

Research on digital mobile platform for rural areas and usage of mobile phones in an urban household scenario.

As a research intern at
Tata Cosultancy Services(TCS) Innovation Labs - Mumbai.
Yantra Park, Thane.

Pooja Masurkar

Student, M.Des. - Visual Communication

Industrial Design Centre, IIT Bombay

TOPIC

I) Investigating the various problems faced by people living in rural and urban areas with respect to using technology for their communication needs.



II) Studying the 'GappaGoshtiTM' mobile application and designing a method to transfer money (mobile payment) through the same.



POINT OF VIEW

Application of technology in rural areas will help in educating rural people, enable development of self sustainable and self reliant rural models which will further help in bridging the rural urban divide.

OBJECTIVE

1. Enabling application of technology in rural areas for fulfilling their communication needs.
2. To study problems faced by users of rural and urban areas with respect to using technology for their communication needs.

Objective of work assigned by TCS in the 'GappaGoshti™' platform:

1. Getting the experience of the rural world on a digital platform.
2. To study the the existing model of the digital platform for rural areas.
3. Research problems regarding the same.
4. Understand the rural scenario for further problems and insights to improve the existing digital model.

Design Problems



Existing Interface



Modified Interface

Design Problems



Existing Interface



Date and time format

Modified Interface

Design Problems



Existing Interface



AM and PM format

Modified Interface

Design Problems



Existing Interface



Modified Interface

Design Problems



Existing Interface

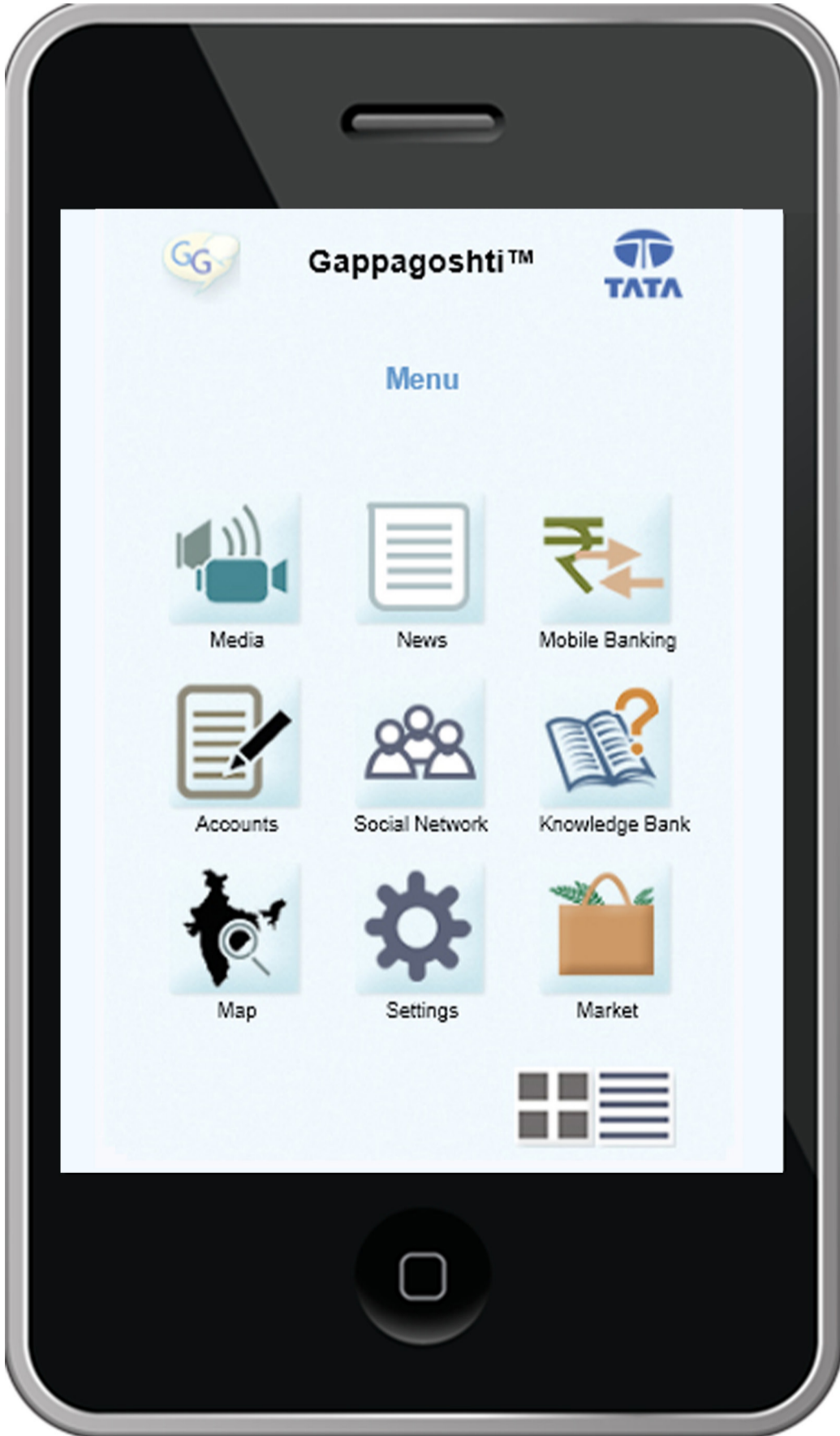


Modified Interface

Design Problems



Existing Interface



Modified Interface

Navigation through icons on a modular grid

Studying the existing information structure of GappaGoshti™

Existing Information flow for the application - Gappagoshti

Title page	→ Name of the Application-Gappagoshti
Welcome page	→ Name of the User
Home page	→ <u>Screen</u> - Names of the farmers , posted images, videos, audios; icons, time → <u>Tab</u> - <u>Options</u> → Channels → Weather → <u>Screen</u> - Rain Temperature Cloud
News	→ <u>Screen</u> - Headlines - Agrowon → <u>Tab</u> - Change Newspaper → E-Sakaal Lokmat Maharashtra Times
Yellow Pages	→ <u>Screen</u> - Bank info Local Train Time Table State Transport Time Table Express Train Time table
