually relevant online communities. In these communities they can share their teaching techniques, their children's artwork and their use of ingenious craft materials and processes. The second was a web-based generative tool that helps teachers with prompts related to topics to teach for specific children.

The forum had the benefit of building on existing teaching communities, which were already organising events and meet-ups. These could become places to share topics, classroom activities and host discussions on relevant topics. We decided to not work on it for two reasons. One, the efficacy of the solution depended entirely on sustained teacher interest and a supply of new material on a weekly basis. Both were difficult to achieve within a P3 project time-frame. Furthermore, we felt that the project wasn't exciting enough to sustain our interest for the three months. There appeared to be very little novelty.

Why Prompts?

Acceptability of any such intervention would depend on respecting existing work-flows and known ways of conducting classes. We saw that childrens' enjoyment and extent of exploration of the boundaries depended the most on what they were asked to draw. The topics or the prompts that a teacher presented in class decided how the class responded to an exercise. We decided that a prompt-level intervention, without judgements on syllabi, teaching methods and evaluation criteria was ideal. Approaching the problem via prompts is also

validated by early studies[11] on divergent thinking, creativity and experiments with sketching as a thinking tool. Such an intervention also comes with its set of disadvantages. Beyond the ones generated by the tool, we expect the teachers to think for themselves and bring in local, cultural flavour. This teacher dependence is one of its weakest points. An excellent teacher can maximise the variety of outcome of a prompt through effective classroom activities, while another can limit explorations with prescriptions and references. We hope to overcome this when the teachers realise they can make their own schemes or modifying the existing ones. The web-tool nature puts it out of sight, unlike an application that is a visible presence on the mobile phone home-screens. Increasing the utility and variety of content within the tool is one way of addressing the problem. Absence of direct visual references is also likely to be a deviation from what is expected of a web-based tool. Image references tended to influence childrens' drawings and work against exploration. This observation informed our design decision to avoid such references. As we observed during our earlier research, textual prompts can, in contrast, help avoiding the 'observe and reproduce' trap easier. More than anything else, changing the prompts does not affect any other steps in the instruction process and does not upset the status quo of the classroom.

The prompt-generator, in contrast to the other approaches mentioned earlier, used many behaviour patterns gleaned from previous research findings, as well as established methods of generating unique ideas and themes to draw from. It also appeared to offer ample scope for approaching it as a lager system. Such a system could involve prompt generation, evaluating the prompts, collecting feedback from the teachers to improve off kilter prompts and making an accompanying evaluation rubric for classroom use. It even presented an opportunity to build an archive of students' work in response to the briefs. Such a gallery could serve as proof of the tool's effectiveness and motivate more teachers to try unorthodox methods of instruction. We see the 'solution as an ecosystem' approach to be a worthy area for intervention.

Please read our paper on page 73 in the Appendix

4 Goals

4.1 **Goals:** Overview

1: The students seemed to approach drawing assignments as tasks to be completed within strictly set parameters rather than fun opportunities to explore multiple solutions. The existing instruction structure had robbed art classes of some of their joy. Hence, our primary goals are to make art exercises fun again and help children think in divergent ways.

2: The art teachers are overworked according to their accounts, often deputed to non-teaching tasks and substituted for classes where designated teachers are on leave. We do not wish to burden them any further with a design intervention. So, our second goal is to make it easy for the art teacher to create drawing exercises in class with generated prompts. We base these prompts on the syllabus.

3: Along with the lack of diversity, there is also a dearth of local themes and objects depicted in the students' art. We attributed this partially to easy to find foreign references. To bring back local context, we want contents of the tool to be culturally relevant and rooted in the children's local context.

4: To help teachers cope with new prompts and the resulting variety of drawings, provide appropriate classroom activity and evaluation guidelines. This activity suggestion follows the 'do not overburden' goal.

Learning Goals

We are of the opinion that in our case, the art exercises are not meant to teach children specific things, but to affect the way they think. The learning goals implicit in observe and reproduce exercises—skill development and keeping a steady hand—apply here.

4.2 **Goals:** In Detail

The project proposes an intervention that makes art exercises fun, helping teachers engage the students' imagination and let them think divergently. The product we developed is a web-based tool that generates prompts for the teachers. The methods for generating prompts are based on earlier studies in creativity, lateral thinking and sketching and ideation exercises.

We realise that 'altering ways of thinking' is an ambitious goal for a technology product. It is not likely that a one-shot solution will bring about such a fundamental change. However, based on results from the pilot tests, we are optimistic that the tool will help teachers consider incorporating similar approaches in art education. Our goal is to tackle the conventions that keep teachers from experimenting with creative approaches breaking the monotony. In that sense, the design solution discussed is to be seen only as one instance of the many techniques and tools towards a fundamental change in thinking—teachers' and students' alike.

5 Overview of Existing Tools

5.1 A culture of out-of-classroom learning has flourished in response to the shortcomings in the existing schooling system (these we discuss in detail in our earlier research, appended). Private tutors, self administered online and offline courses and tool-kits for art and drawing are gaining a growing, steady audience. Many static prompt collections exist for use in drawing exercises. This section discusses such collections, some generative tools and the lessons learnt from them.

5.1.1 Art of Ed '100 Drawing Prompts'

The Art of Ed website[12] offers 'the 100 Drawing Prompts' for download. It is a list of prompts presented in categories. The collection of prompts is categorised into sections of objects, skills, themes, animals, etc. There is an intent to point towards out of the box thinking and originality.

The categorisation improves efficiency in picking prompts in specific contexts. A couple of the prompts are vague. For example, 'Draw two self-portraits with odd expressions.' Some are enough to confuse the user into being unable to start drawing. Many others are likely to produce interesting results. A good example is to "Draw the oldest thing in your refrigerator." One of the list's sections is titled "Creativity/ Originality." It also includes, unfortunately, a prompt that reads "Draw yourself as an original superhero." Many similar prompts feature words such as magic, mystery, imagined, and more classifiers detaching the subject from everyday. They end up being too abstract to be helpful qualifiers. They are less effective in their dependence on words like 'original,' too abstract to be used as helpful pointers. The Art of Ed tool thus suggests directions for our tool to be designed, and categories to build on.

On a similar note, during our initial conversation before we set out on our research, Prof. Athavankar mentioned the use of things that do not have direct visual references in prompts. We talked about the increased possibility of getting original responses to a prompt that the student has never experienced in totality before. In such prompts, as in the better 'Art of Ed' prompts, the components are known while the situation they are in is new. A house in zero gravity for example.

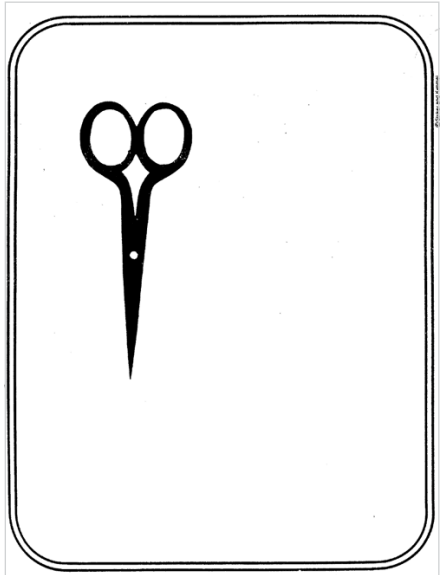
←
A page showing one of the categories in the *Art of Ed*'s downloadable list of prompts

» theartofed.com

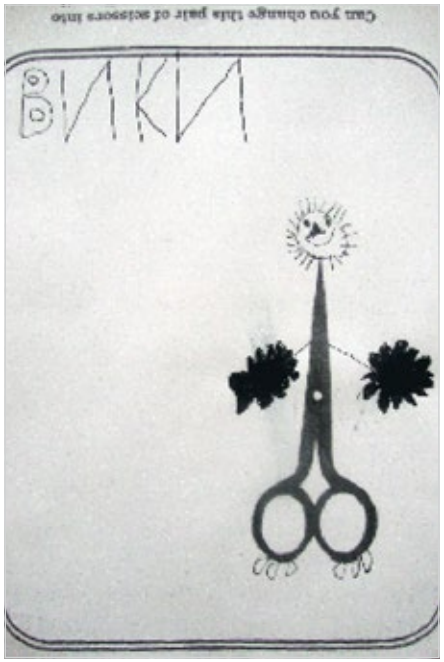
5.1.2 Anti-Coloring Books

Susan Striker's Anti-Coloring Books[13] are a good example of how instructions along with drawing prompts work well in eliminating obvious or uninspired ideas. These are typically sentence based prompts, a small line drawn in a designated space, or an object, that the student has to incorporate into an artwork by drawing around.

In a recent prompt to draw on 'what are you thankful on this thanksgiving' she comments how one should avoid drawing a turkey along one's palm outlined on paper. The hand-turkey is apparently a common bird in their (US) context. She goes on to suggest that it has nothing to do with being thankful. Ideally the suggestion eliminates clichés and forces children to try drawing on alternative, original ideas. We could also see the Anti-drawing Book's appeal to a child starting out to draw. The use of 'anti-drawing' brand language makes it desirable and helps get rid of inhibitions and fear of failure. Several testimonies on the website as well as independent reviews elsewhere make note of their narrative of rebellion. Since we are wired to see being rebellious as being more creative or nonconforming, the use of such cues can be a good strategy to emulate—in a different project.



Can you change this pair of scissors into something completely different? Turn the paper any way you want to.



←
A prompt (far left) and students' responses uploaded to the Anti-Coloring Books website.

» susanstriker.com

5.1.3 TypeCooker

Typecooker[14] is a web-based tool that generates sets of specifications as prompts for drawing letters. Using the tool, one selects the difficulty level from ‘Easy’ to ‘Pro,’ and the tool auto-generates qualities of the set of glyphs one is to draw. A sample prompt is below.

On clicking each part of the prompt, a detailed explanation of what the tool means by it, is displayed. For instance, “Contrast Amount: no contrast at all” expands to say “Thick equals thin. There is no contrast, even when you really need it.”

The tool is targeted to a very specific audience of type-designers and students proficient in the jargon that goes with their profession. The art-teachers also share their professional jargon and indigenous words for concepts. In addition, TypeCooker presents a good workaround to complicated sentence construction, in the way these prompts throw up an intelligible set of sentences. The generative part of their algorithm works well in making a cohesive whole out of the mixed bag of prompts.

→

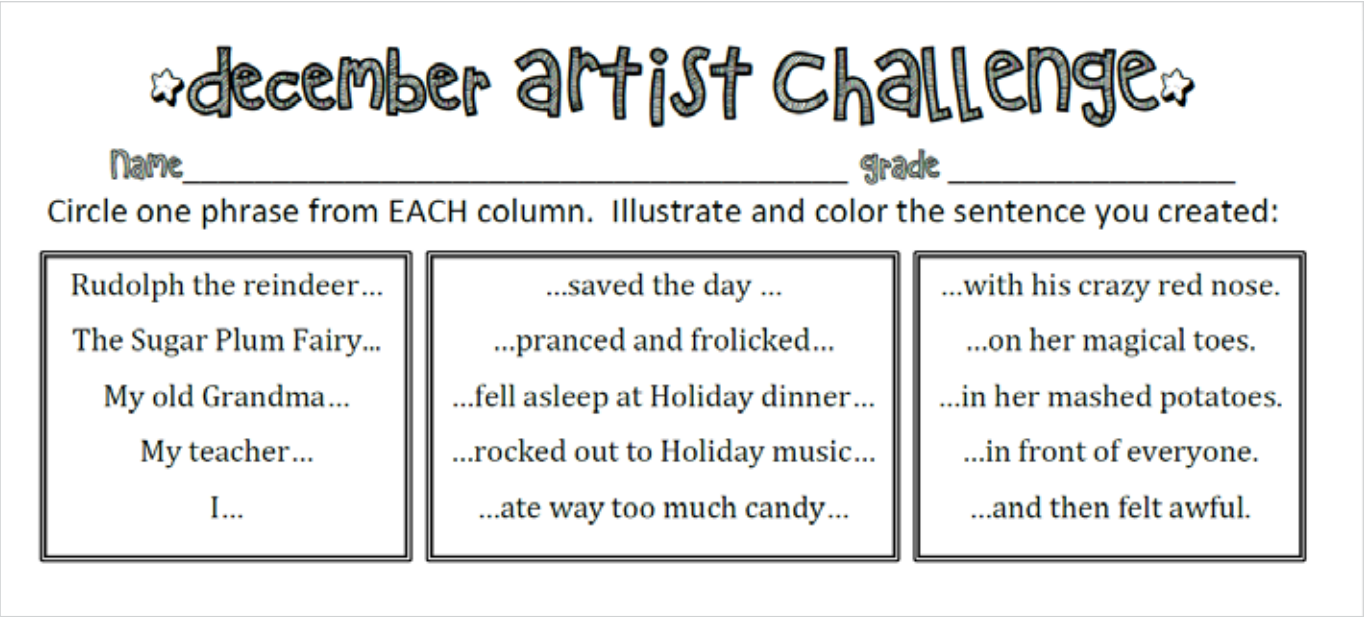
A ‘pro’ level prompt from TypeCooker. To the right is the “special” character explained.

» typecooker.com

5.1.4 Creative Curriculum

The Creative Curriculum blog[15] available at *scholtenart.wordpress.com* hints at an in-between solution. One picks parts of a sentence from three columns, and considers the resulting sentence as a prompt.

There are limits to how much grammatical sense these combinations make, underlining the superiority of the Typecooker model. As prompts, the resulting sentences are, by design, not instructive. They are statements one has to build potential artwork-briefs from. From the examples, one sees that it is hard to make complete, generatively constructed sentences work without an explanation.



december artist challenge

Name _____ Grade _____

Circle one phrase from EACH column. Illustrate and color the sentence you created:

Rudolph the reindeer…	…saved the day …	…with his crazy red nose.
The Sugar Plum Fairy…	…pranced and frolicked…	…on her magical toes.
My old Grandma…	…fell asleep at Holiday dinner…	…in her mashed potatoes.
My teacher…	…rocked out to Holiday music…	…in front of everyone.
I…	…ate way too much candy…	…and then felt awful.

←
The Creative Curriculum prompt generator PDF. Prompts are created by picking one entry from each of the columns

» *scholtenart.wordpress.com*

5.1.5 The Slogan Cube

A physical manifestation of generative sentences is the brand tag line generator Rubik's cube called the Slogan Cube[16] from Nick Asbury. Intended as a joke on the unintelligible tag lines big brands have recently turned to, the cube offers a good application of the generative combinations idea, taken off the screen. The Rubik's Cube allows for 43 quintillion ($43*10^{18}$) combinations, of which at least a million could be used well as tag lines or prompts.

The object exudes playfulness in the way the original (Rubik's Cube) does, and appropriately communicates the sense of ennui directed to corporate-speak. The marriage two concepts—the Rubik's Cube and the tag-lines—feels appropriately playful. If our project were better manifest as a non-digital tool, physicality of the cube would have been a good example to follow.

→

Asbury and Asbury's Slogan Cube a physical instance of a random word combination generator.

