# Learning Aid for Children in Rural Areas

Interaction Design Degree Project Stage II

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Guide:
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Submitted in partial fulfillment of the requirement for the degree of
Master of Design in Interaction Design

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# Approval Sheet

The Interaction design project 3 entitled
"Learning Aid for Children in Rural Areas" by Hemruchi Shah (07633803) is approved, in partial fulfillment of the requirements for Master of Design degree in Interaction design.

Guide :

Chairman :

Internal Examiner :

External Examiner :

# Acknowledgements

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Hemruchi Shah
April 2009

# Content

# 1. Overview

# 1.1 Abstract

The face of Education is changing in urban India. But many remote parts of Rural India are still neglected. While technology has virtually taken over every aspect of life in the city, many villages face problems like shortage of power, good buildings for school and various other basic amenities.

My product, Appy is an application designed with the aim to provide a setting to children of remote rural areas where in they enjoy education and learn from observing their surroundings. Involvement of the teacher and community is a must for small schools to flourish and captivate the interest of the child.

Appy is designed to give children of rural areas a richer learning experience and engage them in the process of education such that they can make use of the available resources from the environment and put them to a meaningful and practical purpose. I have made an attempt to connect the school, child, teacher and community through this device.

# 1.2 Introduction

While education has become more interactive and project based in the cities, the schools in rural places suffer because of the lack of resources and lack of initiative. The schools in rural India are a contrast to the ones in the city. The situation is even worse in micro – interiors [Fig 1.2.1]. There is lack of basic amenities such as proper school buildings, simple good quality teaching aids, games and charts.

Amongst the various reasons due to which children drop out of schools in rural areas, one is the lack of appropriate material to teach the child. Due to lack of interactive educational material and resources, rural schools fail to capture the attention and interest of students. Paucity of Proper communication links, power facilities, scattered settlements and the fact that many of these remote places are very difficult to reach by road add to the problems.

The adverse teacher - student ratio makes it difficult for the students. This leads to multi-grade teaching where in teachers conduct collective classes. While multi-grade teaching is a good example of collaborative learning, the curriculum in India is not suitable to multi-grade teaching. It does not allow flexibility for students' different learning speeds and styles.

The teachers adopt old techniques of teaching, text book learning and a few charts and maps as visual reference. Less resources do not allow the teacher to broaden their scope of teaching and move out from text book teaching. The teachers educational background is not as strong as their urban counterparts. (12 + D. Ed.) There are no extra curricular activities besides PT and yoga. The play time of the children is either during free hours in school or between tasks when at home.

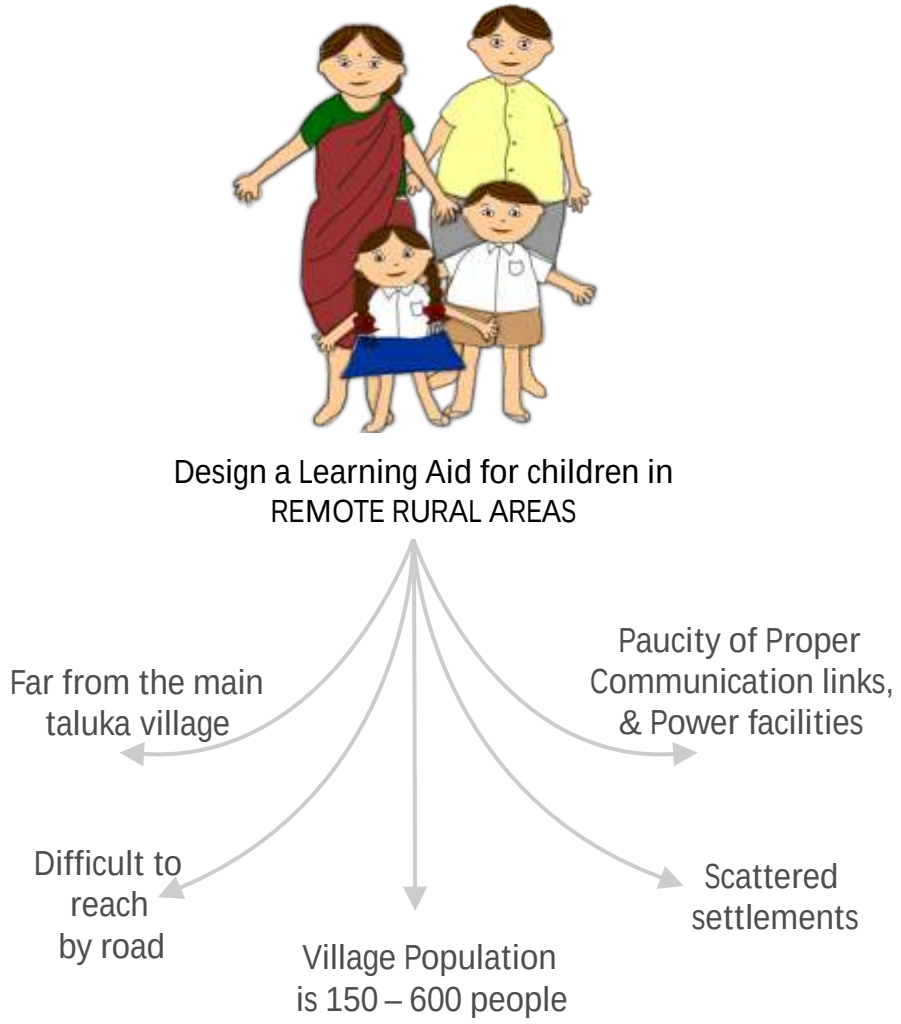



Fig 1.2.1: Why I chose Remote Rural Areas

# 1.2 Introduction

User studies also reveled that due to the pressure of work at home and on the farm, the parents could not actively participate in the child's education.

My aim is to develop an interactive mobile learning aid that can be utilized by the education provider to:

- make learning an interactive and captivating experience.
- sustain interest and develop a positive attitude towards learning.
- make the education system relevant to the child.
- motivate the child to go to school and complete formal education.
- learn though a collaborative mode by developing their interests.

# 1.3 Methodology

I used the following method while working on my project:

User Studies:
A primary data collection in form of user studies was done to understand my users. I observed education in the schools in a few remote villages in Pune district. My user studies included visits to schools, observing the learning and teaching process, talking to teachers, visiting the homes of a few students, talking to the parents and the children themselves.

Secondary Data:
My secondary study included finding out projects that were done in IDC and on-going industry projects. Then I did a brainstorming session and made mind maps to jot down all the data in a consolidated manner. Next I did analysis of the user studies and made a list of goals, problems and possible solutions. Then I identified the different domains in which I would develop my ideas.

Ideation:
After my research was done, I developed a few concepts that I thought would be probable solutions to the problems. I explored various domains and came up with few applications.

Prototyping:
I am working on the prototype.

Feedback:
User feed back will be taken based on the prototype.

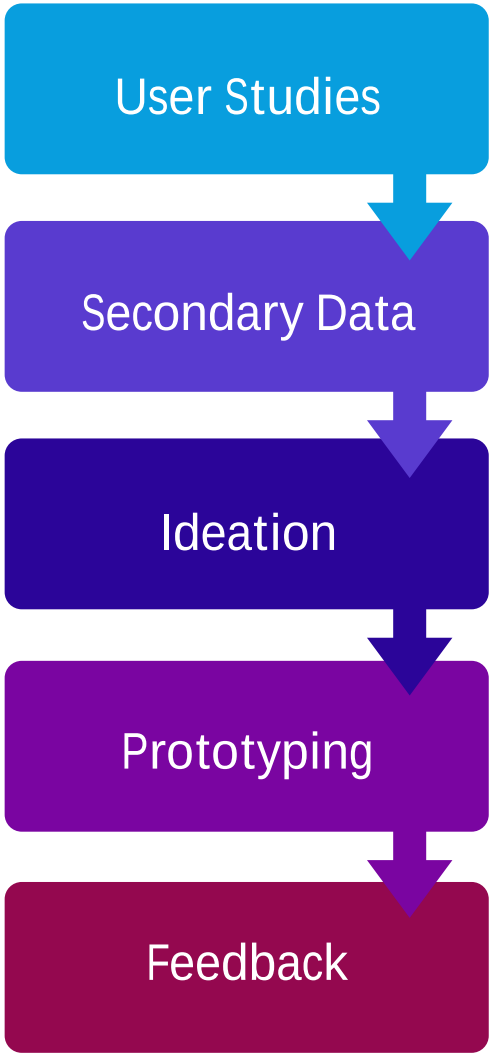



Fig 1.3.1: Design Process Followed

# 1.4 Project Timeline

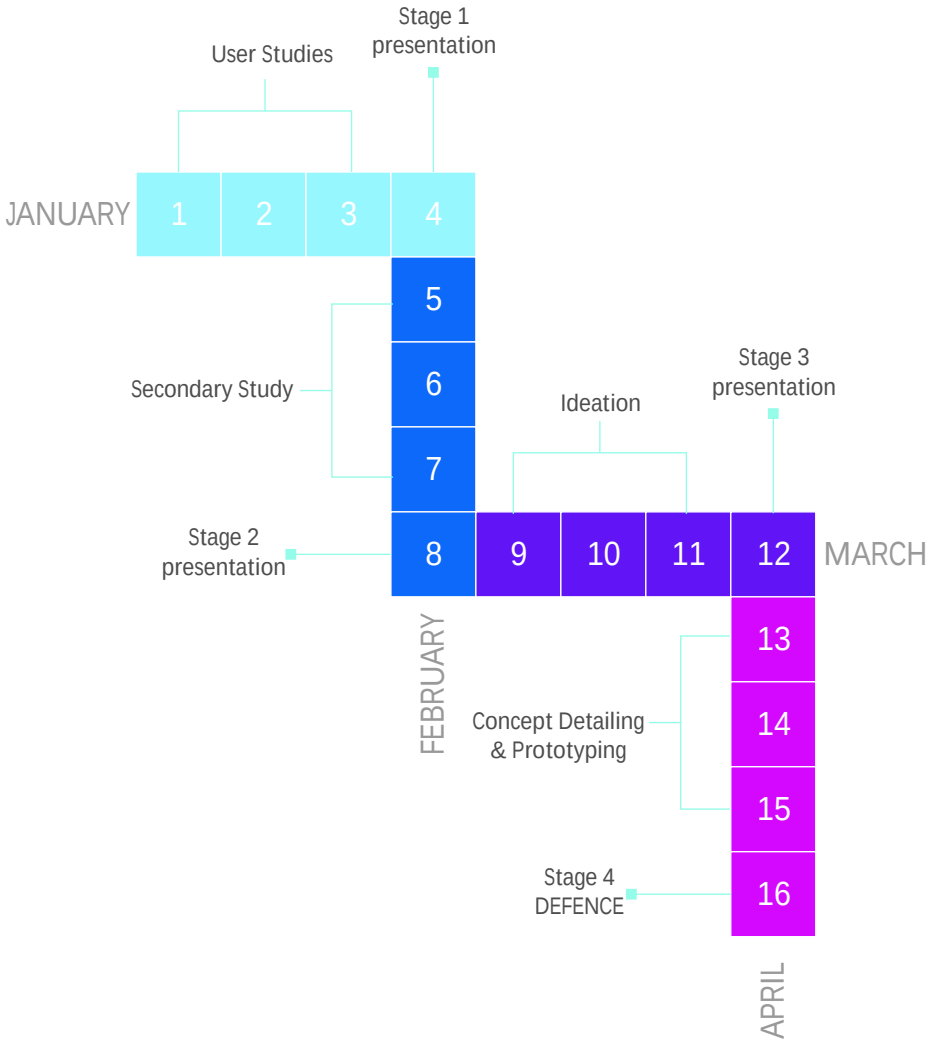



Fig 1.4.1: Project Timeline

The Project was divided into 4 stages:

Stage 1:
I started with data collection. I conducted user studies In a few remote villages in Pune district, Maharashtra, India. I analyzed and noted down my observations.

Stage 2:
Then I did a brainstorm and made mind maps. Next I studied the various organizations that worked towards rural development. I also studied the past projects in IDC related to education in rural areas. The next step was to find out different learning principles and then ideation on a learning aid that would assist the children in remote areas.

Stage 3:
After my research was done, I finalized my target age group and learning principles I would put to use. Then I finalized the content of the aid and developed a few concepts that I thought would be probable solutions to the problems. I explored various domains.

Stage 4:
This will include my concept detailing and prototyping. Then going to the user for a feedback.

