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# Digital Companion for School Students

Project 3

Guide

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Submitted in partial fulfillment of the requirement of the  
Degree of Master in Design by

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## Approval Sheet

The Report Committee for Interaction Design, Industrial Design Centre, IIT Bombay certifies that this is the approved version of the following report on Digital Companion for School Students by Kiran Prasanth R, 176330008.

Project Guide : 

Chairperson : 

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

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## Abstract

Age is the factor which categorizes people into Baby Boomers, Gen X, Millennials/ Gen Y, and Gen Z. Baby Boomers are the people who were born between 1944 and 1964. They are the eldest generation out of the four categories. Generation Z or Gen Z are the youngest of the four category. This group consist of children and youngsters today. All these categories are different to each other in many ways, event the way each group perceive technology in very different. There are people who had seen and hadn't seen a world before internet.

The project focuses on the relation between the current technology and school education in Indian context. This project analyses how much the technology can help the school students, learn and understand better, and do more in class, what all innovations can be brought in the education system through technology. Also, the project considers factors such as, at what age the school students should be given access to devices and Internet, encouragement of parents and teachers, pain points, help and support etc.

The project tries to bring a digital companion for the school students. It is a companion which helps the students to manage and organize day to day activities in class, gather information, clear their doubts. It also helps them create own tools for solving problems and provide a space to keep and access their data.

# Table of Contents

<b><i>Introduction</i></b>	<b>1</b>
• Motivation	
• The Problem	
• Target Users	
• Objective	
• Goal	
<b><i>Research Work</i></b>	<b>3</b>
<b><i>Primary Research</i></b>	<b>3</b>
<b><i>Secondary Research</i></b>	<b>10</b>
• Literature Review	
• Observations	
• Insights	
<b><i>Concepts &amp; Exploration</i></b>	<b>18</b>
<b><i>The Concept</i></b>	<b>20</b>
• Garrett's Model	
• Information Architecture	
• Wire-frames	
• Medium Fidelity Prototype	
• High Fidelity Prototype	
<b><i>Evaluation</i></b>	<b>34</b>
<b><i>Conclusion</i></b>	<b>35</b>
<b><i>References</i></b>	<b>36</b>

## Introduction

Today, digital devices and Internet have become very common in our country. We can see different devices, applications, services around, which serve various kinds of purposes. Individuals from 2 years old and above are getting access to digital devices everyday without any difficulties. People who are used to and not used to digital devices and internet are forced to adapt them in one way or the other. The emergence of internet brought many good and bad changes into the world along with it. Internet plays a major role in globalization and also influences our culture, education system, healthcare, infrastructure and many other areas. Today it has become very easy for us to share information with anyone around the world. An enormous amount of data, information and study materials are available on the internet. Today, it turns out that the technology knows more about us than we do ourselves.

The technology has made big changes in India. Each and everyone carries a smartphone or a feature phone along with them, especially youngsters. Some schools have also started using digital devices such as laptops and tablets for the education purpose. Many new tools and innovative methodologies are emerging in the educational field day by day in our country. We can see many applications, online services and various kinds of platforms are available in the market focusing on education.

This project looks at how technology can help the school students in their education, what all opportunities and innovation does the technology can bring for them. It also sees whether digital platforms make students become systematic, organized, understand better and participate in group activities, and do more in class. Field visit and interviews were conducted as part of the research. School students, their parents and teachers were interviewed during the process, and later the data collected was segregated to understand problems, get insights, design interventions and concepts.

The research conducted was based on the points below :

- Usage of Digital Devices and Internet.
- Help and Support from parents, teachers, and others.
- Rewards & appreciations, motivation, and feedbacks.
- Learning and understanding.
- After usage of textbooks and notebooks.
- Frustration points / Pain points.
- Encouragement of parents and teachers on using digital devices for students.

### ***Motivation***

The modern-day classroom is more centered on students, the teachers take on the role of facilitators and guides instead of being mere providers of knowledge. Also, the Digital transformation can have a profound effect on every aspect of the educational experience and new tools would emerge. Government of India had introduced many schemes and programs in E-content learning and also accessible technology, but in the area of school education for students, the activities performed are inadequate. Considering the change in technology today, it is evident that, the change can definitely help modify our education system and bring innovation into the future of classroom education in India.

### ***The Problem***

A lot of information, data and study materials related to the school education are available on the internet today. Different kinds of applications, websites, online services, etc. are there in the market for school students. The students are getting access to digital devices and internet in one way or the other. It has become very easy for students to get any data related to curriculum.

The identified problem

It's easy for school students to get the information they want, but there is no common space where they can keep all the information they find.

## ***Target Users***

The target users for the project are school students from class 8th to 12th, who are 13 to 17 years old.

- Reasons for choosing this particular age group is because :
- Parents are not able to help their children in their studies, once after they reach high school.
- This is the age where most students, start studying on their own.
- This is the time where most of the students start going for tuitions and they are in a need of extra help and support.
- Parents starts supporting the usage of digital devices by their children, under their guidance.
- Teachers moves away from being a point of knowledge to that of guidance.

## ***Objective***

The Objective of the project is to provide a space to save, segregate, organize, share and clear doubts. It should help students learn, understand, find & share knowledge and achieve more than what is taught in class. They should be able to access the data anywhere at any time.

## ***Goal***

The Goals of the project are as follows:

- Gather all the information and data collected in one space
- Manage and organize day to day activities at school
- Access data from any location at any time
- Personalize and build around each school student
- Promote teamwork/group activity
- Each one, teach one.

## Research Works - Primary Research

The project was started by doing a field research; going to different houses and schools, interviewing students, their parents and teachers. Questions for interviewing and a set of questionnaires were prepared. During the field visit, students studying in different classes were interviewed. One of the interesting areas which were found in between the field visit was the service of school on wheels, which functions in the Mumbai city. The name of the school is “The Door Step School”. The doorstep school has 6 buses which go to different locations in and around Mumbai and basic education is provided for the kids from the slums, who are not able to go to schools. The classes have their own timings, the class consisted of children of different age and the bus was their classroom (Fig. 1). The school provided the kids with food and uniform. The Door Step School provided the children basic education. The students were taught just the basics of mathematics (addition, subtraction, division and multiplication.), to read and write in Marathi, Hindi, and English. The curriculum and teaching methodologies were different from the other schools.

Separate questions and questionnaire were prepared for the teachers, students, and parents. The questions for the students covered points such as their hobbies & extracurricular activities, learning and understanding, pain points in education, group activity, motivations and appreciations, usage of the internet and digital devices, support from parents and others.

Most of the interviews were video recorded, the interviews taken in the schools with students and teachers were voice recorded and also written down. On the initial stage of the interview students from all classes were interviewed. (Fig 2)



Fig. 1  
The school bus which is the class room, is parked at its location while the class is happening. Students are divided in to groups and are given assignments.

1. Nikunj  
13 to 14 years old (9th std),  
Powai English medium School

---

2. Neeraj Patel  
16 to 17 years old (12th std)

---

3. Classroom of The Door Step School

---

4. Rahul Sahu  
12 to 13 years old (8th std)

---

5. Ravi Raju  
12 years old (8 th std)

---

6. Anand, 14 years old (9th std)  
Powai English medium School

---

7. Ved Vyas & Shubhranjan  
(10th std) Kendriya Vidyalaya  
(ONGC), Panvel

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8. Vinayak  
from The Door Step School

---

9. Annabelle  
12 to 13 years old (9 th std)

---

10. Anamika  
13 to 14 years old (9th std)

---

11. IIT Campus school, Powai

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12. Ved Vyas (10th),  
Kendriya Vidyalaya (ONGC), Panvel



Fig. 2 Some photographs taken during the field research

The information and data required to know through the interview and the questionnaire sessions were

- Can a digital device make the school students learn and do more?
- At what age should school students start using/ be given access to digital platforms?
- How much do parents and teachers encourage the use of digital devices by students?
- How much are these digital platforms helping the students in their education?

It was realized that the digital transformation can have a profound effect on every aspect of the education experience and new tools would emerge. And the impact it would create is that the students will be able to understand and learn more. It will help them in group activity, provide ease in exchange of data. It will help them become systematic and do more in class.

### Affinity Mapping

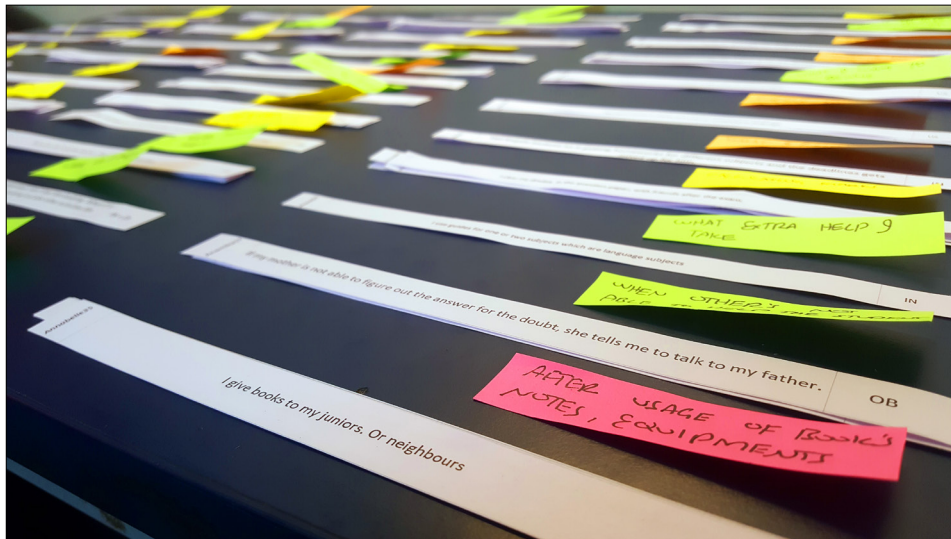


Fig. 3 Affinity Mapping

Affinity mapping helped to segregate the data properly, which was collected from the interviews, questionnaire, photographs, videos and voice recordings. This process showed the path to get to know the genuine problems, observations, and insights,

design interventions, some solutions, ideas, and concepts. Grouping of interpretations was done at 3 hierarchical levels to achieve design insights and come up with design ideas. Images of the process can be seen in Fig.4 & Fig.5.