» asburyandasbury.com

5.2 Insights from Secondary Research (Of Existing Prompt Tools)

Existing prompt collections and tools offer a comprehensive list of features and strategies to emulate and avoid. Categorisation seems to make deliberate selection of prompts effective. An ability to alter parts of the prompt appears to offer mixed results. Too much customisation limits the surprise element offered by generating the topics in the first place, while it lets an advanced user modify a prompt to make it work better. Presenting the prompt in independent parts seem to work better with translations and addressing the issue of starting trouble. Some of the examples highlight the importance of help text, making the tool more effective and easier to use while interacting. An analysis of the examples discussed above helped distil features to be incorporated in our tool. The features are listed with short descriptions in the following section.

Serendipity via Randomisation

The advantages of serendipitous pairing is seen in TypeCooker. To get out of a thinking rut and suggest a potentially exciting beginning is not a simple task. TypeCooker takes on this task well, knowing its audience and using language that makes even the most menacing of prompts sound quirky and worth a try. The pitfall is that it throws up completely off-kilter combinations that would baffle a considerable share of users. The quick refresh model where each new click on the difficulty level regenerates a new combination, takes care of this to an extent. But the previous combination is lost in the refresh process. We could argue for an individual refresh of portions of the prompt, but such fine grained control could also take away from the freshness of a randomly generated set.

6 Feature Wish-list

Based on the insights discussed before, we came up with a list of features to be incorporated into the tool. We describe them below.

Teachers should have the option to choose levels of difficulty, topics and techniques.

The syllabus suggests specific techniques and concepts appropriate for different classes. The tool respects this decision and lets teachers determine the kinds of prompts based on single selection criteria such as “Which class are you teaching?” The framework has to be intelligent enough to decide the work-flow and eventual prompt based on this single teacher input.

Chances to refresh (reconsider) specific parts

One annoyance with TypeCooker was that the generated prompt was entirely rewritten on each refresh. There was no tweaking of parts of the prompt. The advantage was that the prompts were entirely unpredictable and thus likely to be more effective. The decision of how much fine-grained control to place in the teachers’ hand is crucial. Some control is ideal, while overdoing that in the name of feature-richness will work against the basic principles the tool is built on.

The option to add specific words and concepts

Teachers are good judges of local flavour and it is in everyone’s best interest to let them participate in making the prompts more relevant to the students, and culturally much richer, by adding specific words and concepts to the generated prompt. We hope that children will be able to connect to the prompts better if there is a connection to their locality and day-to-day life.

An evaluation guide

The evaluation rubric ought to be generated with reference to contents of each prompt. This is to be as specific as possible. A generic instruction would be to grade based on ‘understanding’ or ‘creativity’—themselves terms difficult to define objectively. A specific suggestion will ask teachers to consider formal qualities, whether the child has managed to identify and represent features that make an object unique. The wording is important, as it will decide whether the teachers accept the suggestions.

An ability to upload and share student work

The option to upload and share student work for the art teacher community will contribute to the tool being a more holistic system rather than an isolated, quick fix. Sharing finished examples as visual references, necessitates ample separation between the prompt-setting space and gallery-space so as to not influence artwork or evaluation decisions.

Visual, audio cues for the users to explore

Using the potential of internet, one can also include visual and audio cues for the teachers to explore as they encounter a certain word or phrase and gets stuck. For example, an unfamiliar phenomenon can be explored in detail with a video link next to the suggested word. This is an ideal use for the ‘distractions’ available on the internet. The downside here is that providing visual references pose the threat of influencing drawing outcome. The hypothesis that all external visual referencing is bad for thinking differently is worth investigating. Weighing the merits of such a claim is part of the tool’s evaluation.

Proficiency Versus Growth

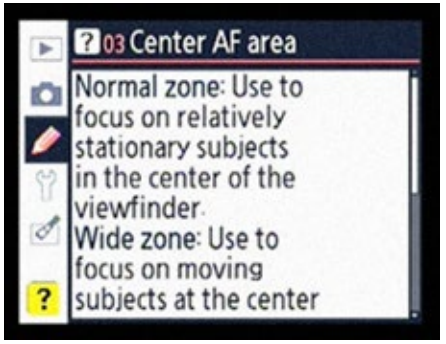
There is no consensus[17] on whether it is proficiency or progress that must be evaluated. We are undecided on how much burden either approach poses to the teacher, adding to an already strained schedule of deputed periods and non-teaching tasks. Either way, the evaluation rubric is to be made as specific and binding as possible, while allowing teachers flexibility in terms of setting their own standards. The evaluation guidelines are to be presented as suggestions, not rules.

Suggestions to avoid trite ideas (classroom activity and pointers)

The tool has to present suggestions to avoid trite ideas, similar to the one discussed in the turkey example from Susan Striker. The function can be incorporated in at-least two ways. One is a page where the system generates a generic instruction list of ideas to avoid. The second is incorporating a classroom activity where one round of quick ideas are turned into a list of things to avoid. The activity is to make the kids draw more unique, personal solutions. The Art of Ed uses a basic exercise sheet that lists these trite ideas and their alternates to be suggested by the student. This bad-idea-avoidance-matrix appears to work well. A digital translation may involve either pre-set lists of things to avoid with each object suggested, or ready-made, generic, instructions for a classroom activity.

Explain each component of the prompt on request

The explanation-on-request is a feature we kept going back to on TypeCooker. It was confidence inducing and fun. A parallel is the implementation of help on technical terms in digital cameras. Each menu item is explained on request, and we have found ourselves using the feature even after many years of everyday use of the camera to cross check whether a specific function meant what we thought it did. The TypeCooker example also suggests that the tone-of-voice plays a very important role in the usability of explanation. The TypeCooker version is fun and features inside jokes.



An in-camera help screen. The question mark is mapped to a button on the camera. Image from *www.dcresource.com*

7 Design Approach

Based on the analysis, our list of features to add and the design brief, we considered various ways of presenting the prompt generator. We also considered a physical, activity based manifestation. In this section, we discuss our decision to make it a web-based tool—its merits and demerits.

7.1 Why Web?

Existing Infrastructure

Most schools we visited during our research had no computers in regular classrooms. The available computers were kept in designated ‘smart-classrooms.’ In spite of technology provided by the schools being hard to get access to, teachers mentioned YouTube and image search as tools they use to find references and paintings from all over the world. Some had laptops they used to run their practices outside school, while others used computers in the school to do desktop publishing work for events and announcements. All teachers carried smart phones capable of accessing internet. They were familiar with many applications and were avid sharers of media online. These existing devices are an appropriate mode of delivery for technology-led solutions.

Compatibility

A responsive website eliminates most barriers to entry—of searching for and then installing specific applications. It does not require specific software and hardware versions for compatibility like many applications. We also appreciate the scope for continuous upgrades that a server-based solution offers. In this case, the tool as a lightweight website that does not strain paid internet makes sense.

Acceptance

There is one added advantage of acceptability; presented as yet another tool at their disposal, we argue that the product is less threatening as a digital intervention. For the older, experienced teachers who may be averse to using technology in an unfamiliar form, a web based tool accessed from the comfort of their own devices is easier to adapt to.

Moreover, we introduce the prompt generator as a mere tool, like a sharpener or an eraser, and not as a technology intervention. Allaying the fear of technology is a big part of getting people to try new technology, even when it doesn't directly threaten their job security in any way. What we *call the tool* defines it better than what it *is*. That is, introducing it as an aid, rather than an end in itself.

7.2 What Subjects to Include in the Prototype?

Referencing the existing syllabus and its suggestions on topics appropriate to each class, the three topics we choose to work with are technique, observation and creative thinking. The tool deals with memory drawing (observation), geometric shapes (technique) and illustration (creative thinking). This selection is based on our own familiarity with these subjects. We chose these so that we do justice to the content the tool starts out with.

7.3 Concepts

Divergent Thinking and Problem-solving Approach to Art and Drawing

It is necessary to make a case for diversity in drawing output before we decide to concentrate on generative prompts as a positive intervention in art education. We argue that a generation of children raised to consider alternatives and uncommon solutions to problems will be more tolerant and adaptive with better chances of survival in a resource-constrained world. The basis of looking at art as problem-solving is in treating it as a real-life tool. This idea of 'practicality of art' found resonance with most teachers interviewed during our previous research.

'Problem Solving'

Teachers find it easy to judge answers that follow a specified norm. The popularity of standardised tests is a case in point. They encourage students to follow set rules towards a uniform goal. This works out to

be efficient in an overpopulated classroom where individual attention is often a luxury. Such a constrained way of solving problems inhibits a child's thinking for herself once she starts making her own decisions outside of the classroom. However, introducing art as a tool to solve problems is not an easy task. Edward De Bono[10] calls problem-solving 'dealing with a situation,' and 'overcoming an obstacle,' to distance itself from connotations as a predominantly adult activity. 'Problem-solving' conjures images of long tables, sticky notes and whiteboard markers, while 'dealing with a situation' is something everyone can relate to.

We quote De Bono verbatim when we say 'dealing with a situation,' etc.

The Idea of Problem Solving as Presented in the Tool

Some of the prompt schemes explore the problem-solving facet, while the others are word associations which warrant newer ways of looking at familiar things and qualities.

Building on the list of goals, subjects to teach and features to be incorporated, we made a single page prototype to evaluate the word combinations and use them in some exercises.

The Value of Divergent Thinking

It is often discussed[20] how convergent thinking (focussing on one 'correct' answer) serves as a platform to sprout divergent ideas (looking at multiple possible answers) from. It is also accepted[21] that divergent thinking fosters new ways of looking at solutions and accrues benefits to progress. We decided to approach diversity in drawing acknowledging this larger goal.

8 Prototypes and Product

The approach was to prototype and test the prompt generation schemes and the tool in parallel. We followed an iterative design process. The design began with a bare-bones prototype and moved on to higher fidelity ones incorporating feedback and insights from the evaluation.

8.1 Prototyping

Generating Prompts: Strategies and Schemes

Initial Attempt: Our first attempt was based on random association. This was a relatively simple approach where we combined attributes and objects to form prompts. This produced results that weren't very effective in getting children to think through varied possibilities.

Examples: funny car, big house, orange vehicle, heavy fruit, etc.

The Second Attempt: Having seen that the earlier approach was ineffective, trying to come up with a fresh new scheme for generating prompts based on random associations, we decided to reverse engineer these from plausible prompts. The prompts were gathered from the list of resources consulted during ideation and sentences suggested by Prof. Athavankar and Prof. Girish. As we read through some of them and attempted drawing them on our own, we realised that conceptual precedents and existence of visual references cut down tremendously on our ability to draw something that may be considered new or original. Prompts that could be called 'successful' offered no such ready-references.

The three schemes reverse-engineered from successful prompts are:

1. Random Word Combinations
2. Situations (What if?, How to?)

3. Lines from a Story

Examples: dangerous fruit, fish house, whale transport, etc.

Random word combinations used as prompts seem to work better for younger children. The prompts are sets of objects and qualities, where the relationships are (almost always) non-obvious. For example, 'unsuccessful bird' is something that demands a fair amount of thinking up a back-story before one could get into drawing the characteristics that makes a bird (any bird) unsuccessful. Was it something to do with a competition, getting food in the morning, did the bird wake up too late to catch the worm, or did the bird simply fail to take off? How the bird and its lack of success is depicted then becomes the second layer using divergent thinking. As a scheme to be deployed across languages, the word-combination scheme required less effort in translation since the words could be separately translated, and since they are not complete sentences, they are free from complications of grammar and syntax.

Examples: kitchen on the moon, how to make the fruit bigger, etc.

Situations-based prompts are based on an idea Prof. Athavankar shared. The first of his prompt suggestions was "What would a kitchen on the moon look like?'' The prompt presented a familiar setup (kitchen) in an unfamiliar context, forcing children to rethink forms, properties and what it means to cook in zero gravity. Prof. Girish suggested the prompt 'how to make the fruit bigger.' Like the space-kitchen, this presented a familiar object in an unfamiliar situation. It is not everyday that someone or something makes a fruit bigger. In getting it to work as a combination exercise, we divided the prompt into question, object and situation. The combination is further abstracted into 'How or Where to,' 'What' and 'Object.' At times, this doesn't work as a pure one-frame-drawing-only exercise, as description of such situations involve captions and diagrammatic representation. We find those drawings with

descriptions and captions to be more interesting than simple drawings, in that there is a deeper involvement with the subject as well as a more detailed thinking about the parts. In addition, the focus shifts from the objects themselves to 'situating' these objects. We see that children come up with unique and interesting drawings in response to situation based prompts.

The third is the most straightforward scheme, with potential to infuse results with local context. This is a scheme we haven't tested at all, and hence, is explained with the least wordage. By taking a situation, an expression or the most interesting portions from existing literature one expects a response that is unique in its imagination of characters and locales. For example, loosely translated from the Malayalam novel 'When it blossoms in Akkaldama'[17] by MT Vasudevan Nair, a sentence reads, "Flowers are in full bloom, in Akkaldama. Red, yellow and white. Beautiful." Given this sentence, there is the possibility of imagining the place to be anything, anywhere, with all kinds of unapologetic geography. The interpretation of the kind of flowers is entirely up-to the child's imagination. The colours work as good places to start from. The listing exercise, discussed later, helps make sense of this wide range of possibilities.

Example: "Flowers are in full bloom, in Akkaldama. Red, yellow and white. Beautiful."

8.2 Randomising on Paper Versus Randomising on a Computer

Initially, after listing down potential combinations of words, we would write down quasi-random combinations of words by picking one from each column. This proved to work for a while, generating prompts that could be understood without too much trouble. We realise that predictability is one quality that wouldn't work in favour of divergent thinking. However, once the lists were fed to a simple JavaScript

randomiser, the results got weirder with each refresh. There ought to be more rigour in selecting words and phrases so they fit better in all kinds of combinations and make sense. We then weighed each new entry against possible combinations before settling in putting them down as suitable candidates. It is ironic that the process turned out to be much more limiting—as in, concerned with staying within boundaries—while the art exercise is aimed towards maximising diversity, out of the norms thinking. We spent time rule-building for the prompt generation schemes to help children break free from rules. The means to the end were thus at odds with the ends.

Why These Schemes?

