# Design of devices for group interaction

Guide: Prof Ravi Poovaiah

Visual communication project

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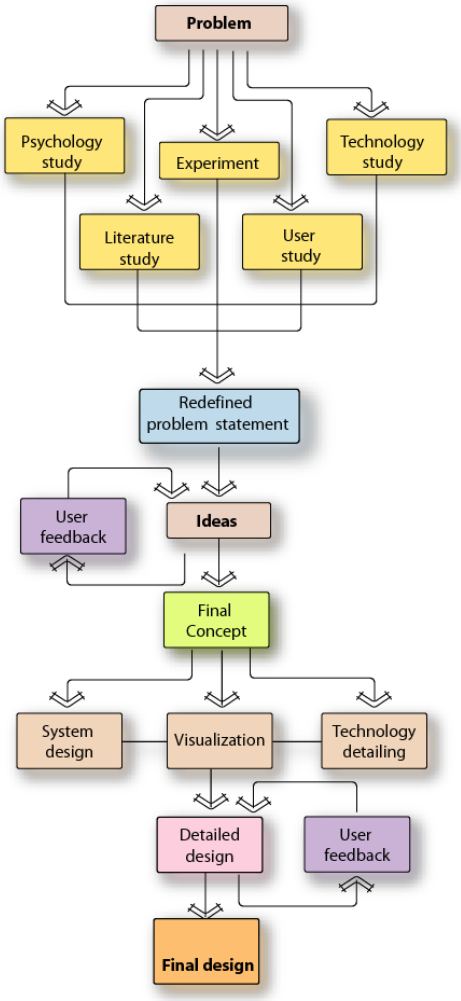
- Scenario
- User testing
- Retrospective


# Methodology

*Study Phase*

*Ideation*

*Detailed design*



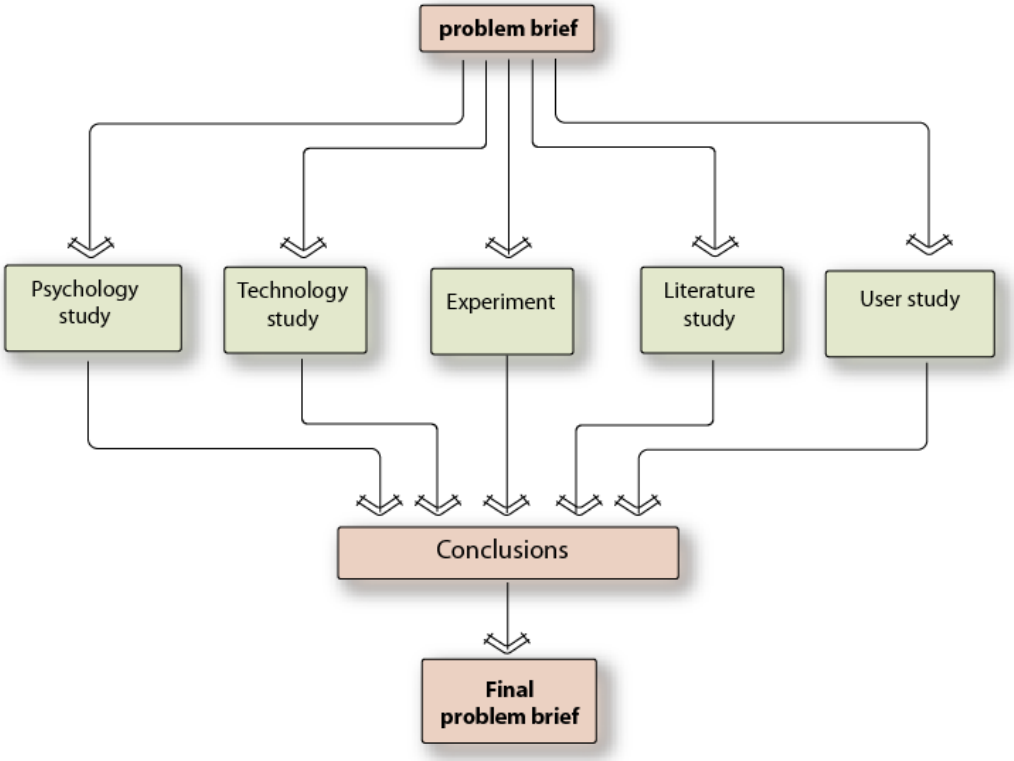

# Problem definition

Design a device and its interface which would foster casual group to group interaction.

## Vision

*To relive the moments of fun and laughter we had as a group with friends who are now far far apart.*

# Study Phase


problem brief
Psychology study
Technology study
Experiment
Literature study
User study
Conclusions
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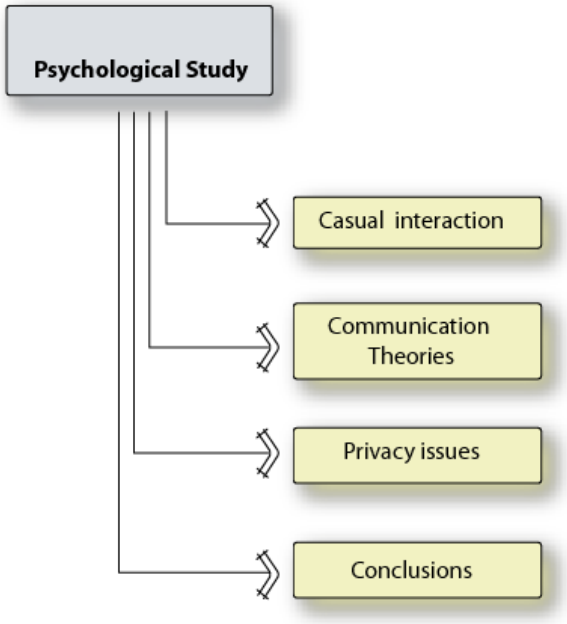
# Psychological aspects




# Psychological aspects

## Casual Interaction

- Unscheduled
- Random participants
- Unarranged agenda
- Interactive
- Rich content
- Informal language

# Psychological aspects

## Prerequisites

- Concentration of suitable partners
- Co-presence
- Low personal cost
- Visual channel

## Framework

- Gaze
- Posture
- Gesture
- Facial expression

# Psychological aspects

## Pointers for causal interaction

- Physical proximity

  The most crucial aspect for informal interaction to happen is physical proximity

- Informal awareness ( environment )

  Informal awareness is a naturally gained understanding of who is around, what tasks they are performing, and whether or not they are available for conversation.