Fig. 4 Affinity mapping level 1

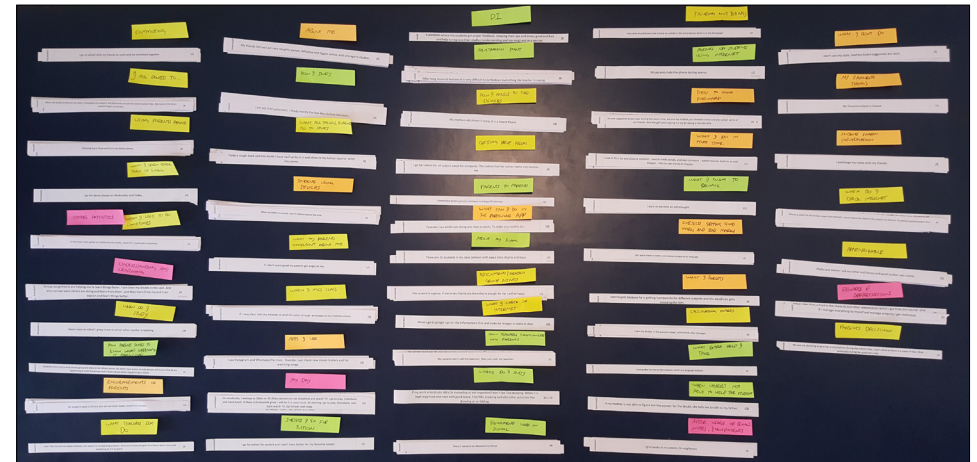
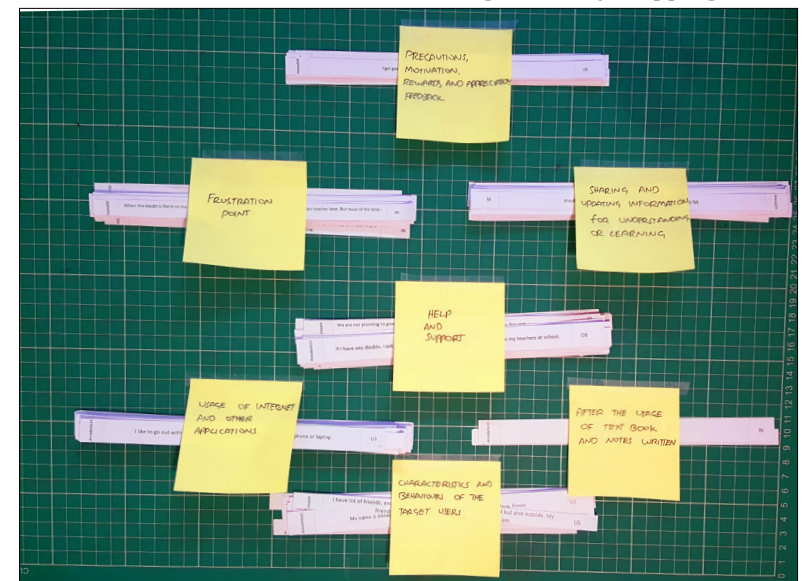
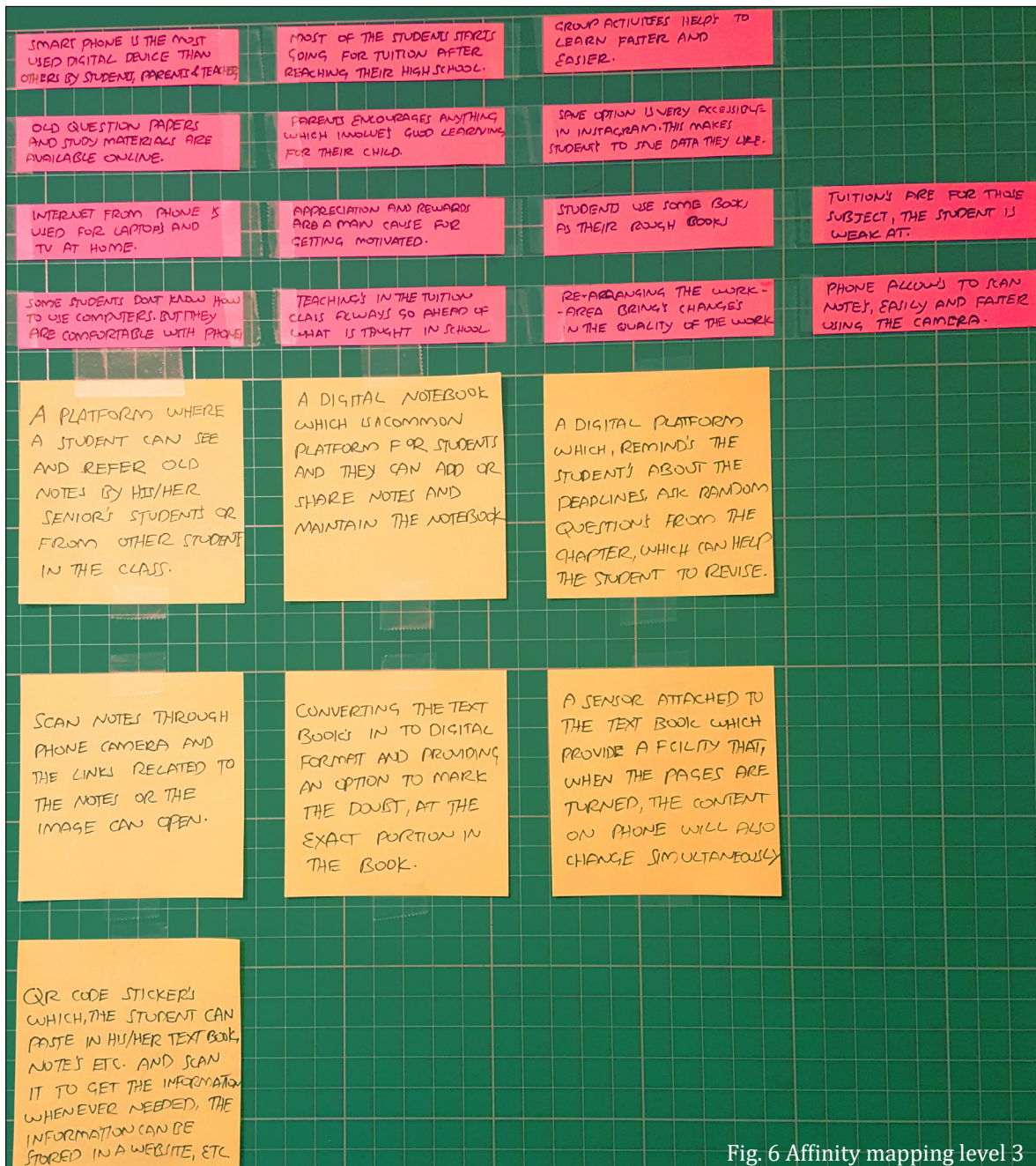


Fig. 5 Affinity mapping level 2





Design Insights

Design Ideas

Affinity mapping helped to distinguish between the data required and the unwanted ones. The collected data was grouped accordingly :

- Usage of Digital Devices and Internet.
- Help and Support
- Motivation, Precautions, Rewards/Appreciations, and Feedbacks
- Understanding and Learning
- After usage of Textbooks and notes taken down
- Frustration points / Pain points
- Applications using
- Sharing and updating

The Insights and concepts are shown in the Fig.6. The detailed output of each of the above category is provided in the following pages.

Fig. 6 Affinity mapping level 3

## Usage of Digital Devices and Internet.

### Observations

- Boredom is another main reason which forces students to use smartphones.
- Students prefer smartphones than laptops, phones are more comfortable and handy.
- Students and parents are aware of the offers and unlimited internet plans for phones.
- Students use the internet to clarify doubts and use it also as a reference.
- Students are not concerned about screen sizes.
- Students, parents, and teachers rely on WhatsApp for sharing and communicating with each other.
- Parents are ok with, children using their phones, but not for a longer duration.
- Parents get updated and are aware of the activities happening at school through the WhatsApp groups.
- Most of the students get their own phone which is their parent's old phone.
- Laptop or desktop computer is common for all homes, it's not personalized. But phones are personalized.
- Parents are ok with their child using a laptop than a smartphone.
- Parents and teachers communicate through WhatsApp.

## Help and Support

### Observations

- Ordered some books online to encourage the habit of reading in the child.
- Parents know about online platforms but they are only familiar with Byjus learning app.
- Most of the students use Byjus application because of their parents.
- Students stop using the application when they came to know it's a paid application.
- For parents it was difficult, to help their children in studies after they reached high school.

## Motivation, Precautions, Rewards, Appreciations, and Feedbacks

### Observations

- The things that motivate students are the rewards and appreciations gotten after answering a question, completing an assignment or project on time, taking

initiatives, helping other students and teachers

- Students collect notebooks and textbooks from seniors and try to study and understand the subject early.
- Students refer the borrowed notes, whenever they have doubts or use it as guides.
- The students calculates marks after giving an exam.

## Understanding and Learning

### Observations

- Students understand and learn better when they come and revise whatever that has been taught at school on that day itself.
- Arrangement of workspace affects the way students study
- Doubts don't come to mind immediately after learning, they come after understanding.

## After usage of Notes taken down and books

### Observations

- Parents keep the old textbooks and throw the notebooks away.
- Empty pages of old notebooks are used or the book is used as rough book.
- Students borrow notebooks from their seniors to study in advance or to use as a reference whenever needed.

## Frustration point

### Observations

- Teachers give lots of notes and do not explain everything from them.
- After long hours of lectures, it is very difficult to write down everything the teacher said.
- When the question paper is not discussed by the teacher after the exam.
- When the teachings at tuition and school don't go parallelly.
- When students cannot check attendance percentages, performance review etc.
- When there are no proper notes.
- When the doubt is not asked to the teacher at the right time.
- Searching for a place to write down the doubts and later facing the difficulty to find it.
- Unavailability of textbooks in the beginning of the academic year.

- When the exam dates are near
- When a student forgets to do the assignment or forgets about any class test and forgets to study for that.
- When a student has to study more than one subject at the same time, especially during exams.
- When a student does not like a teacher.

### Applications using

#### Observations

- It is the parents who install all educational applications for their child.
- Whatsapp, youtube, Instagram, Facebook. Byjus learning app is forced by parents.
- Students who uses instagram have a habit of saving a post which they like.
- Students who have their own phone keep the phone also aside if they are studying using textbooks. So that when they have any doubts or need to get more information, he/she checks them online.

### Sharing Information's and getting updated.

#### Observations

- Whatsapp is preferred for communication and sharing informations by the students, teachers and parents.
- There are whatsapp groups with
  - teachers and students,
  - teachers and parents,
  - parents and parents,
  - students and students,
  - teachers and teachers. But a group with parents and students, also with all the three does not exist. This is because of the matter of privacy.
- Teachers in school use educom and projector to show video demonstrations while the tuition teacher access the internet to show demonstrations.
- Photos of the notes are taken and kept in the phone gallery only, no separate folder is created for these notes.
- Scanning is very eas<sup>l</sup>y in phone because it is easy and quick to open camera on a phone and click a picture.
- If more than one students have the same doubt, it is cleared in a group activity easily and faster.

### Help & Support

#### Observations

- Siblings help, teach and learn from each other.
- Tuition teacher is more approachable than a school teacher because there is a common space for student and to clear his/her doubts.
- Students rely on whatsapp to clear doubts and share
- Students get more ideas and a clear picture while he/she searches through internet.
- It is difficult to ask doubt through phone and show which specific portion is the doubt about. So student take pictures, mark the portion and send it through whatsapp.
- Students use guides or CD which consist of video demonstration.

### Insights

- Syllabus question papers and study materials are available online which are provided by the school itself.  
\_\_\_\_\_
- The internet used for laptop and TV is from the phone.  
\_\_\_\_\_
- The phone is used more than other digital devices by students, parents and teachers.  
\_\_\_\_\_
- Some students are not really good with computers but they are very comfortable with phones.  
\_\_\_\_\_
- Most of the students start going for tuitions after reaching their high school.  
\_\_\_\_\_
- Parents encourage anything which involves learning for their child.  
\_\_\_\_\_
- Appreciation and Reward are the main cause of getting motivated.  
\_\_\_\_\_
- Teaching in tuition is always ahead of what is taught in school.  
\_\_\_\_\_
- Updating/ changing the work area brings change and quality in the work.

- Clearing student's doubts should be free.

---
- Students use some notebook as their Rough Book.

---
- Frustrations are happening when they don't know what to do next or in which direction to move forward, not having a proper plan, getting stuck somewhere and no access to help.

---
- Students saves posts which they like because of the 'save' option is very accessible and to keep the post in to a group is very easy. and fast.

---
- Group activities help learn and understand faster and easier.

---
- The phone allows to scan notes easily because of the camera.

---
- Tuitions are for those subjects in which the student is weak.

### ***Design Ideas***

The design ideas and opportunities for design got after the affinity mapping are :

1. The ideas got after are take care of after the secondary research in this report

---
2. The platform where a student can refer the old notes by the senior students or from the other student's in-class notes.

---
3. A digital notebook which is a common platform for Students and they can add or share notes and maintain the notebook.

---
4. A digital platform which reminds the students about deadlines, asks random questions from the chapter which will help the student to revise.

---
5. Scan notes through phone camera and the links related to the note or the image will open.

---
6. Marking the exact portion which have doubt.

## Research Works - Secondary Research

### Literature Review

[1]Age is the factor which categorizes people into Baby Boomers, Gen X, Millennials/ Gen Y, and Gen Z. Baby Boomers are the people who were born between 1944 and 1964. They are the eldest generation out of the four categories. People in this generation are 55 to 75 years old today. Generation X which is called as Gen X are those people who are 40 to 54 years old, born between 1965 and 1979. Generation Y / Gen Y also known as the Millennials consist of people who are born between the year 1980 and 1994, these people are currently 25 to 39 years old.

Generation Z / Gen Z includes today's children, teenagers and youngsters who were born between 1995 and 2015 and their age is from 4 to 24 years old. Gen Z is called as the Gen Tech, Post- Millennials, I Generation, Gen Y-Fi etc.

The media consumption of each category is shown in Fig 7

*“We don't go online anymore, we live online. We need to think beyond customer journeys and map the moment in our target customers day/ moment that matter and ask- How will we deliver value at that moment ?”*

*- Jemy Dishler  
(VP of product management at Google)*

[3]Generation Z is those born between 1995 and 2015. Some papers and journals mention the Gen Z is born between 1990 to 2010 or 1993 to 2005. There is variation in the years but still, most of the people who under Gen Z are youngsters who are below the age of 24.

### ***Baby Boomers 10, 16 italic***

- Television
- Radio is highly consumed
- Reads a lot.
- 90% of them have a Facebook account today.

### ***Generation X (Gen X)***

- Watch television a lot.
- Most of them have a reading habit.
- Heavy Facebook users and Bloggers.
- Blogs are the favorite form of content.

### ***Generation Y / Millennials***

- 95% people still watches TV.
- but increasingly cutting the chord for streaming option.
- Uses Smartphones but more comfortable with computers.
- Generation to which, Internet and social media were introduced.

### ***Generation (Gen Z)***

- 41% of this category spends at least 3 to 6 hours a day online.
- Addicted to smartphones.
- Hadn't seen the world before Internet.
- This generation was exposed to the internet and distinct devices at a young age.

( Data from [2 ]Boomers, Gen X, Gen Y, and Gen Z Explained )

Fig.7 Media consumption of different generations

[Journal of individual psychology, Vol 71, no 2, summer 2015. By the university of Texas Press.]

[4] Generation Z or Gen Z is the generation which hadn't experienced life before the internet. This is one reason they are also called as I- Generation, Net- Gen, Digital Natives. Today the generation which is from 2 to 16 years old, the children and the current teenager from the Gen Z category are also called as "The Screen Agers". This is because they are the generation which were born when laptops, smartphones, flat TV, tablets etc. were and are part of their life completely.

