

DEP 703 / Communication Design Project II

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Development of  
**Educational Aid for  
Game Design**

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Communication Design 2017-19

Project Guide : Prof. Prasad Bokil

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IDC School of Design  
Indian Institute of Technology Bombay  
Masters in Communication design ( 2017-19)

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## Approval Sheet

The project titled “Developing educational support for game design course” by Ishu Kardam of Senior M.Des. Communication Design 2017-2019 is approved as a partial fulfillment of requirements for Project 2 in M.Des Communication Design, IDC I.I.T. Bombay.

External Examiner :



Internal Examiner :



Project Guide :



Chairperson :



## Declaration

I hereby declare that this written submission submitted to IDC School of Design, I.I.T. Bombay, is a record of original work done by me. The written submission represents my idea in my words. I have adequately cited and referenced the original source. I also declare that I have adhered to all principals of academic honesty and integrity and have not misinterpreted or falsified any idea/fact/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 panel action from the sources which have thus not been properly cited or from whom proper permission has not been taken if needed.

Ishu kardam

176450002

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## Acknowledgment

I bring to me a sense of pride to thank my guide Prof. Prasad bokil for his support and interest in my topic, without whom it could have been a different job altogether. His interest and guidance was invaluable to this project.

I would like to thank all the Communication Design faculty for their feedback and my fellow batch mates for their suggestions.

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## Abstract

Gamification has been practicing in various forms across disciplines like education, learning, conveying messages, business, and marketing. Currently, educational and learning are some of the most dominant and widespread forms of gamification. Here we explore the scope of gamification in game design course itself, and how physically gamified coursework could be better than digital learning.

This aim of the project is to replicate game design coursework into a physical medium such that the essence and the message remain intact, but the form changes in order to add the interactivity. The idea is to combine coursework with the engagement of a board game, which gives the essence of a book but also the experience of a board game to compete with the digital platform of learning, including the accessories and elements of coursework.

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# Introduction

## Introduction

There is very less number of an education program that encourages your child's mind. Nothing much that provokes their behavior and decision making, they are just covering the syllabus in one or another way. And stimulating such as a teacher or designer, how you solve these problems is another big challenge.

Teaching through the game and covering educational requirement is a creative way. Moreover, here the challenge comes for the designer; As the designing game is not the same as designing other things, it requires the whole different process.

### **Reasons for using gamification in creating a framework**

This education support would be easy to comprehend since it is more game based, it will be easy to monitor student's progress (as he/she proceed in the game ) and to give feedback.

### **Elaboration**

Learning is a stressful process; it hampers motivation and a student's quality of education. With gamification, personalization and positive messaging, learning is continuous, interactive and highly effective, it is also observed that gamification increases the student engagement with studies, which supports the idea of gamification of the game course itself.

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## Questions

I ask many questions, to seek the best possible solution so to fulfill the design brief.

Q.1. What kind of medium is appropriate for education aids?

Q.2. Can coursework be constructed so lesser level of mentorship is required?

### **What do we know?**

- Lack of understanding of the concept
- The low attention span of kids
- Insufficient student-teacher interaction.
- Lack of concentration.
- A casual attitude towards learning & teaching
- Low attendance of student.
- High dropout rates.
- Insufficient way of teaching.

### **What we don't know?**

- Physiological behavior & thought process level of students
- Expectation of teachers
- Existing aids of teaching.
- Issues with the traditional way of teaching.

### **How will I know and what I want to know?**

By creating stakeholders mapping, secondary research observing and testing the aids, comparing the experiences of different mediums and how they fulfill learning objective in a better way.

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## Research

Books and Films used as references

## Books



### Rules of Play Game Design Fundamentals

By Katie Salen Tekinba

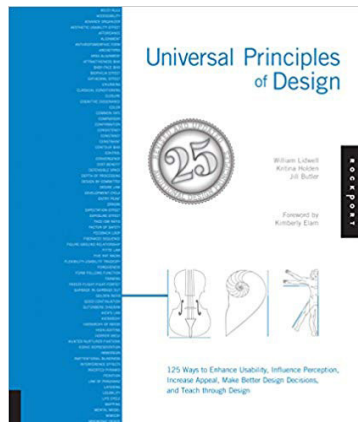
An impassioned look at games and game design that offers the most ambitious framework for understanding them to date.



### How Games Move Us:

by Katherine Isbister

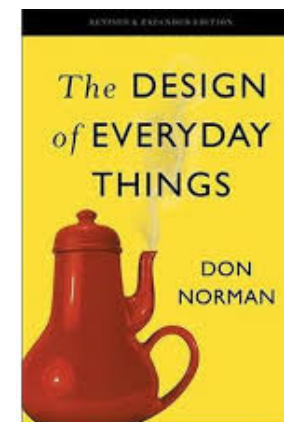
An engaging examination of how video game design can create strong, positive emotional experiences for players, with examples from popular, indie, and art games.