# Psychology study

## Conclusions

The interface should support

- Visual channel
- Non verbal communication
- Informal awareness
- Audio communication
- Style messages
- Have low personal cost
- Group formation
- Link up a lot of people
- Casual and intimate communication

# Communication theories

## Communication theories

- Symbolic Convergence Theory

  "Symbolic" refers to verbal and nonverbal messages and "convergence" refers to shared understanding and meaning.

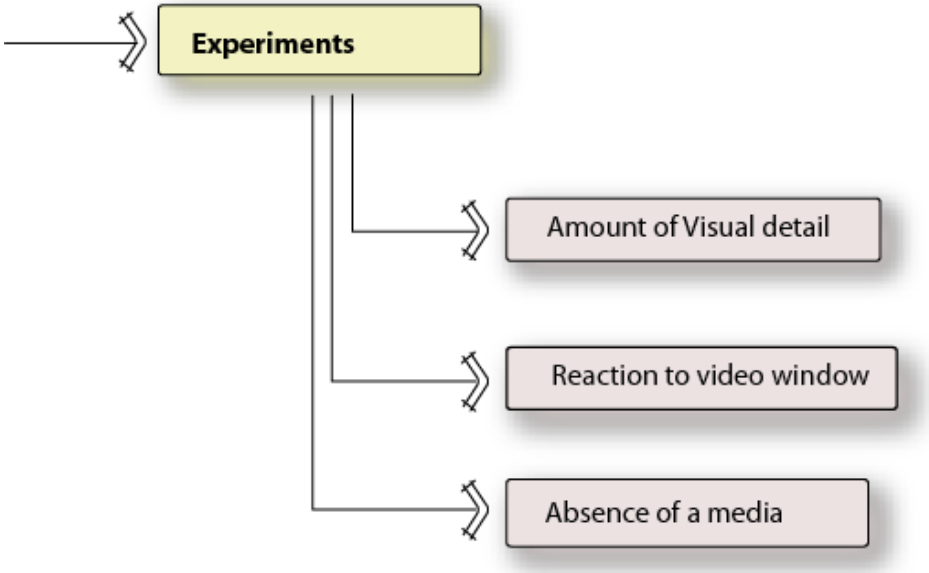
- Communicator style (Trait theory)

  Individuals have a predominant manner or style in which they communicate.

- Social penetration theory

  Relationships become more intimate over time when disclosure takes place.

# Experiments




# Experiment

## Amount of visual detail

### Intent

The intent of the experiment was to

find out the amount of visual detail that is needed to support casual interaction.

### Setup

Group of seven people were asked to interact during a power failure. Two experiments were done.

# Experiment

## Reaction to video window

### Intent

The intent of the experiment was to find out how people reacted to a video link between two spaces and to find out the psychological problems involved

### Setup:

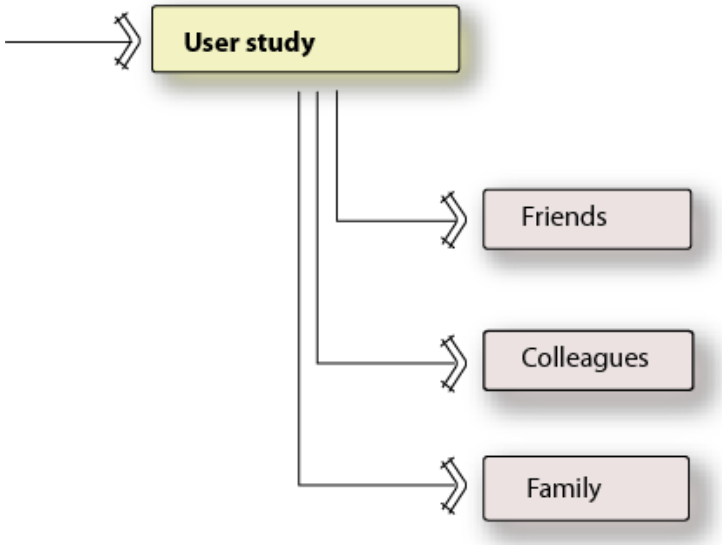
Two labs at IDC were connected up using web cams and net meeting software for a week.

# Experiment

## Conclusions

- Between friends there is no need for high visual detail to foster group interaction
- People voiced concerns on privacy
- People developed innovative ways and codes to compensate for the loss of one communication channel
- People preferred life size displays
- The zone of view was not clear
- Need to support private conversation

# User study



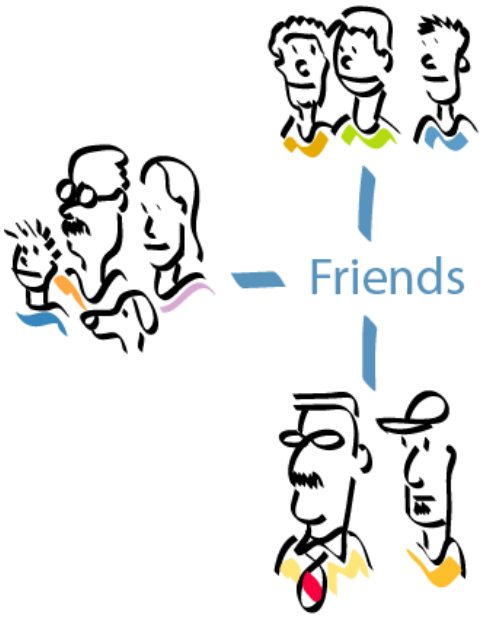

# User study

The users were asked the following questions.

- Where do they interact
- When do they interact
- What all they do when they interact
- How all do they interact
  - as a group