[1] [4] Generation Z: Technology and Social Interest by Antony Turner focuses on the people who fall under Generation Z, individual psychology, Adlerian, Social Media, their relationship with technology, parenting etc. One of the unique features about Gen Z is that they are the only generation which has lived in the era with advanced technology that too in their young age.

[Prensky 2001, Digital Natives, Digital Technology]  
Flat television, Laptops, Tablets, Smartphones, Internet, Social Media, application, Virtual reality and other different kinds of platforms are enormously available and accessible for Generation Z.

### ***Strength of technology***

[1] [5] No Generation has demonstrated a level of proficiency or comfort with technology at such an early age as Generation Z.  
(Palley, 2012)

[1] [6] Social Media has the potential to encourage forums that can facilitate both the formation of public opinion and civic participation  
(Bers, 2010).

[1] [6] Computers can be used in a very positive way, to provide and an outlet for meeting new people, to share artistic tastes, to keep up with family and friends across the globe, to mobilize civic protests, to find romantic partners and even to gain therapeutic support through online and E-mail therapy  
(Bers 2010).

[1][7] Teachers are using technological resources to enhance classroom learning

experiences  
(xigoquins, Yuankun and xiaofeng, 2013)

[1][8] These educators continue to increase access to technological devices, such as the iPad, because of their mobility and multitasking capabilities  
(Pilgrim, Bledsoe & Reily, 2012).

[4] [Digital Natives and Digital Immigrants by Mark Prensky focuses majorly on two kinds of people. The first kind includes people who were born before the era of internet and adapted using the technology, the people who include in this category are mostly millennials. Prensky had called them as the Digital Immigrants.

[4] The other kind those who were born in the digital age or the post-digital age after the emergence of the internet and other technologies. These include some percentage of millennials, Gen Z and Screen Agers. They are the ones who develop and speak the new language of the digital age.

[4] Mark Prensky states that the current education system is not suitable for the students today who are the digital natives, it's time to bring a new education system looking at the students who had changed radically. [4] About the educators, Prensky says that "We need to be thinking about how to teach both legacy and future content in the language of digital natives. The first involves a major translation and change of methodology; the second involves all that new content and thinking its not actually clear to me which is harder " Learning new stuff" or learning a new way to do old stuff" I suspect it's the latter.

### Existing Products

During the empirical research, it was also noted down that which phone does user have and the specifications were noted down later. Fig. # shows the details of the phones which the target users have access to and their specifications. This was done to observe mainly how comfortable is the user with the screen size and other features. And also these details can help in the concepts especially in the area of visual design.

The table below Fig.# consists of the details of smartphones from parents, teachers, and the students.

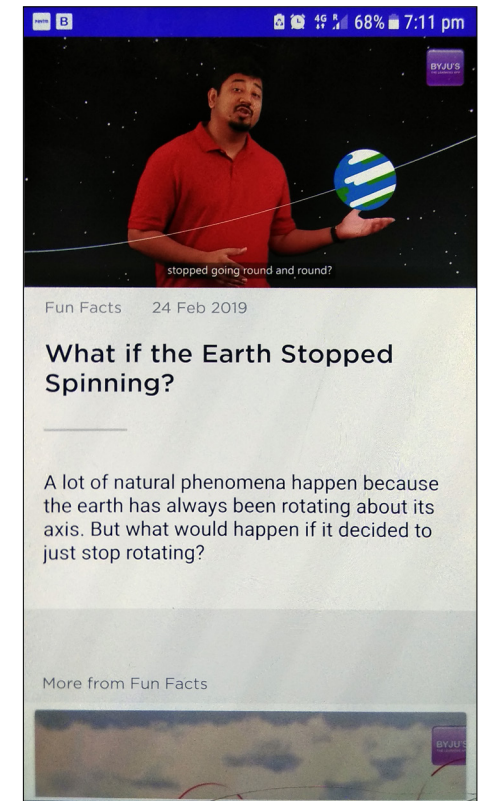
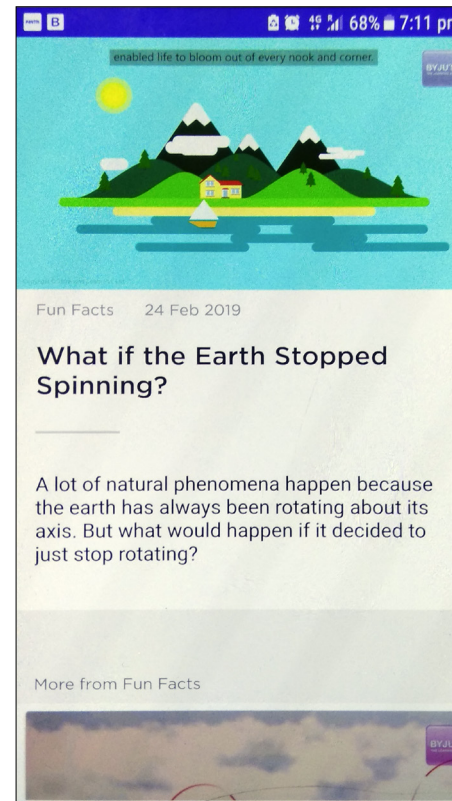
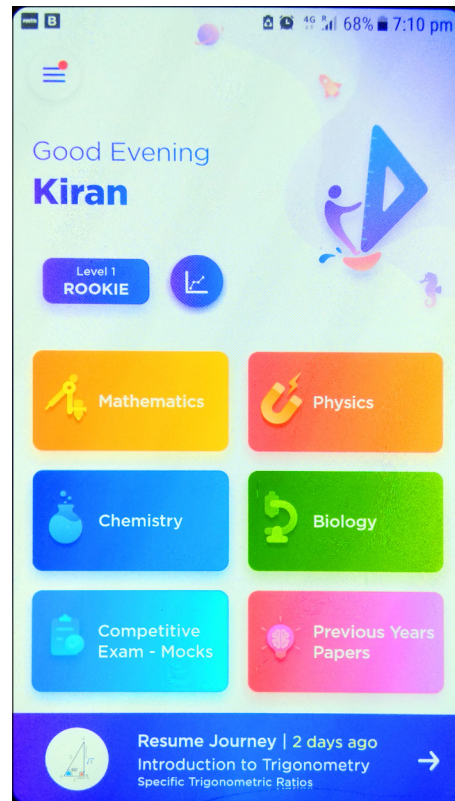
Phone	Operating System	Screen Resolution Width x Height	Pixel Density	Pixel Per Inch
Samsung A5	Android	720 x 1280	100% MDPI	294
Samsung J7	Android	1280 x 720	100% MDPI	267
Oppo F1	Android	1280 x 720	100% MDPI	294
One Plus 2	Android	1080 x 1920	100% MDPI	401
Sony Xperia Z1	Android	1920 x 1080	100% MDPI	441
Xiaomi Redmi Note 3	Android	1920 x 1080	100% MDPI	403
Samsung Galaxy S8	Android	2960 x 1440	100% MDPI	570
Microsoft Lumia	Windows	1440 x 2560	100% MDPI	564
One Plus 6	Android	1080 x 2280	100% MDPI	402

Data regarding the specification is taken from SCREEN SIZ.ES

Link : <http://screensiz.es/>

Fig.8 Phone screen sizes

Fig.9 Screenfrom Byjus Application



## Byjus App

Byjus App is a learning platform for school students, and this application offers the learning program in maths and science for students from 4th to 12th class. The Byjus app allows students to learn, practice, analyze, revise, prepare for exams including other external / entrance exams.

During the empirical research it was observed that, every student and their parents knows about Byjus learning platform. And most the time, it is the parents who installs the application for their child. Most of the advantages and disadvantages got from parents, students, teachers and from other sources

The advantages and the disadvantages are as follows :

### Advantages

- The demonstrations are through video format. Explains the content and concepts using visualization techniques such as animations (2d and 3d).
- Devices such as tablets are provided by this service for the paid version.
- The student get to attend quiz and test regarding his/her syllabus.
- Being an online platform, student can access Byjus app from any place through smartphone or other devices.

- Different versions of , same application are available considering different users.
- Byjus application is a platform which is suitable for the education system in India, they are considering all education boards.
- Gives provision for children in 11th and 12th to prepare further. For example, IIT JEE, AIPMT, IAS, CAT, etc.
- The application provides a service for interacting, asking doubts, attending courses taken by professionals.
- Tests and other practices sessions are available after finishing one chapter in the application.
- Students are able to learn and understand faster through the video demonstrations, animations and other features provided by the application.
- For the paid version of the application, they provide equipment and other study materials to the students. The artifacts include tablets, guides, links, books, and access to their own library.
- Have a good library with thousands of books in PDF format, which is only accessible for the paid users.

### *Disadvantage*

- Byju's learning app is not available in any other language other than English.
- After learning one chapter, students have to attend test and practices, after that only he/she can access the next chapter. This is making the students not able to study systematically along with whatever taught in their classroom.
- The explanations and demonstrations are only through the videos made by Byjus App. The applications are not supporting the feature of sharing other links related to the topic in the application.
- Difference in interface design of the desktop version and the smartphone version, the dissimilarity between the interface design and the current textbooks of the

subjects bring about a discomfort in students to relate or to find the same content in the textbook from the application.

- Student cannot save data, share, takes a screenshot anywhere in the application.
- Some phones do not support this application, so students/parents had to uninstall the app. The children's version which contains 2D and 3D animations has lots of bugs and perform very slow in some phones.
- Considers only maths and science. Avoided the language subjects and social studies etc.
- ICSE, 11th and 12 class students face difficulty in using this Byjus App because the data provided to them is incomplete. Video demonstrations for every subject or some chapters are not available.
- Students cannot access videos or other demonstrations at any time. Once the student completes one task, they have to wait for some time, it can be a day or more than that.
- The application provides timings for test and to get access to some of the features, students are forced to wait until that particular time.

## Connected Classroom

Connect Class Room is an application by Unidocs for students. This is an application which should be used inside a classroom and work together. At the same time, this application connects a teacher with students using internet. This application is recently used by tuition centers. Advantages and disadvantages are as follows:

### Advantages

- Connects teacher and students through an online platform.
- The teacher can track the activity of each and every student.
- Works in a classroom or in any other space.
- Brings everyone in one single space and makes it easy to work together.
- One can write anywhere on the interface and the teacher can evaluate and live tracking facility is provided for teacher.
- Each student doesn't have to get their textbooks or other notes, the students just have to open the app in the device.

### Disadvantages

- The application works only on tablets and wont work offline.
- Difficult for the teacher to track many students at the same time.
- One cannot work on the application on different devices from different locations at different timings.
- Homework, assignment, etc. are not given through this application because it's meant for a live activity. Many constraints are there.

Fig.10 Teachers version of Connected classroom app

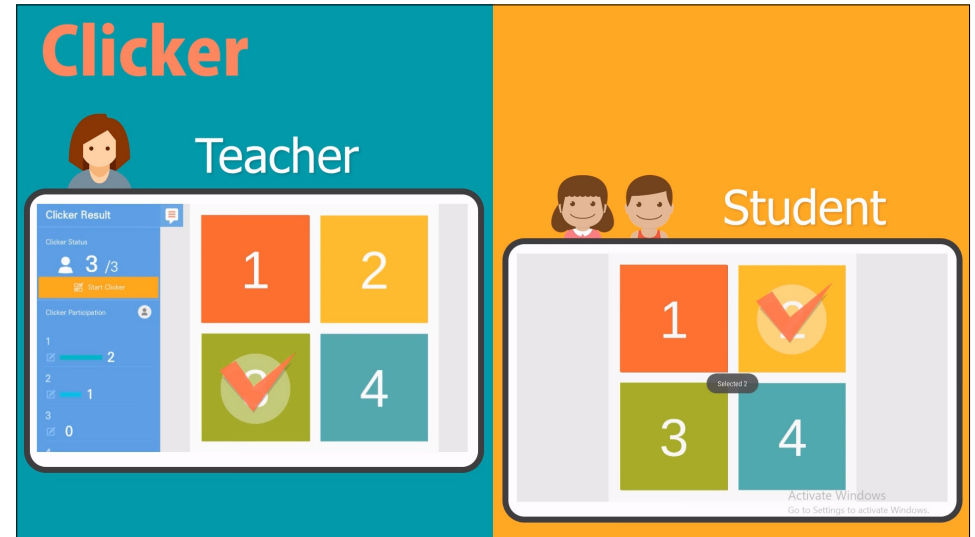
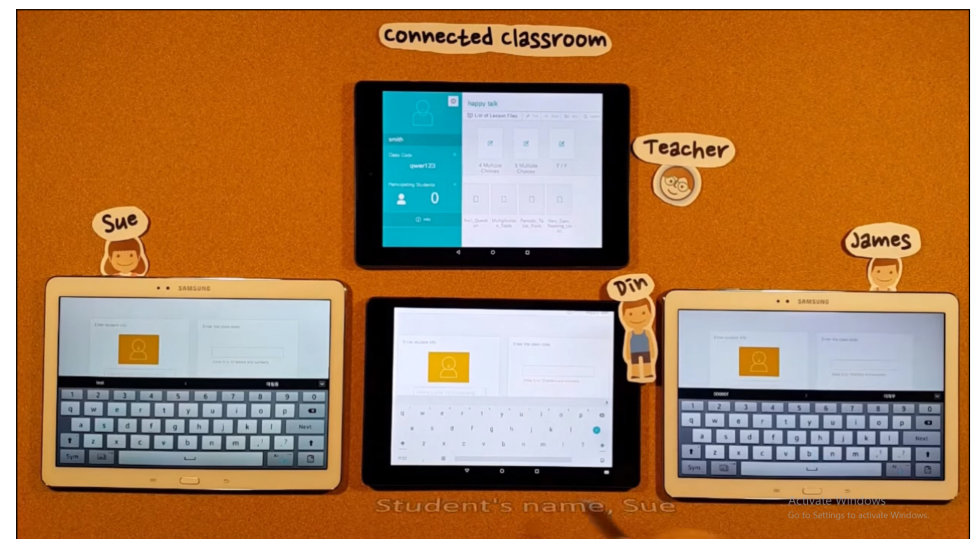


Fig.11 Students version of Connected classroom app



Many applications regarding school curriculum and syllabus is available in Google playstore. These is no limitation in getting an application related to the education but the problem which was observed was most of the application serves the same purpose. and some of the application doesn't work in every smartphones. It is very difficult for people who uses Apple; I-Phone to find an educational application. The Fig 14, it is shows the list applications for school students.