### Universal Principles of Design

by William Lidwell, Jill Butler

Richly illustrated and easy to navigate, this book pairs clear explanations of the design concepts featured with visual examples of those concepts applied in practice. From the 80/20 rule to chunking, from baby-face bias to Ockham's razor, and from self-similarity to storytelling, 100 design concepts are defined and illustrated for readers to expand their knowledge.



### The Design of Everyday Things

by Donald A. Norman

The Design of Everyday Things is a best-selling book by cognitive scientist and usability engineer Donald Norman about how design serves as the communication between object and user, and how to optimize that conduit of communication in order to make the experience of using the object pleasurable.

## Films and Documentaries



### The Power of Gamification in Education

By Scott Hebert

Scott Hebert addresses why the modern education system is experiencing an engagement crisis, and how we can solve it through a new approach in teaching. #GameMyClass Scott Hebert is a local middle school teacher, author, former TEDx speaker and educational innovator from Fort Saskatchewan where he teaches at Our Lady of the Angels Catholic School. He has been on a crusade since beginning his career in 2009 to rid the stereotypes and archaic expectations of schools.



### Creating new worlds : a journey through video game design

By Peter Burroughs

Peter Burroughs is a video game enthusiast and world-shaper in more ways than one. While pursuing his degree through MSU's College of Communication Arts and Sciences, he's also researching how video games can create social influence as well. Peter takes us through his philosophy in crafting virtual worlds, and how they might impact ours.

## Potential Project Directions

## Ideation



### Course booklet

- Activity oriented lessons
- Regular book to teach.
- Enhanced visualizations to understand concepts.
- User engagement is lesser



### Board and card games

- Physical games to teach concepts
- Cards to communicate concepts
- Board games
- Activity card games



### Interactive E-Book

- Enhance the learning experience with interactive textbooks
  - Distribute E-Books individually or collectively within an education library app.
  - Rich with readers engagement
  - Interactive table top display
  - Instant response and feedbacks
-

## Understanding the course

To understand course structure better i started again with going through the course itself, understanding the flow, framework, definitions, assignments, and designing a game, a game design course teaches, to design educational games for kids .

As a core structure for game design course based on game design module running in IDC school of design, by Prof. Uday Athavankar. Compiling game definitions, assignments & activities. the course duration is four weeks which helps to understand what makes a game a game, how game works even without costly hardwares

### Zero cost games

His Recent work includes designing educational games with zero cost for the underprivileged children and these are displayed on You Tube for free download.

Some of them are

- Matha-Chibbi
- Hunters-Shunters
- ZEqual
- Fun Factor
- Trick a - Boo



Prof Uday Athavankar, IDC school of design



Fun Factor



Trick - a - Boo

## Designing game

Attempt -1

### Game design for children to learn colors spectrum

#### HOW TO PLAY

What you need:

- 10 Pieces of each color Violet, Indigo, Blue, Green, Yellow, Orange and Red ( 60 pieces total)
- A checkers board
- 2-6 players
- Age group 8-12 years

Objective:

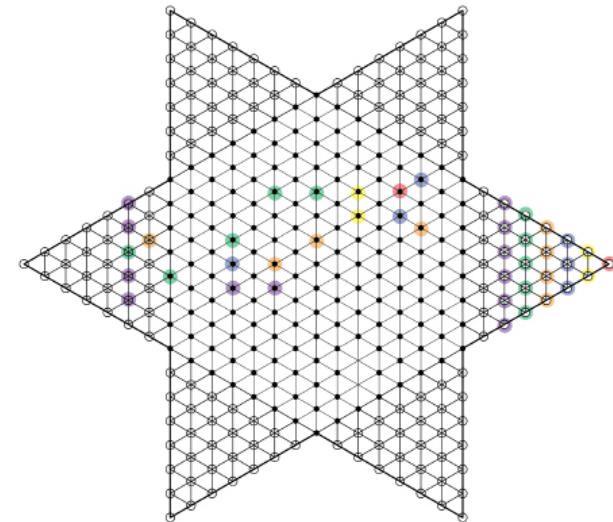
- To reach opponent's clan first.
- Use your opponents pieces to jump and create higher color value from his pieces
- Score maximum points

Constrains

- one can jump as many pieces in one turn, but only one piece in one jump.
- you can only move one piece in one turn

Why it didn't work

- The number of colors on board makes lots of confusion.
- The movement strategy contradicts the color gameplay, so can confuse more.
- Capturing opponent's clan can be restricted by not moving even by one piece.