# 2. Background Study

# 2.1 Understanding my User

I started by conducted user studies in a remote village in Maharashtra. I visited schools and homes in the villages as mentioned in Fig. 2.1.1.

During my visits, I interacted with teachers, parents and students themselves. I observed and documented their lifestyle. Below are a few pictures from the conducted studies.

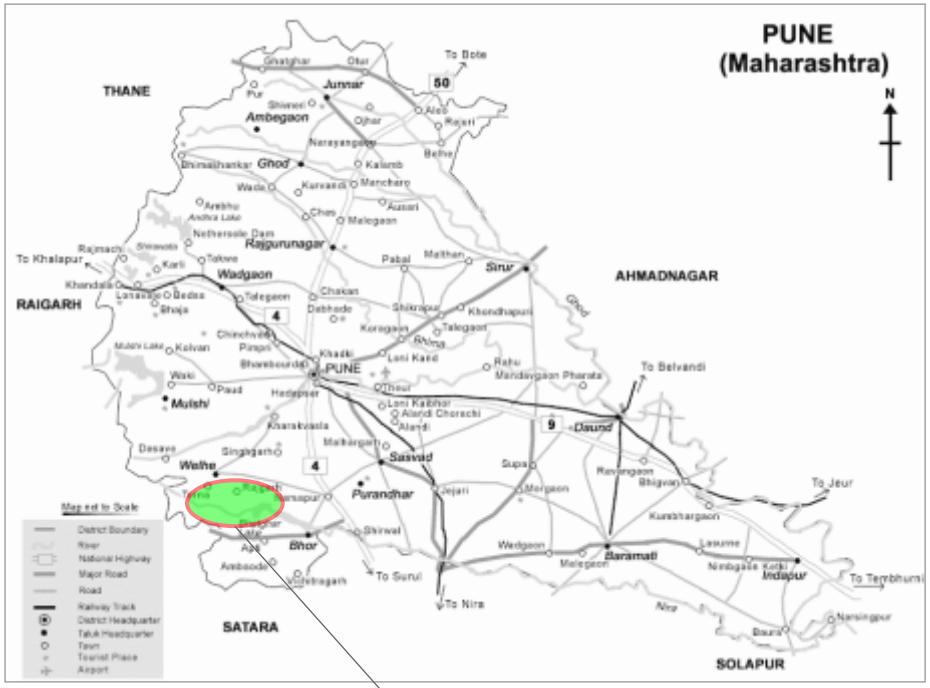



Fig 2.1.1: [W1] Map of Pune showing villages where user study was conducted.

# 2.1 Understanding my User


Fig 2.1.2: Brainstorm on keywords with affinity mapping.

I initially did a brainstorm on keywords like school, family, farm, learning and entertainment. Fig 2.1.2 shows a part of my brainstorm with an overlay of an affinity of my user studies.

During the user studies the teachers highlighted:

1. The schools are till 7th Standard only. (many also till 4th)
2. The children are very loving and caring.
3. Many students have to walk about an hour to come to school since their village has classes only till 4th.
4. Home environment is not conducive to learn.
5. There are no computers. Educational material depends on the government grants.

The Parents highlighted:

1. On their poor economic conditions.
2. The need for additional hands on the farm to generate income.

The Children Highlighted:

1. Distance they travelled to reach school.
2. Need for them to help their parents.
3. Excitement for videos, movies, documentaries etc and fun in eating lunch at school.
4. Not liking to study at home.

# 2.1 Understanding my User

I divided my user studies into 2 sections: [Fig. 2.1.3]

1. The Life and Environment
2. Media and Tool the Children Use

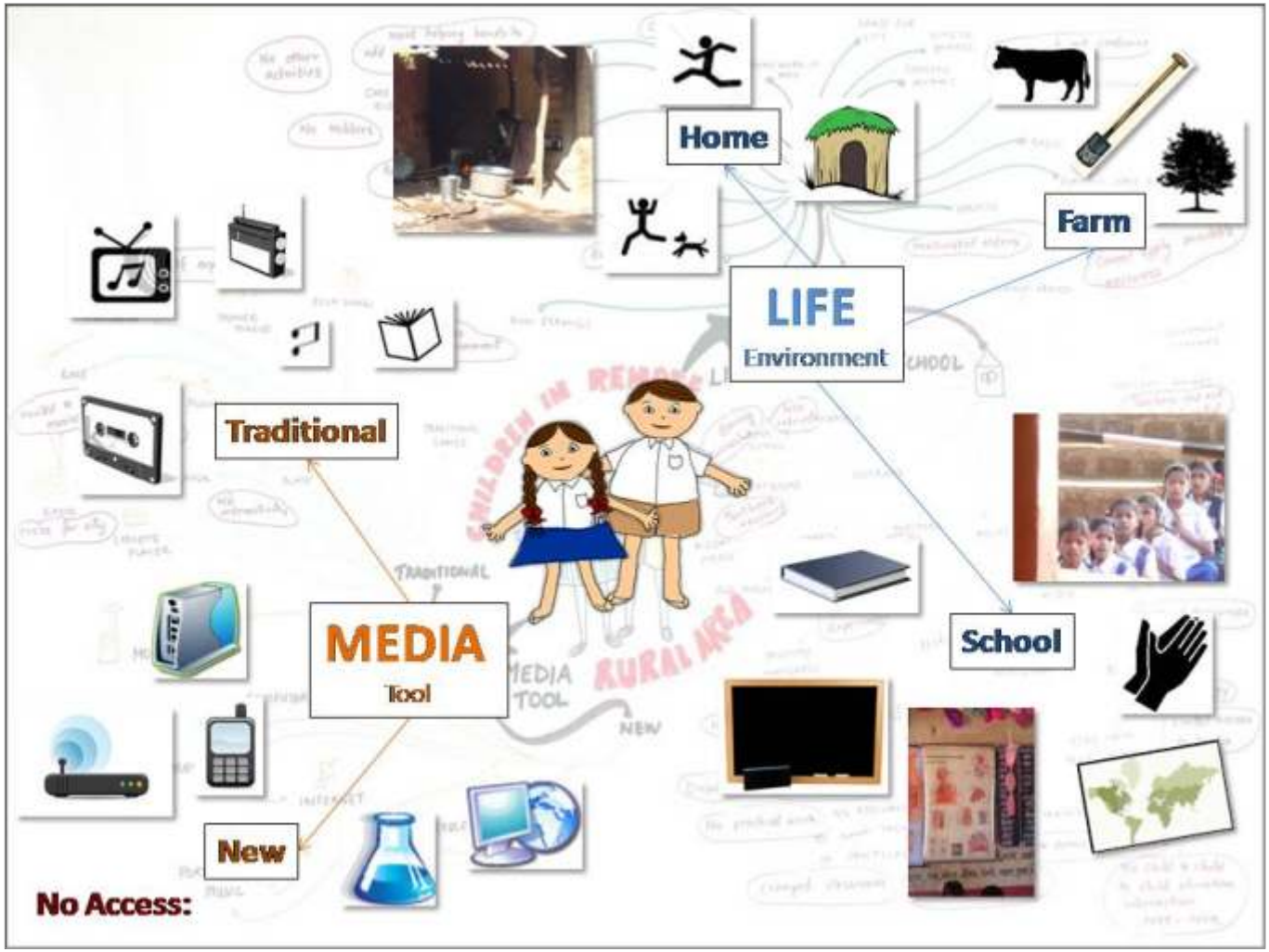



Fig 2.1.3: Environment and Tool Map

# 2.1 Understanding my User




Fig 2.1.4: Environment of the Child

The children have 3 kinds of environment. They go to school, they stay at home and they help their family on the farm.

Apart from the curriculum, at school they are taught about cleanliness, culture, values, tradition. At home they either help in doing household chores, or run about from one house to another and help their if needed. On the farm, they help the family in farming.

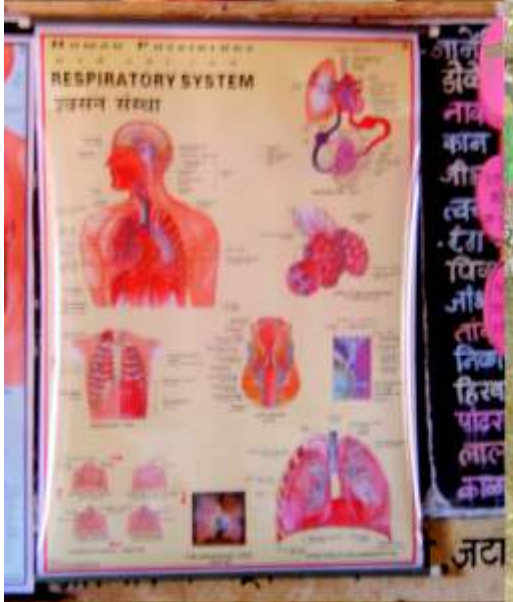
The media on the other hand can be categorized into two sections: Traditional media and New Media.

The traditional media would include local stories, radio, cassettes, old books, folk stories, folk songs, traditional farming equipment, hunting knives etc

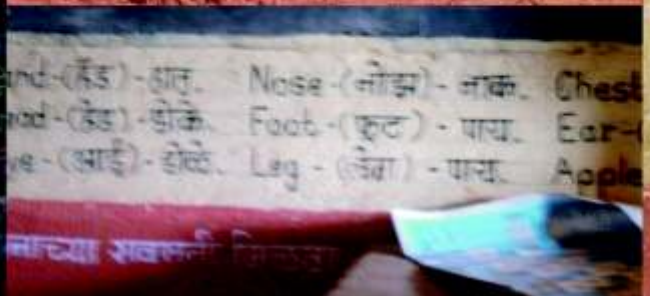
The new media would include mobile, computers, internet, modem facilities and Cd's etc. But it must be noted that these children know about media like mobile, computers etc. but have not come in contact with these.

At school they come in contact with media like the text books, old magazines that have been donated, cassettes and recorders, notebooks, usual stationary, books, pens, slates, chalk etc.

At home they use media radio. On the farm they come in contact with media like the plough, fertilizer, farming methods, cattle, various instruments used for farming, hunting etc.








Studying the school environment:

The schools were decorated with various drawings, charts pictures and wall and ceiling hangings. Many of the hangings were made by students. The teachers still make use of wall displays and picture chats to explain concepts to the children. This shows that the school has limited educational resources. Of the various schools I visited, only one school was granted a television set. When there was electricity, the children could watch educational CD,s sent by the governing board, Zilla Parishad.

Due to the lack of basic amenities, like a proper school building, various classes are cramped up in one classroom. This form gives way to multi-grade teaching. Though this mode is a better form of teaching, the present school curriculum is such that it does not suit this kind of education.

# A Day At School

Fig 2.1.5: A day at School

Paripat

Assembly, prayers, attendance, General knowledge, personal hygiene, creating an environment leading to a good day.

Snack Break

School Provides Biscuits

Subject Classes

Subject Classes

Maharashtra board SSC curriculum in marathi

10 am | 11.00 | 11.35 | 12.15 | 12.30 | 1 pm | 1.30 | 2.00 | 2.30 | 3 pm | 3.30 | 4.30

Subject Classes

The school provides the mid day meal to the children

Lunch Break

Home

# 2.1 Understanding my User

Insights from my user studies: Identifying Needs

1. Lack of basic amenities such as school building, teaching aids, computers, electricity etc.

2. Many settlements are far from school. Children have to travel a lot.

3. There is not enough visual material to teach the child.

4. Multi-grade Teaching. Current curriculum is not fit for multi-grade classroom setting, to allow flexibility for students' different learning speeds and styles.

5. Less resources do not allow the teacher to broaden their scope of teaching. They cannot move out from text book teaching.