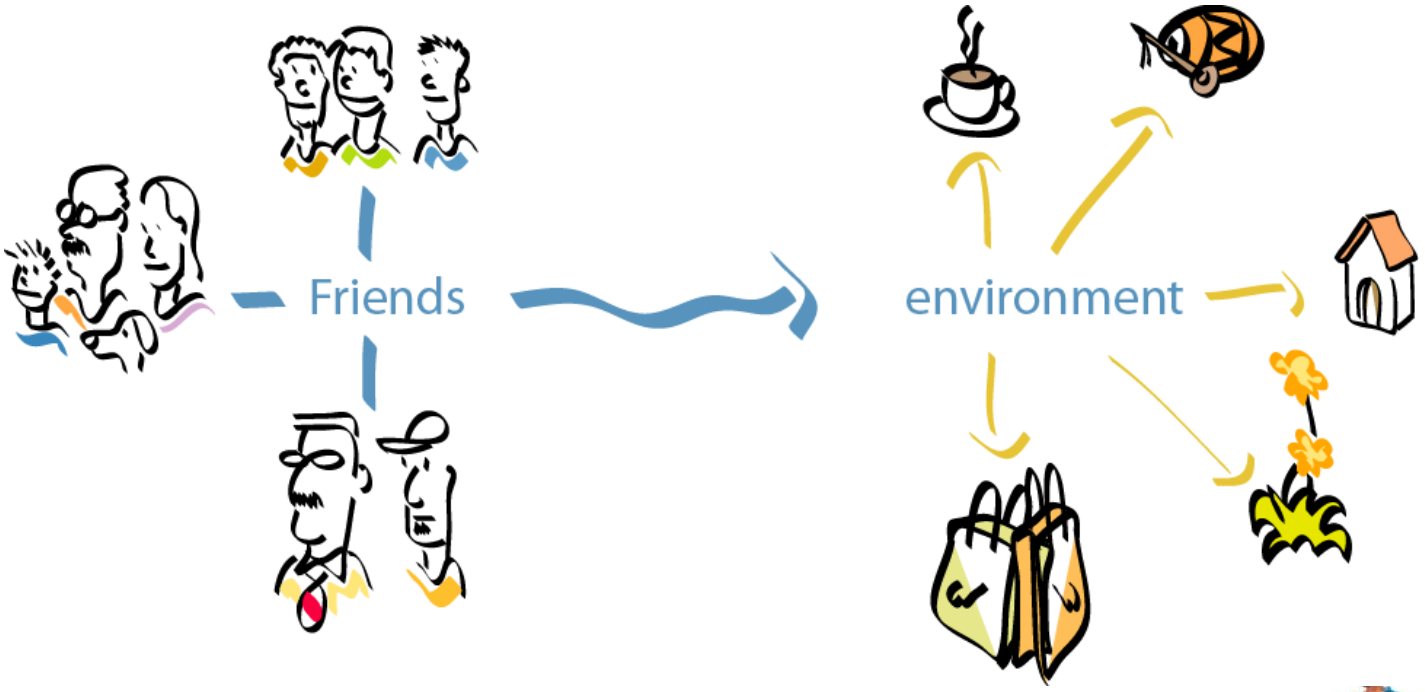
# User study

## Friends




# User study

## Friends




# User study

## Media Analysis

| Activities | Medias |
|---|---|
| Class, professors, computers, daily events, news, movie, music, gossip, clothes, sports, cosmetics, beauty, work | voice. visual mobile |
| Daily events, children, tv, family matters, clothes, photographs, movie, music, play | voice. visual, white board haptic |
| gossip, problems, music, festivals, holidays, events, meetings, movies | voice. visual, mobile |
| Music, movies, sports, games, jokes, art | voice. visual, mobile, white board |

# User study

## Conclusions

- Most users felt the need for a group interaction device
- The environment played an important part in group interaction
- Need to support multiple medias
- Users wanted an easy to use device
- Users wanted the device to be ubiquitous
- Users felt the need to be part of distant social functions
- The interface should support formation of subgroups
- The device should support public and private conversations

# Literature study

## Relevant research work

- Living in Augmented Reality
  (Ubiquitous computing) Bill Buxton
- Media Space, Xerox PARC
  Stults, R. (1986)
- Self Reflection can Substitute Eye Contac, Osamu Morikawa, Ryoichi Hashimoto and Juli Yamashita

# Literature study

## Conclusions

### The interface should

- Provide Privacy
- Device should be ubiquitous
- Use life size displays
- Support existing practices
- Provide awareness view
- Support Gaze
- Technology should be transparent

# Scenarios

- Family: elderly couple

- Friends : college mates

- Colleagues : new employee

- Office : dispersed groups

# Idea clues

## Emotional aspects of casual interaction as told by users:

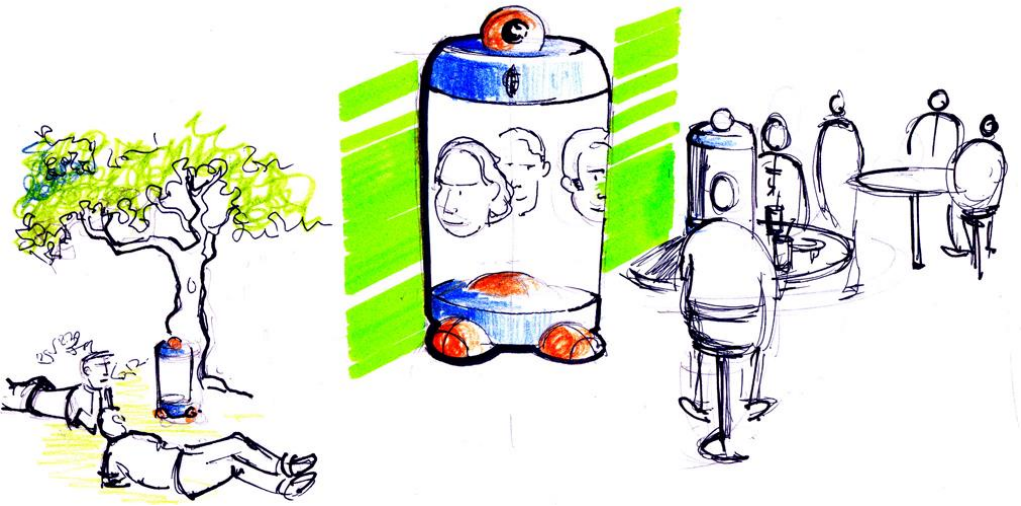
Close, special intimate, sharing, memorable, creative, spontaneous, sweet, personal, funny, fresh, everlasting, cozy, familiar, connected, trust, informal, unplanned, spicy, Naughty.

## Environmental clues

Table, Couch, door, vase, mats, games, posters, book, toys, ceiling, floor, fan, mug, tv, chair, rug, mobile, wall.