During the field visit, it was observed that the students uses guide books also. Some students uses Video CD's which contains video demonstrations in it (Fig. 12). Demonstration videos related to the syllabus are also available in online. Many of these videos can be found in Youtube and other websites. The source which provides this video demonstrations CD's, most of them runs a website also. Students can access those website to get more informations (Fig.12)

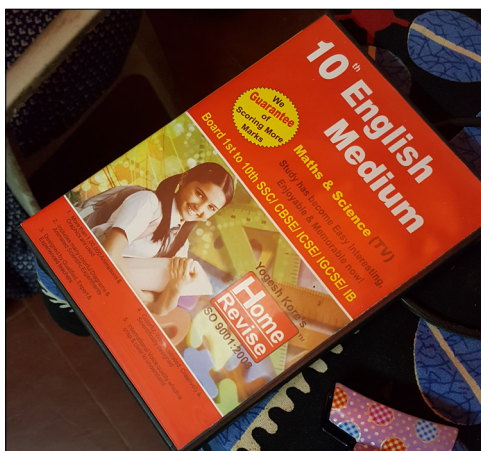


Fig.12  
Video demonstration CD's



Fig.13  
Video tutorials from youtube for school students

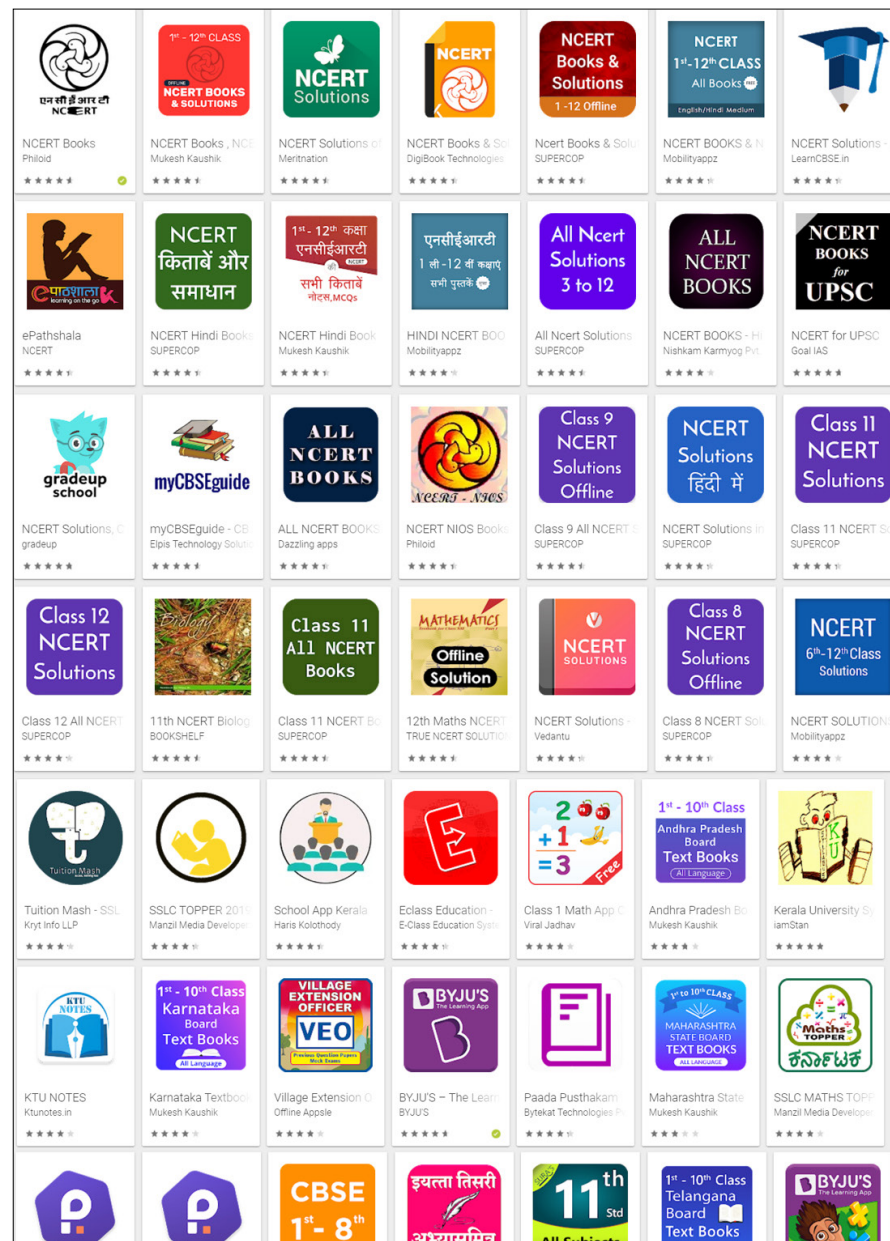


Fig.14  
List of application for school students from Google Playstore

Mind-mapping done before the concept development and exploration

TUTORIALS MULTITASKING  
STUDENTS ASSIGNMENTS ATTENDANCE  
ORGANISED PHOTOS MARKING TUITION PROJECTS EVENTS  
HOLIDAY TEACHERS CLASSES VACATIONS ROUGH NOTES  
JUNIOURS INTERNET FRUSTRATION PARENTS DEBATE INSTRUMENTS  
GADGETS BAGS PERMISSIONS GUIDES AGE SPACE EXTRA CLASS  
BEHAVIOURS LEARNING PRECAUTION PAIN POINT CONVOCATION INTREST  
DOUBTS DIARY EXAMS SCHOOLS TEST GRADES AWARENESS FORGET  
VOLUNTEERANG SHARING TEXTBOOKS EXCHAGING FAIL SENIOURS  
LANGUAGE UNDERSTANDING MOTIVATION LAPTOPS COMMUNICATION FEEDBACKS  
GIRLS CLASS SEARCH BOYS PLANNING  
FAIL PAST RECORD PEN EDUCATION BORROWING REWARDS  
CALENDAR REPORTS EVALUATION NOTEBOOKS PUNCTUALITY CLASSROOMS  
LECTURES TRUST PARALLEL COURSES MARKS PUNISHMENT COMMUTING  
PLANNING PRACTICAL NOTES SYSTEMATIC INDOOR OUTDOOR  
THEORY MEETINGS TIMETABLE LABORATORY SAFTEY TECHNOLOGY SPORTS  
MOBILE PHONES EXHIBITION CURRICULAM MEMORY BUNKING DEADLINES FRIENDS  
HOME WORK STUDY APPLICATIONS SUBJECTS GROUPACTIVITY BOREDOM  
EQUIPMENTS SYLLABUS FREE PERIOD MOVIES ABSENT CLASSTIMING  
COMPETITIONS OPEN DAY



## Concept 2

The concept 2 was decided to execute using sensors. These sensors will be placed on the sides of the pages of the text book. When the pages are turned one by one, the data in the phone will change accordingly, showing the information related to that particular screen.

This concept can be executed in many different ways but the number of disadvantages is more than advantages because, always a third element is required to be with the user other than the book and the phone. And the current technology is not able to support.

Some of the ways to execute the concept 2 are:

- 1) Using QR code.
- 2) Using NFC / RFID Reader
- 3) Placing the phone or a camera vertically and scanning the provided symbol.
- 4) Placing an ultra sonic sensor which include emitter and receiver.