6. Teachers educational background is not as strong as their urban counterparts. (12 + D. Ed.)

7. There are no extra curricular activities besides PT and yoga.

8. The play time of the children is either during free hours in school or between tasks when at home.

9. Lack of participation by parents.

Fig 2.1.6: Mr. Satish Ghajbiye, Headmaster of Kelad ZP School

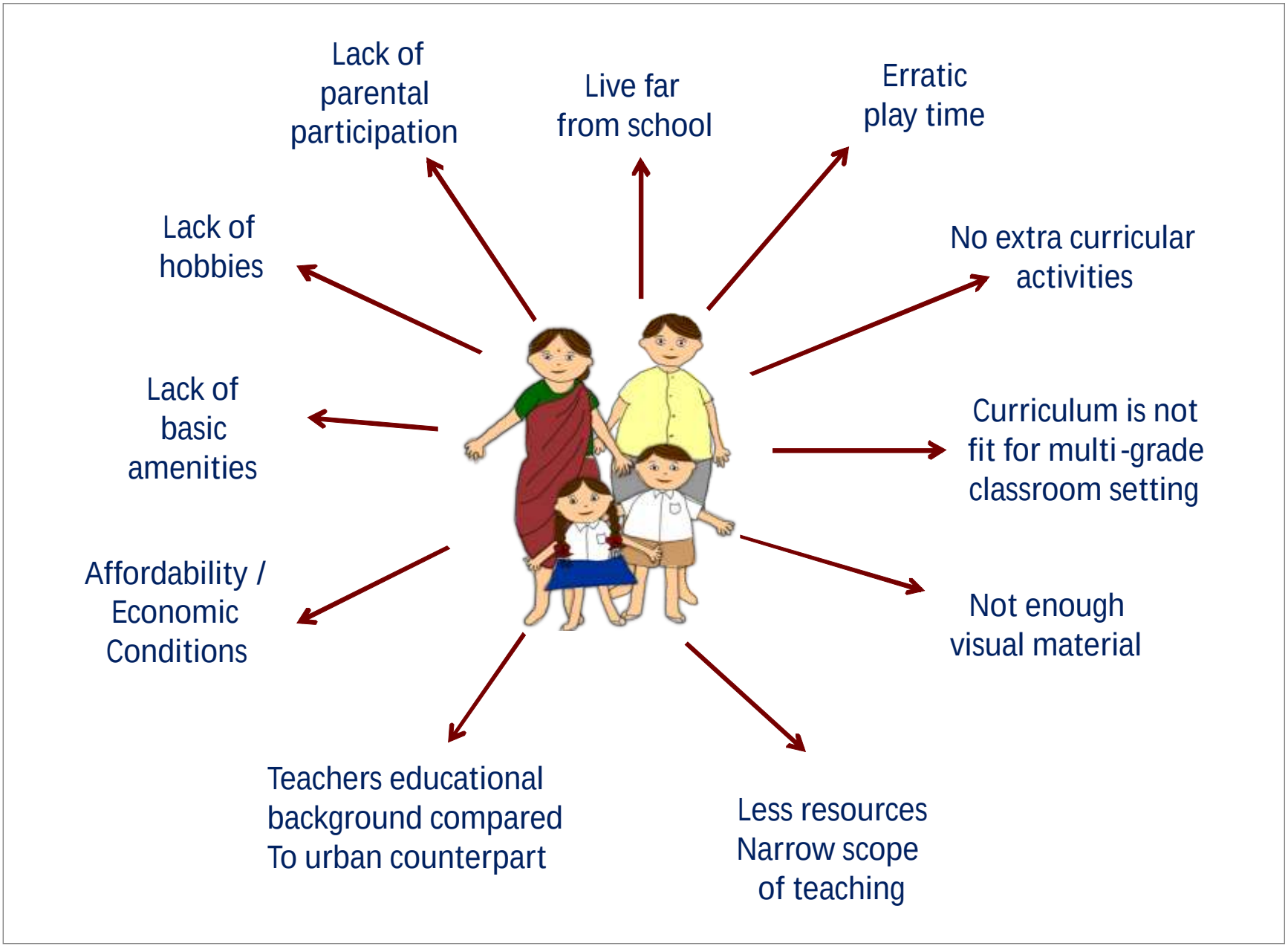



Fig 2.1.7: Problem Identification

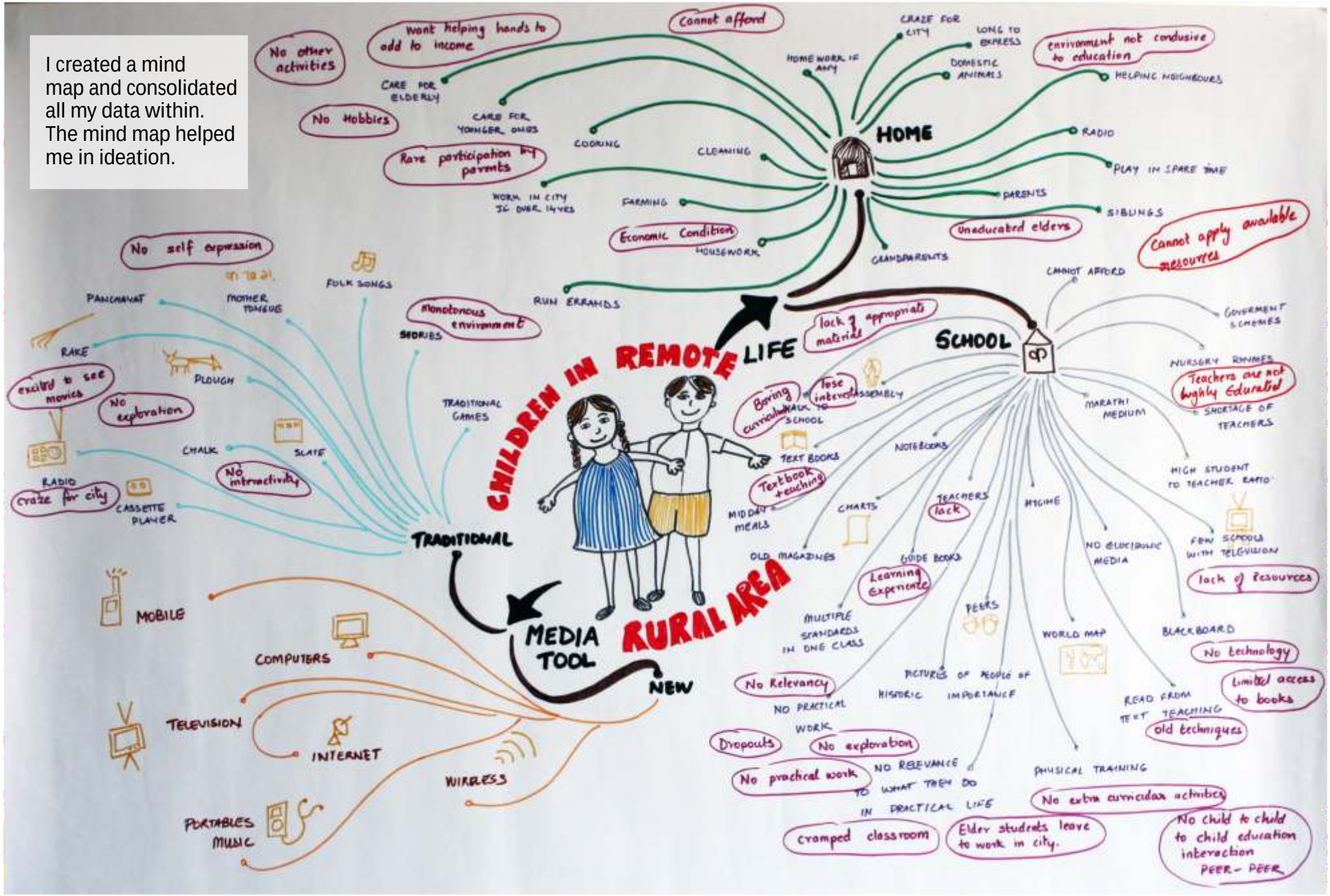



Fig 2.1.8: Mind map on Children in remote rural areas

# 2.1 Understanding my User

Scope of Ideation:

1. Allow the child to pursue an activity that he can enjoy and thereby express himself - a means of entertainment.

2. School periods become monotonous. Setting collaborative tasks break the monotony.

3. There is no peer tutoring or active participation by kids.

4. Connect small schools to their communities, as high levels of community involvement can help increase schools' levels of physical and human resources.

5. Create burden free environment.

6. Support for teachers for improving teaching and learning as the enthusiasm and abilities of teachers often determine the successes or failures of small schools.

7. A revitalized curriculum making use of available resources that will help the students and the community to understand the relevance of education.

8. Captivate the child's attention. Making the student feel the need to ask questions.

9. Create from relevance. Allow them to experience the concepts you're teaching firsthand, and then discuss them.

10. Variation & Customization, both in the system and the classroom.

# 2.2 Work done in IDC

The next step in my project was to study the different projects done in IDC related to learning.

1. Travelling School
   *Teaching kit for Doorstep School in rural India*
   *Jithesh. R, 03613004, Industrial design (PD) IDC 03 - 05*

- Educating children from the rural populace is inevitable for a better India.
- The project aims in finding an alternative method to deliver education to children in rural areas.
- To design a product to effectively introduce mobile education concept in the rural parts of India.

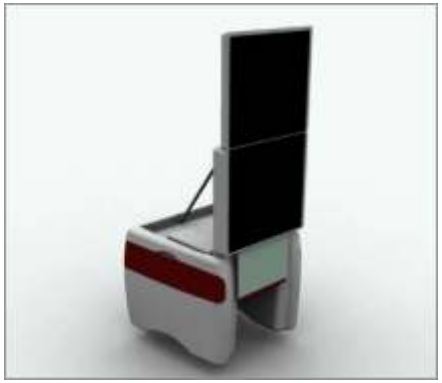


Fig 2.2.2: [R1] IDC - Travelling School

2. Projector system for rural schools
   *Pradeep Deulkar, 03613807, Industrial design (PD) IDC 03 - 05*

- The project focused on giving an audio-visual experience to children in rural schools.
- It also aimed at making a product that would cater to the common rural peoples as the secondary user.

Fig 2.2.2: [R2] IDC - Projector system for rural schools

3. Curricular Learning for Secondary School Students
   *Shreyasi Roy, 07633002, Interaction Design (IxD) IDC 07 - 09*

- The project aims to create a platform for secondary school students where in they can interact with each other and discuss text book content in form of relevant data.
- The media allows the student to upload content and view the online database.

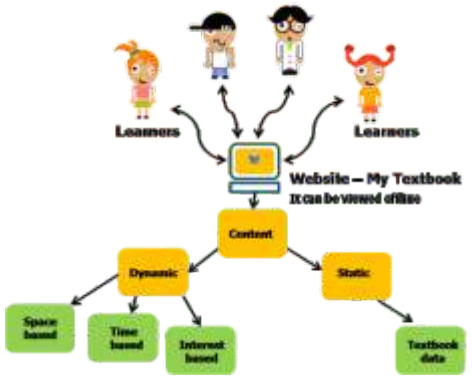



Fig 2.2.3: [R3] IDC - Curricular Learning for Secondary School Students

# 2.3 Existing Organizations

I also looked at what was done by different organizations for the welfare of rural areas. I came across a few organizations who laid down simple systems through which the rural communities would benefit, especially the children.

1. Door Step School: [W2]

"Door Step School" aims to address the issues of illiteracy amongst the low income sections of society. They provide resources like libraries, mobile class rooms and reading and writing material to these sections. Their flagship bus “School on Wheels” delivers Door Step education to children who cannot afford school fees or who have dropped out of school for various reasons.

Door Step School has been working in Mumbai since 1989 and have now expanded to Pune and other villages in that district. Currently they cater to about 25,000 students and aim to avail education to many more.

They have 6 main areas of providing education to the children:

- Non-formal Education Classes
- Balwadi (Kindergarten)
- School on Wheels
- Study Classes
- School Library Program
- Computer Classes

Their future agenda includes expanding their bank of activities and increase the number of classes so that they can include more street children.

# 2.3 Existing Organizations

2. Vidnyanvahini [W3]

Vidnyanvahini is a non-profit organization located in the city of Pune, That has a Mobile Science Lab that teaches science experiments to children from the rural areas.

Their vision is to enable children of the rural areas to have access to basic science experiments, experience them and there-by learn. In rural India we see poverty, a lack of basic infrastructure, and an abundance of superstitions. Vidnyanvahini's vision is to try to reduce this gap as much as possible, at least at the educational level.

Their objectives include providing rural school children with the opportunity to handle scientific apparatus and learn the basics of science through experiments.

They also aim to create awareness of the relevance of science in the lives of rural school children by discussing concepts such as cleanliness, hygiene, safe drinking water, and the environment.

They believe that only by bridging the gap between urban and rural education these children can achieve prosperity.