Ideas

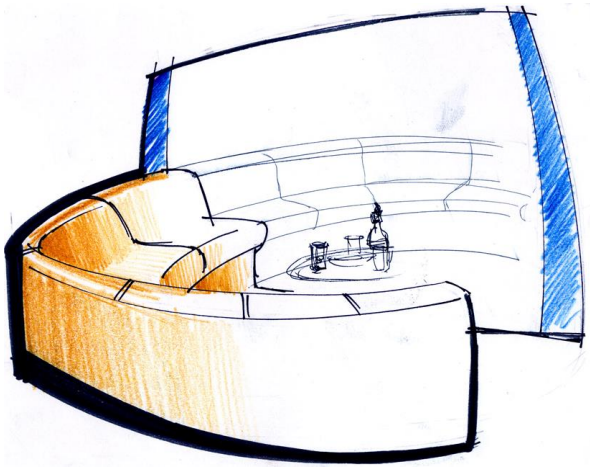
# Ideas



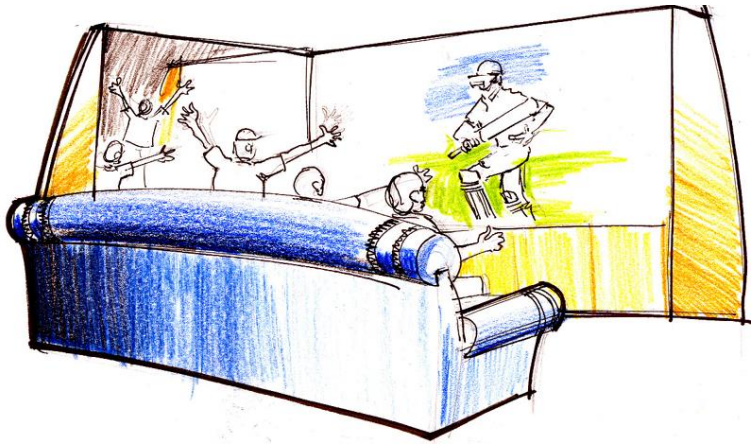
Portable friends

Kids view

# Ideas

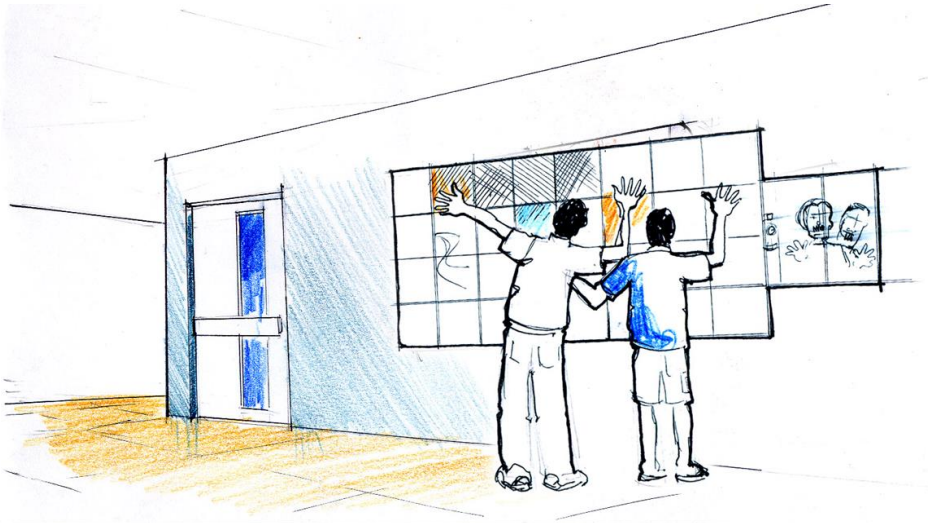


Share a meal



Group action

# Ideas



Corridor group fun

Corridor dynamics

# User feedback

- –The users liked most of the concepts
- –Users connected readily with the idea of share a meal
- –The idea of group action was welcome by a lot of students in the campus
- –Families said they could meet up with their loved ones and share a meal
- –Most users asked why these were not already implemented
- –Certain users felt that devices like kids view and portable friends would become redundant soon.
- –Users felt that it cant be adapted to other uses later

# Final concept

## Corridor dynamics

*“Thoughts exchanged by one and another are not the same in one room as in another”*
Louis I. Kahn

# Corridor dynamics

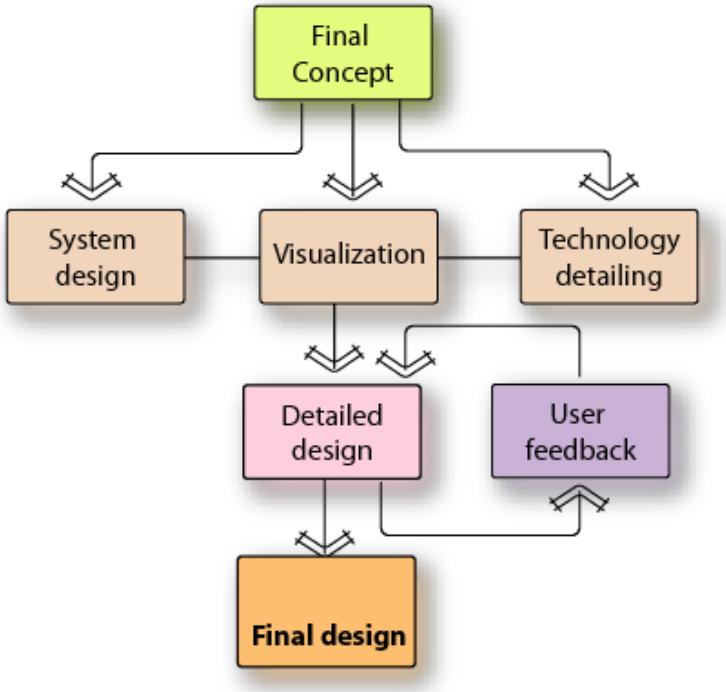
To connect up two remote offices so as

to build a bond which makes the employees feel they are part of a complete family.

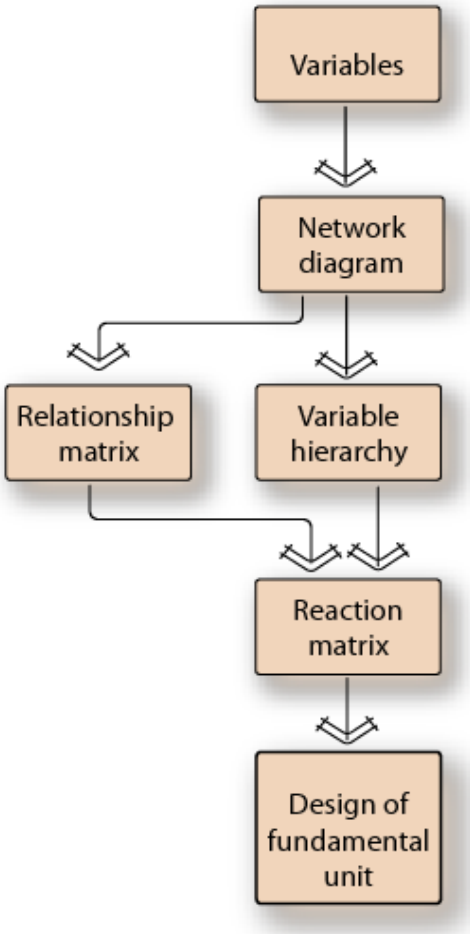
A device that would prompt people to reach out and make friends.

A device that would create an experience which is playful, involving, magical, memorable and natural.