Piece scoring according to wavelength

Red -7 points

Orange -6 points

Yellow -5 points

Green -4 points

Blue -3 points

Indigo -2 points

Violet -1 points

## Attempt -2

### Game design for children to learn additive and subtractive colors

#### HOW TO PLAY

##### What you need

- 10 Pieces of each color RGB AND CMYK
- A board of 8 x 8 grid
- 2 players
- Age group 8-12 years

##### Objective

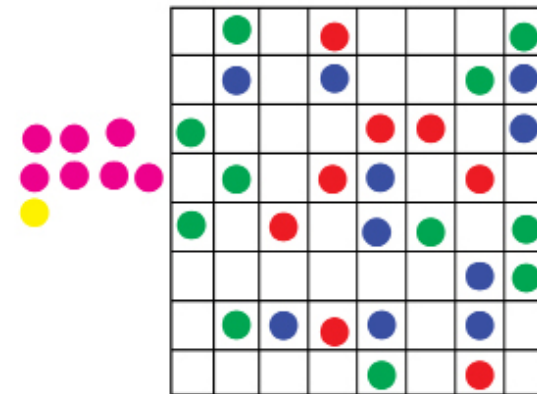
- To capture your opponent's tokens so that he can no longer Make three in a row. (In other words, until he has only 2 pieces left.)
- Create white or black color by combining 3 different pieces.
- Score maximum points.

##### Constrains

- one can jump as many pieces in one turn, but only one piece in one jump
- Can only jump over opponents pieces
- Place new color piece in place of jumped piece on board

##### Why it didn't work

- The movement strategy contradicts the color gameplay, so can confuse more.
- Focuses more on movement strategy than color gameplay



## Attempt -3

### Game design for children to learn additive and subtractive colors

#### HOW TO PLAY

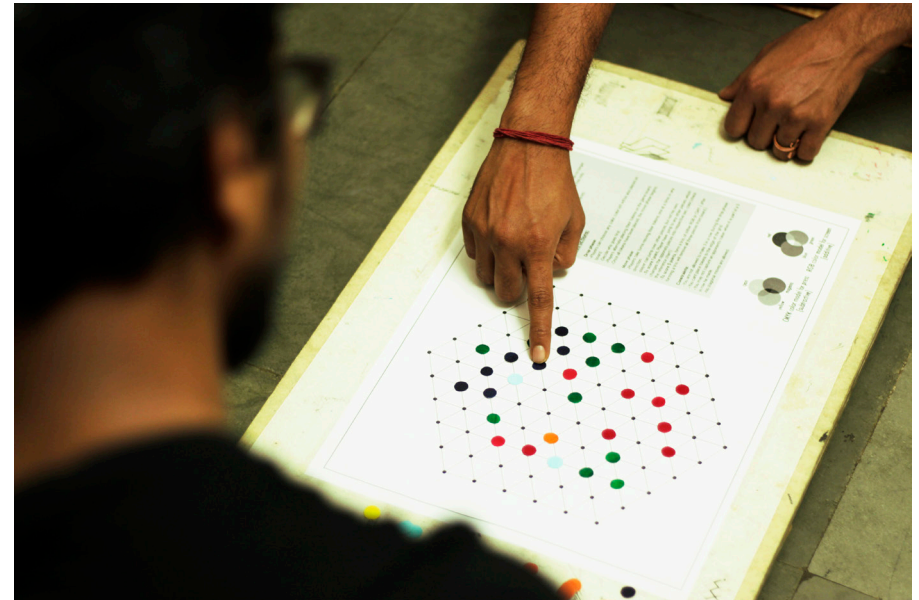
•

What you need:

- 10 Pieces of each color Red, Yellow, Blue ( 30 pieces total )
- A Hexagonal grid.
- 2-3 players
- Age group 8-12 years

#### Objective

- To capture your opponent's tokens so that he can no longer Make three in a row. (In other words, until he has only 2 pieces left.)
- Create white or black color by combining 3 different pieces.
- Score maximum points.



Subtractive color (CMYK)



Additive Color (RGB)