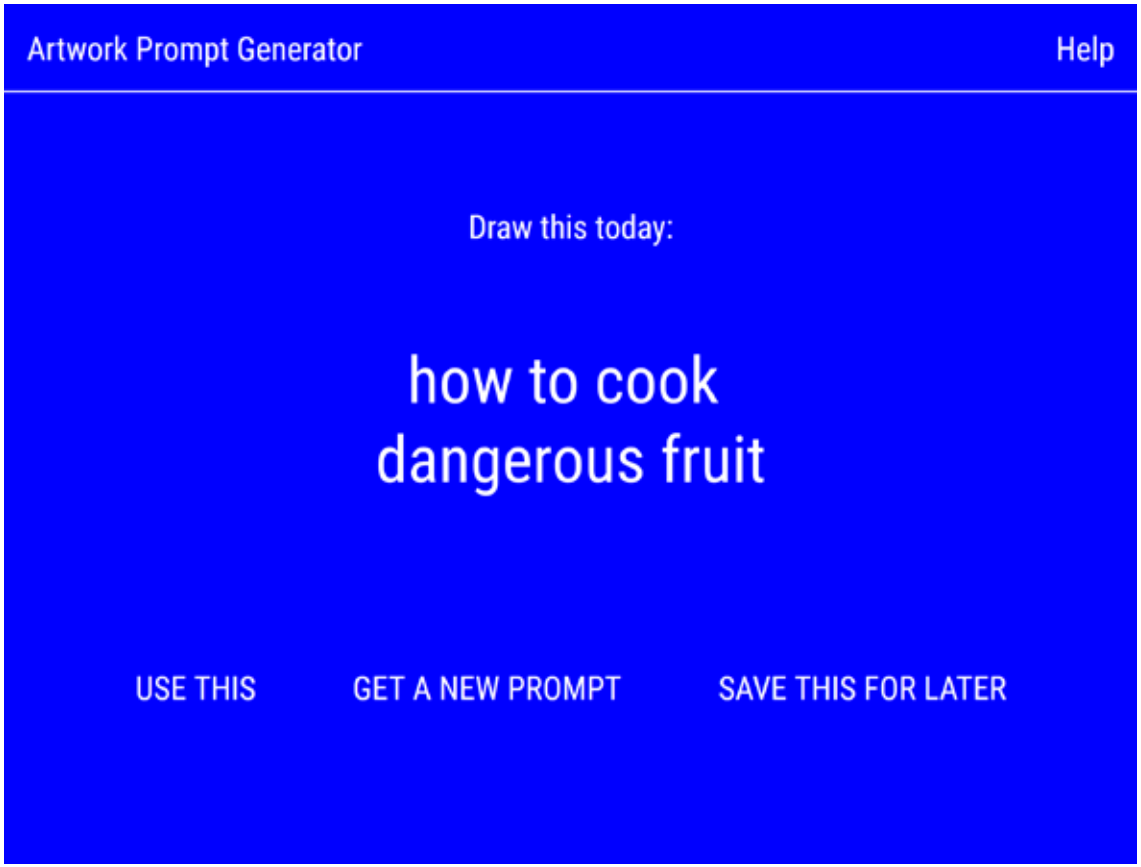
The 'familiar object, unfamiliar situation' prompts are loosely based on constructivist principles of building on acquire knowledge. Children use their existing knowledge (of the parts of the prompt) to build drawings considering the prompt as a whole greater than its parts. Reverse engineering the schemes from successful prompts has helped us make sure they work most of the time.

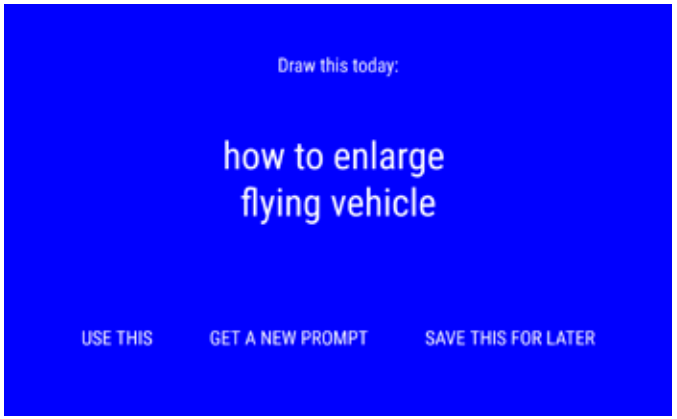
The new prompts from our tool attempt to build on top of the 'observe and reproduce' model. These do not take away what we consider important learnings from reproducing artwork—hand-eye-coordination, drawing skills and for the teachers, ease of feedback and evaluation. It is impossible to do this evaluation the way it has always been done, so we include guidelines for judging and feedback mentioning specific things like formal and reasoning diversity to focus on.

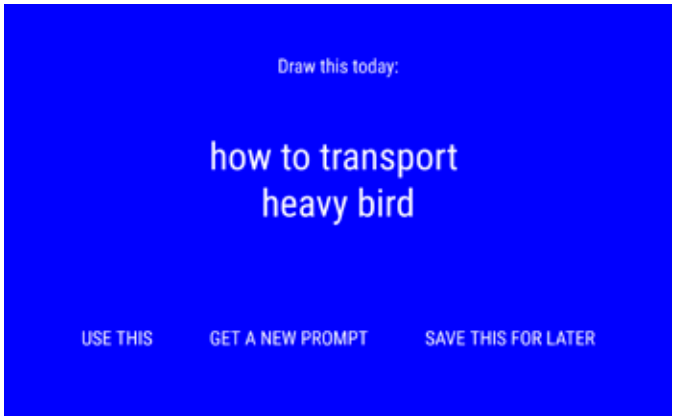
While the problem-solving approach bases the exercise on constructivism, we accept that in itself, this approach to making generation schemes does not have the best of theoretical groundings.

8.3 The First Working Prototype

The first working prototype is a web page with a single ‘regenerate prompt’ button. We used this to test the entries we fed into the script and populate a list of prompts for pilot-test.







9 Testing Prompts

9.1 We took the prompts generated by the first working prototype to schools and tested their appropriateness and efficacy. We discuss the results below.

9.1.1 Pilot

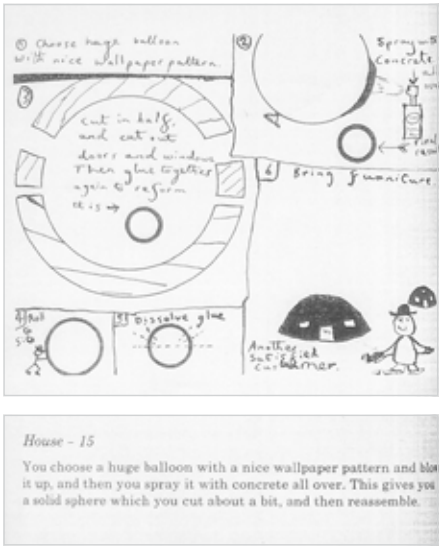
The prompt ‘Bird, Moon, Red’ was given to a mixed group of B.Des. and M.Des. students at IDC. We introduced the topic, and told them the nature of the exercise was “anything goes” as long as the drawing was completed in 20 minutes. 20 minutes is the amount of time available in a real life classroom after introduction and discussions. We were receptive of confusion and the nature of questions they had. We also noted the time it took before each of them started drawing, as an indicator of how easy or difficult the prompt was. Most questions were regarding the use of material and the amount of detail that they were expected to put in. We kept these options open, so as to see how restrictive the instructions needed to be in a classroom. Assumption being, when not considering the exercise a skill-based one, it is okay to leave the technique up-to the students. Previous research had suggested that any insistence on drawing material has to be one based on economics, rather than appropriateness.

The results were generally lacking in diversity—around 40% were very different from each other—in terms of subjects and composition, while the connections made were far more diverse. The choice of the bird seemed to be different for most participants; an owl for its relationship with the moonlit night, a parrot for its red beak, a dove for the colour red’s connotations with war, etc. Many participants chose to depict the three as separate, ‘logical’ things. There was no bird-shaped moon, or a moon shaped differently (not a sphere), or a bird with craters. The bird drawing fell in line with the ‘default’ image of a bird, not a peacock or a penguin or an ostrich or a chicken. The ones that stood out were from participants trained in design. We realised that untrained school children couldn’t have done any better, if they were to draw on the same brief.

Images from the first prompt testing exercise. The prompt was 'bird, moon and red.' ↑

9.1.2 With Junior B.Des. Students

Giving the prompt ‘Dangerous, Fruit’ to the Jr. B.Des. students produced some interesting discussions around what was allowed, many wanting to try comic strips, diagrams, textual explanations and “messages so subtle, one wouldn’t ‘see’ it in the page.”



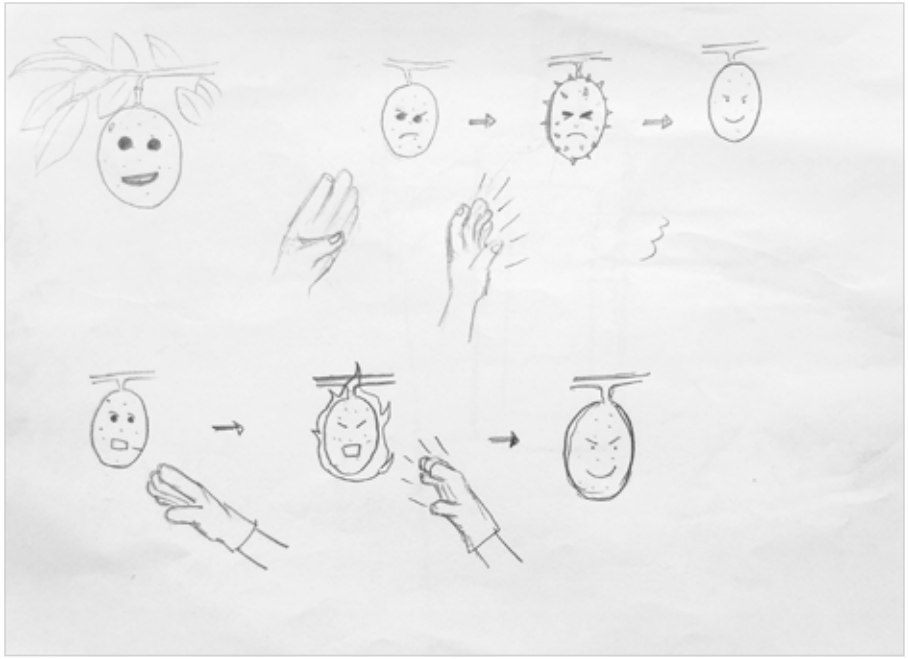
↑
An answer to the ‘build a house, faster’ problem explained in steps. Things and actions often become apparent only after reading the text.

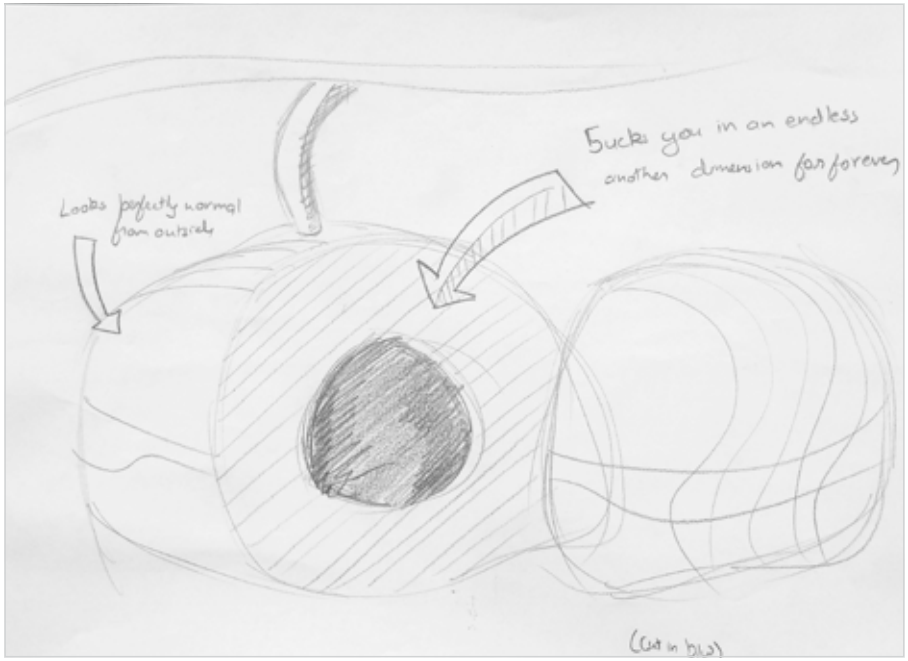
The Edward De Bono book illustrates how powerful the explanations-and-diagrams method is, as an aid to divergent thinking. The children draw complex relationships, simply presented, and explain the details in text. The viewing of the constructed image is an experience quite like looking at a piece of ‘advanced’ art, something that is explicitly laden with meanings. Like something out of an Alan Moore-David Lloyd [18] comic.

The most discouraging aspect of the drawings was that many fruits resembled each other. Despite a variety of fruits in our neighbourhoods and in the markets, we could count a lot of apples and not much else. The experience suggested that a listing exercise is a powerful tool in classroom instruction. Most artwork depicted normal fruits with comic representations of vampire-like teeth and spiky exteriors that made them ‘look’ dangerous. Interesting among them was a fruit concealing a black-hole, one that could ‘suck people inside,’ and another fruit so poisonous that it made its consumer speak evil things. These weren’t dangerous in the visual, usual sense, but attempts at exploring what it meant to be dangerous. We believe the classroom activity focussed on fundamental meanings of each word made the prompt work better.

Detail of a page from *V for Vendetta*. The composition and text reveal layered meanings after multiple readings ↑

→ *Alan Moore and David Lloyd, V for Vendetta (1988–89)*





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The B.Des. students' responses to 'dangerous fruit' make use of the diagram approach.

One employs a transformation and another a transplantation to make the fruit dangerous.

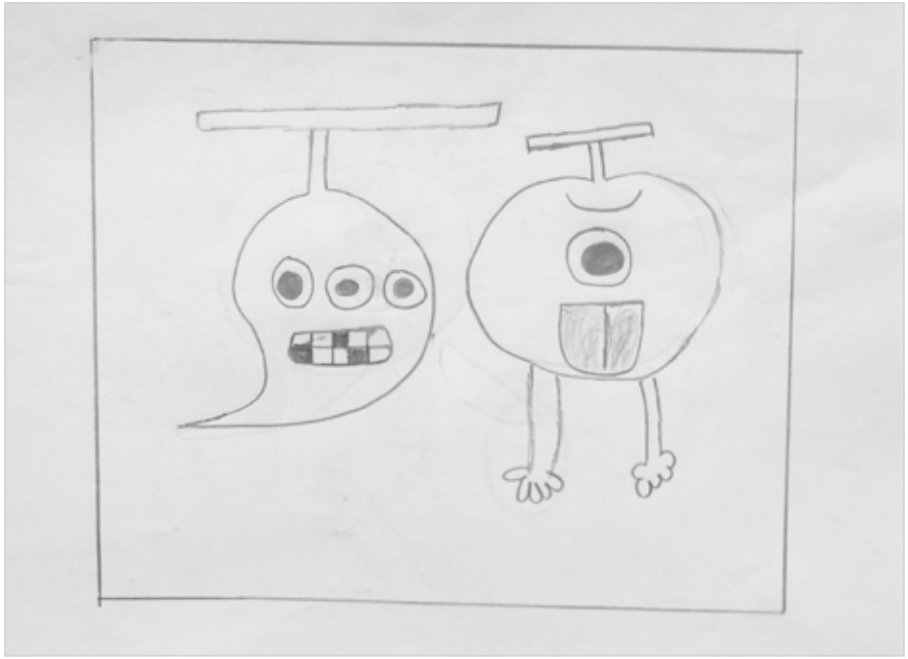
To the left, it is a black hole inside the fruit, capable of 'sucking you in' to 'an endless dimension.'