# Final design

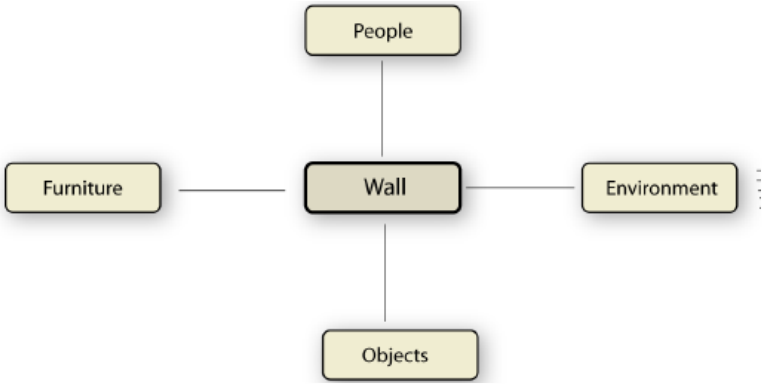



# System design



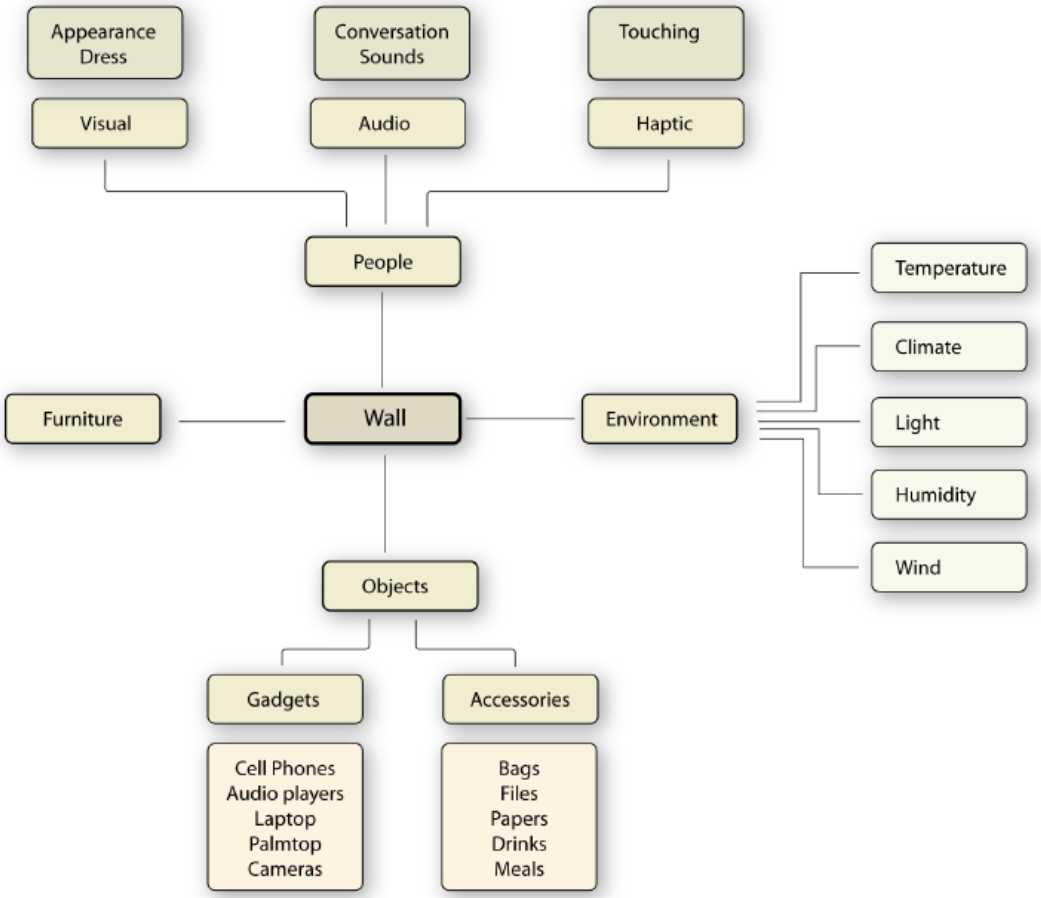

# System design

## Network diagram




# System design

## Network diagram




# System design

## Reaction matrix:

Reaction matrix is a study to understand the reaction of the wall to changes at both ends, the scale of these reaction and the artificial intelligence aspect of these reactions.

## Relationship matrix:

Relationship matrix is a study to understand the relationship between the various variables and build a hierarchy which stipulates what all reactions take place and the scale of those reactions.

# System design

## Reaction matrix:

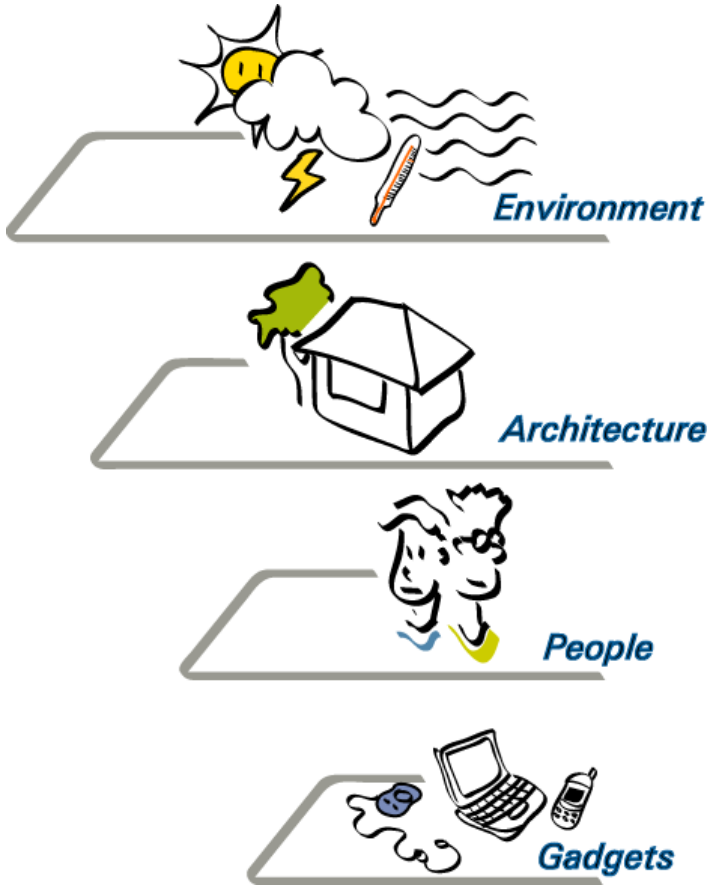
| Input | | Output A | Output B | scale | AI |
|---|---|---|---|---|---|
| Environment | Climate Spring | nil | Random generation of pixels | | |
| | Summer | nil | slow rising of pixels | Speed | The pixel grid gets energized and starts vibrating with increasing amplitude |
| | Winter | nil | Falling pixels | Speed | Minimum vibration |
| | Monsoon | nil | Flowing pixels | speed | The pixel squares loose shape and become soggy |
| | Temperature | nil | Color | red - blue | |
| | Light | nil | Intensity | bright to dull | |
| | Vegetation | active leaves | active leaves | density | |
| | Humidity | nil | condensation | Translucence | |
| | Wind | | digital wind blowing of squares | slow - fast | |
| | standing | digital squares slowly fall down, with time | digital squares slowly fall down | varying speeds | When other entities hit them they scatter |
| | walking | digital squares stay behind sound beats | digital squares stay behind | | When like squares meet then they stick, gets transferred |