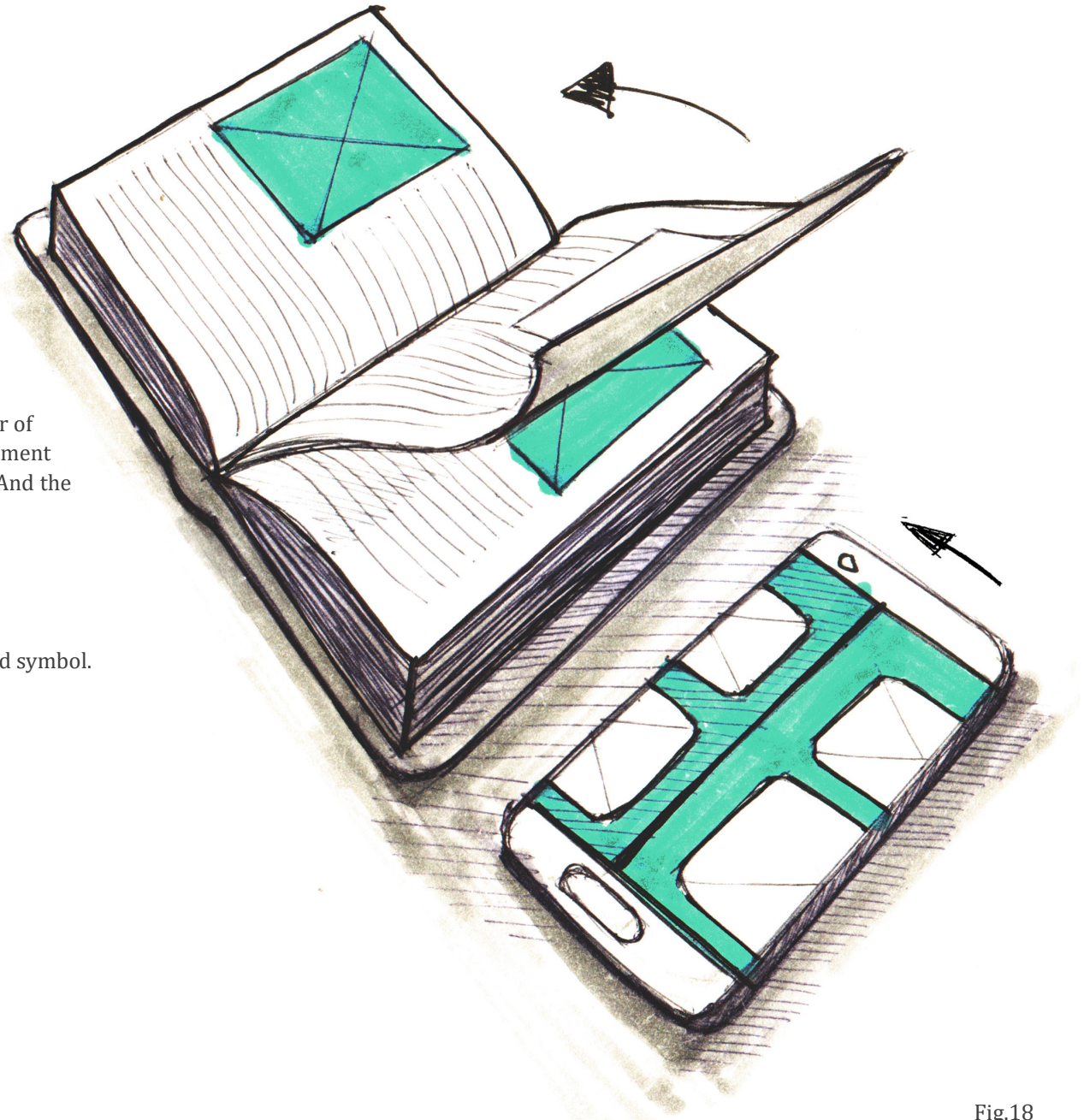


Fig.18  
Phone changing the information according to the page

### Concept 3

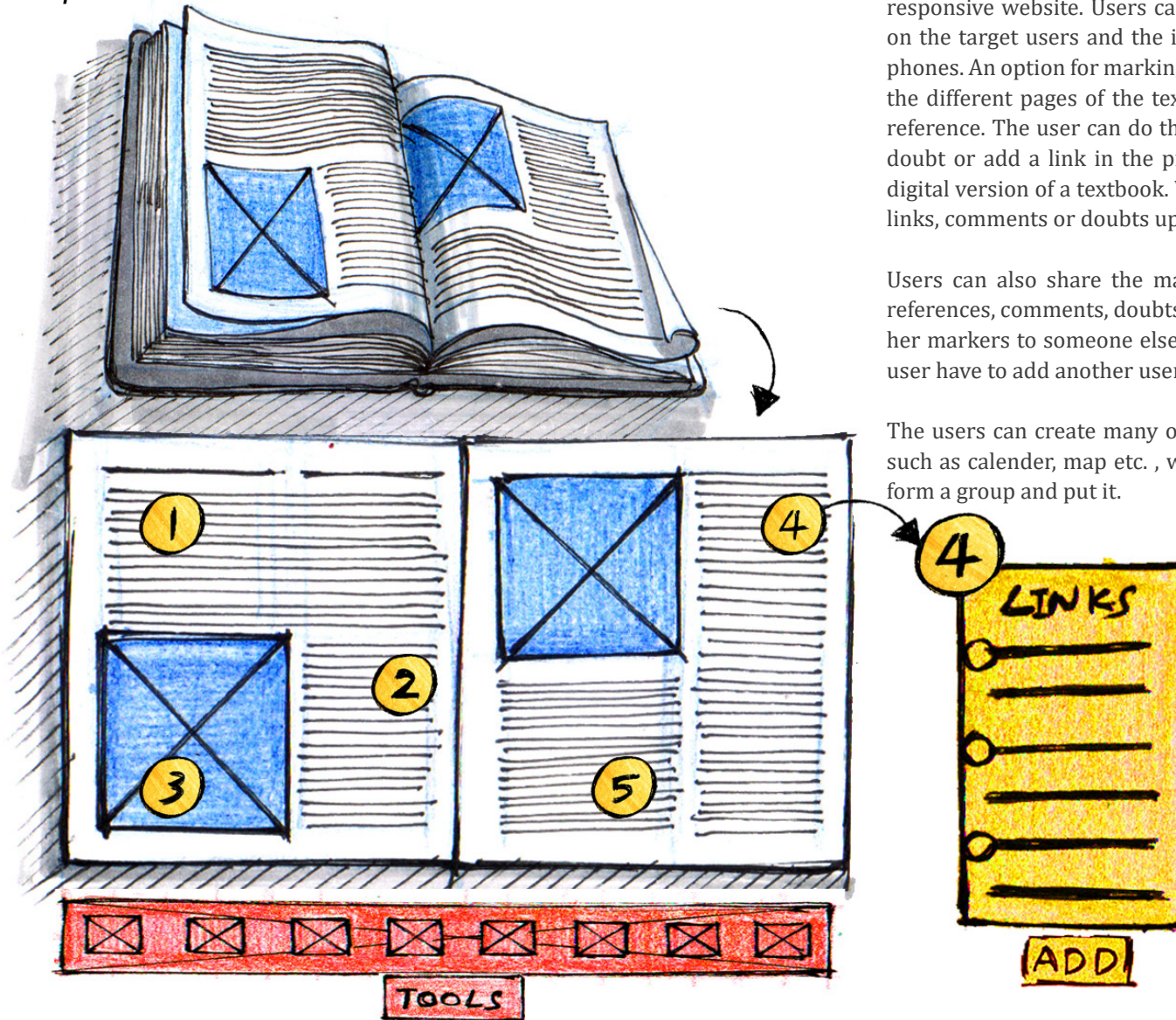


Fig.19 Digital textbook with markers on it.

Concept 3 is the selected concept for the project. This concept works on online platform. The PDF version of textbooks from all the subjects will be uploaded in a responsive website. Users can access this platform using any devices. But focusing on the target users and the insights got, this concept will be facing towards smart phones. An option for marking will be provided for the user. The user can go through the different pages of the textbook. If he/she faces a difficulty or wanted to add a reference. The user can do that by opening the marker, mark the place and add the doubt or add a link in the provided space. The Fig. 19 shows the markers on the digital version of a textbook. When the marker is clicked, it elaborate and shows the links, comments or doubts uploaded by the user.

Users can also share the marker created to other. And also can get the links of references, comments, doubts etc from other users also. The user can only share his/her markers to someone else, if he/she is in the phone contact list. This is how the user have to add another user for sharing data.

The users can create many other groups inside the markers. Users can make tools such as calender, map etc. , what ever needed for a particular activity, the user can form a group and put it.

## Garrett's Model

Jesse James Garrett is basically a User Experience Designer and founder of the strategy and design management firm called Adaptive Path. In 2002 Jesse James Garrett wrote a book called "The Elements of User Experience" [10]. The book was suppose to be meant for web design. In the book, Garrett introduced the five layers of user experience, later this was known as the Garrett's Model[#]. Today, the Garretts Model is adapted in Industrial design, Software Development etc. The five layers of the Garretts Model (Fig 20.) are :

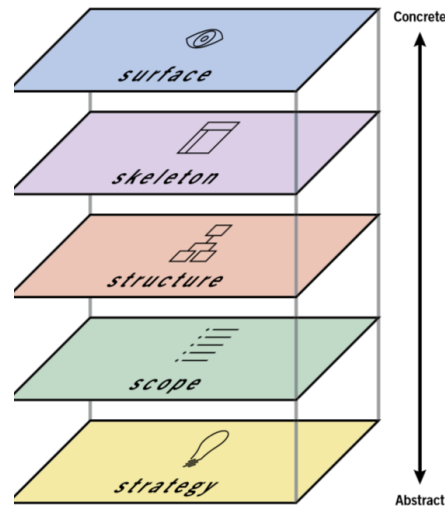


Fig. 20 Five Layers of Garretts Model [10]

### Surface

Visual Design, Visual Identity (Colour, Theme, typography, Icons, Logo), Photographs, Video, Sound, Animations etc.

---

### Skeleton

Wire-frames, Layouts, Placement, Arrangement, Interface, Navigation, Look & Feel.

---

### Structure

Interaction Design, Information Architecture, Categorized content, hierarchy.

---

### Scope

Features, functions, services, facilities, content.

---

### Strategy

Interviews, User Needs, Objective, Goals.

### Strategy

- Promote teamwork/group activity.
- A space to save, segregate, organize, share and clear doubts.
- Learn, understand, find & share knowledge and achieve more than what is taught in class.
- Get access to the data from anywhere at any time.

### Scope

- Textbooks available in digital format
- Mark the exact place where the user have doubts on the digital textbook.
- Gather all the information and data collected in one space.
- Manage and organize day-to-day activities at school.
- Access data from any location at any time.
- Personalize and build around each school student.
- Each one teach one.

## Structure

1) LOGIN / SIGNUP  
2) MY PROFILE  
3) SETTINGS  
CAMERA  
SUBJECTS  
CHAPTERS  
MARKERS  
ADD MARKERS  
UPLOAD  
ADD NOTES  
ADD TO NOTES  
DELETE / REMOVE  
ASK DOUBTS  
CLEAR DOUBTS  
QUIZE  
QUESTIONS  
ANSWERS  
DOUBT CLEARED  
COMMENT  
ADD LINKS  
SHARE  
EXTERNAL LINKS  
ROUGH BOOK  
SAVE / PIN  
SAVED ITEM'S  
EVALUATION  
LOGOUT  
UPDATE  
TOOLS  
ADD LINKS AS TOOLS  
~~CHAT BOOK~~  
CHAT BOX

PROGRESS GRAPH  
IMAGES  
~~VIDOS~~  
VIDEOS  
PDF FILES  
WEBSITE  
APPLICATIONS  
SCANNED IMAGES

The core content of this concept lies in the hands of three simple micro interactions. They are Markers, Doubts and Tools. These three options comes under the same family but their objective is different. Some common advantages and disadvantages of these three features are :

### Advantages

- Can save/store data
- Maximize and minimize according to the requirement.
- Users can share these three options to any other user who have been given access.
- If given access, anyone else also can come and put any of these option and go.
- Even if the three options serve different purposes, the can be brought under the same visual language and interaction.
- Can move around the digital text book
- Applicable on every subjects.
- Can be placed at the exact place where the user is having a doubt, difficulty, etc.
- Can share data within these options itself.
- Comment option is provided for all three options.

### Disadvantages

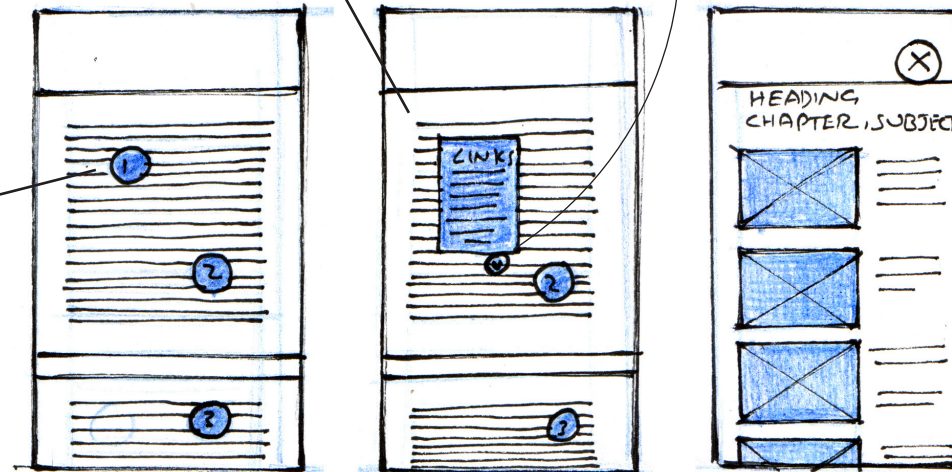
- User can switch between these options but cant use more than one option at the same time. This is because, it can create lot of cluster in the small screen
- The three options are depended to the camera feature.
- If two options are already placed. it becomes confusing and difficult when a third option is kept between the both. This causes difficulty in naming and also affects the others which are already placed.

List of features comes under each option of markers, doubts and tools

Markers / References	Doubts	Tools
<ul style="list-style-type: none"><li>- REFERENCES OR MARKERS</li><li>- LINKS</li><li>- THUMBNAILS</li><li>- HEADING</li><li>- GROUP LINKS</li><li>- PAGE NO.</li><li>- CHAPTER NO</li><li>- SUBJECT</li><li>- CAMERA</li><li>- UPLOAD</li><li>- DOWNLOAD</li><li>- DELETE LINK</li><li>- SHIFT THE LINK TO TOOLS</li><li>- SHARE MARKERS</li><li>- CANCEL</li><li>- ELABORATED VIEW</li><li>- CLOSE</li><li>- COPY</li><li>- PASTE</li><li>- BACK BUTTON</li><li>- DESCRIPTION</li></ul>	<p>DOUBTS</p> <p>HEADING</p> <p>PAGE NO.</p> <p>COMMENT / REPLY</p> <p>ADD DOUBT</p> <p>ADD COMMENT / REPLY</p> <p>MY DOUBTS</p> <p>OTHER'S DOUBTS</p> <p>DELETE REPLY</p> <p>DELETE DOUBT</p> <p>SEND DOUBT TO INDIVIDUAL(S)</p> <p>SERIAL NO. OF THE DOUBT.</p> <p>DOUBT CLEARED.</p> <p>SELECT THE APPROPRIATE COMMENT</p> <p>BEST ANSWER.</p> <p>NUMBER OF DOUBTS IN - CHAPTER</p> <ul style="list-style-type: none"><li>- SUBJECT</li><li>- HEADING</li></ul> <p>CAMERA</p> <p>UPLOAD</p> <p>DOWNWAD</p> <p>SAVE DOUBT / REPLY</p>	<ul style="list-style-type: none"><li>- TOOLS</li><li>- GIVE A NAME TO THE TOOL</li><li>- SHARE TOOLS</li><li>- ADD TOOL</li><li>- REMOVE TOOL</li><li>- GROUP / FOLDER</li><li>- LIST OF TOOLS</li><li>- MOVE TO MARKERS</li><li>- LINKS</li><li>- SCANNED ITEMS</li><li>- ICONS / THUMBNAILS</li><li>- CHANGE ACCORDING TO SUBJECT</li><li>- CAMERA</li><li>- SELECT</li><li>- UPLOAD</li><li>- DOWNLOAD</li><li>- DESCRIPTION / COMMENT</li><li>- SUBJECT</li><li>- CHAPTER</li><li>- HEADING</li><li>- SERIAL NO</li><li>- SAVE TOOLS</li><li>- SHUFFLE</li><li>- PAGE NO.</li></ul>

## Markers

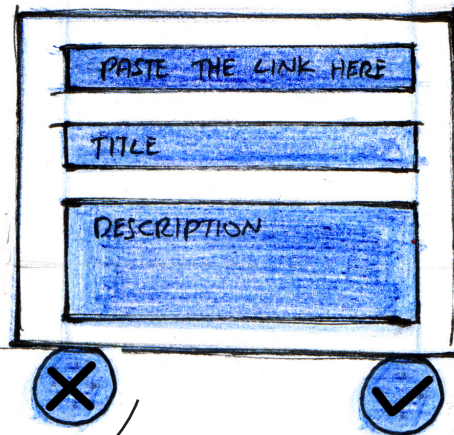
When the users turn on the markers, the markers appears like this on the screen above the digital textbook



When the Marker icon is tapped, it elaborates and shows the links which is attached in that particular portion of the chapter.