Fig 2.3.1: [W3] Vidnyanvahini's Mobile Science Lab

Fig 2.3.2: Arvind Gupta explaining some simple toys and how they can be used in education [24/9/2008]

Fig 2.3.3: Arvind Gupta

# 2.3 Existing Organizations

3. Arvind Gupta Toys

Arvind Gupta is a toymaker. He hails from Pune and has been working towards making simple knockdown science experiments for children. He aims to educate the children by letting them experience the concept by making it relevant to them. Relevancy is the key. The child should know the applicability, functions and features of whatever he uses for studies. Only then will he be able to trust the education system.

We visited Arvind Gupta at his studio in Pune university. He makes simple toys from waste material. He showed us simple educational aids that one could use to teach concepts to children. He believes that a teaching aid need not be technology driven all the time. Re-using waste material and creating something useful is a better way to teach children concepts like sustainability, pollution etc.

In a resources-starved economy such as India where the masses need to be educated about how to properly dispose household waste and used items and huge piles of garbage and trash is dumped on roadsides and street corners, low-cost teaching aids made from household waste and trash serve a particularly useful purpose. With a bit of creativity and imagination, scraps of metal, wood, plastic, rubber, paper etc can metamorphose into valuable items, which can be used as effective teaching tools. System-wide use of low-cost teaching aids will not only boost teacher/student creativity and involvement, help institutional budgets go a longer way, but also serve to keep our immediate environments clean.

Arvind Gupta's work has been displayed on his website: www.arvindguptatoys.com

# 2.3 Existing Organizations

4. One Laptop Per Child - OLPC [W4]

The One Laptop Per Child project is an MIT initiative launched in January 2005 to provide inexpensive laptop computers to children in the developing world as a means of bridging the digital divide. The main driver behind this project is the thought that just as a kid needs to own a pencil and a slate it is also important to own a computer to be able to experiment and explore the new opportunities in today's digital world.

Learning is the main goal for OLPC. They state that computer literacy is a by-product of the fluency children will gain through use of the laptop for learning. Children need the opportunity to learn far more than Word, Excel, and Power-point. Thus OLPC emphasizes on tools for exploring and expressing, rather than instruction. This will lead them to become learners and teachers.

> *A computer too can be a powerful tool. There are many reasons it is important for a child to own something -- like a football, doll, or book -- not the least of which being that these belongings will be well-maintained through love and care.*
>
> *- Nicholas Negroponte, Chairman OLPC* [W5]

Fig 2.3.4: [W4] One Laptop per Child

Fig 2.3.5: One Laptop per Child at IDC Jan 2009

Fig 2.3.6: [W6] Vigyan Ashram at Pabal, near Pune city.

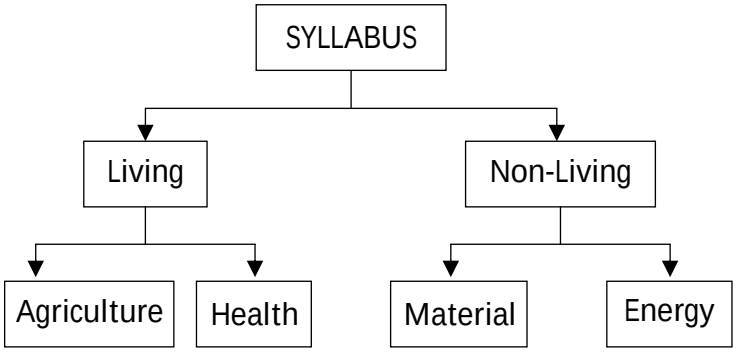



Fig 2.3.7: Syllabus in the educational program by VA

# 2.3 Existing Organizations

5. Vigyan Ashram - Pabal [W6]

Education has to be natural. Then only can the process of learning be fun and not a burden. It should be the same way as we learn to speak our mother tongue. This is this philosophy of Vigyan Ashram that is located in Pabal, near Pune city, Maharashtra.

The quickest way to develop intellect is to give activity to hand. VA aims to develop a child by making him learn by doing simplistic tasks and making them resourceful and solve their own problems. They believe that education comprises of skills, values, creativity and logical thinking.

When Vigyan Ashram (VA) had come to IDC to give a presentation on Innovations in curricular studies, their representative, Mr. Yogesh had made a very apt remark. “Education in rural areas has be relevant. You need to make everything very simple for the child. He should be experiencing what he is learning. That only will make him feel the need to ask questions.”

To make things even more simpler for the child, the syllabus has been dived into basic groups of living and non living [fig. 2.3.7]. And everything revolves around this. In the workshop we were told that till now VA focused on material utility by making the kids do simple experiments or make simple items that they could sell, but now they have taken a step forward and started focusing on personal expression and personal utility as well.

Vigyan Ashram can be contacted on *vapabal@gmail.com* or can be reached at *Vigyan Ashram, Post Pabal, District Pune, 412403.*

# 2.3 Existing Organizations

6. Barefoot College [W7]

The Barefoot College began in 1972. Their belief is that solutions for the problems in rural areas lie within the community itself. If one finds a way to connect the community with a well administered system, one can solve various problems like drinking water, girl education, health & sanitation, rural unemployment, income generation, electricity and power, as well as social awareness and the conservation of ecological systems in rural communities.

The College caters to the need of the poor who have no alternatives. They encourage practical knowledge and skills rather than paper qualifications through a learning by doing process of education.

The Barefoot College is a place of learning and unlearning. It's a place where the teacher is the learner and the learner is the teacher. The college promotes development of rural handicrafts and encourages that these skills and traditions keep going on. They have started selling traditional crafts to generate income for the people.

Fig 2.3.8: [W7] Barefoot College, Tilona, Rajasthan.

Fig 2.3.9: Promoting traditional handicrafts.

# 2.4 Modes of Learning

Educational Institutes have effectively used one or a combination of a few modes of learning to effectively raise the intellect and creativity of the students. The following points were observed in a research conducted by the Carnegie Mellon University. [W8]

1. Prior knowledge can help or hinder learning.
It is important to first clarify any misconception the student holds. Only then can a student connect to new information.

2. Motivation generates, directs, and sustains learning behavior.
Positive & Negative reinforcement influences the amount of time and effort students devote to learning.

3. The way students organize knowledge determines how they use it.
When knowledge superficially organized, students can fail to retrieve or appropriately apply their knowledge.

4. Meaningful engagement is necessary for deeper learning.
Posing and answering meaningful questions about concepts or attempting to apply the concepts to solve problems, leads to longer lasting retention of knowledge.

5. Mastery requires developing component skills.
To master complex skills, students must practice and gain proficiency in the discrete component skills. Students must understand the conditions and contexts of application and must practice applying skills and knowledge appropriately in new contexts.

# 2.4 Modes of Learning

6. Goal-directed practice and targeted feedback are critical to learning.

It involves continually monitoring performance and clearly defining goals. When these are explicitly communicated to students, they indulge in purposeful practice and monitor their own progress.

7. Students must learn to monitor, evaluate and adjust their approaches to learning to become self-directed learners.

Students must become conscious of their thinking processes.

8. Students develop holistically, their learning is affected by the social, emotional and intellectual climate of the classroom.

The social and emotional aspects of the classroom climate affect students in ways that can enhance or hinder learning.

This leads us to thinking of different modes in which we can encourage the students to learn effectively. Various modes have been observed by psychologists and educationists. Listed below, are a few of the modes of learning.

a. Action learning

A process whereby the participant studies their own actions and experience in order to improve performance.

b. Autodidacticism

It is self-education or self-directed learning. An autodidact is a mostly self-taught person, as opposed to learning in a school setting or from a tutor.

c. Brain Dump

the transfer of a large quantity of information from one person to another or to a piece of paper.

# 2.4 Modes of Learning

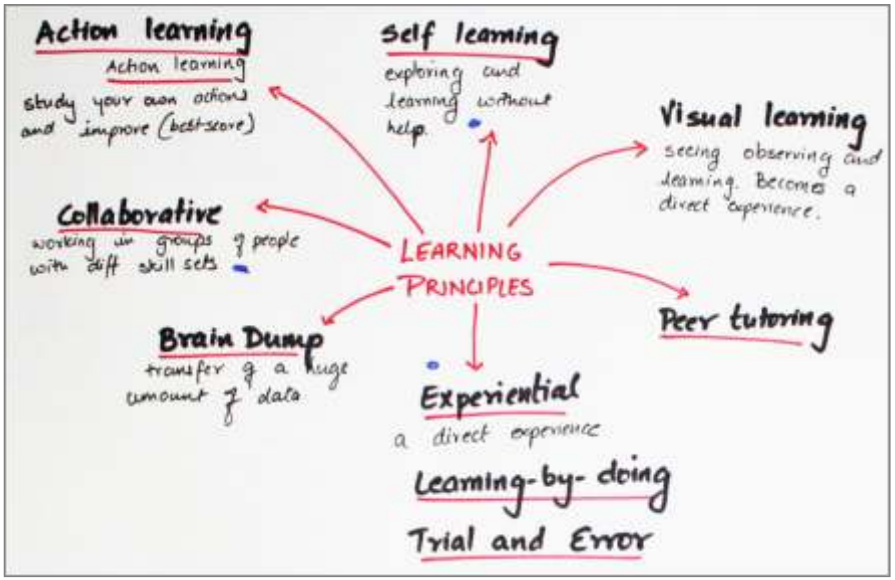



Fig 2.4.1: Brainstorm on Learning Modes

d. Collaborative Learning

Learners engage in a common task in which each individual depends on and is accountable to each other. Groups of students work together in searching for understanding, meaning or solutions or in creating an artifact of their learning such as a product. These learners generally have varied skill sets.

e. Experiential Learning

Experiential Learning is the process of making meaning from direct experience.

f. Problem-based Learning

A student-centered instructional strategy in which students collaboratively solve problems and reflect on their experiences.

g. Discovery Learning

It is a method of inquiry-based instruction. It is a teaching technique in which teachers create situations in which students are to solve problems. Lessons are designed so that students make connections to previous knowledge, bring their own questions to learning, investigate to satisfy their own questions and design ways to try out their ideas.

h. Learning-by-doing

It refers to the capability of learners to improve their productivity by regularly repeating the same type of action. The increased productivity is achieved through practice, self-perfection and minor innovations.

# 3. Ideation

# 3.1 Concept Domains

Based on my Environment and Media map, I identified domains in which I can create interactions for my users.

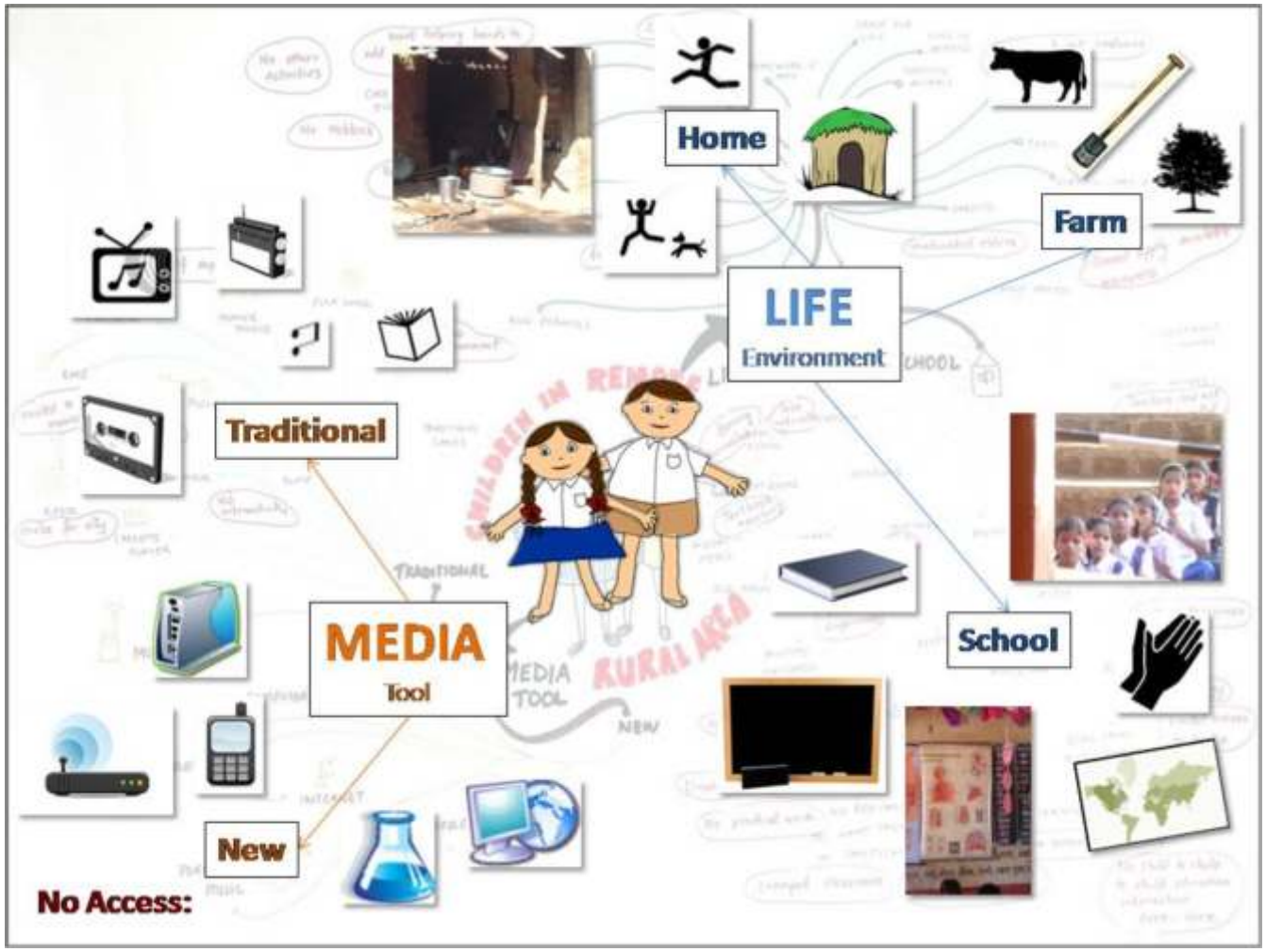



Fig 3.1.1: Different Domains for ideation

# 3.1 Concept Domains

To begin with ideation I looked at Keywords like:

Burden Free: The possiblity of introducing a system that would make education simple and in context to the child's understanding.