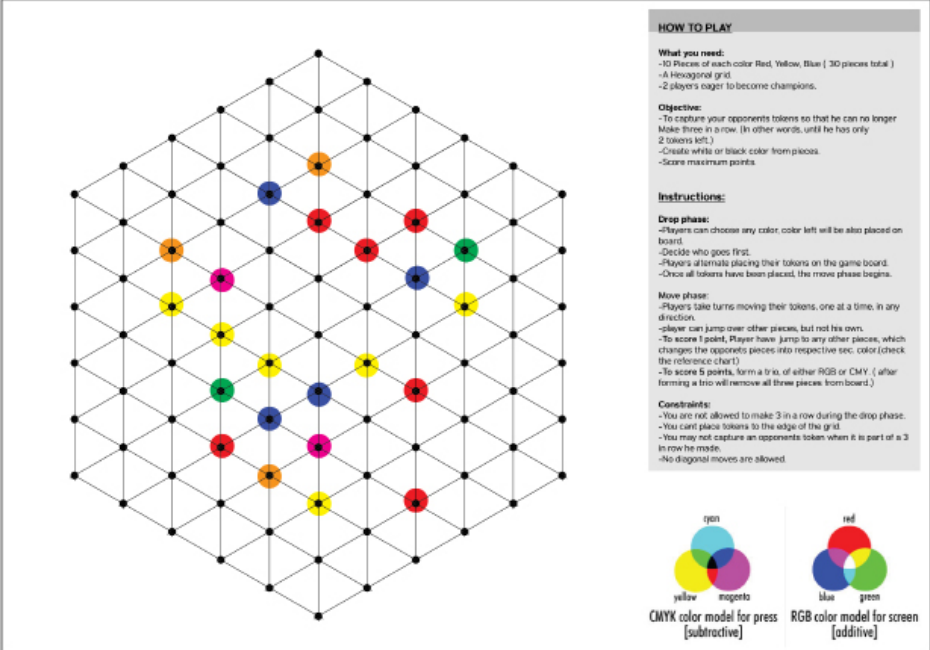
## HOW TO PLAY

### Drop phase

- Players can choose any color, color left will be also placed on board.
- Decide who goes first.
- Players alternate placing their tokens on the game board.
- Once all tokens have been placed, the move phase begins.

### Move phase

- Players take turns moving their tokens, one at a time, in any direction.
- player can jump over other pieces, but not his own.
- To score 1 point, Player have jump to any other pieces, which changes the opponent's pieces into respective sec. color.(check the reference chart)
- To score 5 points, form a trio, of either RGB or CMY.
- ( after forming a trio will remove all three pieces from board.)



**HOW TO PLAY**

**What you need:**

- 10 Pieces of each color Red, Yellow, Blue ( 30 pieces total )
- A Hexagonal grid
- 2 players eager to become champions.

**Objective:**

- To capture your opponents tokens so that he can no longer Make three in a row. (In other words, until he has only 2 towers left.)
- Create white or black color from pieces.
- Score maximum points.

**Instructions:**

**Drop phase:**

- Players can choose any color color left will be also placed on board.
- Decide who goes first.
- Players alternate placing their tokens on the game board.
- Once all tokens have been placed, the move phase begins.

**Move phase:**

- Player's take turns moving their tokens, one at a time, in any direction.
- player can jump over other pieces, but not his own.
- To score 1 point, Player have jump to any other pieces, which changes the opponents pieces into respective sec. color (check the reference chart)
- To score 5 points, form a trio, of either RGB or CMY. ( after forming a trio will remove all three pieces from board.)

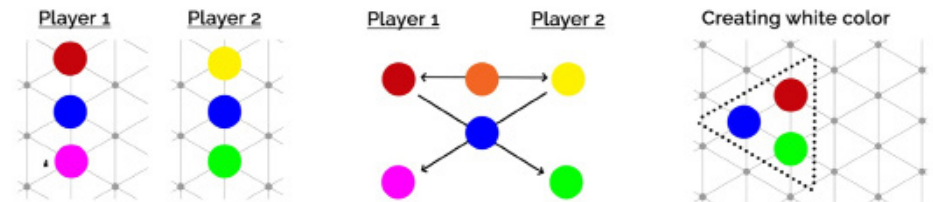
**Constraints:**

- You are not allowed to make 3 in a row during the drop phase.
- You cant place tokens to the edge of the grid
- You may not capture an opponents token when it is part of a 3 in row he made.
- No diagonal moves are allowed.

**Color Reference Chart:**

cyan	red
yellow	blue
magenta	green
CMYK color model for press [subtractive]	RGB color model for screen [additive]

Game board



**Player 1** (Red, Blue, Magenta) | **Player 2** (Yellow, Blue, Green)

**Player 1** (Red, Magenta) | **Player 2** (Yellow, Green)

**Creating white color** (A triangle of Red, Blue, and Green pieces forming a white triangle on the grid)

## Learning with hands

Learning and brainstorming with hands makes a direct impact on brain, the sense of touch and smell directly makes direct impressions on brains, which enhances the whole learning process,

Writer and artist, Austin Kleon says

"computers have robbed us of the feeling that we're actually making things. Instead, we're just typing keys and clicking mouse buttons. This is why so-called knowledge work seems so abstract".

he adds Computers are alienating because they put a sheet of glass between you and whatever is happening. "You never really get to touch anything that you're doing unless you print it out"

We need to find a way to bring your body into your work. Our nerves aren't a one-way street our bodies can tell our brains as much as our brains tell our bodies. You know that phrase, "going through the motions"? That's what's so great about creative work: If we just start going through the motions, if we strum a guitar, or shuffle sticky notes around a conference table, or start kneading clay, the motion kickstarts our brain into thinking.