# System design

Relationship matrix:

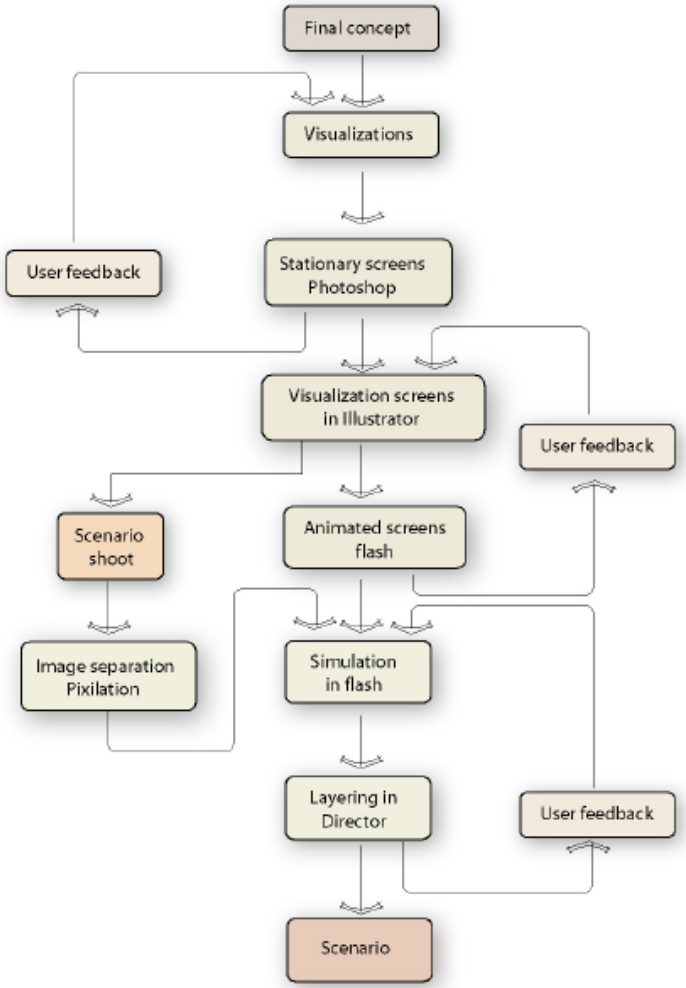
| | Spring | Summer | Winter | Monsoon | Temp | Light | Vege. |
|---|---|---|---|---|---|---|---|
| Climate Spring | nill | | | | | | |
| Summer | | | | | | | |
| Winter | | | | | | | |
| Monsoon | | | | | | | |
| Temperature | 3 | 5 | 2 | 2 | | | |
| Light | 2 | 5 | 2 | 2 | 4 | | |
| Vegetation | 5 | 5 | 5 | 5 | 5 | 5 | |
| Humidity | 4 | 4 | 3 | 5 | 5 | 3 | 0 |
| Wind | 4 | 4 | 4 | 5 | 4 | 2 | 5 |