Resources: The need for the child to understand his environment and make the best use of it, or at least become aware of it.

Sharing: The need for the child to share his surroundings and attached feelings with not only his village and community but also with people from outside the village.

Relevance: The child must learn what is relevant. He should be able to relate to what he is learning and the material should change according to his need.

By making use of relevant and dynamic content that arises out of his natural surrounding resources, I looked at learning modes through which I could connect them.

Entertainment and Experience: There was a need to introduce some kind of mode of entertainment. I wanted to look at how I could introduce a technique where in the child could experience, learn and be entertained.

Peer Tutoring and Learning by doing: There was also the need to connect the children at another level besides the daily school and home chores. There was a need to introduce a system by which they could interact with each other in a beneficial way.

Collaborative Learning: The need for making variations in the multi-grade teaching style in schools.

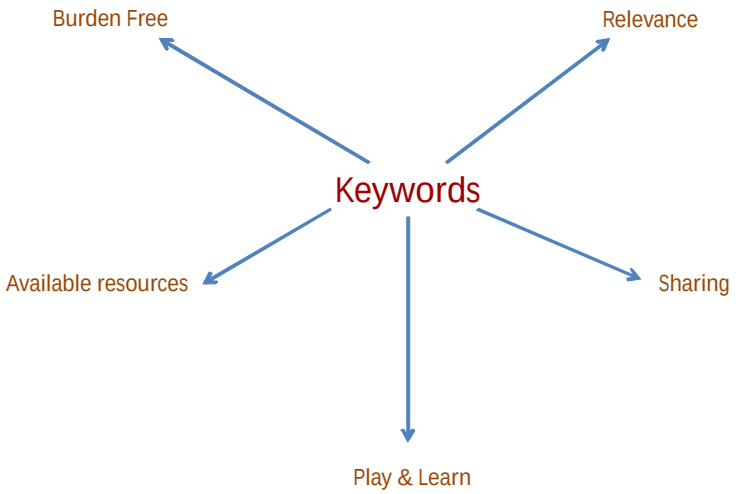



Fig 3.1.2: Keywords

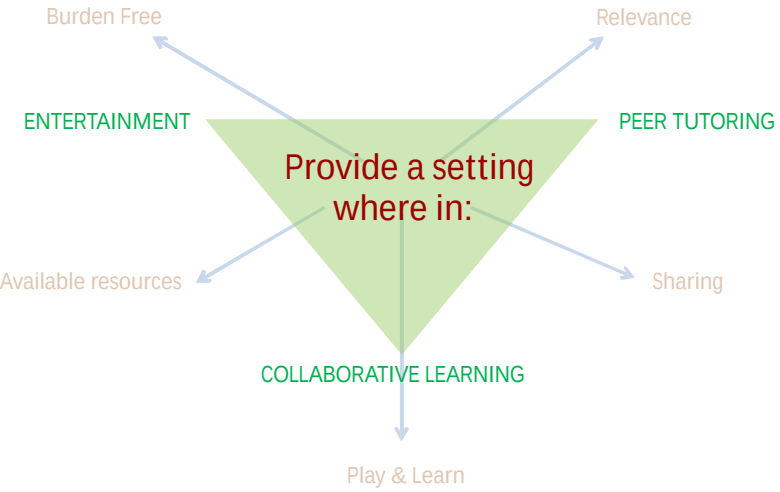



Fig 3.1.3: Setting

# 3.1 Concept Domains

These can be achieved by connecting the child to the teacher and to the community. There has to be active participation by both in the child's work. This will lead to a better learning environment where in the child can learn from his surroundings and with proper guidance from the community and teachers and there by be productive and give back to his environment and lead to a better style of living.

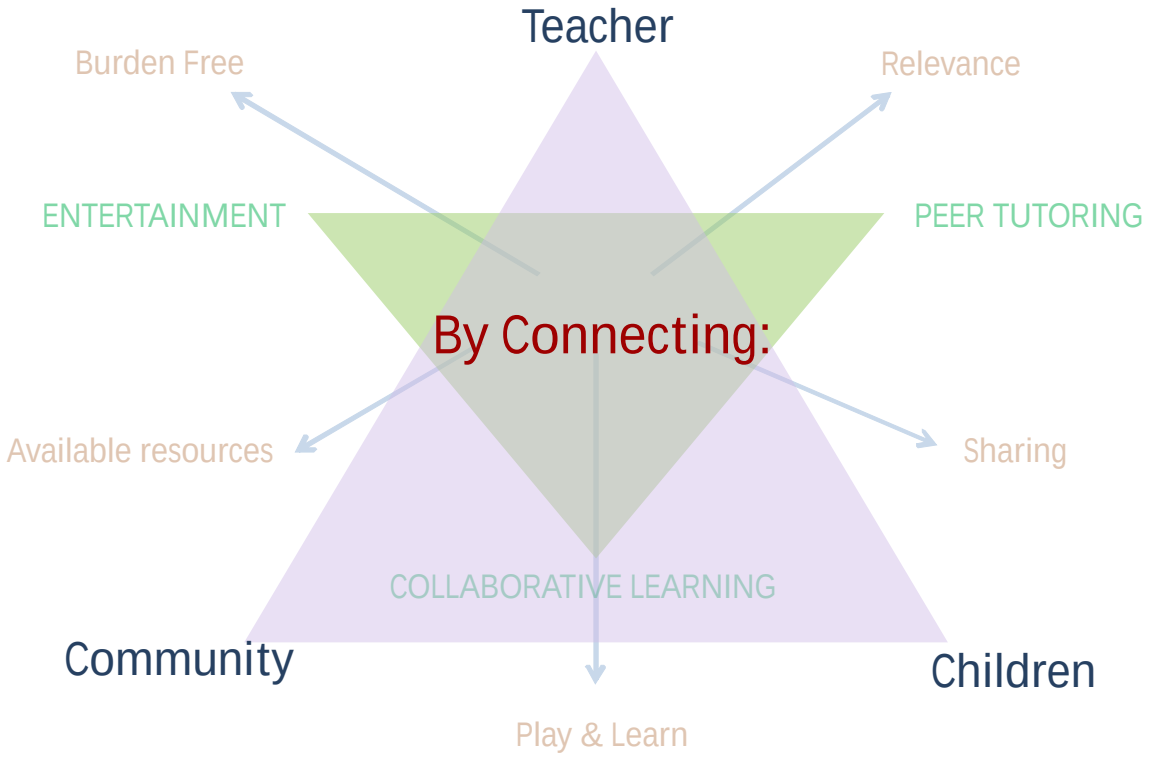



Fig 3.1.4: Connections

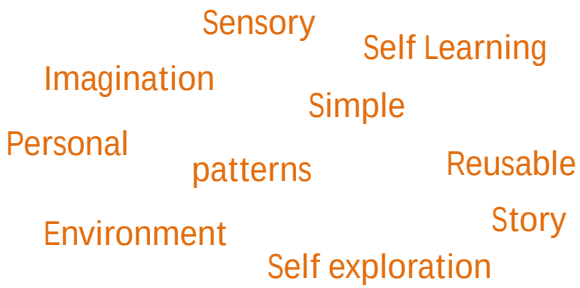
# 3.2 Design Ideas

Design Idea 1: An Interactive Slate

Why Slate?
- Slate is a personal space.
- Gives the child freedom to express.
- It is a simple tool for writing.
- Sensory approach. Feel what you are doing.
- The child can doodle and draw and wander where he wants to.

I used a slate because it is an object that the pre-primary and primary school students relate to. Also I did not want to expose them to a keyboard at this age because it curbs their freedom to free flow. They cannot doodle or draw or erase as they innately do on a normal slate.

So I did a small brainstorm on the slate.



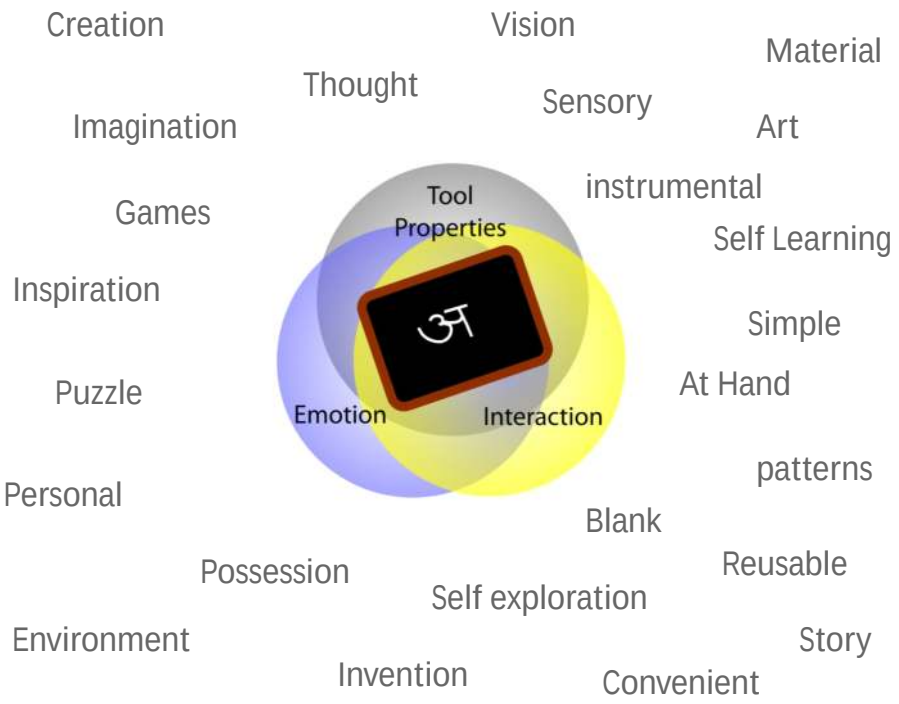




Fig 3.2.1: Brainstorm on slate

# 3.2 Design Ideas

The slate will allow the child to explore, capture and document his environment. Applications on the slate will allow him to draw, connect and search for concepts that he can relate to.

While the slate stays with the child, a copy of his work is saved on the system at school. This can be monitored by the teacher and he can guide the student if needed.

The aim of this slate is to allow the child to develop an interest in his surroundings and ask questions that can be answered by the teacher. The teacher can in turn connect the child to a peer in the city or his counterpart in city schools. This can lead to dynamic exchange of information and make learning a two way process.