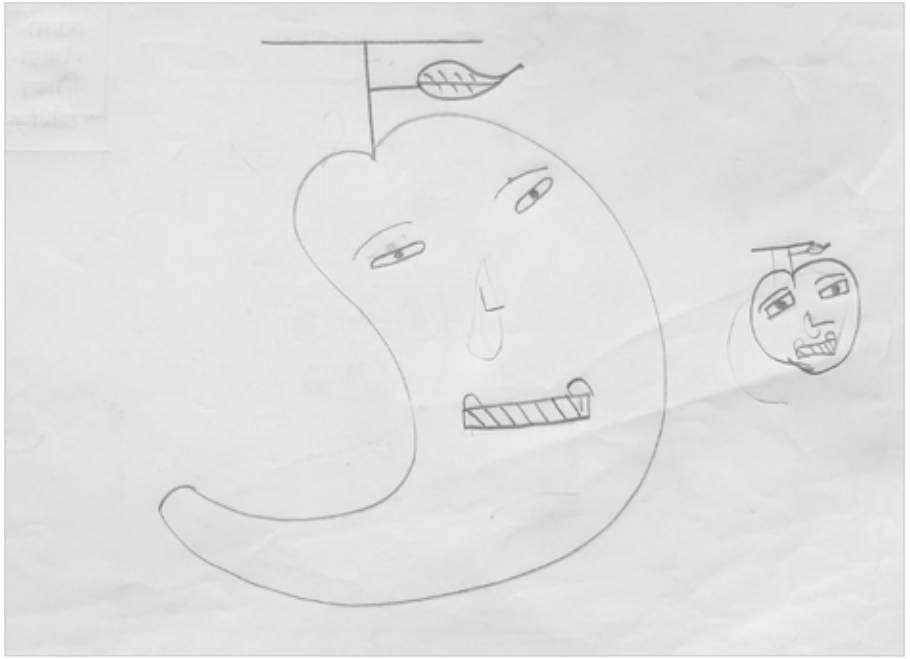
9.1.3 With Students of Class 6, Shri Saraswati Vidya Mandir, Bhandup

The dangerous fruit theme was given again as the prompt. Since the first two exercises highlighted the need for a listing exercise in the classroom, this time, before children sat down to draw, the class listed names of fruits they were familiar with. We followed this up by asking them to explicitly choose from the list and choose different things. The teacher, however, suggested the students draw faces on the fruits, undermining the purpose of the exercise. We tried to do some damage control mentioning that it doesn't take protruding teeth and eyebrows for a fruit to be considered dangerous.

The results were mixed. There was good variety in the fruits chosen with bananas and mangos and a stray kiwi making appearances. There was some interesting variety in the ways a fruit was deemed dangerous. Some had the typical teeth, thick eyebrows combination, while some others took to damage done to the fruits as a sign of danger. Some fruits were also dangerous to other fruits and not necessarily to humans.

The diversity in fruits was a result of the listing exercise followed by intermittent reassurance that there were no absolute rights and wrongs when it came to drawing output. We hadn't done a weeding out exercise which could've ensured even lesser number of apples and oranges in the results. We also failed to effectively counter the evil-face suggestion the teacher gave.





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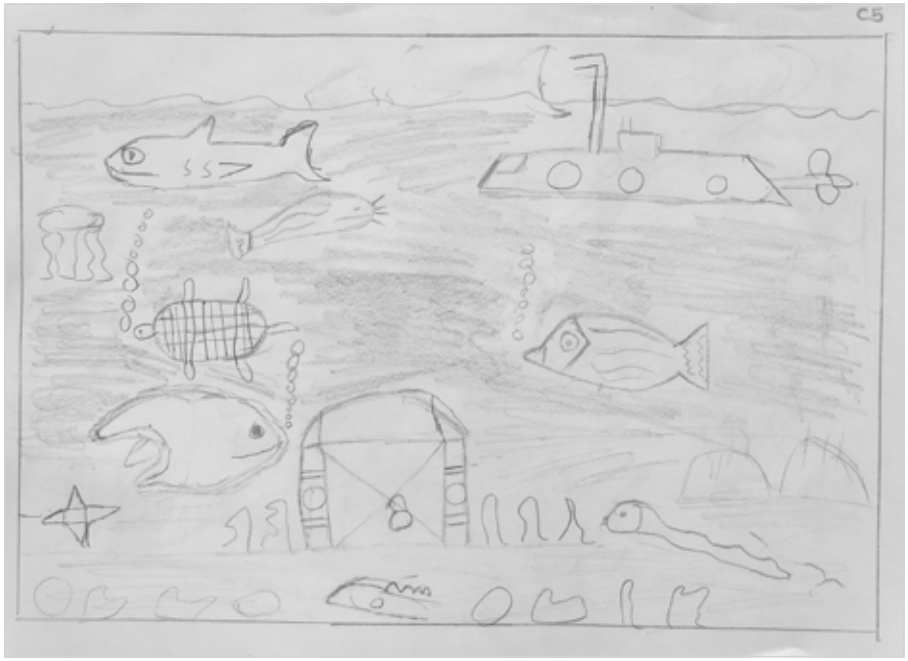
The teacher at Saraswati Vidya Mandir suggested his students draw evil faces on fruits, likely jeopardising our test. The children however came up with a variety of fruits in response.

9.1.4 **With Students of Class 7, Parag Vidyalaya**

The class of 50 were asked to draw “house of fish,” (taking off from “kitchen in the moon”). We listed potential building materials, kinds of fish and kinds of features houses possess, and what happens when these features are built underwater. While the children did not ask questions and started with drawing almost immediately, we could observe confusion where they couldn’t draw the ‘house’ part of the prompt, sticking to drawing only the fish. We had to repeat the discussion and instructions before some of them could start easing up and drawing (still mostly made with basic shapes) houses underwater. Even then, many of them missed the ‘house’ part of the prompt and ended up with drawings of a variety of fish. There was also an unhealthy amount of copying.

There was good variety in the results, with typical outlines of ‘the fish’ giving way to swordfish, dolphins, octopi, snake-like ones and tortoises. There were also additional characters (divers, submarines and sunk ships) accompanying the fish. We could say that the prompt wasn’t too complicated but the children weren’t comfortable enough with making mistakes, or drawing something that maybe counted unfit for the assignment. This problem is insurmountable in one go, given the years of conditioning a child goes through, of staying within boundaries sticking to norms and seeing its positive effects.

In the samples to the right, see how houses are drawn (plan views, sunken chests, etc.), and the variety of fish. Some children even coloured their drawing without being asked to. The one on top-right is the teacher’s drawing. →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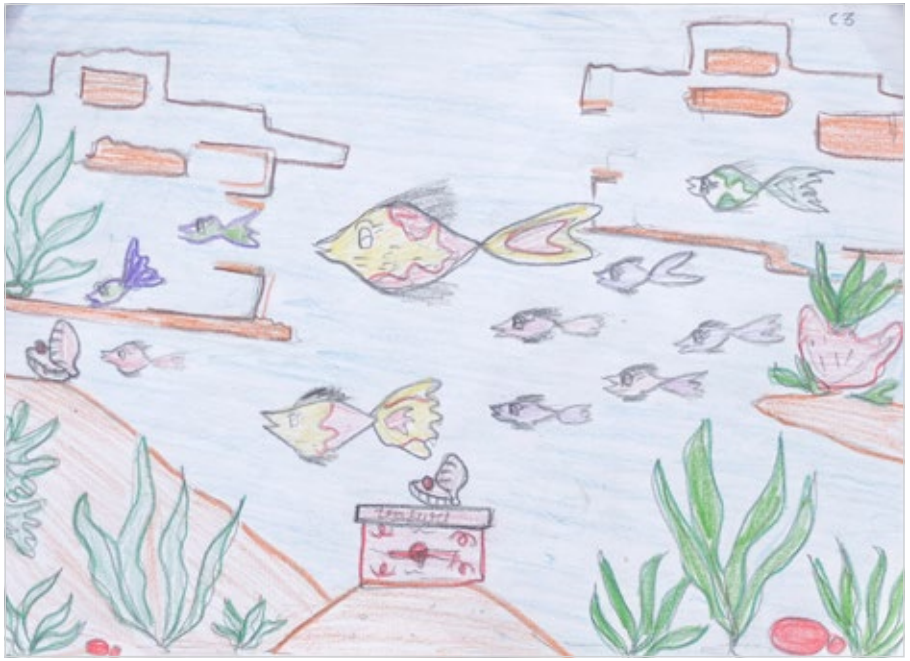


9.2 INFERENCES FROM THE PILOT TESTING

Activities Work

The prompts worked better combined with classroom activities, enough time given to complete the task, and reassurances from the person conducting the class that 'there is no wrong answer.' Simply listing all possible kinds of objects from the prompt helped children make a variety of choices and remember the things they had experienced first hand.

Size Matters: A4 Versus A5

I handed out A4 sheets for the first three exercises. The children had trouble trying to fill up the space and spent time getting the scale right. The twenty-minute deadline added to the anxiety. In the third test, we cut the paper in half and handed A5 sheets out. The drawings this time were more detailed, and there was a better sense of scale in most drawings. The result is yet inconclusive, since there is no control experiment to back the claim, but smaller canvases seem to put the children at ease, making the exercise less stressful, more fun.

These tests confirmed most design decisions were appropriate and made it clear that the teachers still played a defining role in determining how good the results were going to be. The listing and weeding activities also proved necessary, when handled with tact.

9.3 Work-Flow And Wire-Frames

The prototype testing gave us a glimpse into what happens in the classroom. It helped decide a work-flow that is likely to be followed in class. The steps were listed down, making a flow-chart, with potential failures marked at each turn. We have also tried to work around these failures to some extent. The sketches of a basic user interface were translated into a blueprint of the tool with focus on language (tone of voice) and interactions. Building this blueprint in a drawing program helped make sense of the work-flows and some estimate of the production effort. We could also see where there were points of confusion and then try and fix those with work-flow tweaks. For example, the dedicated technique picker stage as a step was replaced by an optional pre-chosen-and-then-edited feature.

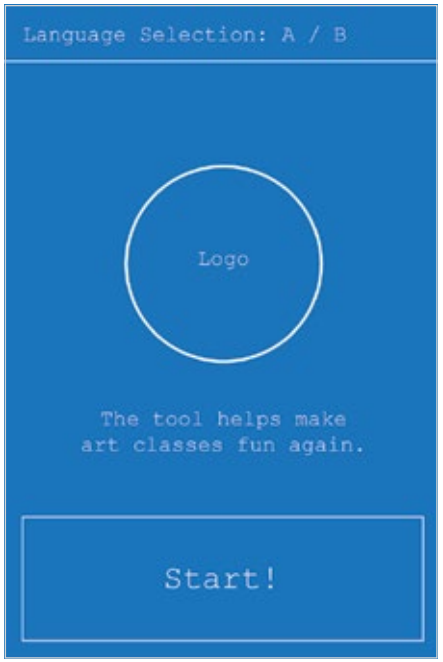
A typical classroom scenario unfolds like this:

→ The teacher consults the website before she enters the classroom. She may have a plan ready to teach a specific subject, or she may consider trusting the tool to pick one.

→ She picks a language (options are Marathi, Malayalam and English), helping the tool decide on contextualising prompts for a specific region.

→ The introductory text establishes the tool as a ‘helper’ and not a ‘replacement.’

→ Clicking the (green) start button establishes that as an action to go ahead. (This ‘green to go’ pattern is then repeated on all pages.)



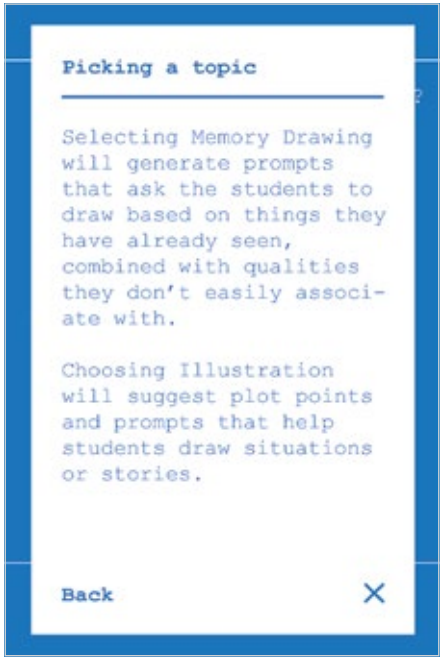
Screen 1: Introduction and language selection ↑

→ She picks the class from the screen that lists classes.

Note: These are two versions of the class picking tool we tried

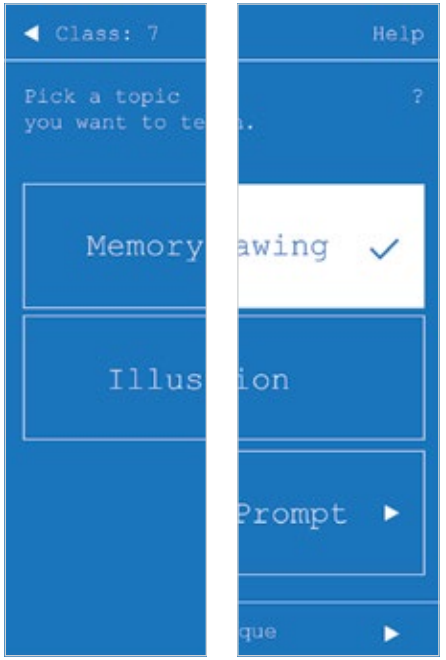
→ Makes a mistake, uses either the back button on the device (present in most android phones) or the link on top to go back. The going-back is always at the top, standing in for a breadcrumb navigation.

→ Picks the right class.



→ She sees the list of topics, is confused and uses the question mark to see what each topic is meant to be. Then dismisses the explanation to go back.

Note: This is the early version of a help screen visualised as a pop-up.

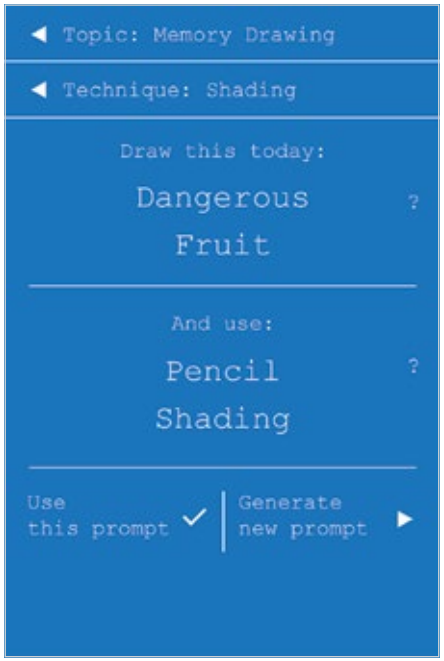


→ She picks from the (now better understood) list of topics.

→ Proceeds to generate a prompt.

Note: This is the box version of the selection UI. Eventually, we settled on a mix of the radio and the box versions

→ Sees that the tool has picked a technique for her (any technique, by default) and proceeds to change it to something specific. (Or to look at other options.) This step is redundant, but helps keep things in perspective.