# Variable Hierarchy

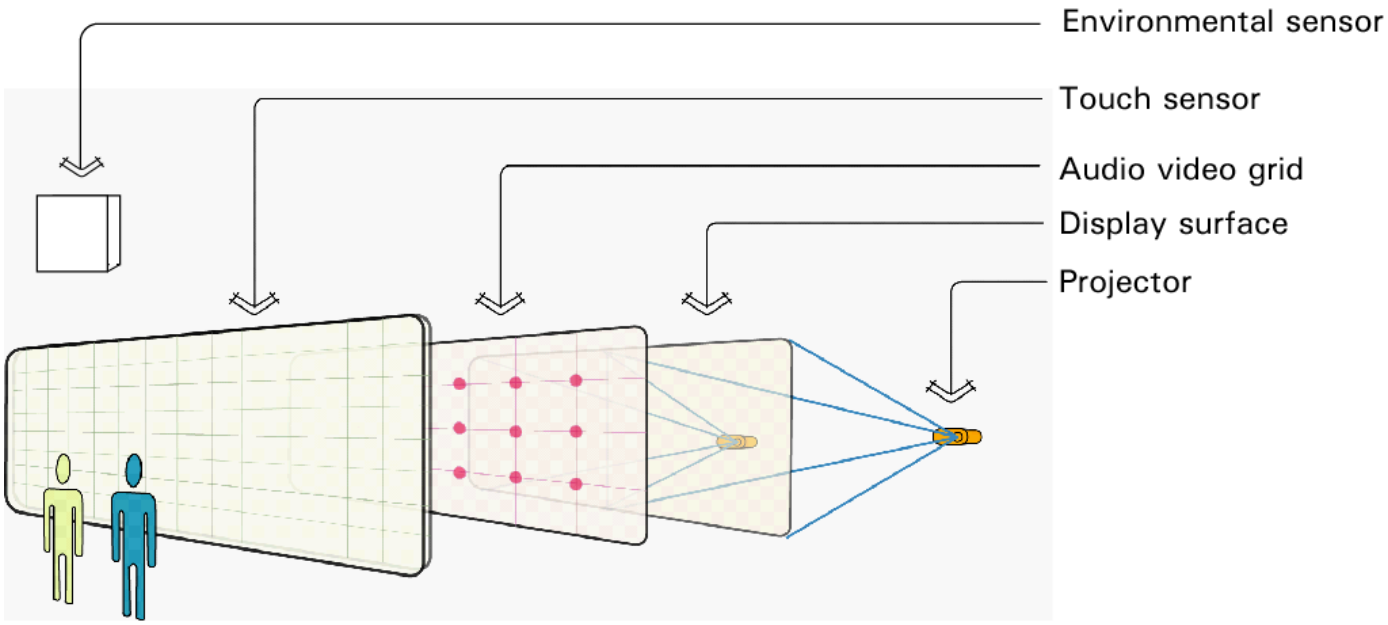



# Scenario

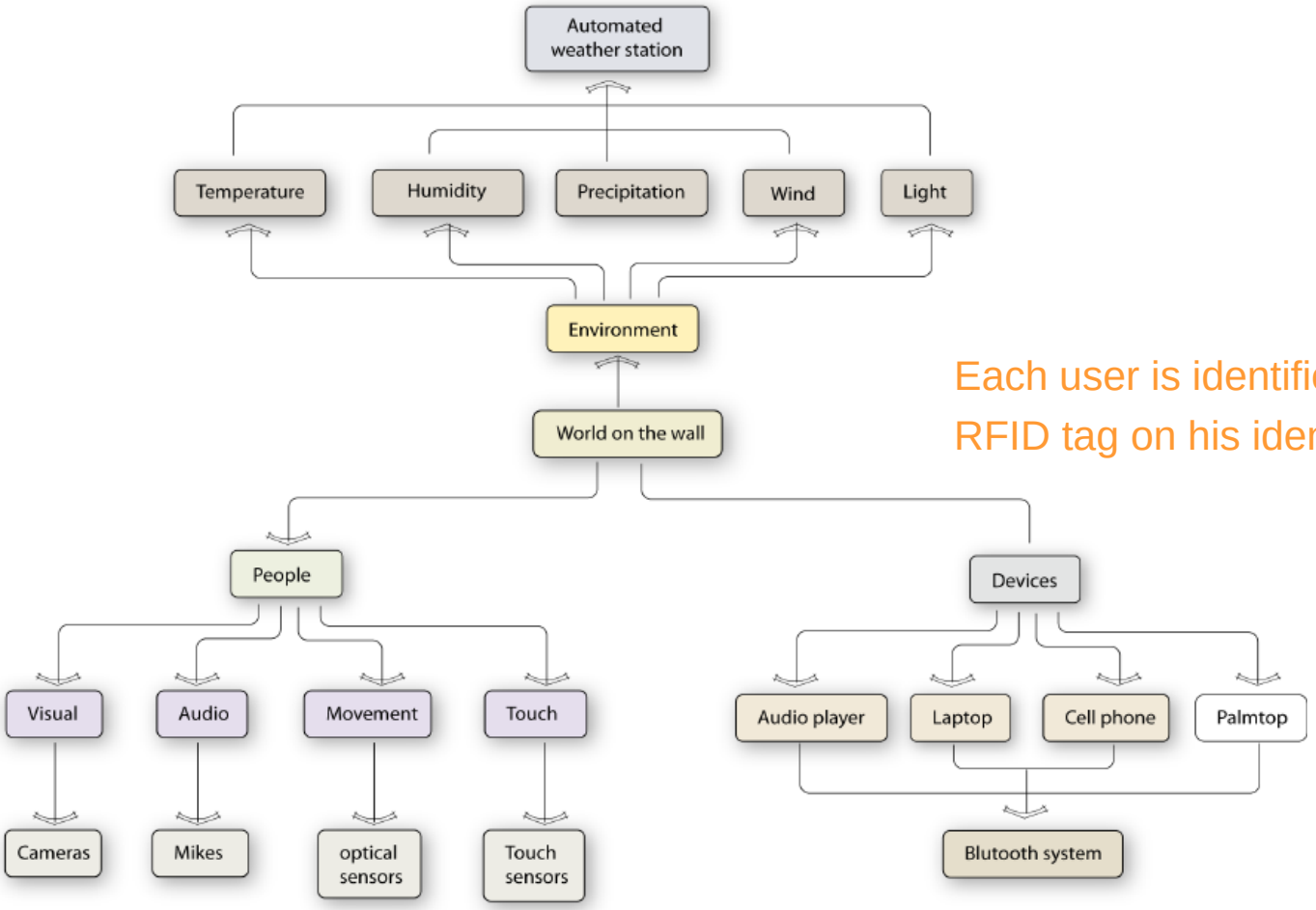
# Simulation


Final concept
Visualizations
User feedback
Stationary screens Photoshop
Visualization screens in Illustrator
User feedback
Scenario shoot
Animated screens flash
Image separation Pixilation
Simulation in flash
Layering in Director
User feedback
Scenario