There is an icon placed below the container which allows the user to elaborate and view in another page with thumbnails

When the user long press on the digital textbook, many options comes including copy, remove marker, add marker. When the user selects add marker and dialog box appears as seen here..



The user have to paste the link of what he/she needs as a reference, then add title and give a description if needed. Then confirm or decline

When we move out of the subject with the marker option still on, there is an option which says view all markers.

The user can choose whatever to view all markers marked in the chapter or on the whole subject.

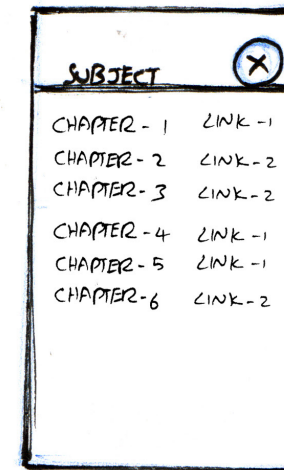


Fig. 21 Functioning of Marker Button

## Doubt

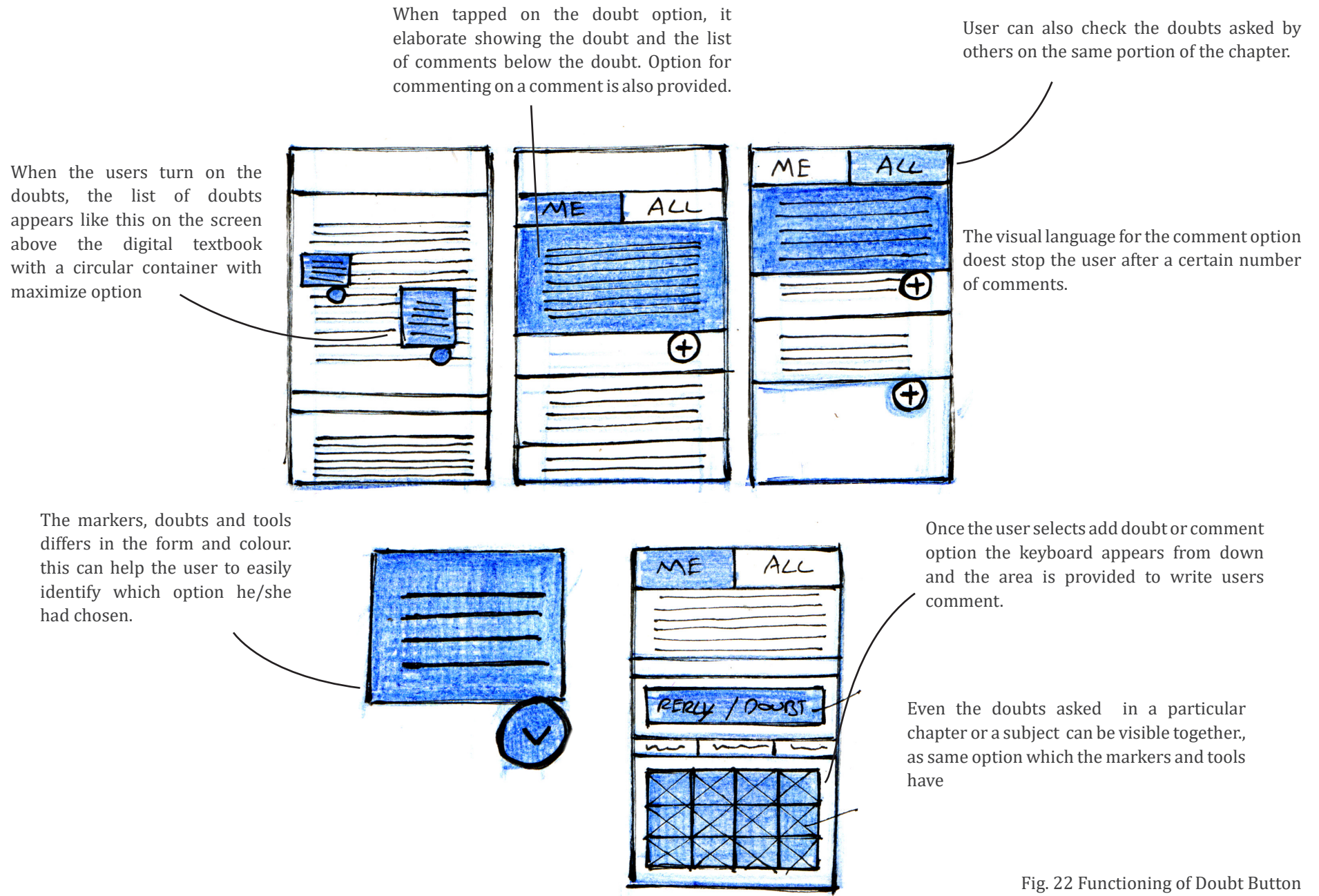
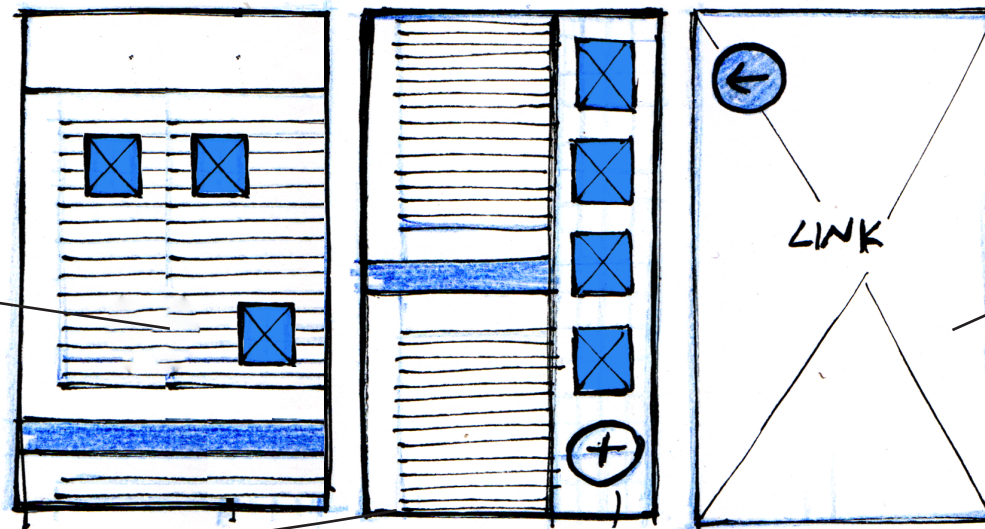


Fig. 22 Functioning of Doubt Button

Tools

User can create his/her own tools. It can be a calendar, timetable, a link, video, image, a marker etc.

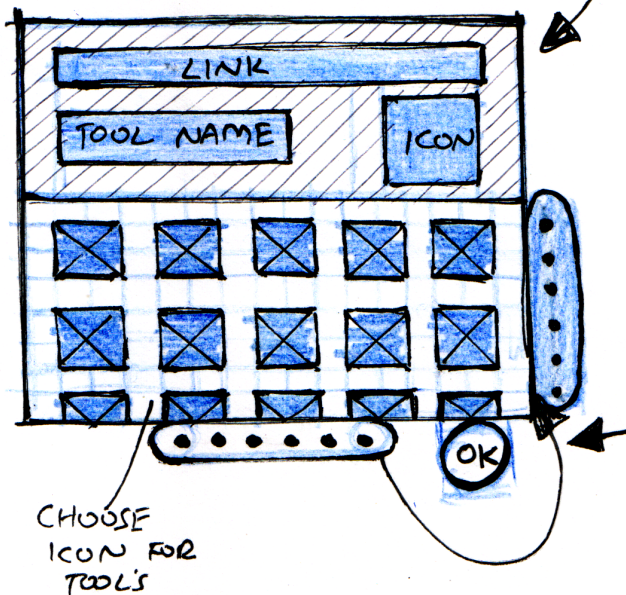
Tools also follows the same language as other. Tools changes according to the change in the page, chapter or subject.



An external link can be also placed as a tool. The tools option is also provided with a scrollable container, this makes the user to access every tool easily.

While adding a new icon. The link has to be pasted above or if it is an image, it can be uploaded. and the user can give an icon from the icon gallery. And later it can be shared to other users.

If there is more number of tools. pages with pagination appears according to the group the user had put them.



CHOOSE  
ICON FOR  
TOOL'S

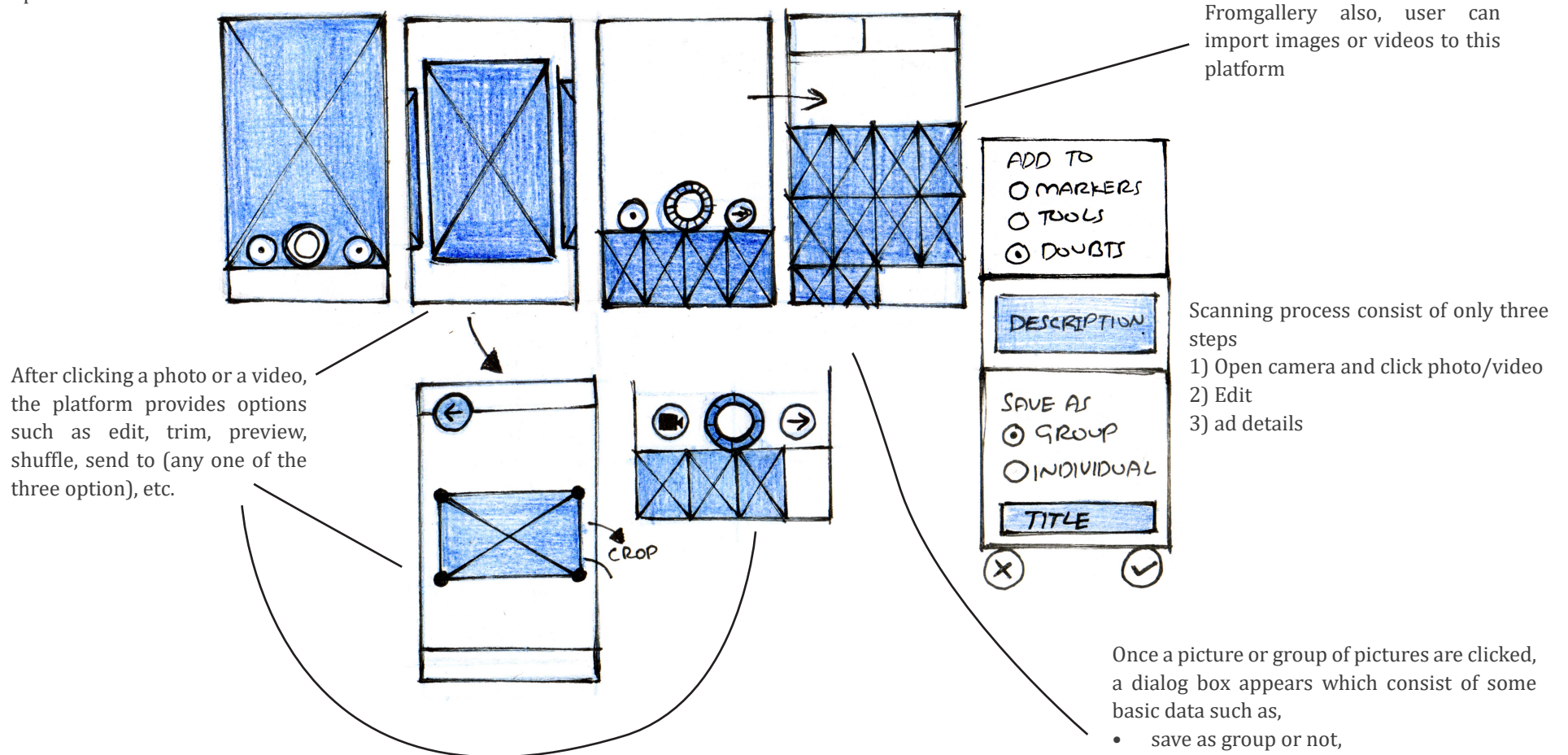
Fig. 23 Functioning of Doubt Button

## Camera

User can open the camera inside the platform or use it and share the image or video to any of the three options.

User can open the camera inside the platform or use it and share the image or video to any of the three options.

While the user is using the digital textbook, with or without any of the three options the camera is accessible easily for scanning.