"We don't know where we get our ideas from.  
What we do know is that we do not get them from our laptops."

-John Cleese



"I have stared long enough at the glowing flat rectangles of computer screens.

Let us give more time for doing things in the real world . . .

plant a plant, walk the dogs, read a real book, go to the opera."

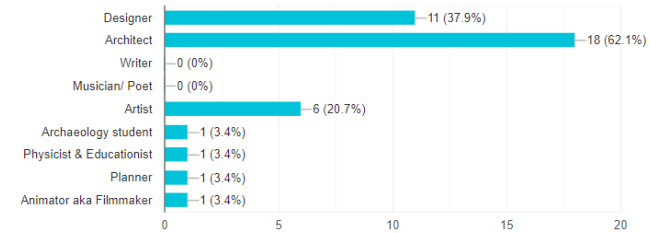
-Edward Tufte

## Questionnaire

### Physical book vs. E-Book

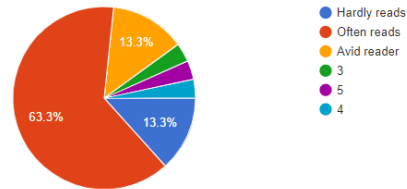
Designing a educational book is challenging, but when the targeted audience is designing and creative field based, it becomes more challenging than technical filed based audiences. So, I to seek more evidences in this direction, I create an on-line questionnaire for peoples from design and creative background, who seeks learning from their surroundings and outside world rather than computer displays.

### Screenshots of Questionnaire



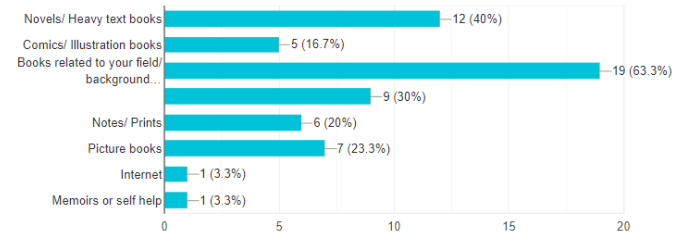
### How often you read ?

30 responses



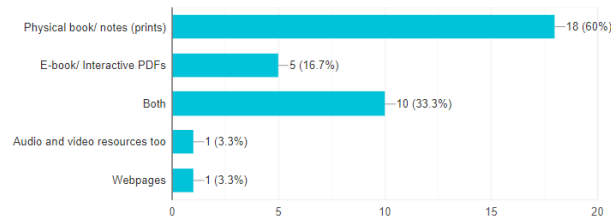
### what you usually read ?

30 responses



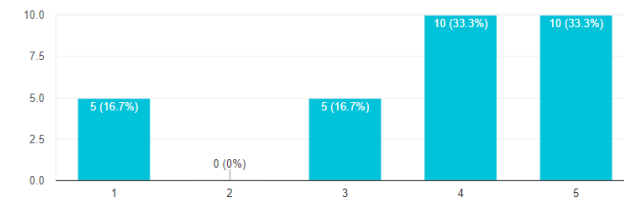
What medium you usually prefers ?

30 responses



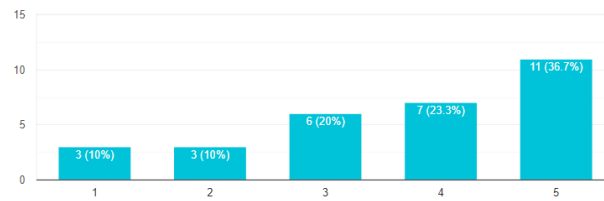
How much experience sense of 'smell and touch' matters to you, in books ?

30 responses



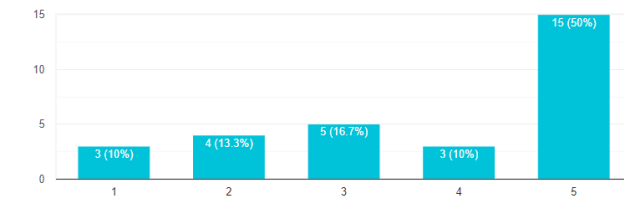
Does this 'experience' helps you in any way ( generating memory/feeling/ concentration) ?

30 responses



Do you like to add any element (bookmarks/ highlighting/papers/ scribbling / leaves) that helps you to interact better with your books

30 responses



## Inferences

From above stats we can see that, users prefers more books and physical contents over digital platforms, this gives a clear direction to our project.