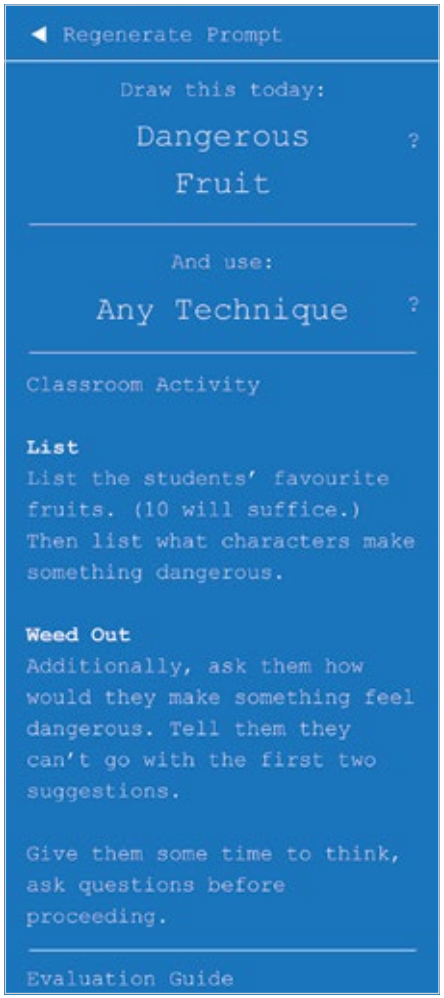
→ Looks at the prompt generated, and notices that it is generated using random words. Curious, she decides to see what else is possible.

→ From a list with explanations she chooses one that is more appropriate and exciting. (Not shown above.)

→ Decides to use the prompt and proceeds to the page that details the activity and evaluation plan.

→ Realises the prompt may be too difficult for the class (that started 10 minutes late) and revisits the previous page, to regenerate another prompt.

→ Uses the new prompt and activities in class, looking up references she deems necessary.



→ At the end of the class, rates the prompt on a scale of 1 to 5. This rating helps her identify effective ones later.

10 Final Design

A discussion on design and content decisions for the final product.

10.1 Naming

Since the tool is intended for an audience spanning two states, the name needed to make sense in at-least two languages. Something that also referenced the very nature of art and drawing—looking for answers, and for ways of being—seemed like an ideal name worth working towards. The names considered were:

Rekha
Meant the same in Marathi and Malayalam, and the line is one of the basic forms making any drawing.

Rang
Similar in meaning, but lacked the breadth to accommodate all kinds of art. This was also the most obvious choice, and not fun.

Pickasso
Referencing the act of picking and choosing, failed to pass the context/relevance test.

StART
Made sense on paper. Was too cliché laden and devoid of any deeper meaning.

ka-Guess
Going the pun route. Tried too hard to be clever, failed at an emotional response.

Seek
Meant very relate-able things in both Hindi and English. Though they meant different things; to seek is to find, seekhna is to learn. Seek being a verb helped underline the 'tool-ness' of the product.

Logo explorations based on an 'infinite possibilities' theme →

10.2 Visual Style and User Interface

Logo and colour palette ↑

Colour Palette

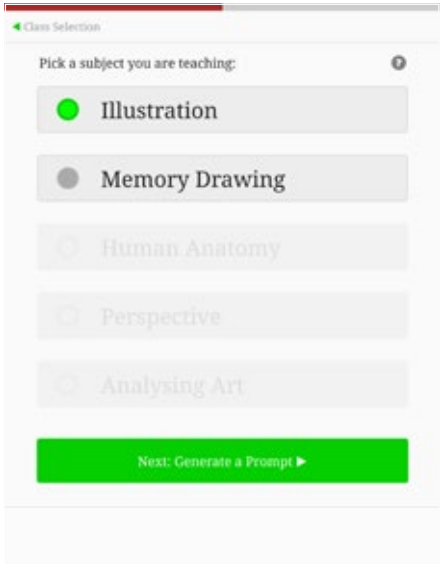
The colour palette is a dominant earthy brown with accents of leafy green. The green is used exclusively as headings and submit buttons. The brown is the identifying colour, present in the logo and progress bar.

Navigation

Certain navigation conventions are established right from the home screen. A bottom green button is always meant to take the teacher to the next page, while the top link is a breadcrumb equivalent that serves the dual purpose of locating the page in the grand work-flow and letting the teacher deal with errors in selection. Question marks are present in places where there is need for an explanation of the concepts presented. The link behaviours are consistent throughout. The teacher takes a linear path toward the prompt, with additional options branching out at appropriate locations. For instance, while editing the choice of generation technique.

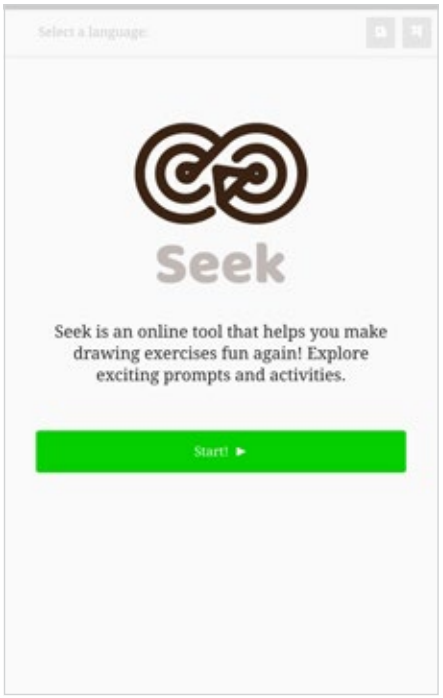
Progress Bar

The progress bar is an addition to the top of the page, situating most pages in the work-flow. It nudges the teacher to complete the next step in the process and lets them know where they are, within the scheme of pages.



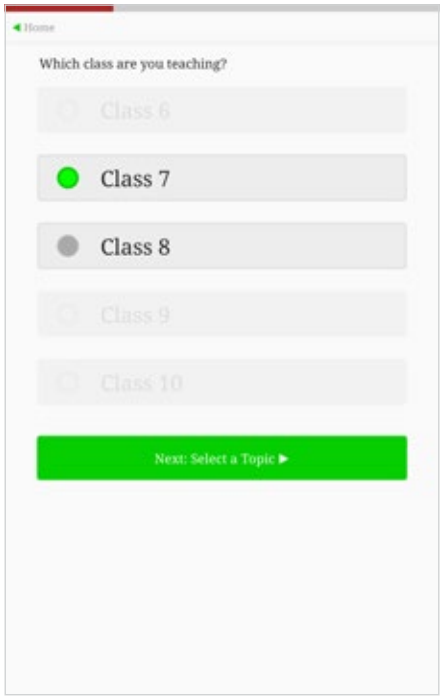
Navigation and progress bar ↑

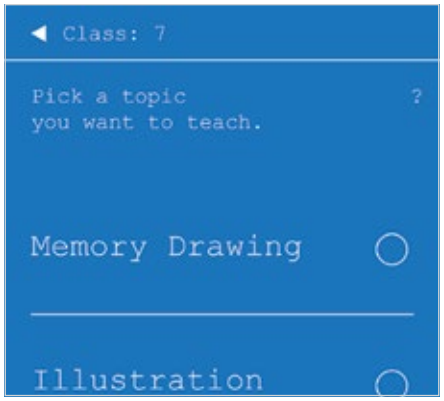
10.3 **This spread: Screens captured from the live prompt tool. Follows the same scenario and work-flow as the wire-frames.**



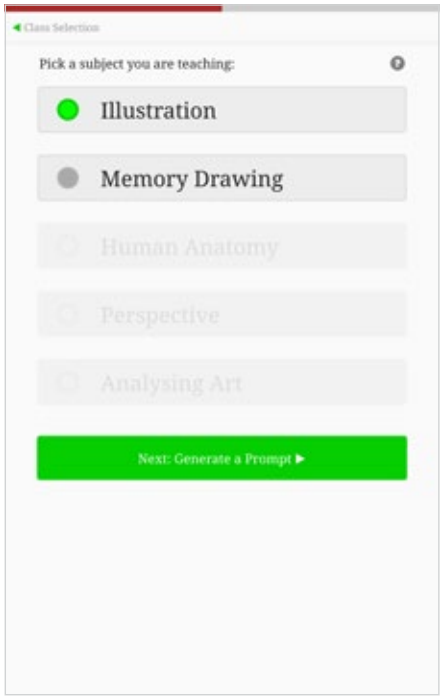
→ The homepage

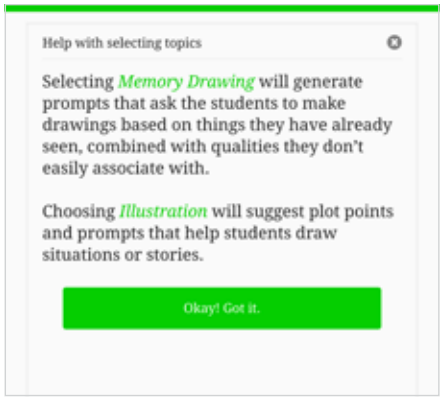
→ The homepage in Malayalam and Marathi. This page is where the teacher's choice lets the tool decide what objects and situations to show them.



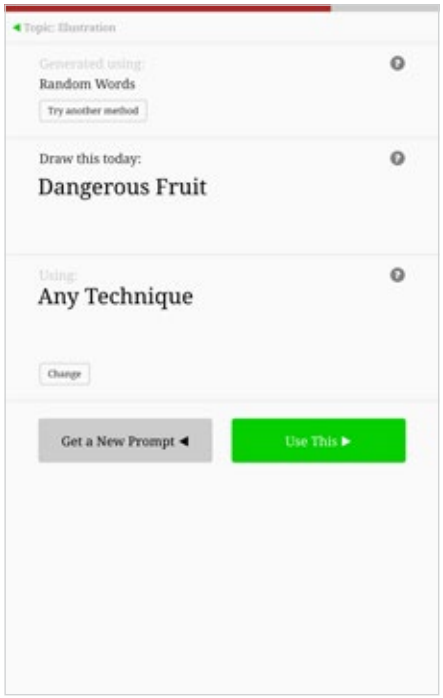


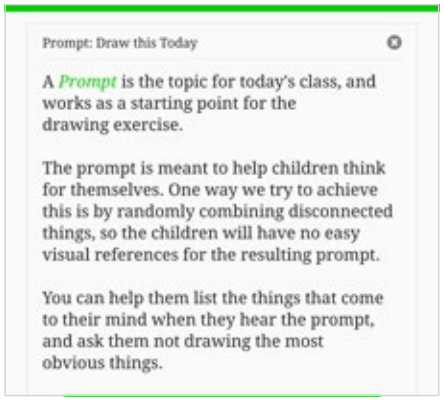
The wire-frame, for comparison



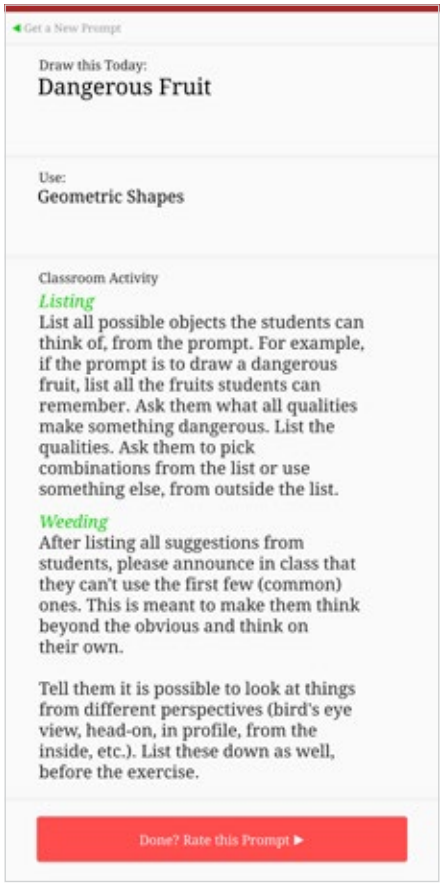


→ Subject selection (top) and help screen (bottom)

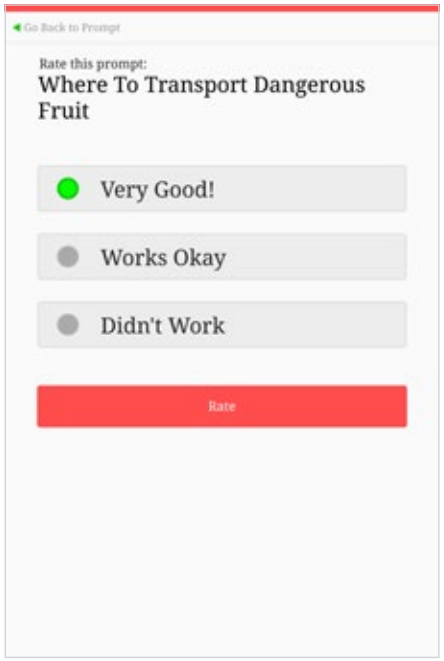




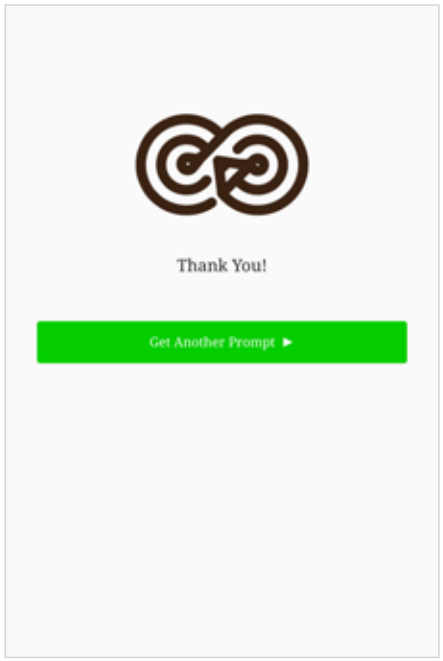
→ The prompt generator page (top) and its help screen (bottom)



→ The prompt page with suggested classroom activity

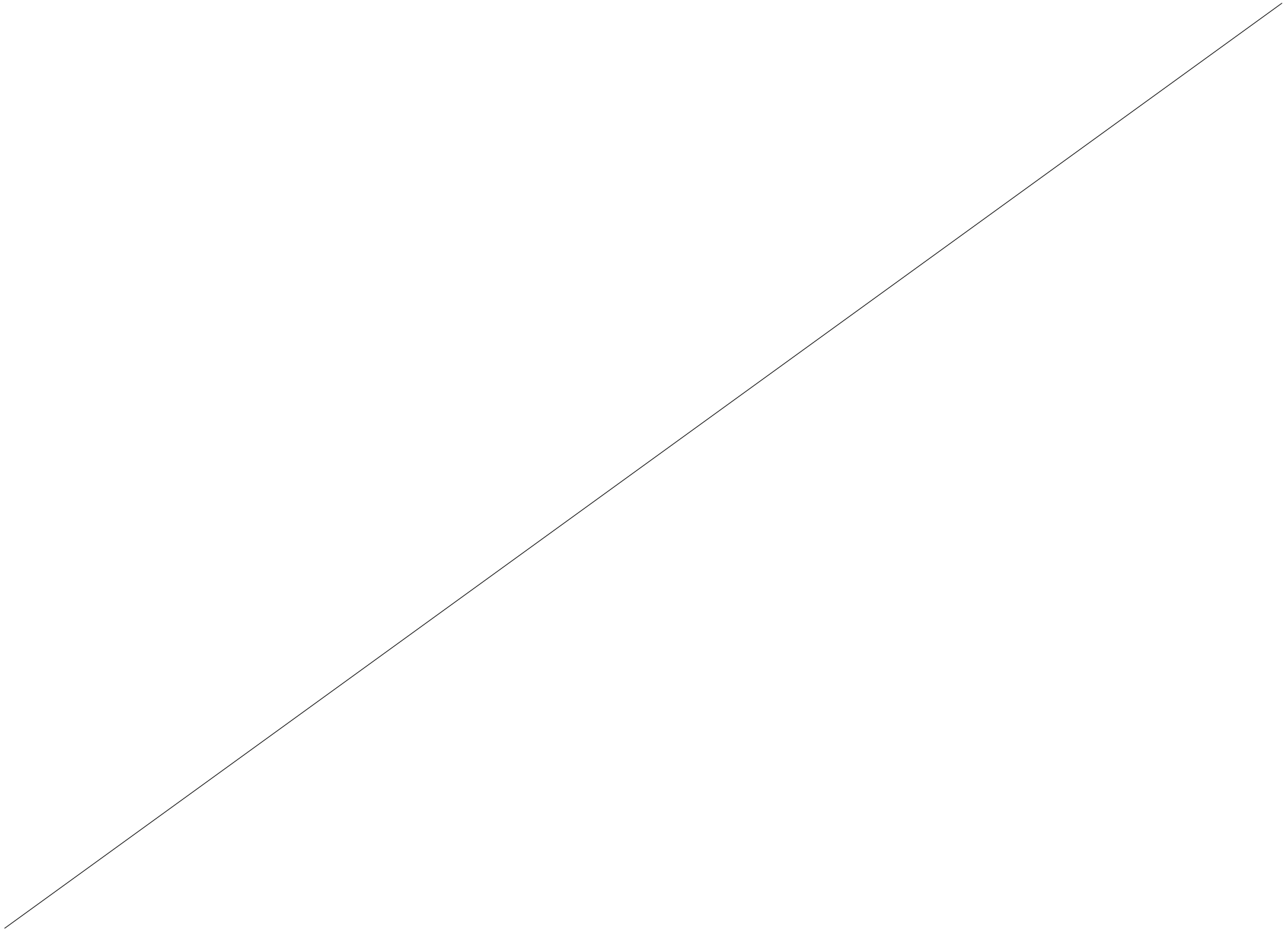


→ The rating page is meant to accumulate data help teachers more efficiently pick combinations the second time around.