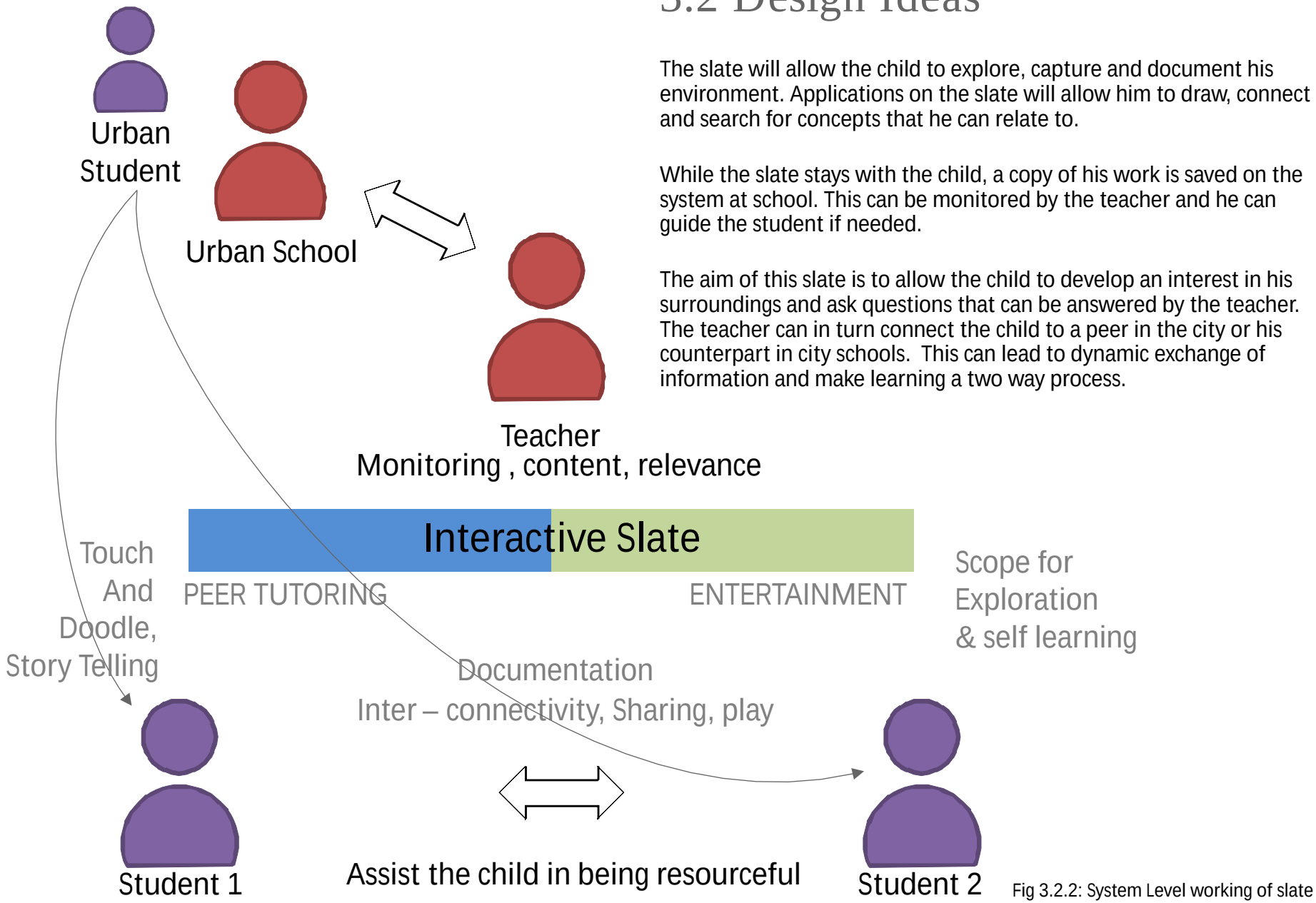



Fig 3.2.2: System Level working of slate

# 3.2 Design Ideas

Design Idea 2: A Children's Panchayat

Why Panchayat?
- A collaboration of children of various standards.
- Forming a body that will interact with the community.
- Take responsibility of using resources'.
- A device that will help them gather know-how's and to – do's of a problem.
- Assisting the body in working towards better interaction.
- Learn things that are relevant to them.

So I did a small brainstorm on the panchayat.

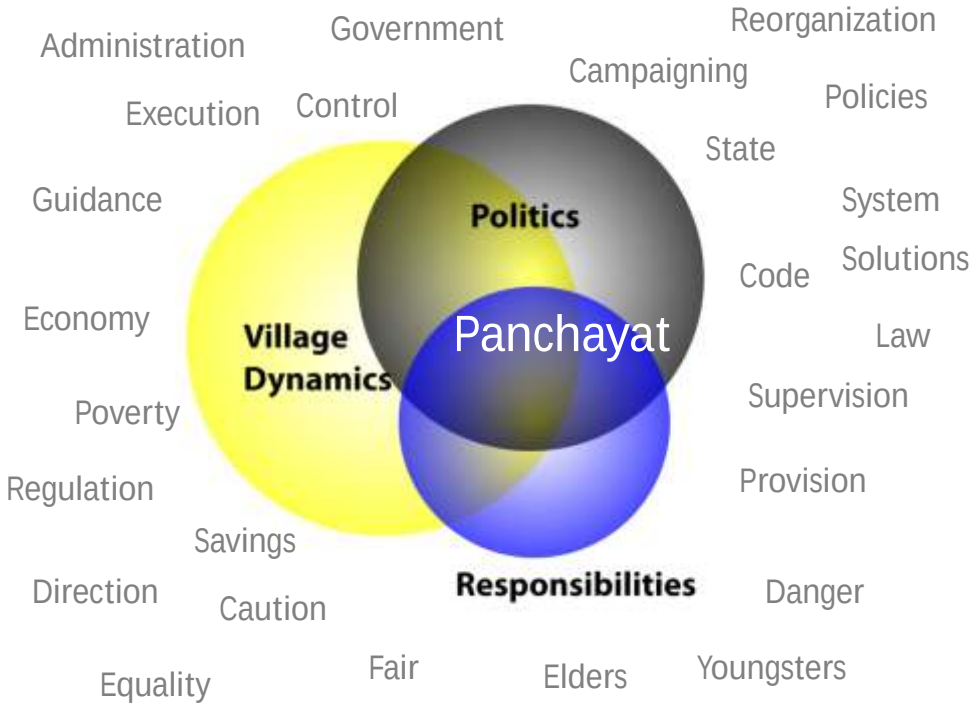




Fig 3.2.3: Brainstorm of a Panchayat

# 3.2 Design Ideas

Here the Children choose their own governing body. They get to assume roles of the Village Panchayat. They can interact with the community, interact with the device and formulate work plans in a way that they can help build a better place and an interactive environment and increase the social networking for the community.

The Teacher is the integral part in this system and works as a mediator between the governing body and community. He passes over the problem to the children and at the same time guiding them to work towards solving it by making use of this device.

The device will help the users to record, browse and search various concepts and allow the children to broaden their scope of learning.

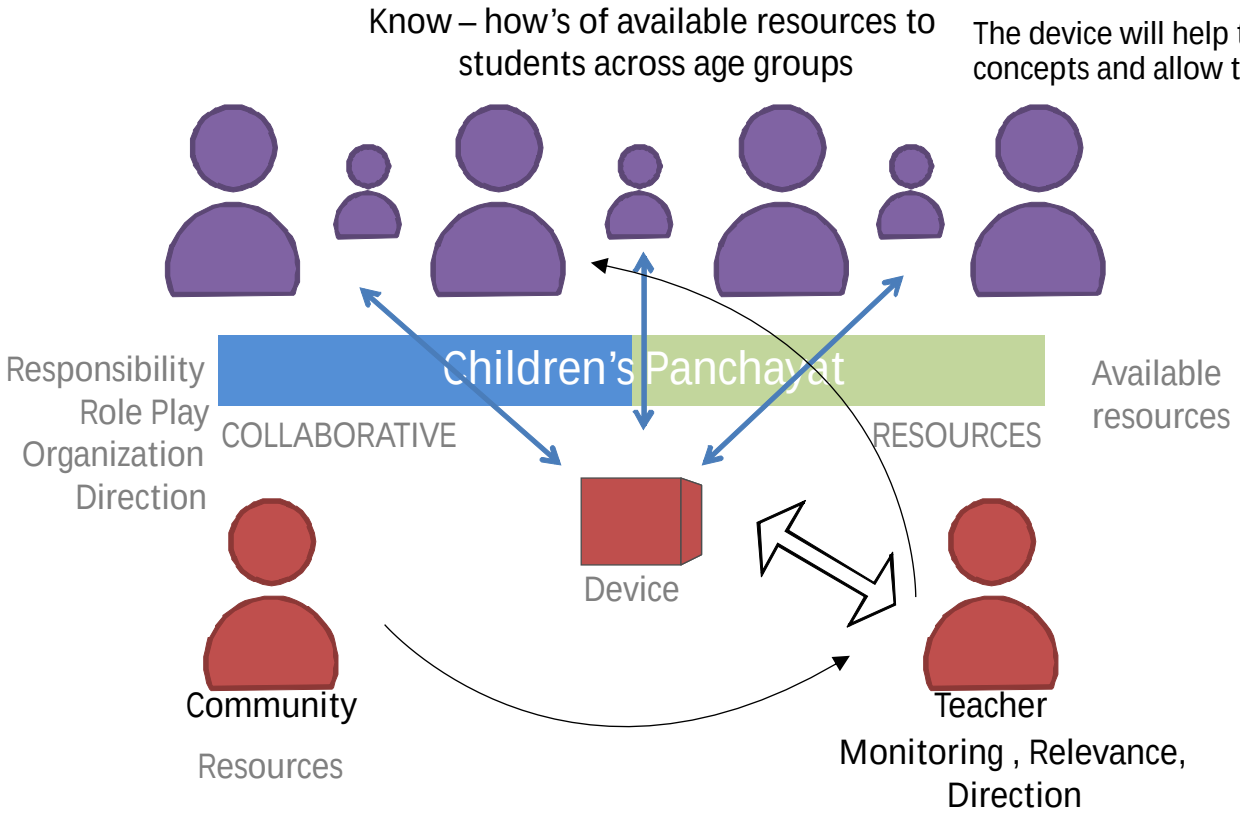



Fig 3.2.3: System Level working of Panchayat

# 3.2 Design Ideas

Design Idea 3: Interactive Television

Why TV?

- A good Audio-Visual Medium.
- One way channel of communication.
- Captures the children's attention.
- Explore the possibility of making it a two way channel.
- Accessible to a database.
- Combines entertainment and learning.
- Collaborative learning in schools.

Every child will have an input device. The television will broadcast a show that covers the curriculum. The show will be structured in a manner that the child finds it easy to relate to the chapter. There will be question intervals in the show after every main point is covered. The question will be displayed on the screen of the device and the children have to write the answer in the device. The device will collect all answers and display who gave the right answers and who gave it wrong. It will also display who gave the fastest correct answer.

This will motivate the children to compete in a safe manner. This concept is an adaptation of quiz times that are held in the schools. The only difference being that the device will modify the question according to the child's need and speed and learning progress.

the device maintains a record of the child progress and may give him multiple questions to solve till he has acquired the needed level to pass.