**Final Design**

## Booklet of game design course

After making attempts, we were concluding what can be the best possible out execution of the course. It makes me clear what can be aligned with this course. Using game constituents and principles to create an environment like a game, and thinking user as a player itself going on a journey and learning with the gameplay

### Booklet design

- User Engagement
- Sensory experience can't be replaced.
- Sensory adventure of smell/ touch/ sound.
- Less distractions

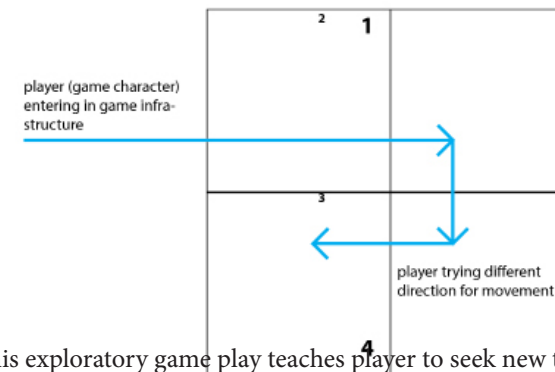
### What constitutes game ?

- Fun
- Interests
- Emerging conditions
- Challenges
- Instant feedbacks
- Uncertainty

### Mental modeling

People understand and interact with system and environment based on mental representation developed from experiences.

To first create a better experience we make a small model to follow by used to interact with our book framework. Usually book flips (moves) in horizontal direction, (vertical in case of sketchbook/album). but in our case it moves in all four quadrants. Like a character moves in game (moves forward, backward and then try to jump to seek new possibilities)



This exploratory game play teaches player to seek new things and learn faster and more strategically. With practising this will develop into a habitual activity.

## Shaping

Shaping technique is used to teach a desired behavior by reinforcing increasing accurate approximations of behavior. here we explore all three sizes with users.

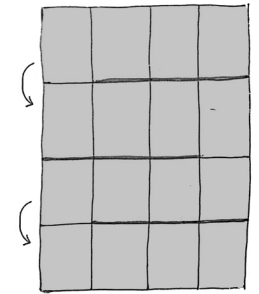
### Sizes for books



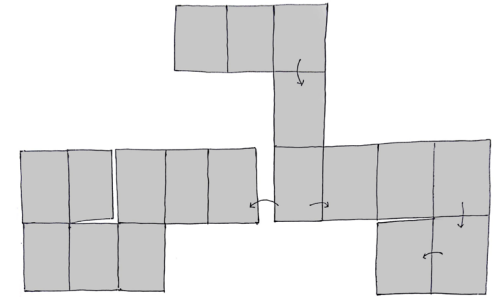
Hence, the portrait layout prove to be more feasible in terms of usability and experiences. the rectangular portrait size helps to make movement directional and reinforces shaping technique since most textbooks follow the same size layout .

We divide course in three parts according to the content, for our all three booklets we come up with three different layouts which becomes more complex as we precedes.

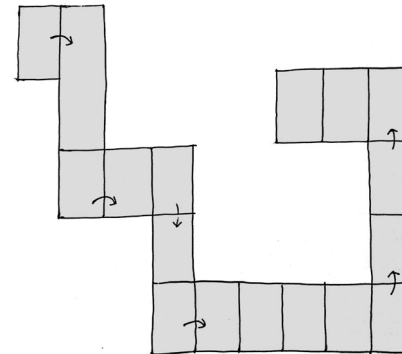
### Layout 1



### Layout 2



### Layout 3



## About the Booklet

The set of three booklets will leap a journey in game world which sets to be multi dimensional, and navigates inside with the help of graphic, semiotic and illustrations.

This booklet intends to introduce to the game principles and terminologies and how one can apply them in designing a educational game.

it also gives a idea of how physical, digital and hybrid games works. give insights of lots of games designed previously by students as a reference.

## Details of the Booklet

Size of the booklet: 16 X 22 cm

Number of pages: 32 pages

Binding: Accordion / Flipping

Cover: Hardbound

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## Typography

Heading **Learning from game design** 48 pts

Heading **Learning from game design** 24 pts

Body text the interactions between players that occurs during the play mode are two kinds interaction that are part of planned game play interation that happens in spite of game play. generally these are informal exchanges and involves fun, shouting, laughter and so on. 12 pts

List style the play mode are two kinds  
 1. Interaction that are part of planned  
 2. Interation that happens in spite of game play.  
 3. Interation that done by player by intention. 12 pts

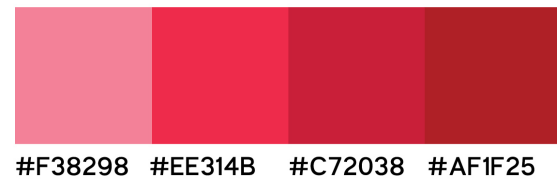
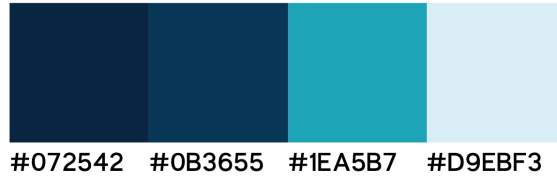
Call outs How game realy works ? 10 pts