→ A 'thank you' page redirects the teacher to the class selection page

See: keyaar.in/seek



11 Evaluation

The tool is evaluated on these four aspects, each with multiple measures to triangulate from:
→ Difficulty of the prompt(s)
→ Diversity of resulting artwork
→ Fun and engagement
→ Teacher acceptance of the tool

The evaluation was carried out during the summer vacations. Student participants were of varied age groups. The results are thus inconclusive.

1: Difficulty of the Prompt(s)

Time taken before drawing starts

During the pilot and the first set of prompt tests, the participants spent some time thinking, before they started drawing. Some also spent time drawing thumbnail versions before moving on to drawing the final version. They had questions about the prompt itself and were trying to wrap their head around the demands of the prompt. The time they spent thinking up solutions before starting to draw can be seen an indicator of how easy or difficult the prompt was.

Ask children how difficult/easy the prompt was (Rating 1–5)

The second measure of difficulty is a likert scale with 'very easy' on one end and 'very difficult' on the other. Children will be asked to rate the prompt towards the end of their twenty minutes of drawing time.

Teacher rating the exercise (Rating 1–5)

Similar to the students' rating, this is a likert scale. Since the teachers know their pupils' abilities, the rating will be an accurate, objective evaluation of the prompts in context.

2: Diversity

Qualitatively measuring diversity requires a set of guidelines to be applied to the variety of artwork. Many of these parameters are borrowed from De Bono's experiments. These were tested on the artwork created during the pilot studies.

Forms (kinds of fruit, fish, etc.)

Measuring the diversity in forms is a basic shape-analysis, where each thing in the drawing will be compared to the common pool. For example, the difference can be in the kind of fish drawn, the orientation of the fish (looked at from above, below, sideways, etc.).

Reasoning (why half-eaten fruit, why the Swastika, etc.)

Even with similar forms drawn, the reason they are drawn can be different. A half eaten fruit shows the horror of being eaten, or it can be the horror of eating a poisonous fruit.

Connections (between moon, bird and red, for example)

With a similar set of objects drawn, the connections made between them can be different. An owl is drawn for its being a nocturnal creature, while the parrot is featured for its red beak.

Technique (borrowing, replacement, multiplication, etc.)

With situation-based and random-word based prompts, there is variety in the strategies children use to make known characteristics work with unknown situations. For example, a dangerous fruit gets crooked teeth transplanted from a demon, while another is transformed to alcohol. (Transformation versus transplantation.)

Point of View (inside house, plan, exterior, etc.)

When it comes to spaces and overall composition, the points of view used can be varied. Some children drew houses from the outside, cutaway views and even plan views. The scene could also be drawn from different angles (fish-eye view, bird's eye view, worm's perspective, etc.).

Teacher Rating (how diverse are the results)

The sixth parameter measuring diversity is the teachers' opinion on how diverse the artworks appear to her. This is again a likert scale with a familiar five-point ranking system. We will also solicit their opinion on why they consider something similar or different.

3: Fun and Engagement

An overall reaction to the prompt, in most cases, could be observed in the class's taking to the exercise and the chatter in the classroom. Making the exercise fun is one of the tool's stated goals; it is measured through these parameters:

Extra effort (shading, colouring)

Some students spent extra time and effort painting and shading their artwork (even after it was announced that a simple line drawing would do). Their reluctance to let go of the artwork and interest in putting in those extra finishing touches can be seen as a marker for them having fun with the prompt.

Attention (asking to include a detail mid-drawing)

During the exercise, an additional feature to be added will be mentioned by writing it down on the blackboard (say, draw three circles in the bottom of the page). The students' engagement in the exercise can be measured by looking at how many of them end up incorporating the suggestion into their drawing.

Conversations in class (showing work around, etc.)

An excited bunch of students will discuss their drawing as the exercise is progressing. They show off a feature they have just drawn in, a new object they have added, etc. The general excitement of the class can be understood listening to the in-class chatter.

Asking the students how fun it was (Rating 1-5)

A likert scale. The students will be asked to rate the exercise during and right after the class.

4: Teacher Acceptance

We devised three measures for teacher acceptance.

Asking for a new prompt

On asking for a new prompt, whether the teacher uses the tool (or employs a similar generation tactic) will be noted (as a yes or no). The teacher will then be asked why she made that choice.

How likely is she to use the prompting tool for the next class

Likelihood of future use will be marked on a five-point likert scale of 'not at all likely' to 'very,' followed by a probing question as to why she made that choice.

Ask to pick the best three and discuss

The teacher will be asked to select the three best drawings from the class, and discuss what made them her favourites. We could get an idea of what she thinks are of value, and see if there is a marked difference from what all were deemed valuable during previous interviews.

Analysis and Claims

→ Please see Appendix B: Artwork Evaluation

After assigning student IDs to the artwork collected from exercises, we gave each artwork scores based on the diversity parameters discussed in detail in the previous section.

For scoring, we used the following scheme:
1: Unsatisfactory; all are typical objects and themes
3: Okay, only perspective and details are different
5: Only difference is the addition of some details
7: Objects are similar, but context or combination, perspective and details are different
10: Very Good; each thing (perspective, context, details) is new, unique or different from most others

The results are inconclusive of the effectiveness of the tool. The average values from ranking diversity indicate that the 'dream' prompt works better than the 'dangerous box' prompt. It is also more engaging and fun.

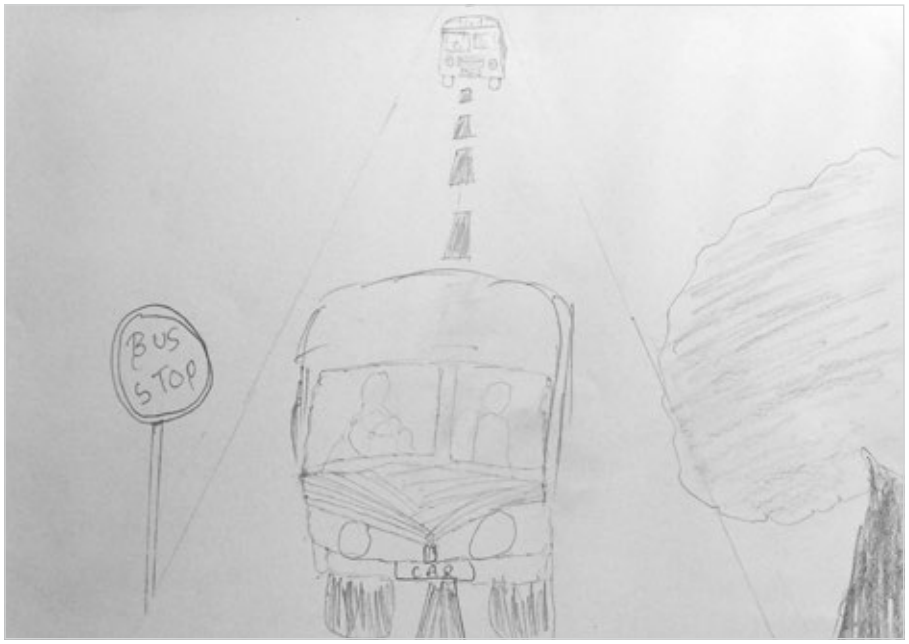
From the limited set of results, we can claim the following:

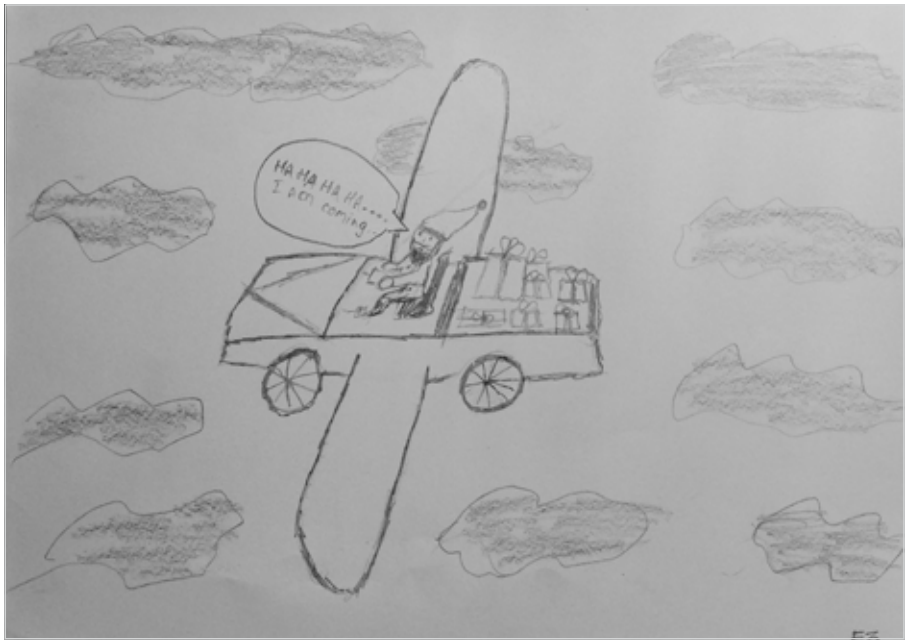
→ The project is a step towards teachers embracing different ways of looking at a problem. And letting children explore those different ways.
→ The prompts manage to make the exercise fun, and are inclusive of the learning goals of 'observe and reproduce.' The skill and technique are still reflected in the drwing output.

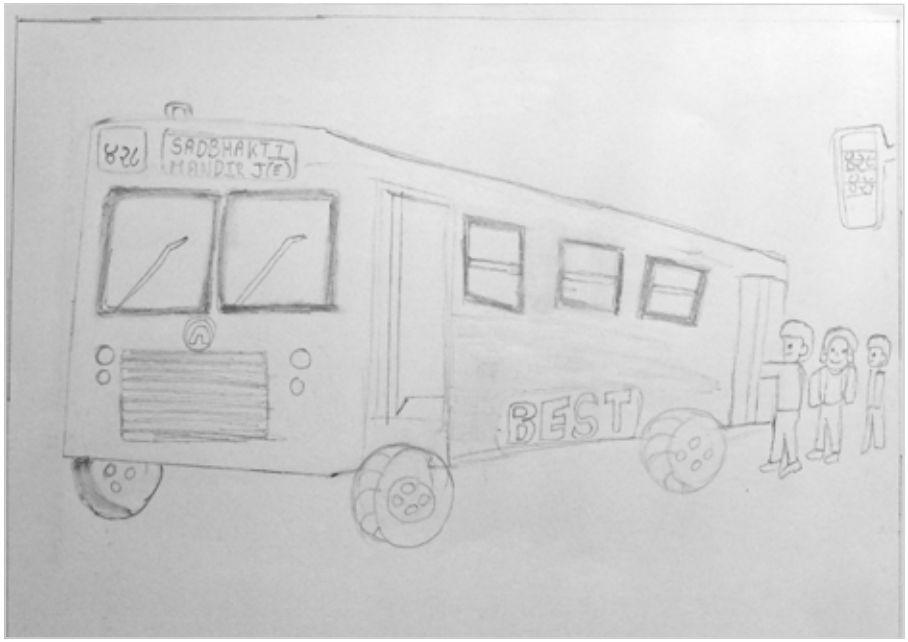
→

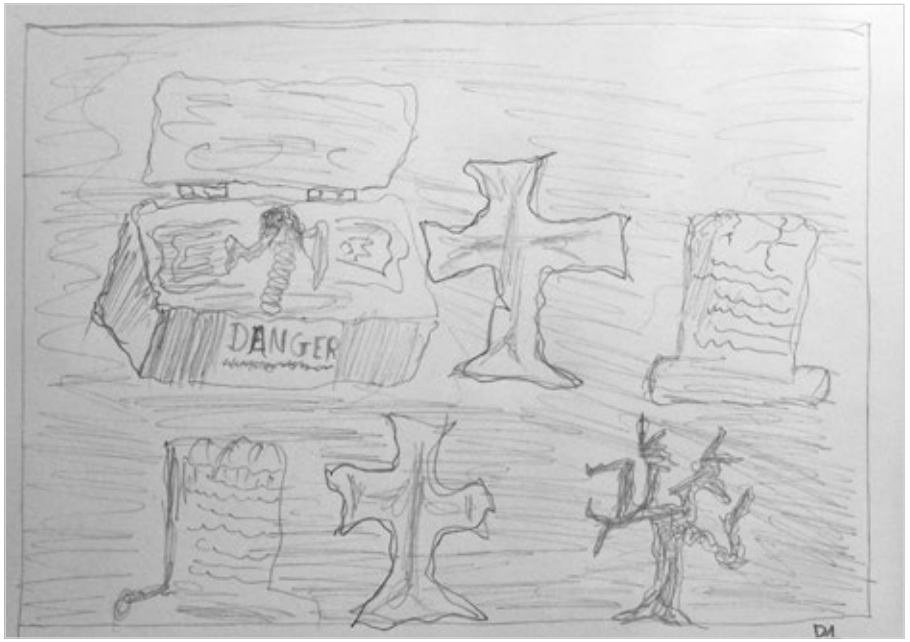
First row: a student's drawing of the control prompt (bus stop) and the generated prompt (a dream you have had)

Second row: drawings of the control prompt (bus stop) and the generated prompt (dangerous box)


BUS
STOP
CAR


Ha Ha Ha Ha.....
I am coming


826
SADBHAKTI
MANDIR J(E)
BEST


DANGER

12 In Conclusion

In our introduction, we described the effects of deficient infrastructure, insufficient number of teachers and an exam-oriented instruction on primary school art education. We discussed how children put through such a system might end up incapable of thinking for themselves. Furthermore, we theorised that the monotony in artwork children produce is an indicator of their lack of divergent thinking. As an antidote, we suggested that teachers approach art from a fresh perspective employing a problem solving attitude. We realise design for change in the way teachers—and their, students—think has to consider the ground realities of economics and sheer numbers. There are too many children in most classes for a teacher to be able to pay individual attention to them. Not all the children can afford expensive art material. Clearly, an expensive solution—in terms of time and money—is not the answer.