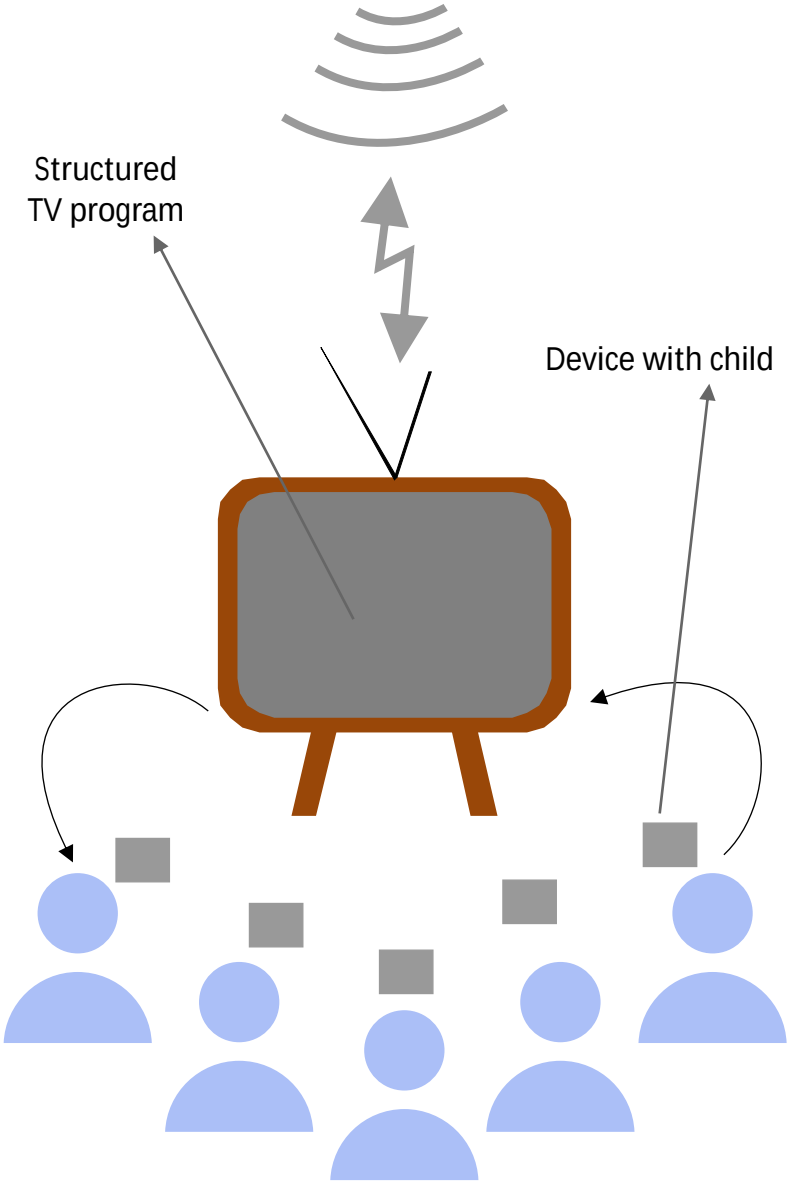



Fig 3.2.4: Television as an Input device

# 3.2 Design Ideas

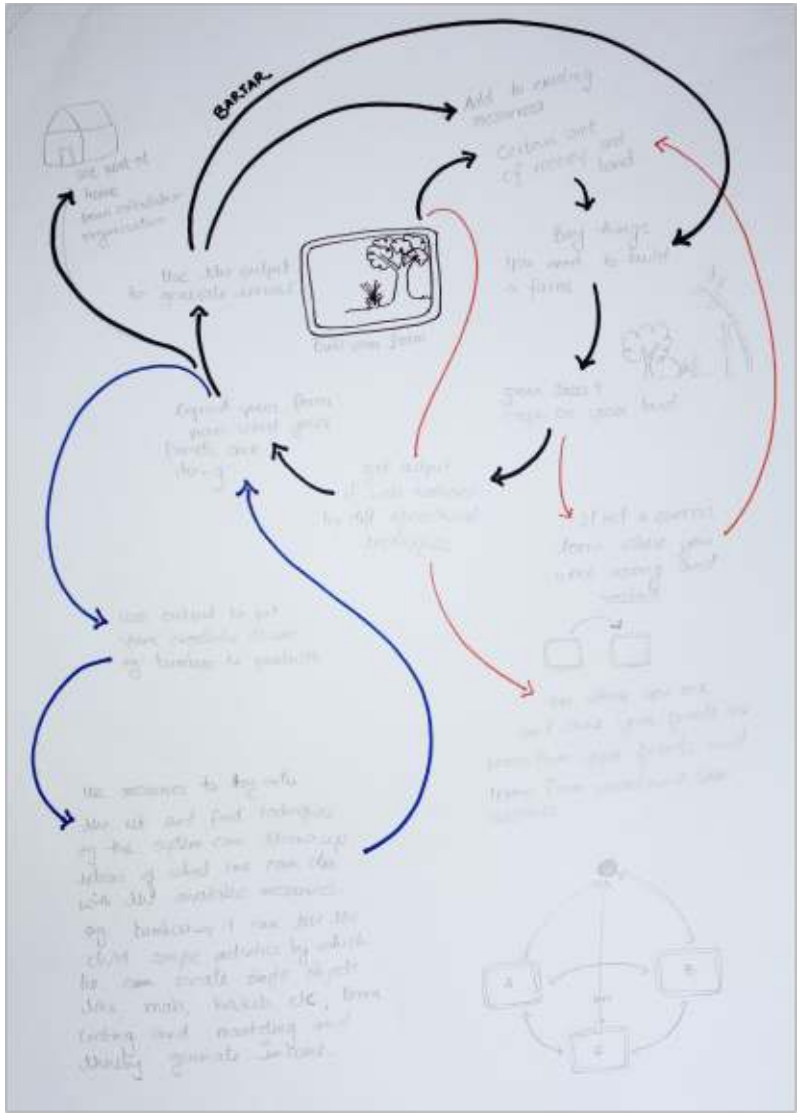



Fig 3.2.5: Game on land resources

Design Idea 4: Game on Land resources

This game allows the child to build a farm with the given resources. The child can buy material and improve his farm, sow seeds, grow crops and plants, generate output and thereby income. The child is the sole caretaker of the entire farm and duties to be carried out within.

He can expand his farm on basis of his crop output. He can utilize the output by either applying it somewhere, utilize the output to make something new and sell for more money, selling it for money, using a part of it at home, in barter and in pooling in to buy expensive resources.

The application allows friends to see how the other is doing and learn from their mistakes and from strong areas.

# 3.2 Design Ideas

Design Idea 5: Learning from Environment

The idea was to make the children observe the environment and build upon it. Here a child can click pictures and keep uploading the information on a database. Other children can view what is uploaded and build upon it by including new knowledge.

Hence work happens in a personal space as well as a collaborative environment.

Step 1: The Child has the application that can be available on any platform like, PC, mobile, OLPC or new hardware like a slate.

Step 2: He has attached peripherals that allow him to click pictures and record sound. Eg. a boy can click a picture of a bird

Step 3: He can upload the data into the system.

Step 4: Other children around can view the update and add data to it. Eg. One child happens to capture the bird eating, one captures his nest, eggs etc.

The idea was to allow children a platform on which they could explore content from their curriculum and learn in a relevant manner. The application can assist the teacher in setting projects for the children.

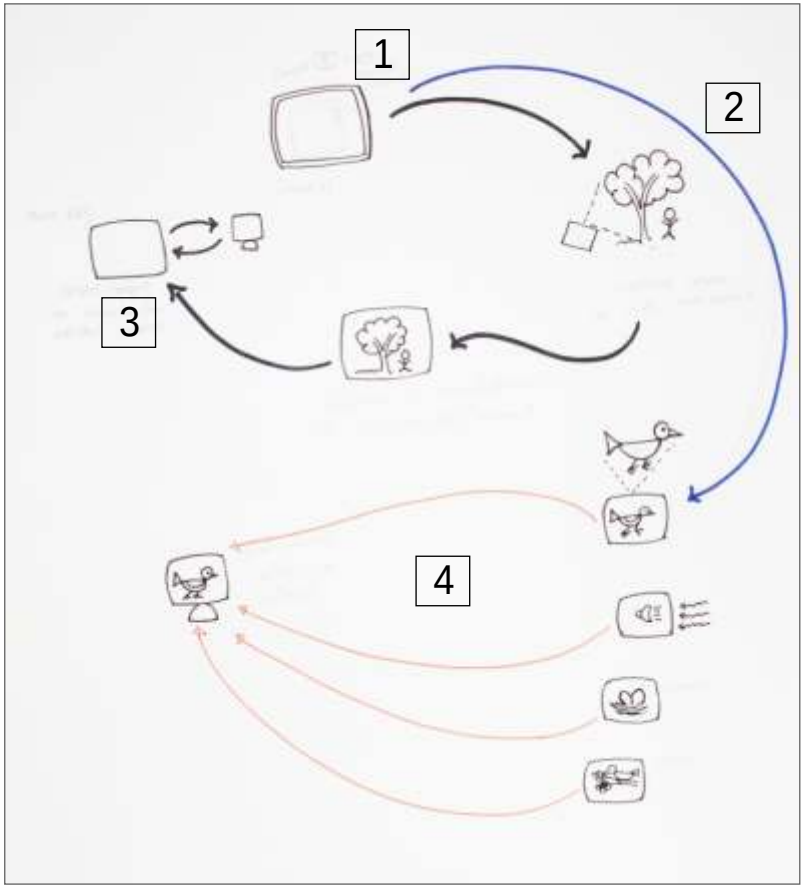



Fig 3.2.6: Learning from Environment

# 4. Final Concept

# 4.1 Project Focus

After analyzing all my design ideas, I identified my target users and defined a product profile.

Focus:
An application for Primary Students of remote rural areas. It will allow the child to:

- Work on curricular content by learning from environment.
- Maintain a picture diary.
- Doodle, draw and record.
- Receive updates on friends and additions on system.
- Build upon anything that is uploaded into the system.

Product Profile:

- Goal Oriented product

My aim is to allow the child to freely gain access to information on his surroundings.

- Web - Server - Database

The system is a software used by the teacher to monitor the child's activities and the application with the child that updates content on the database from his profile.

- Target Audience

Primary School Students of Remote Rural Schools, mainly 3rd and 4th standards.

# 4.2 Concept Map

CONNECT WITH:

**Teacher**

View the child's work and guide

**Family & Friends**

Help the child connect & share his experience

**A friend from city school**

Assist the child, teach him relevant concepts and learn about the village life

TO DO:

**Build on content**

**Learn from environment**

USE AT:

**School**

Work on textbook content

**Home**

Document lifestyle, folk tales, Songs, have a creative hobby

**Farm**

Learn how to use available resources, Document nature, learn new simple methods of sustainability, share

# 4.3 Concept Detailing

Appy is an application that can run on various platforms like large screen mobiles, desktops or digital surfaces. I have built my scenario around the surface and taken the metaphor of a slate.

Appy can be carried place to place by the students. It can also be used to connect with the teacher at school and friends back at home.

As shown in the figure 4.3.2, Appy is divided into 3 sections.

1. The Modes

The modes can be changed from Textbook, Share, Audio to Pictures. When none is selected, the Notebook can be used for doodling or browsing through by flipping its pages.

All content in these modes can be dragged to the notebook space to browse their features.

The textbook mode allows the child to open the chapters from their textbooks. The Picture and Audio mode allows the child to see and hear what they have recorded and stored. The share mode allows then to connect with the people nearby.

2. Tools

Simple tools for writing and doodling have been provided. There is also a presentation tool that gives the child a simple means to see a presentation.

3. The Notebook

All content is worked upon inside the notebook. Each item worked on gets displayed inside the notebook pages automatically. One can browse the pages of the notebook by flipping them or simply by going to the date and entering the desired date.


Fig 4.3.1: Different Platforms for Appy - Mobile, Desktop and a digital surface

Tool bar

Pencil
Eraser
Crayons
Colour Palette
Select
Basic Shapes
Ruled Bg
Presentation

Fig 4.3.2: Appy- Different Modes and tools


Mode

Text book
Share
Gallery
- Audio
- Photos

Note book

Use like personal notebook, flip pages around. Work gets saved on the book itself. Jump to any page and time. Doodle, compile and share.


# 4.4 Scenarios

I will explain the working of Appy through Scenarios.

Scenario 1

This Scenario Identifies the need and how Appy leads to community participation. It also defines how appy can actually take classroom learning out into the environment and help the child in learning by observing. this scenario details out the use of the notebook with the audio and picture modes and how the child can make use of them to compile small educative presentations.

Scenario 2

This scenario outlines the use of a textbook and how an interactive textbook can enhance learning.

Scenario 3

This scenario outlines the change Appy gets in the multigrade classrooms and how despite the chaos, learning happens through a fun way.

Scenario 4

This scenario is in form of a concept map that briefly outlines how a child from the city can help the child in a village and encourage peer tutoring which very highly affects learning.

# 4.4 Scenarios

Scenario 1

Yeh hai bhor zilla parishad prathamik shala. Satish Ghajbiye, chowthi kaksha ko padha rahe hai.  Din ka aakhri paat hai!


Satish Ghajbiye:
Baccho! somwaar ke liye yeh pata kijiye ki aas paas aise kaun sepaed hai? Kya aap sab ek aisa paed chun kar uspe kuch jaankari la sakte ho? Jaise ki hum ghar pe uska istaimaal kaise karte hai? Kya uska ayurved mein bohot moolya hai!

Aapke liye ek sahayak: apni daadi se puchiye!


Narrator:
Khyati chowthi class main padhti hai! Who ghar jake apni daadi se puchti hai:

Khyati: Daadi, daadi, bataona! Yaha pe ek paed jiska kuch ayurvedic mulya hai!

Daadi: Bohot hai! Aamla, hirad, jambu, ..... Kyu kya hua?