Heading **Aa** Akzidenz Grotesk BQ Bold

Paragraph **Aa** Akzidenz Grotesk BQ Regular

## Color palette

### Primary colors



### Alternative



## Visual elements

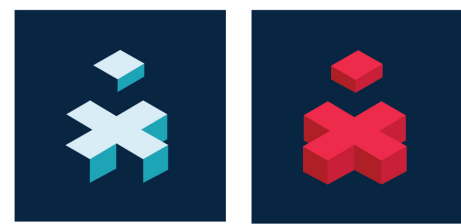
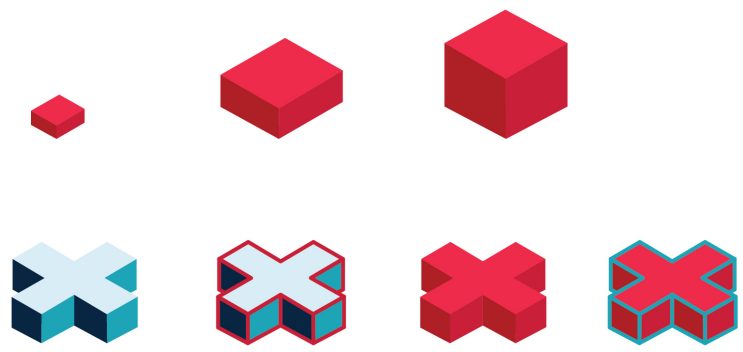
### 2 Dimensional