As an instance of effective intervention, we designed and developed a tool embedded in the existing work-flow of classroom instruction. We achieved this integration by focusing on the prompt that sets children off making artwork. We argue that this focus on the prompt—an integral yet taken-for-granted part of a drawing exercise—adds limited burden to the teachers' work-flow, while allowing them to help maximise the variety of their students' output. The prompt generation schemes are based on successful prompts we tested, where students were able to produce artwork with variety. The schemes equip children draw using the constructivist principle of building on existing knowledge. We find that supplementing our prompts with in-class activities—listing ideas and weeding out bad ones—contribute to the diversity in subjects drawn. Our prompt testing benefited from this classroom activity with a marked increase in variety of themes and objects in classes. In the classroom, we listed and weeded out obvious ideas at the beginning of

the exercise. These activities were also seen to elicit a deliberate attempt from the students to understand each component of the problem. They would often question whether an approach is appropriate, and have discussions among friends. The more interesting and unusual the prompt, the discussions in class were richer with local context, the childrens' own experiences and unusual ideas.

We see that the children enjoyed a departure from the usual 'set-and-forget' prompts that offer little scope for discussion. In addition to making artowrks rich and varied in comparison to the usual prompts, they provided the teacher an opportunity to discuss the 'no one correct answer' approach to learning art. We can not claim sustenance of such discussions happening, but they reiterate our claim of the tool being an instance of realisation.

The literature review, comparison of existing tools and the evaluation of our tool present a usable list of concerns, features and design directions for future interventions. The tool builds on existing practices and workflows, and incorporates effective and interesting features from the existing tools we studied. The prompt generator we proposed is web-based allowing for future updates based on usage patterns and new requirements as and when they arise. That way, the tool always stays one step ahead of the teachers' expectations and sustains their interest.

We maintain that the tool is only one of the possible solutions addressing the diversity problem. In fact, it may be better to treat the project as a precursor to a solution. For us, the tool is a medium; one that is meant to show simple changes such as the ones we have made to prompts can have a significant impact on the way students think. We believe the teachers' outlook to classroom instruction alone is powerful

enough to incite young children to be brave, embracing their own experiences and drawing from them. The tool is positioned as a step towards transforming their—both teachers' and students'—existing ways of looking at art education. After considering more traditional interventions, we chose to present this provocative us to try and shake their perceptions of art exercises and explore the boundaries of acceptance in the process. However, we have been cautious by presenting the tool in a non-threatening light, without explicitly stating our objectives. This surreptitious deployment is meant to let the people using it discover our intended goals on their own, in the hope of making it a richer, memorable, more rewarding experience for them.

The evaluation we conducted, while inconcusive, points to the potential of the tool to expand in scope, incorporate better classroom activities and be more effective in making student output in response to art exercises diverse. The general trend indicates that the artowrk in response to the prompts generated by our tool is richer in diversity as compared to the control prompt. We see sustained use of the tool having a positive effect on the way art teachers and students approach drawing.

Our hope is that this attempt serves as a springboard to projects exploring new avenues in art education.

13 What Next?

Due to time and resource constraints we haven't been able to do justice to the entire feature wish list. We take solace in the fact that as a web-based tool, it is built to get better with frequent updates and feature additions as more teachers use it and leave feedback.

For true grassroots adoption of the tool to be possible—though that is not an end-goal in itself—language localisation is necessary, in addition to adding better local references and examples. In most cases we suggest a complete rewrite of copy from our experience translating the home page. We find turns of phrases and actions particularly hard to directly translate. An efficient way forward will be participatory, with art teachers translating it themselves for their peers.

Artists thrive on appreciation of their work. Teachers given an opportunity to showcase the unique prompts they come up with, and the students' response to them, are more likely to buy into the 'alternate approaches to art education' proposal. A step towards effecting this would be to introduce the gallery feature we discuss in the wish list while effectively separating it from the prompt section.

To better initial 'success' rate of generated prompts, a teacher feedback system can be properly integrated. Being able to see beforehand if a particular combination has worked well for someone else is an incentive to try it or something similar.

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15

Appendix A: Research Paper

Blackboards and Basic-shaped Landscapes: State of Art Education In India

Abhijith KR, Girish Dalvi
2017

ABSTRACT

In most Indian states, primary art education in government schools is troubled by deficient infrastructure and a shortfall of teachers. As a result, students are unable to access technological aids and there is a shortage of contact hours. There also seems to be a disconnect between the government art education syllabus and how it is taught by teachers. To investigate the likely causes of this mismatch, we conducted a series of interviews with six primary and high school art teachers in two cities—Mumbai and Kozhikode. Our analysis indicates that most parents and teachers consider art education as secondary as compared to other subjects such as science and mathematics. Furthermore, we found that this view adds on to the existing infrastructure problems in the schools. The lower status given to art education manifests itself in the appointment of fewer specialist art teachers, fewer hours dedicated to teaching arts, and the deputation of art teachers to non-teaching activities. This results in even lesser number of contact hours for art classes. The disconnect between syllabus and instruction is evident in the mismatch between what art education source books emphasise as a basis for evaluating the children, versus the teachers' value systems. Our study documented methods and techniques of art instruction and the teachers' outlook towards art and art education. Insights from the study have implications for design intervention, leveraging the teachers' conceptual models and techniques. We recorded teachers elucidate concepts of 'lower' and 'higher' levels of art being taught, corresponding to what they see as 'real' and 'creative' art. Here the teachers focus on evaluating children based on their skills and the complexity of their artwork, which they see as 'higher' or 'creative,' as opposed to themes and concepts. We also found that despite a well-prepared syllabus and teachers' good intentions, children produce artwork which is very similar to each other. Teaching techniques based on "observe and reproduce" along with exam-focused instruction are possible reasons for this similitude.

KEYWORDS

Art Education, India, Art Teaching Techniques, Teacher Perception

INTRODUCTION

Over 30 million children in India attend classes 7th and 8th, with 6.7 million teachers teaching in up to secondary (classes five to seven) schools. Of these, art, craft, dance and theatre teachers are called specialist teachers. Many Indian states have cut down on the number of specialist teachers appointed to fill the vacancies of retiring teachers, as well as fresh appointments. For example, in Kerala new appointments hadn't been made since the Right to Education Act in 2009; started fresh art teacher appointments in 2016. The state provides teachers

with a comprehensive syllabus, lesson plan and evaluation criteria. The syllabus is outlined in separate source-books for primary (classes 1st to 7th) and high school classes (classes 8th to 10th). A state resource group (SRG) of teachers, aided by artists and content creators curates and prepares this material. The state of Maharashtra instituted Elementary and Intermediate drawing exams in 1880 to help children interested in art take it up professionally. Qualifying these exams helps children pursue careers in art education.

The interviews reveal that art teachers in schools often cater only to syllabus of such examinations; by tailoring class lessons according to the exam syllabus. The well-performing students are advised and coached separately to appear for the exams. Almost all art teachers we interviewed in Maharashtra teach the exam syllabus in classrooms and conduct private tuitions for students preparing for the exams. We realised that the artwork produced by children was a direct consequence of the evaluation focused instruction by teachers; hence, a study of the teachers' perspective on art education was necessary.

Objectives of the Study

We observed that there was substantial similarity in the children's artwork both in the themes and the drawing techniques. For example, a house is always drawn as a set of polygons. Topped with a triangular roof and a rectangular chimney (a feature not found in Indian homes) set on an independent plot of land, with hills and a river in the vicinity. We were intrigued by the likely cause of this similarity seen across culturally diverse groups. We hypothesised that evaluation practices in lower classes encourage a constrained approach to drawing.

Many studies deal with art education with a focus on student behaviour in the classroom. We found no studies on how teachers perceive and teach the prescribed syllabi within the Indian context. Our study documents the syllabus, how it is translated into methods of instruction, and the teachers' methods of evaluation. We build conceptual and process models from the teachers' responses to understand how this syllabus-to-teaching translation works in practice, and identify areas for intervention. Additionally, we document the educators' outlook to art and art education. How they look at art is an important area of our focus. It helps us understand how their outlook to and appreciation of art and their art practices contribute to classroom instruction.

Methodology

Our study employed a semi-structured questionnaire , which was administered to elementary and high school teachers in the states of Maharashtra and Kerala. The responses received from these interviews were then analysed using qualitative methods such as content analysis. We chose our participants—four art teachers from Government Schools in Mumbai and two from Kozhikode—based on whether they taught classes 7th or 8th. The first set of participants also suggested the next interviewees from the art teachers community. The interviewees varied in teaching experience from three to nineteen years, with their ages ranging from 29 to 53 years. We conducted the interviews at the schools during breaks and off-periods. Each interview lasted from around 40 minutes to 1.5 hours. We noted salient parts of the conversation, capturing turns of phrases, indigenous words and gestured references. The interviews were also recorded with permission, and we documented spaces and artefacts during and after the interviews. The teachers were informed of the research objectives a day before the interviews so they

could bring artefacts they wished to share. The questionnaire comprises of four sets of questions and associated probes listed below.

→ Demography and warm-up questions, such as teaching experience and educational background followed by a recollection of techniques their teachers employed in the past.
→ Syllabus and infrastructure-related questions, for example, number of hours they teach and whether those that is enough, and probes into the amount of influence they have in deciding the timetable.
→ Questions regarding methods of instruction, where we inquired how a specific topic was taught, and to describe their own unique methods if any.
→ Probes to determine the teachers' outlook towards art and art education.

ANALYSIS AND FINDINGS

In the first stage, we transcribed and examined the interviews for repetitions, indigenous words, metaphors, transitions, similarities and differences based on the method outlined in Analysing Qualitative Data (Ryan and Bernard, 2010) . The next stage involved inferring Conceptual and Process Models based on these findings. We chose the methods described by Ryan and Bernard to fully capture the nuances and insights from our non-structured interview format.

FINDINGS: WHAT ARE STUDENTS TAUGHT?

Memory Drawing

A majority of the art teachers make the children draw landscapes and themes of social relevance, in sync with government programs, environmental issues and current affairs. For example, School 3 had a series of wall paintings that the students had created in the premises. T4 walked us through the pieces of wall-art depicting popular government-led programmes like Swachch Bharat Abhiyan (a cleanliness drive) and a composition illustrating the Smart Cities initiative. We observed that these end up being picked from the limited pool of subjects readily available (through the media and circulars) in the schools and children end up producing artwork along similar, expected lines. Even when comparatively fresher concepts were drawn, the teacher chose to comment on the drawing technique, i.e., the application of colours rather than the content. A drawing where an ice-cream cone stood in for a warmer planet was commented on for its lack of even colouring . We also observed a tendency to look up visual references for memory-drawing exercises. Some teachers depended on online image searches, while others brought printed photographs to class.

Drawing The Human Figure

After training children in memory drawing, teachers move on to human figure drawing. Among the teachers, this is universally accepted as one of the more difficult things to be taught. A majority of the teachers use variations of the 7½ heads system for teaching proportions, where the human body is constructed based on multiples of the head size. T1 and T2 reported using a 5½ heads system to help children of lower classes

understand the proportions easier. Except for when sideways-view drawings were made, children had trouble keeping the proportions correct. All teachers reported that children get these proportions wrong when drawing actions (as opposed to a standing figure) and need to be corrected by demonstrating these actions in front of the class. T6 uses a system of matchsticks to teach the 7½ heads system, where he arranges them in a skeletal form, moving the sticks around to mimic actions. Even with traditional and custom methods, human figures are seen to be hard to master within the confines of the classroom. In some cases, figurative representation is discouraged by the parents due to religious beliefs, and the teachers comment that the curriculum is not flexible enough to address such issues.

Incorporating the Human Figure in Landscapes

Drawing people in their environment is a logical next step to basic memory drawing and human proportions. Here again, subjects are picked from a common, limited pool (bus-stop, harvest, fish-market, etc.), and this produces expected, monotonous results. T2, for example, incorporates situations he encounters during his commute to school (traffic jams) and the climate (heavy rain) in his exercises. Interestingly, cultural and social conditions influence the drawing output to some degree. For example, a student who has not been exposed to a specific mode of transportation (for e.g. trains), attempts to depict the closest one she has encountered (school bus). In one of the pictures where the children drew their homes, the architectural features looked like they belong to a different economic class. It was easy for us to assume that these were aspirational. The teacher explained that the drawing was referenced from a guide-book. This points to more reasons why we encounter homogeneity in these drawings.

Drawing Still Life

The fourth most common drawing exercise, taken from the syllabi for the exams is drawing still life. Children are asked to incorporate their learnings from shading and colouring exercises into still-life compositions of vessels and simple flowers against a drapery. The teacher demonstrates live or refers to an earlier work to guide students through the exercise when there is not enough time for a demonstration. The practice of show and tell is easier in schools which have a dedicated art classroom.

Art Appreciation (Concepts, Schools, People and Themes)

The syllabus mandates that children are introduced to important works of art from different movements and of a local flavour. The Kerala government source book lists a set of sample images and outlines a discussion of different aspects of the images. Our interviews suggest that, teachers lack a conceptual understanding of this subject and do not have access to resources tailored to a young audience. Paintings discussed tend to be inappropriate for school contexts and socio-cultural structures. Those teachers who have active art practices tend to be better aware of their peers, who work as artists. Even then they fail to bring that exposure into the classroom. This was seen in all teachers with an exception of T5. In many cases, teachers (like T4) consider such subjects and techniques to be more difficult than what the students can comprehend.

These are the major subjects taught most of the teachers. Individual teachers also teach basics of installations, critiquing, emblem making, collages, paper crafts (e.g. paper quilling) and cut-out artwork.

FINDINGS: THEMES AND CONCEPTS

The following themes emerged from the study. These illustrate how art teachers look at art education. We describe their concepts of high and low art and the role of technology. We also discuss how seeing art as a secondary subject in comparison with the sciences contribute to even lesser emphasis on the quality of art classes.

Blackboard Skills and Demonstration

Older, experienced teachers lament that the newer teachers lack blackboard drawing skills. They consider the skill to be essential, even with the introduction of video tutorials and affordable, step-by-step guidebooks on teaching art techniques. The dark-and-light relationship of pencil and paper (which the students work on, eventually) is reversed on a blackboard, where white chalk is applied on its black surface., For instance, shading taught on a blackboard works very differently when one uses pencils on paper. The lighter areas implied by the blackboard surface are a result of not using the chalk in those areas. These have a different character compared to the white areas left behind on paper. As a tool, chalk is different in fidelity compared to various grades of pencils, when it comes to the layers of transparency and control over tones. Since it is thus more than a matter of skill learning alone, effective and appropriate use of the blackboard in classroom instruction is an area of great design opportunity. Such an intervention could help new teachers master this technique and let the experienced teachers share the techniques they use to overcome the limitations discussed.