Khyati: Aaj hame padhaya gaya ki kuch paed aise hai jinse hum dawaiya bana sakte hai! Toh kya main aamla pe apna project kar sakti hu?

Daadi: ha! Aamla bohot gunkari hai! Ayurved mein istaimaal hota hai! Bope main Navlu ka khet hai! Usko pata hoga! Main usko bol doongi!

Scenario 1

Khyati: Thik hai dadi!

Narrator: Ujji, Khyati ka chota bhai hai! Woo khyati ki school main teesri class padhta hai! Aaj class main usne teacher ko padhate hue sunna aur khyati ke saath jaana chahata tha!

Ujji: Daadi daadi, main bhi ja sakta ju!

Daadi: thik hai!

Ujji: Sahi hai bey!

Narrator:
Agle din, Shaniwar ko, Khyati aur Ujji subah 7 baje ki ST lekar Bope ki aur nikalte hai! Bope pahuch kar dono Navlu chacha key khet main unse milne jaate hai!

Khyati:
Ujji, tu yeh camera le! photo khichna. Main sab likh loongi.
Wooh Dekh! Navlu chacha aa rahe hai!

Navlu: Arrey ujji meri photo le raha hai! Wah! Khyati, teri daadi ne bataya tujhe kuch kaam tha?

Khyati: Ha Navlu chacha. Mujhe aamla pe school se project karna hai! Hum ghar main aamla ka kaise upyog kar sakte hai!

Scenario 1

Navlu: Ujji, dekh who aamla ka paed hai! Usse ek daali, phal aur paatoy ke saath tod ke la!

Khyati: Kyu? Ek aamla chalega mujhe!

Navlu: Sirf phal mein gun nahi hota!

Khyati: chacha ek minute! Ujji yeh kaam ka hai record kar. Ha chacha! Aap keh rahe they:

Navlu: aamla bahu upyogi..... (Voice Fades)

Narrator: Khyati aur Ujji Navlu chacha ke saath baat karte hai aur unse aamle ke gharelu upyog ke baare main jaankari prapt karte hai!

Narrator:
Shaam ko wapas aane par Khyati apne project par likhna shuru karti hai!

Narrator:
Ghar aakar Khyati apni daadi ko batati hai ki aaj usne kya jankari praapt ki. Woh apni daadi se bhi jankari leti hai aamla ka gharelu upyog kaise hota hai.

Phir woh apna project likhna shuru karti hai.


Voice Over: (Khyati thinking aloud)
Chalo book mein project banati hu!
---

On clicking the picture mode, Khyati can open all stored pictures in Appy.

Note: The note book This can be used like an exercise book. The child can write and doodle as if he were to do so in a book with a pen. This is the dynamic space that automatically saves the content.

Voice Over: (Khyati thinking aloud)
Aamla..... navlu chaacha..... Hmm pictures aache hai.....
---

She browses through the pictures and drags the one she needs on the notebook. She can add more pictures or delete data.

Note: Resize the picture by clicking on it and dragging the edges.


Voice Over: (Khyati thinking aloud)
Yeh line wala paper ki main likh saku....
---

She clicks the ruled page icon for lines.


Voice Over: (Khyati thinking aloud)
Abhi choti point size ki pencil.....
---

She clicks on the pencil tool to find options of point size.


Voice Over: (Khyati thinking aloud)
Aur yeh kala rang.....
---

She clicks on the colour palette to choose black colour to write the content of her project.

Note: I have tried to give a feeling of making a personal diary where in the child can scribble, colour, draw, doodle and write in his own style.

Voice Over: (Khyati thinking aloud)
Aaj hame sikhaya gaya ki kai paed aushadh banane main upyog hote hai.... Mera project aamla pe hai..... Dadi ne navlu chacha se milne ko bola.....
---

She starts writing in the notebook.


Voice Over: (Khyati thinking aloud)
Navlu chacha ki baat record ki thi na maine.... Ha....
Yeh Sound ... aur kaha hai.... ha.... yeh wali
---

She searches for a voice recording of her talks with Navlu chacha. She drags it to the notebook.

Note: Drag and drop feature allows the child to experiment with various content formats on the same screen.

Voice Over: (Khyati thinking aloud)
Chalo abhi yeh main satish sir ko bhej deti hu!
---

She completes her project.


She completes her project by assembling all the content she had in her slate. She drags various pictures, draws few graphics, add audio clips and finishes her project.

Voice Over:
Narrator: Is tarah Khyati apna project pura karti hai.
---

She flips the pages of her project to go thru it once again.

Note: The flipping of pages is like turning pages in a paper book.


Voice Over: (Khyati thinking aloud)
Presentation..... Marker.....
---

She selects the presentation tool and then the marker, to mark out portions of the project in a chronological order for presentation.

Note: I have tried to provide a simple tool for presentation. This tool allows them to simply connect the parts for presentation and the then play it in chronological order.

Voice Over: (Khyati thinking aloud)
Yeh 1.....
---

She starts marking her content.


Voice Over: (Khyati thinking aloud)
2 aur 3.... Play.....
---

She completes her selection order and presses play button.


Voice Over: (Khyati thinking aloud)
Chalo khatam.
---

She reviews her content and presentation.


Voice Over: (Khyati thinking aloud)
Share.... aur yeh bhej diya!
---

She sends her presentation to her teacher.

Note: The data will be sent on basis of proximity of the devices. Whenever within range, data selected for sending will get automatically transferred.

# 4.4 Scenarios

Scenario 2
This scenario outlines the use of a textbook and how an interactive textbook can enhance learning.

The aim here was to create an environment where the child could learn outside the classroom walls. I used interactive textbooks on which I could allow the child to doodle. Also the child can make small notes or write his analysis by dragging the textbook onto the notebook.

I have tried to fuse the textbook and notebook together as one. I have added features like voice books and dictionary which can allow the child to interact with the content. I have also explored the possibility of multi-lingual voice outputs.


Working with Textbook Content


Khyati browses throught he textbook mode.
She selects a chapter she wants to work upon.

She drags her chapter to the notebook.

Note: I have tried to make every feature of the slate accessible from the notebook.

The chapter opens up with its available features on the notebook pages.


Khyati clicks on the selection tool in the toolbox and selects a paragraph.

Note: The slate allows the child to select and hear any portion of the textbook. They can browse the pop up box of the selection tool in the textbook mode.


Khyati clicks on a language button in the pop up box of the textbook. She can now hear the selected text in the chosen available language.


Khyati can also select a particular word and hear its meaning in a chosen available language.

Note: By click on a word with the selection tool, one can select a word and then click on the dictionary icon.
The system gives a voice response of the selected word and its meaning in the chosen language.


The word gets highlighted and a small pop up appears near the word which displays the meaning of the word.


The system allows the child to scribble his notes in the textbook. She can take the pencil tool and write down the meaning on the word chosen.

Note: This gives the child an opportunity to the child to use this slate while the teacher is teaching. She can doodle her thoughts as well as those of the teacher while the class is going on. This leads to a self learning method which is effective.

The child can also take dynamic exercises of the selected or whole text of the chapter in the notebook.


Upon clicking the exercise button on the textbook features, the notebook flips the page to a blank exercise sheet.

Note: A start button appears that times the child and his responses. All tests are voice record based where in the child has to speak into the microphone to answer questions.

The system reads out the question to the child leaving a blank space for the child to fill in by speaking the answer.
The recorder switches on for a few seconds before closing.

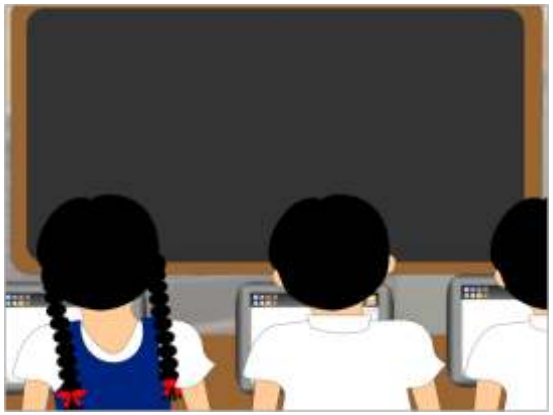
Once the answer is recorded by the system, it is fixed automatically with the blank space on the question.

This time the system reads out the answer with the response of the child and then reads out the sentence in system voice again with the correct answer.

The child then has to evaluate himself whether he was right or wrong and then mark himself accordingly.

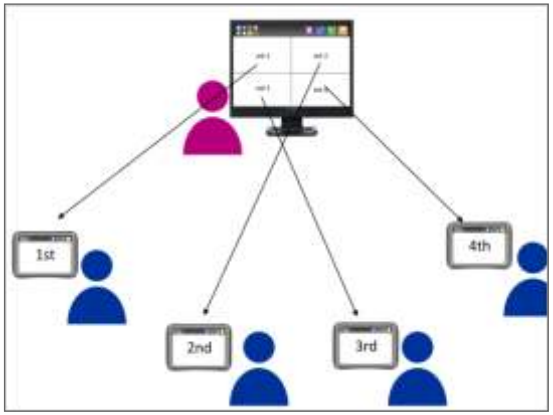
# 4.4 Scenarios

Scenario 3 - Using Appy in the Classroom



1. Children carry Appy to school everyday


2. The Teacher has Appy on a desktop in which he can slipt his screen for each grade




3. Every child can share content with the teacher according to the split the teacher has created


4. Children can access and transfer content


5. Similarly every child can access only specific data as set by the teacher

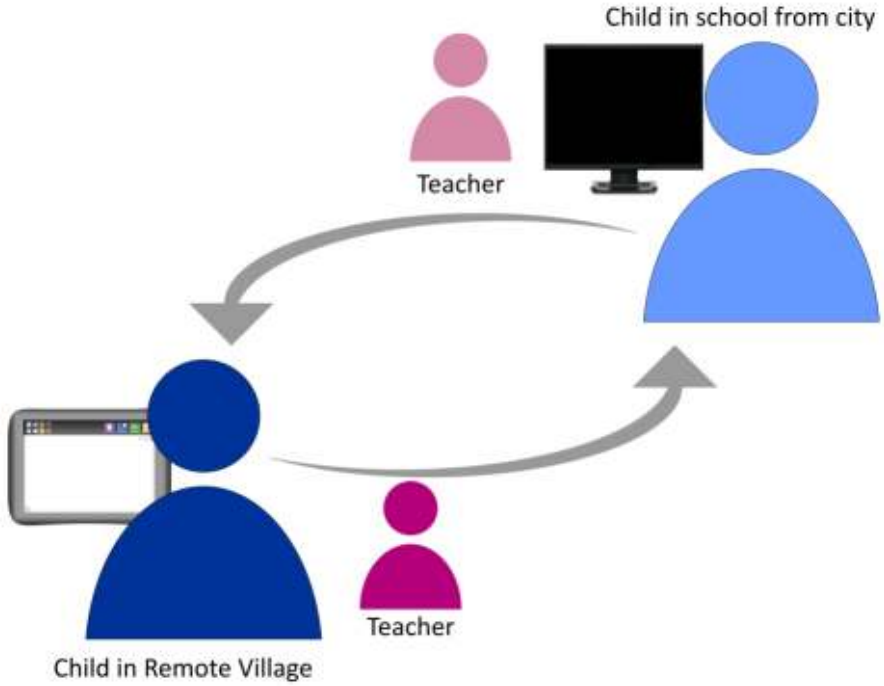

6. The split mode connects to the child's Appy and the teacher can teach the child visually through interactive means

# 4.4 Scenarios

Scenario 4 - Further Application of Appy

Appy can help the child in remote rural areas to make a buddy in the city. Through the internet and servers, they can connect with each other and share content.

The content can be monitored from both sides by the teachers who can collaborate on teaching methods and set live projects for the students to work on.



# 5. Conclusion

Appy is devised to make the child move out from the classroom and go and seek answers to his projects by inquiring and documenting his environment. It will assist the teacher in setting interactive projects for the child so that he has a better experience in learning. Appy makes the child feel the need to ask more questions and become more enthusiastic.

Appy can be used by the child in all spaces. It is such that it enables the child to find existing content and work upon it by practical means. It aims to connect the child with the teacher and the community. This happens when the projects set are such that the child can apply them for the betterment of community.

Indeed Appy is a futuristic product, but those days are not far when even remote rural areas will be accessible, both physically and virtually.

I have tried to bridge this physical and virtual gap with the means of my project. I do hope that with innovations, children from remote rural areas will also get a better experience of education and not be limited to the multi-grade classes and restricted within classroom walls.

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