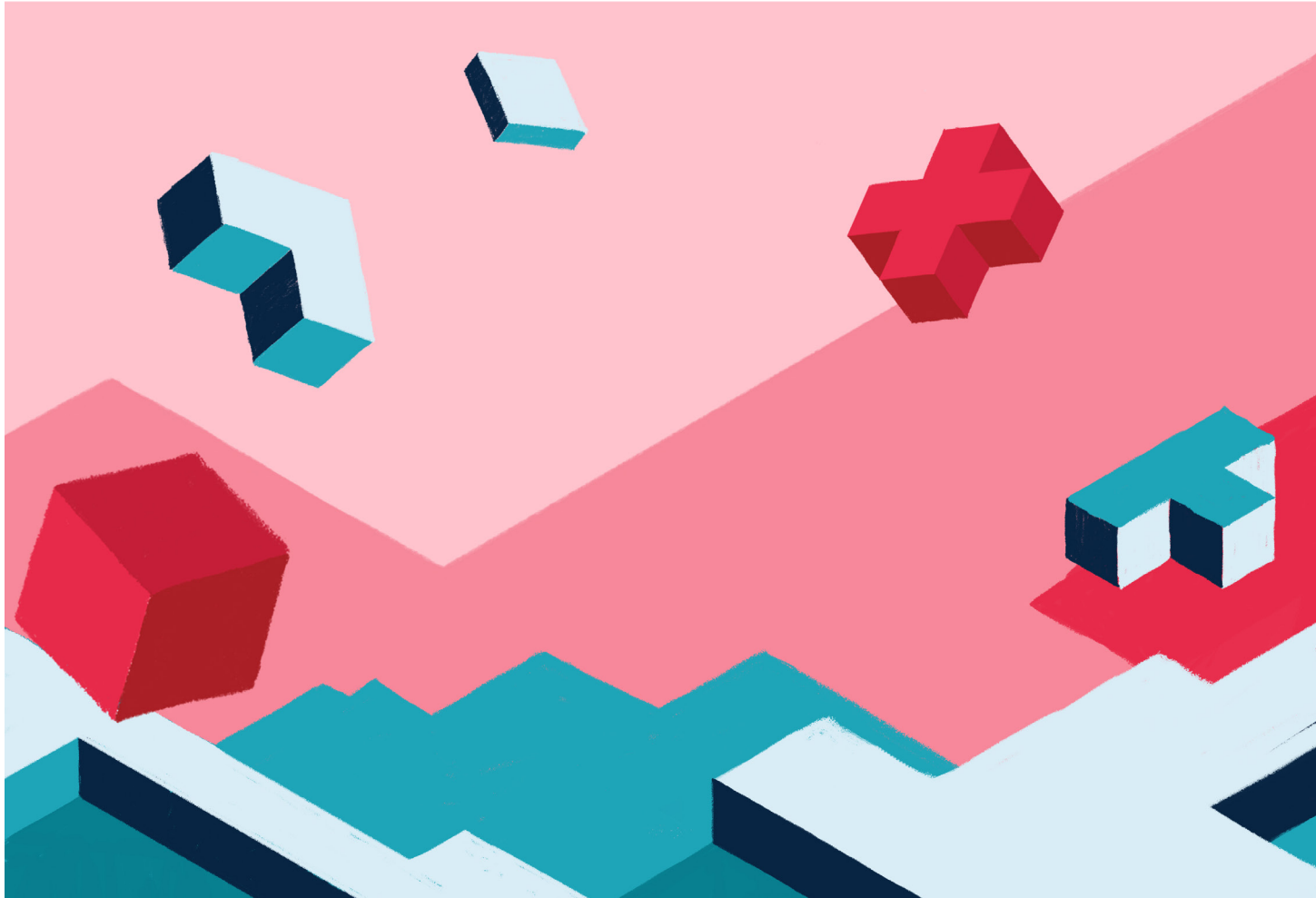
### Navigation

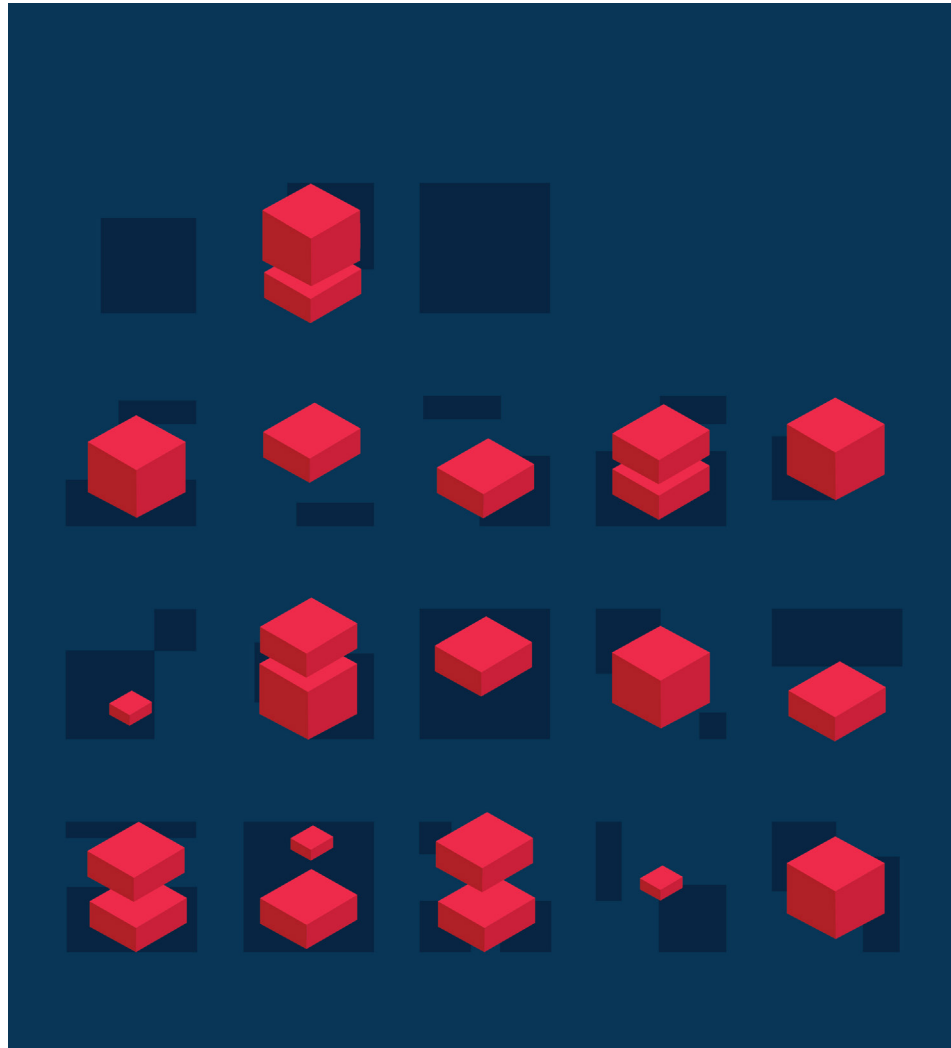


### 3 Dimensional



## Environment





## Bibliography

### Website References

- Udayathavankar, Experiments in Designing Games for Children  
: <http://www.udayathavankar.in/bio.html>

-Games are not just hardware, Talks by Uday Athavankar  
<https://www.youtube.com/watch?v=WnZ1QMprCzY&feature=youtu.be>

-Design for children one,  
<https://youtu.be/Nz2wAHUsOZA>

-Forbes: <https://www.forbes.com/sites/sindhujabalaji/2018/03/11/how-are-indias-biggest-edtech-startups-winning-students-by-treating-it-like-a-game/#5d46d3e66908>

-<https://mitpress.mit.edu/books/rules-play>

-<https://www.psychotactics.com/philosophy/>

-<https://www.verbaltovisual.com/visual-thinking-games-story-cubes/>

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