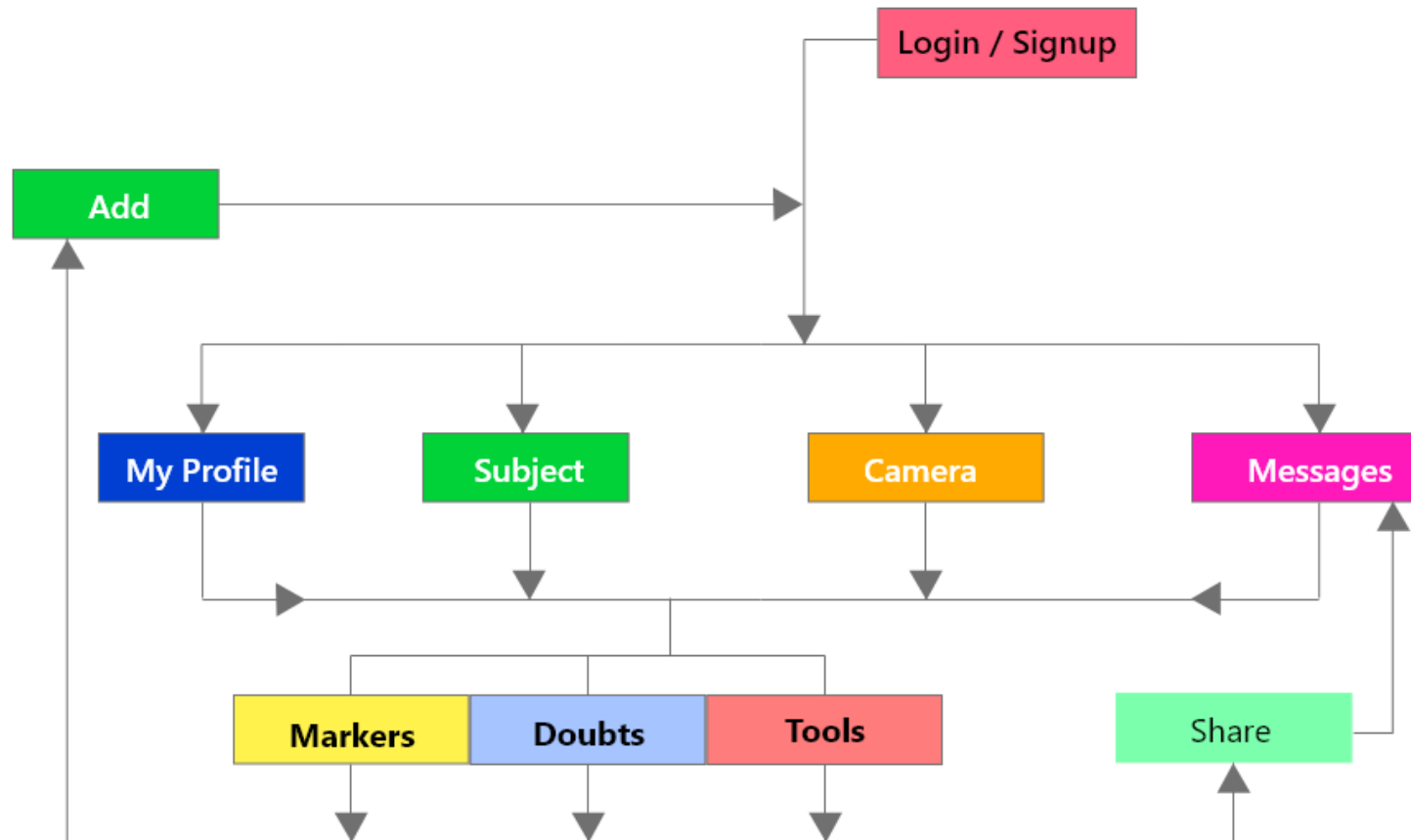


Fig. #

# Information Architecture (with Details)

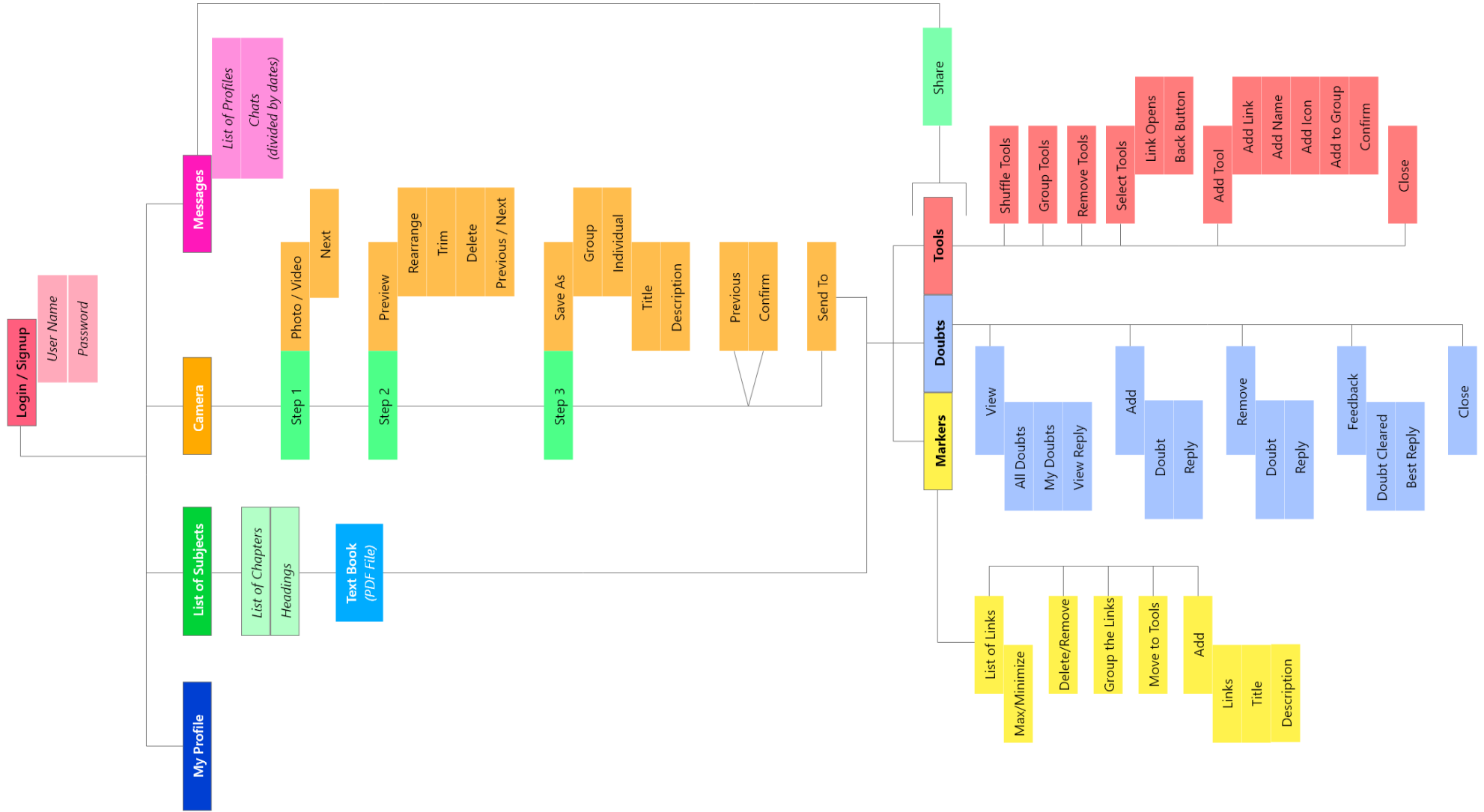


Fig. 25 Functioning of Doubt Button

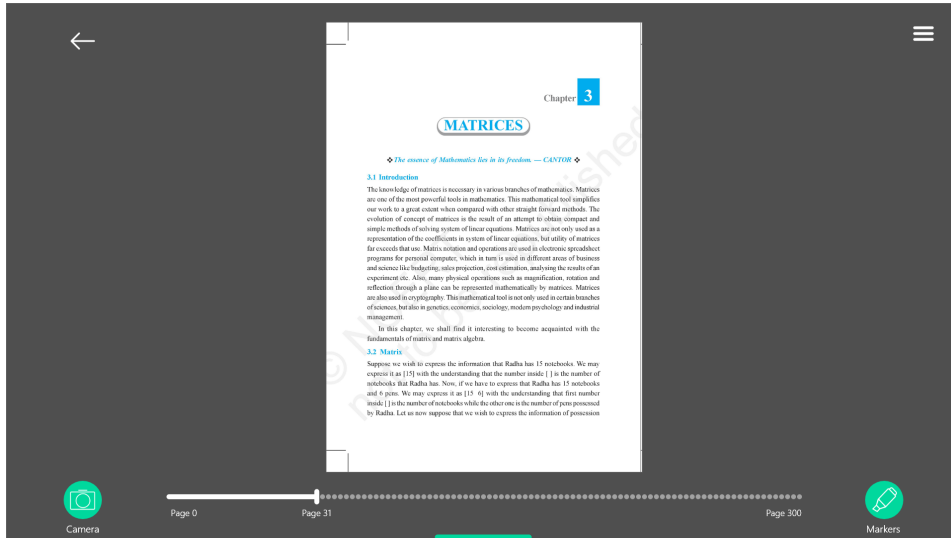


Fig. 26 Functioning of Doubt Button

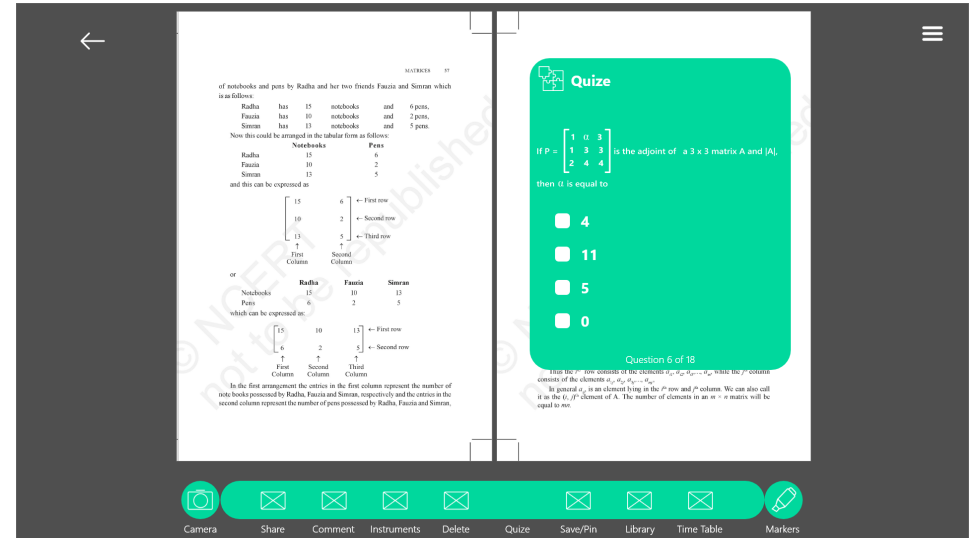
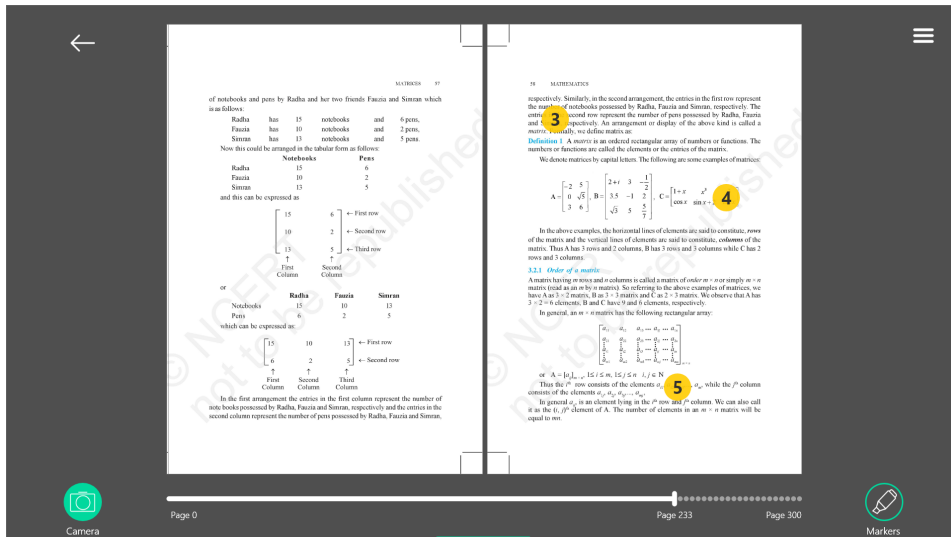
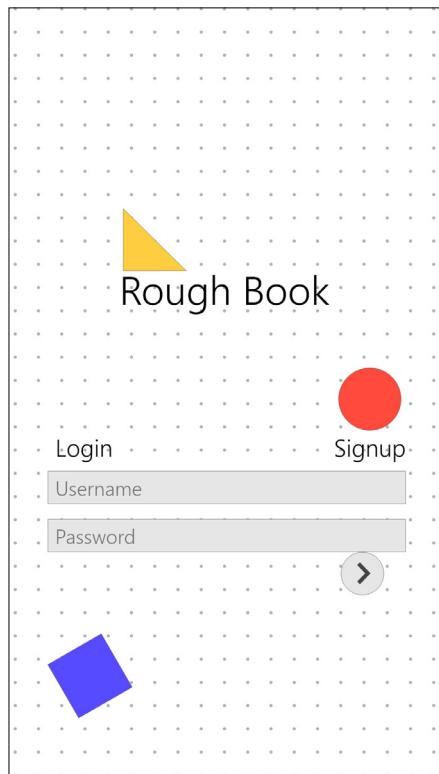