# Technology detailing



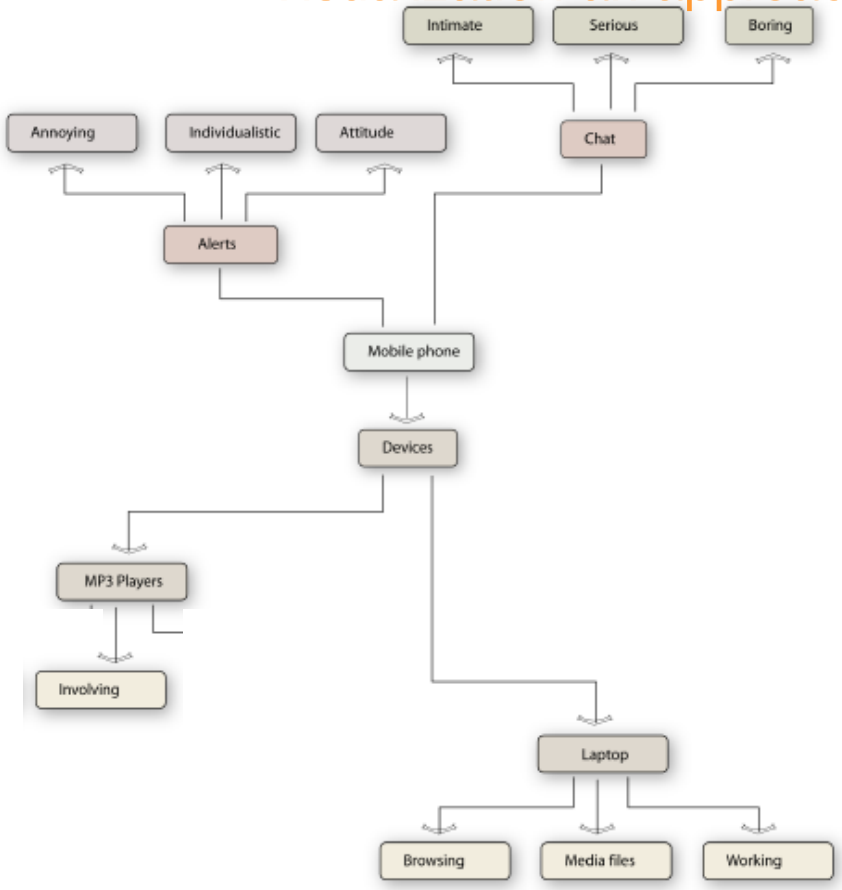

# The working of the wall




Each user is identified by the RFID tag on his identity card

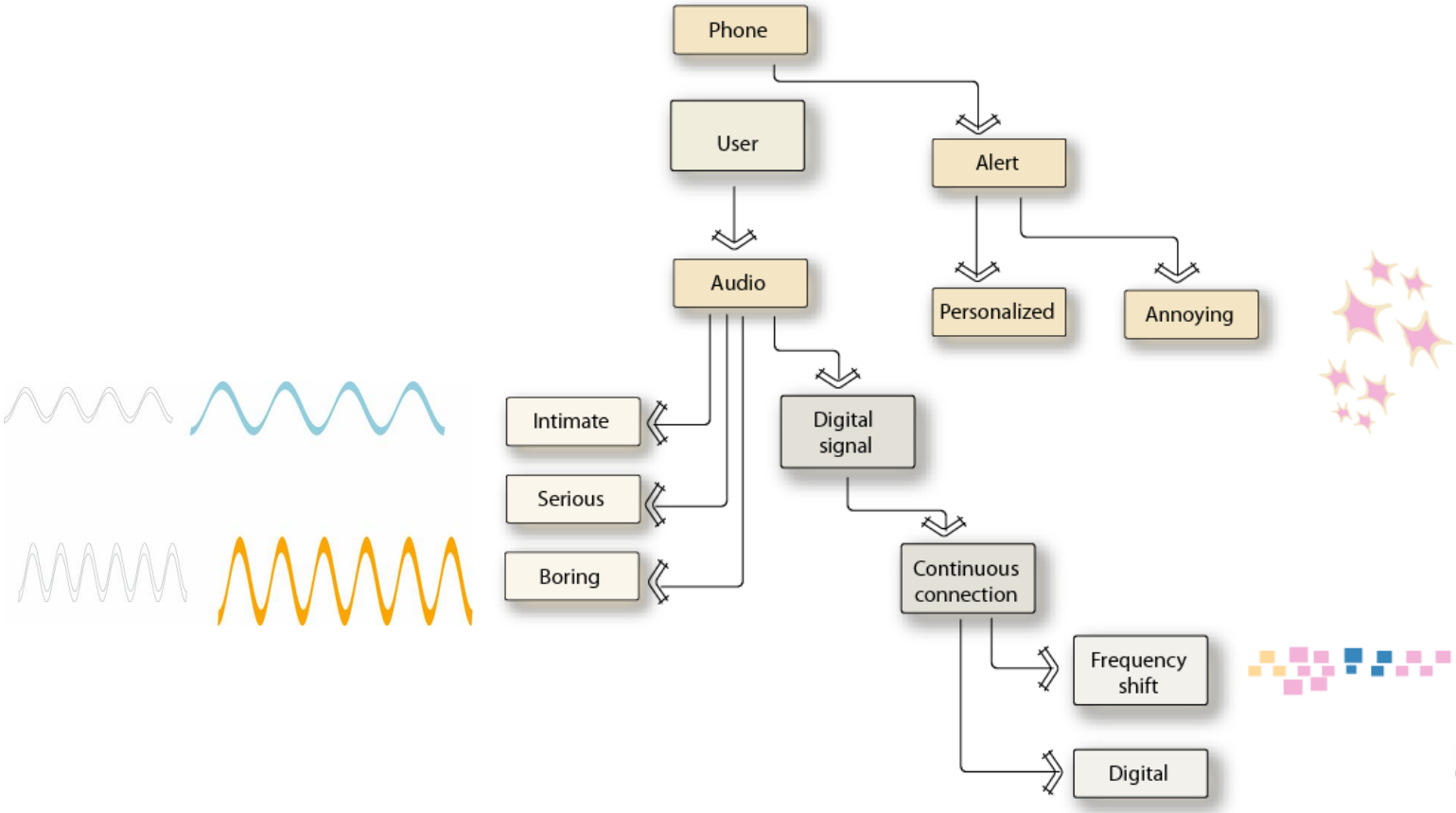
# Visualization

Visualization an approach Gadgets

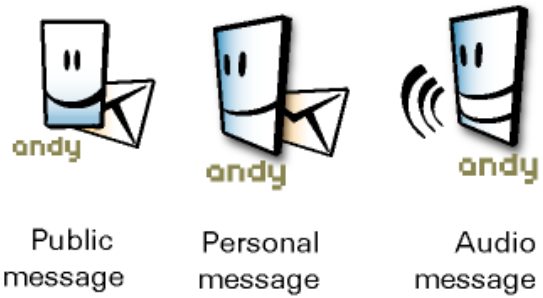


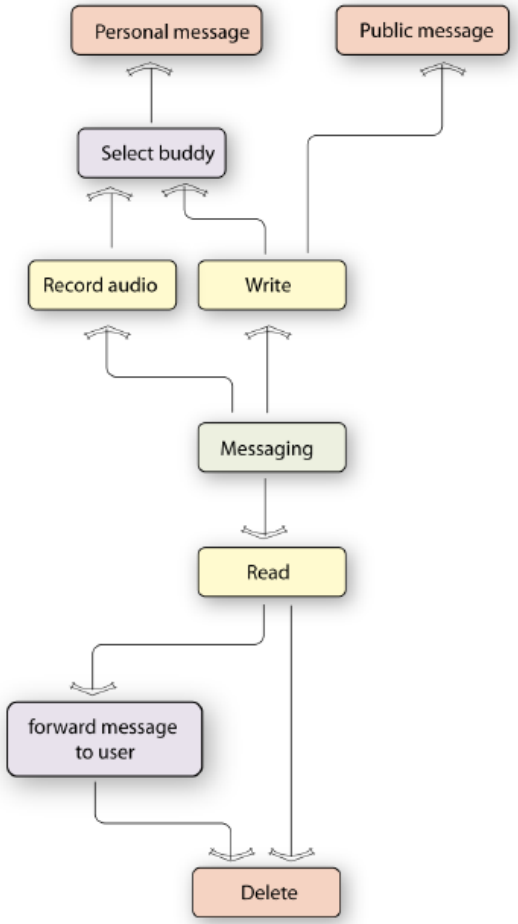

# Visualization

## Visualization an approach Cellphone



# Messaging


andy
andy
andy
Public message
Personal message
Audio message


Personal message
Public message
Select buddy
Record audio
Write
Messaging
Read
forward message to user
Delete

# User feedback

# Applications

- The wall can be implemented in chain stores giving the users an entirely new experience
- Schools and studios can be connected up to enrich the learning experience
- Connect up streets in different Places giving a view into each others environment

# Future work

- Can the wall detect emotional states
- Work both as a formal and informal interaction device

Thank you