‘Collage’ and ‘Design’

The common understanding is that collage and design are subjects of a higher order. Therefore, exercises in collage and design are introduced to classes 7th and 8th after they have completed their basic technical skill courses in the lower classes. T5 approaches collage in three phases:

→ Children are unassisted and asked to “just make a collage.”
→ A discussion follows, where the overall form of the collage is emphasised, so that it may thematically connect to the pieces used in the collage.
→ In the third phase, the overall form is explored in detail.

T4 considers collage to be an exercise in concepts and themes, while the majority of the teachers use a method where multicoloured pieces of paper are used like patches of pigment, devoid of any meaning or context. In those cases, the results are evaluated solely on the use of colour, contrast and other, formal attributes. Each teacher interprets collage and design modules in her own way, and is taught as exercises in technique and skill rather than in conceptualisation. From the teachers’ accounts, collage making is one of the exercises popular with students. Its popularity maybe attributed to the fact that the focus shifts from skills required to apply colour evenly, to a relatively easier exercise of arranging pre-coloured pieces.

Concept of ‘Lower’ and ‘Higher’

Teachers consider complex drawings, employing levels of abstraction and stylised depiction as advanced, and desirable. Such drawings are described as ‘artistic,’ ‘creative,’ or ‘high-level,’ as opposed to ‘normal,’

'realistic,' or 'basic.' (For example, according to T4, geometric shapes are more creative compared to organic ones.) Number of techniques children use and their application skills determine whether the work merits these classifications. T4 considers cartoons to be creative, while memory drawing or nature drawing exercises are considered 'asli' (literally, real).They are thus seen to require lesser abilities. As an illustration of this divide, shading and tint-swatch exercises (where children paint lighter shades of a colour, from the pure hue to white, by adding white pigment) are considered basic, while complex geometric divisions painted in these tints are looked up at as creative. Complexity is regarded as more valuable than originality and conceptual clarity.

Beyond Paper and Pencil

There is a remarkable shift from the concept of making art as an act of putting pencil to paper (T5) to art as one of building careers out of creating art installations, working in commercial art and design. T5 has a background in advertising and runs a design agency in the city. He talks to his students about the various ways to apply their knowledge of art in real life professions for real life problem-solving. In class, they discuss logos; their constituent parts and what the logos mean when used in their contexts. In a follow-up exercise, the students make emblems for their school based on what the school stands for. The activity can be seen as a proto-branding exercise. The students use updated icons and other signifiers to convey a meaning similar to that of the original emblem. The focus here is on a descriptive depiction as opposed to the design school version of minimalism, scalability, etc. The shift in focus makes it easier for the students to work on the meaning-making and not get caught up in constraints of real life application.

Art as 'Secondary' to Core Subjects

All interviewees spoke of the secondary status attributed to art education, and in turn, to them. Timetables, for instance, are decided with greatest weightage to science and mathematics, considered to be more important by most parents, and ironically, by the art teachers themselves. The interviewees are aware that a lot of value is placed on how one can make a living out of the things taught under subjects other than art, and not on their real-life applicability. T5 has this notion that art has better practical value as compared to advanced mathematics. He considers it to be the base of everything. According to him, art plays an important role in the 'presentation' of everything; in the way the world eventually comes to see all kinds of advancements. There is a sense of anger (T5 calls it 'injustice') at how art periods are appropriated by the 'serious' subjects towards the end of the year. All of them feel the current number of periods grossly inadequate to teach things in whole. They also remark that without additional special educators appointed, the burden will be impossible to bear.

Art as Collective Effort

There is an effort to present art as a collective activity, through wall paintings carried out by groups of students (T4), and installations on relevant social and cultural events (T5). Students are encouraged to participate in creating a whole from individual parts. The resulting artwork is then exhibited to the public beyond the school. From an audience approval perspective such a public exhibition elevates the artwork in value, and motivates children to achieve results that would otherwise be impossible within the classroom setting, carried out by individual students. The praise and attention go a long way in keeping them engaged and excited.

The Surprise Element in Instruction

During classroom instruction, some teachers employ a theatrical way of presenting their exercises to the students. For instance, T5 starts the class with students rolling newsprint paper to tubes and crumpling some sheets into spheres. They are not told why they are doing these things. They then paste two of the spheres onto a corner of the classroom wall, followed by the tubes, completing a spider and the web around it. The surprise element sustains interest and contributes to this 'act of making together.' Similar techniques (of completing a drawing from a random scrawl on the blackboard) were used by art teachers in the past. The use of surprise in today's classrooms is an extension of this tried and tested technique.

Affordable Materials, Ingenious Techniques

Many government schools we visited had student population from very low and low-income families from the neighbourhood. Most students can't afford art material, when a decent set of watercolours could be as expensive as a day's earnings of their family. Most teachers work around this problem by buying materials in bulk (T2), suggesting everyday materials (T3 lets the children use twigs from broomsticks as crafts material), employing a strategy of 'best from waste' (T1, T2) and sticking to basic tools. While some of the schools have access to technology (tablets and computers on campus), many rely on very basic infrastructure. It is, therefore, crucial that design interventions work within these constraints and explore other possibilities.

Art Teacher Communities

T4 believes art shows and public presentation of one's work has their merits, and leads a group of local art teachers in conducting shows and workshops. The groups are local enough to enable meetings and discussions. One could, however, not see similarity in techniques employed in teaching difficult concepts (like the matchstick method for teaching human figures). This suggests that these groups have not grown into places for exchanging teaching methods and practices. T4 does his coordination of local art groups through a WhatsApp group, while T5 publicises his and his student's art through multiple social media channels. The communities are very active in organising events and work equally well as spaces for promoting the members' work.

DISCUSSION

Our study reveals that art education in India continues to suffer from infrastructure and resources-related problems. Prominent among these is insufficient class time and limited exposure to Indian art. The study also revealed teacher-dependent factors which dictate how the syllabus is translated into classroom teaching.

We find that it is essential for children to have more contact hours with the art teachers to be able to satisfactorily complete lessons in the manner specified by the syllabus -books. The existing under forty-five minutes periods are not enough to finish work on a given subject. Teachers are aware of this handicap and hence they divide and prioritise the subjects they teach. Unfortunately, this selective teaching of topics amounts to a half-measure.

The issue of lack of access and exposure to analytic tools to familiarise children with the wider world of art and their immediate environment is ripe for a technology-backed intervention. Existing infrastructure of internet-connected devices could be put to use contributing to and providing access to shared knowledge on local art and its socio-cultural context. Art teachers have active local social media communities, and these can be leveraged for building knowledge sharing tools and repositories.

In addition, despite well made syllabus source books and enthusiastic teachers, a culture of examination-centred instruction (both in classrooms and as tuition), contributes to a sameness in the children's artwork. When children are trained to work towards a generalised, easily grade-able result, they end up producing artwork that sticks to a prescribed norm. In thematic exercises like illustration and memory-based drawing, where conceptual clarity and thinking ability ought to be worked upon, this inability to think beyond the obvious is a major handicap. Teachers often ask children to work with themes that don't encourage thinking beyond an expected norm, compounding the problem. Some examples of students' work suggest that themes without ready visual references are better at producing a diverse set of results. Further work is required to develop evaluation rubrics for such themes.

Despite the tendency to follow norms, teachers employed ingenious methods of instruction to work around material and space constraints in the classroom. They have an acute awareness of local materials and an eye for presentation—be it in exhibiting the artwork or in the theatrics of teaching. While the older teachers lament the lack of this ability in their younger counterparts, they appreciate the technological expertise that the new crop of teachers brings into the classroom. Their approval of technology as an aid suggests that a marriage of the old and new—where low-cost, local art material and tried-and-tested teaching methods are combined with the ease of access to online resources—is an approach worth considering.

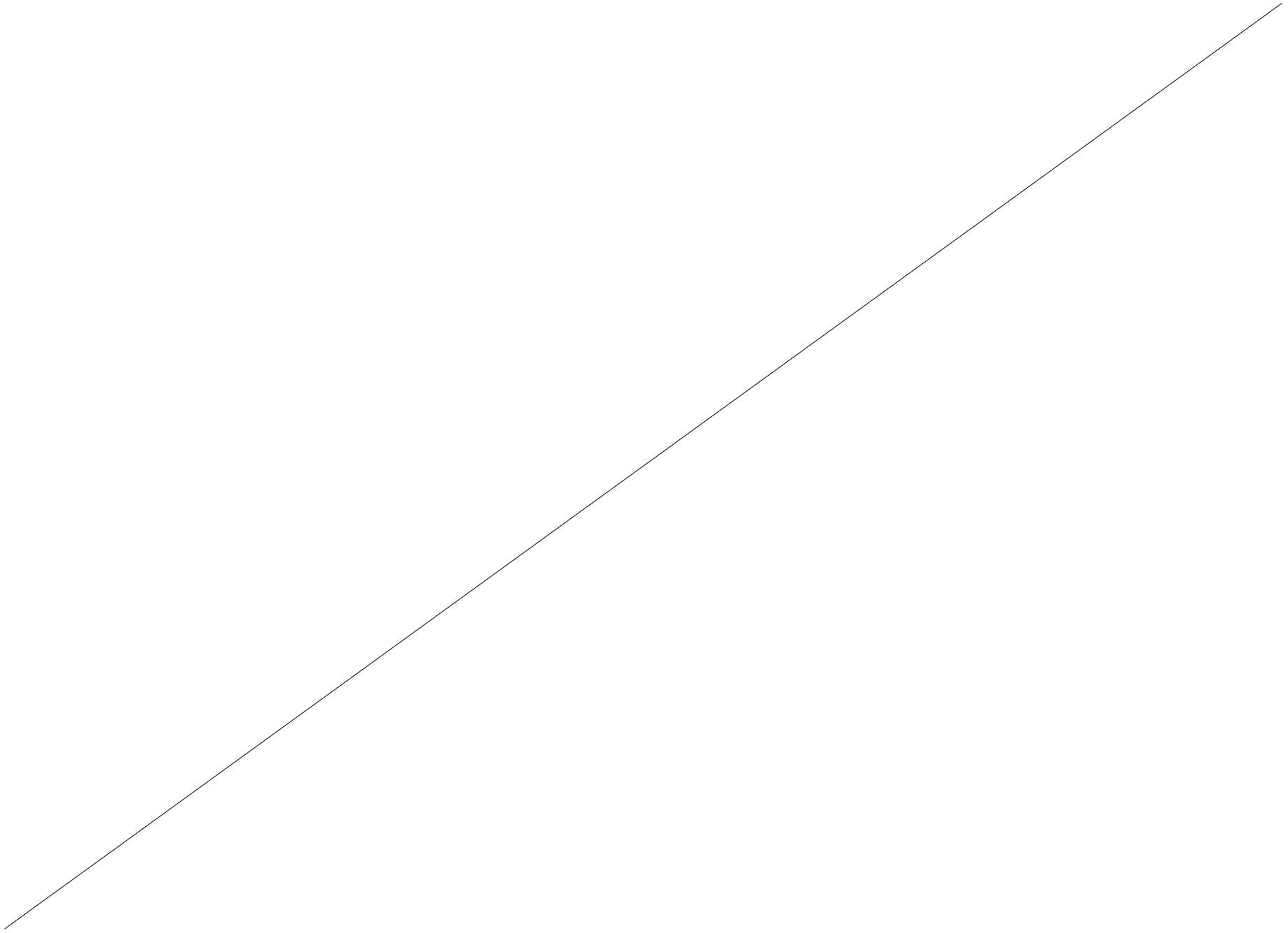
It is crucial that future design interventions should consider the infrastructural and bureaucratic limitations and build on the ingenious, affordable methods the teachers use in their classrooms.

Appendix B: Artwork Evaluation

Student ID	Reasoning behind what is drawn, if similar	Technique (Borrowing, Replacement, Anthropomorphising, etc.)	Connections	Carbon Copies	Fun: Extra Effort (1 = Shading, 2 = Painting, 3 = Multiples)	Engagement: Attention (Test by asking to add a detail in between. Added = No attention, Missed = Engaged)	Conversations in class among students, showing work to each other. (Yes/No)
Parag Vidyalaya (Base: Bus Stop)							
D1	5	5	6		1		Yes, not much.
D2	3	3	3		2		
D3	3	3	3	Yes	1		
D4	3	3	3	Yes	1		
D5	6	4	4		2		
D6	10	9	8		3		
D7	6	4	6		1		
D8	5	3	3		1		
D9	6	5	6		1		
D10	3	6	3		3		
D11	5	4	4		3		
D12	7	4	7		2		
D13	9	7	7		3		
D14	5	3	6		1		**Average Diversity Score: 4.937**
D15	2	2	2		1		
D16	5	6	6		1		
Parag Vidyalaya (Generated: Dangerous Box)							
D1	8	6	9		3	Added	Yes, initially. Not during.
D2	4	5	4		1	Added	
D3	4	3	3		1	Added	
D4	5	5	5		3	Added	
D5	3	3	3		1	Added	
D6	3	3	3		3	Added	
D7	6	6	5		3	Added	
D8	3	3	4		2	Added	
D9	3	3	4		1	Added	
D10	3	4	3		1	Added	
D11	6	7	8		3	Added	
D12	4	6	6		1	Added	
D13	7	7	8		3	Added	
D14	2	4	7		2	Added	**Average Diversity Score: 4.937**
D15	5	5	5		1	Added	
D16	6	6	8		2	Added	

Diversity Score

Student ID	Reasoning behind what is drawn, if similar	Technique (Borrowing, Replacement, Anthropomorphising, etc.)	Connections	Carbon Copies	Fun: Extra Effort (1 = Shading, 2 = Painting, 3 = Multiples)	Engagement: Attention (Test by asking to add a detail in between. Added = No attention, Missed = Engaged)	Conversations in class among students, showing work to each other. (Yes/No)
Diversity Score							
Asha (Base: BusStop)							
E1	4	4	3		1		Lots of discussion, helping out and suggestions. The tone remained serious.
E2	6	5	6		1		
E3	4	4	4		2		
E4	6	6	5		1		
E5	7	7	8		1		
E6	3	3	3		1		
E7	4	3	3		2		
E8	5	2	5	Yes(9)	2		
E9	7	4	7		2		
E10	6	4	7		1		
E11	4	4	5		2		**Average Diversity Score: 4.86**
Asha (Generated: Dream You Had)							
E1	4	5	6		1	Missed	Lots of lively conversations, anecdotes and discussion.
E2	6	5	5		2	Missed	
E3	7	9	9		3	Missed	
E4	6	4	4		1	Missed	
E5	8	7	9		3	Missed	
E6	7	7	7		1	Missed	
E7	8	8	8		2	Missed	
E8	4	4	3		1	Missed	
E9	9	8	7		2	Missed	
E10	8	6	7		1	Missed	
E11	7	5	6		3	Missed	**Average Diversity Score: 6.55**



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Colophon

Notes about the type:

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Appendix B: Evaluation set in Input Mono
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Seek Website (*keyaar.in/seek)*
'Seek' logotype set in Baloo from Ek Type; body copy rendered in
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