Fig. 26 Functioning of Doubt Button

# High Fidelity Prototype

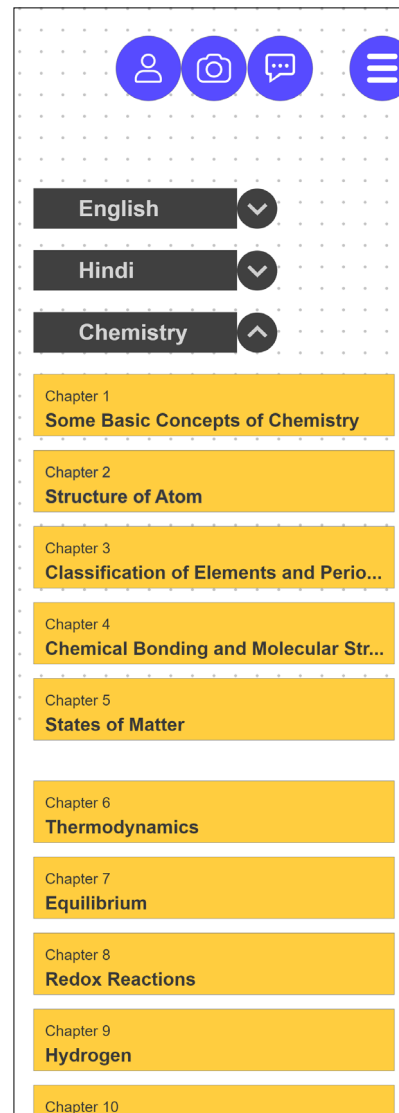
Welcome Screen



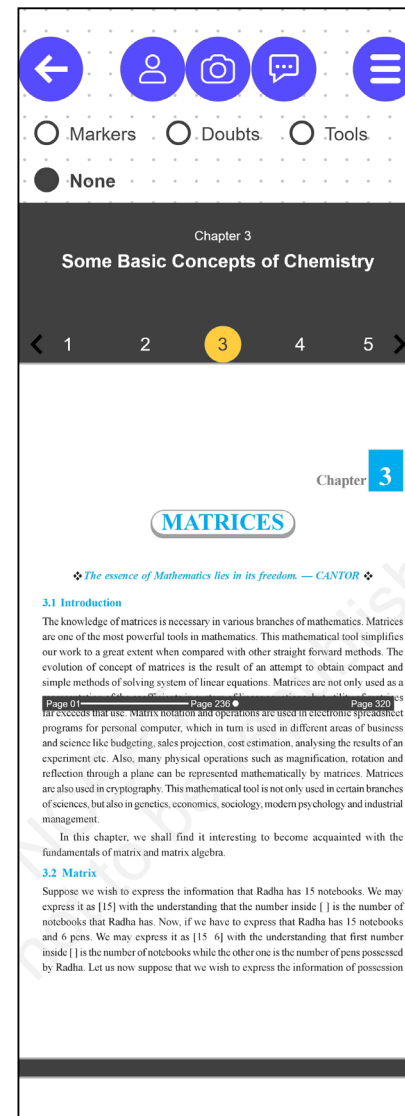
Subjects



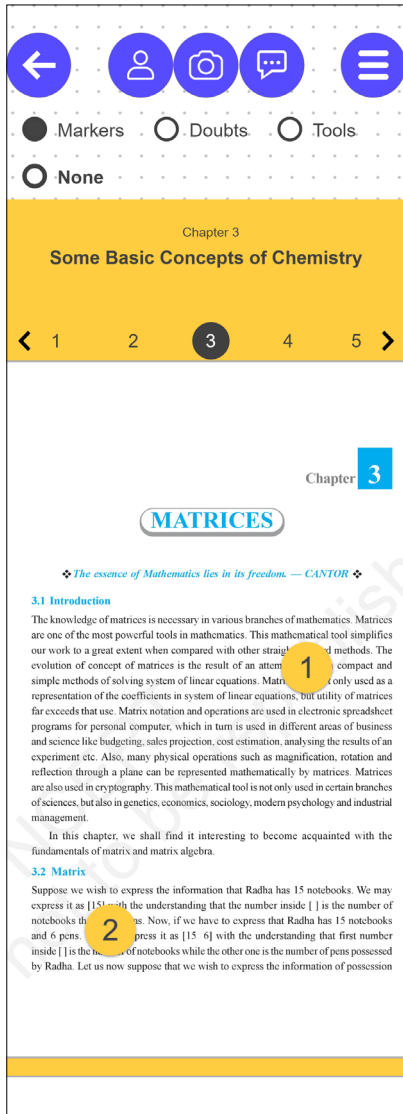
Subjects > Chapters



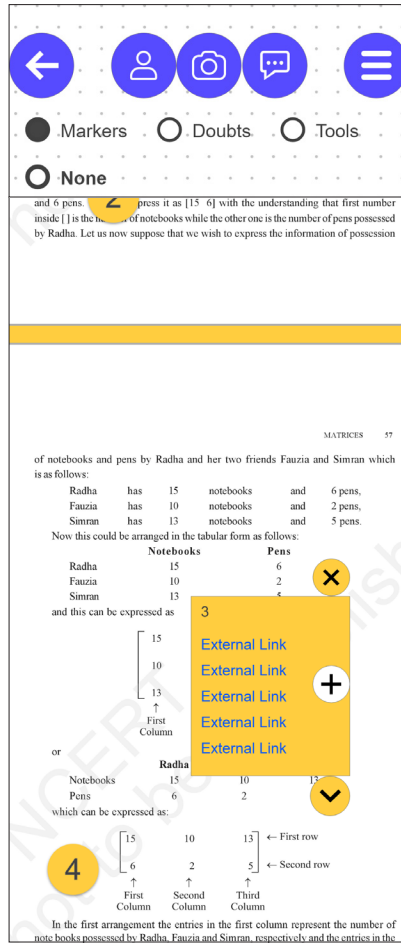
No Option Selected



User selected Markers



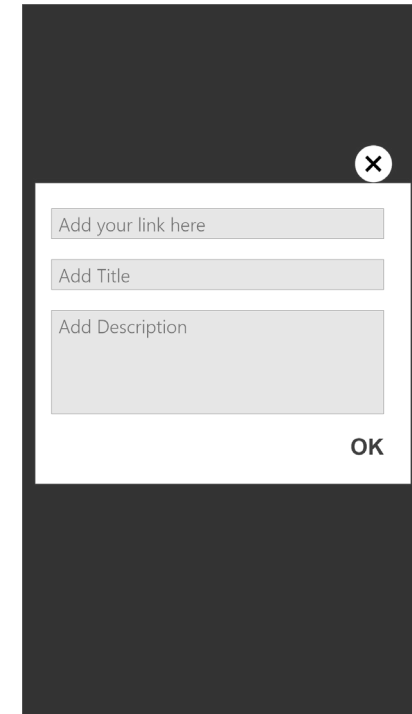
Tapped on a marker drop-down menu



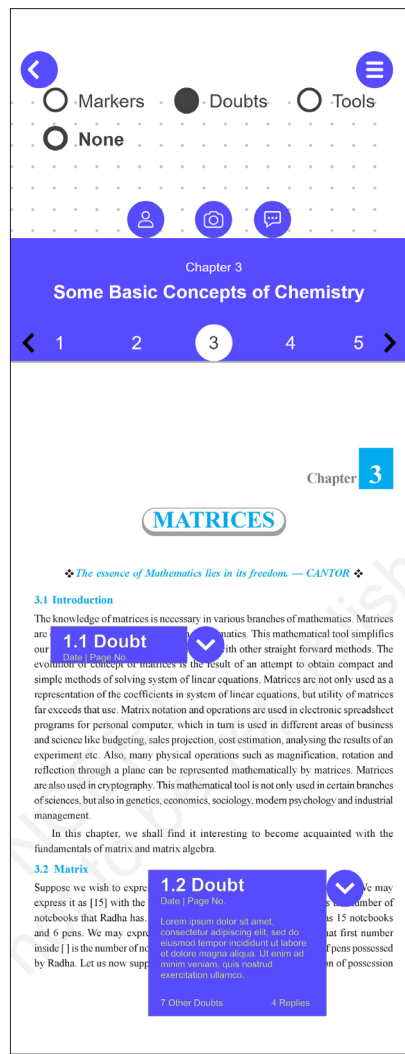
Thumbnail View



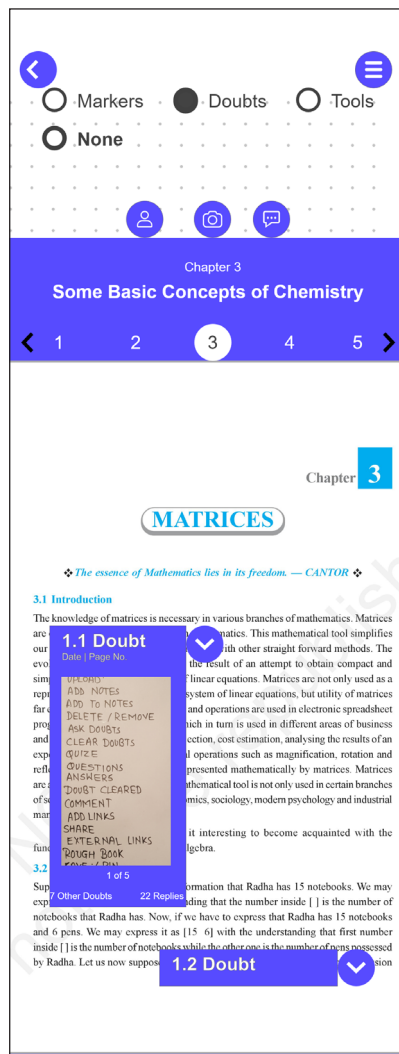
Screen for adding Marker



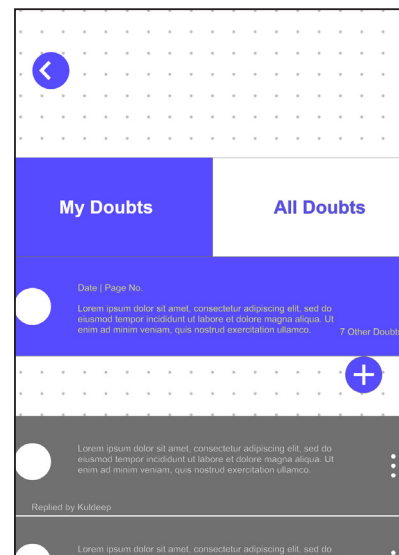
User choosing doubt button



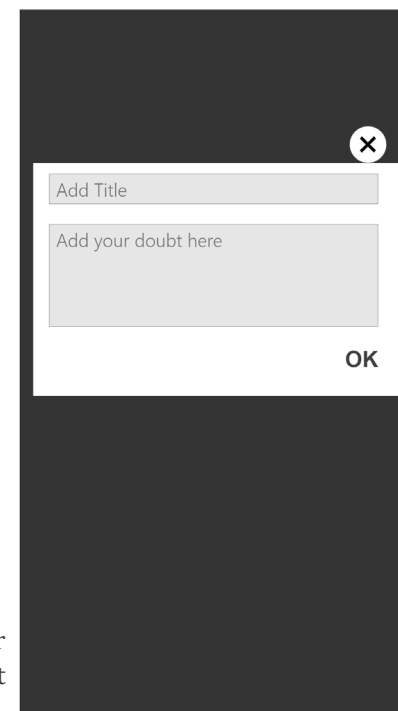
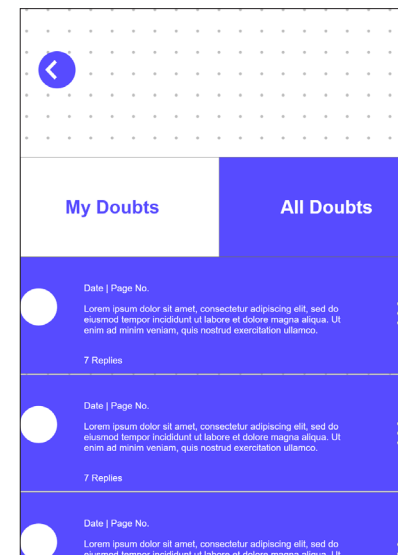
Taps on one doubt to know the responds



Views the responses



Check the doubts asked by the people from the contact list



Portal for adding a new doubt or comment

## Evaluation Plan

### **Protocol**

Think Aloud Protocol

### **Method**

- Live screen recording (Audio + Video)
- Marking the time consumed by the user
- Finger point tracking in the provided device

### **Participants**

Students who are 13 to 17 years old (Target users)

### **Time**

20 minutes per Portal

Half an hour maximum

## Conclusion

The prototype is able to satisfy most of the user needs. The prototype allows the user to gather the data collected in to one space, it can be any formats such as , images, video, links etc. and also the prototype is providing him a facility to place the data where ever he/she wants on the page.

The school students can decide the data to be used as a reference or a tool,and clarify his/her doubts. The student is getting a space of their own and also can give access to remove others from the personal friends list. The platform is taking care of scanning, sharing, segregating, organizing and collaborating with others easily. At the end These all functions and features are just provided by three buttons - the Marker Button, the Doubt Button and the Tools Button.

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