Dnyankosh	→ <u>Screen</u> - Rice Plantation SRT Technique Banana Plant farming Rice for changing weather Agricultural Tourism Pest Control for Mango plant
My Groups	→ <u>Screen</u> - SRT - Posts → <u>Screen</u> - Shows all SRT Rice - Posts → <u>Screen</u> - Shows all Rice → <u>Tab</u> - Members → <u>Screen</u> - Names of Members → Joined → <u>Screen</u> - Name of Member → <u>Tab</u> - Remind → A reminder has been sent - OK (Pop up dialouge) Remove Back Not Joined → <u>Screen</u> - Name of Member → <u>Tab</u> - Remove Member Back → <u>Option</u> - Add Members → <u>Screen</u> - Names of Members (from phonebook with check boxes) → <u>Tab</u> - Send Invitation
Search Post	→ <u>Screen</u> - Names of Members → About - SRT → Posts about his activities Rice Onion Mango Pest Control General → <u>Tab</u> - Back
Customize	→ <u>Screen</u> - Customize Home Page SRT Group Weather Search Post News → <u>Tab</u> - Save Back
Help and Support Page	→ <u>Screen</u> - Help and Support Page → <u>Tab</u> - Back
New Post	→ Voice → <u>Screen</u> - Maximum record time shown (2 mins) → <u>Tab</u> - Start Recording → <u>Screen</u> - Voice Recorder gets activated - Remaining time shown <u>Tab</u> - Stop Recording → <u>Screen</u> - Recorded picture shown <u>Tab</u> - Tag → <u>Screen</u> - About text screen; Tag separated by coma text screen → <u>Tab</u> - Send → <u>Screen</u> - Sent; Automatic Revert to Home screen Send → <u>Screen</u> - Sent ; Automatic Revert to Home screen Back → <u>Screen</u> - Automatic Revert to Home screen
Video	→ <u>Screen</u> - Maximum video time shown (2 mins) → <u>Tab</u> - Start Recording → <u>Screen</u> - Video Camera gets activated - Remaining time shown → <u>Tab</u> - Stop Recording → <u>Screen</u> - Recorded picture shown <u>Tab</u> - Tag → <u>Screen</u> - About text screen; Tag separated by coma text screen → <u>Tab</u> - Send → <u>Screen</u> - Sent; Automatic Revert to Home screen Send → <u>Screen</u> - Sent ; Automatic Revert to Home screen Back → <u>Screen</u> - Automatic Revert to Home screen
Image	→ <u>Screen</u> - Camera screen is activated → <u>Screen</u> - Captured picture shown → <u>Tab</u> - Capture <u>Tab</u> - Tag → <u>Screen</u> - About text screen; Tag separated by coma text screen → <u>Tab</u> - Send → <u>Screen</u> - Sent; Automatic Revert to Home screen Send → <u>Screen</u> - Sent ; Automatic Revert to Home screen Back → <u>Screen</u> - Automatic Revert to Home screen
Text	→ <u>Screen</u> - Text Screen to type is activated → <u>Tab</u> - Send → <u>Screen</u> - Sent ; Automatic Revert to Home screen
Exit	→ <u>Screen</u> - Do you want to exit? (pop up) → <u>Buttons</u> - Yes → Exit → Return to Home screen

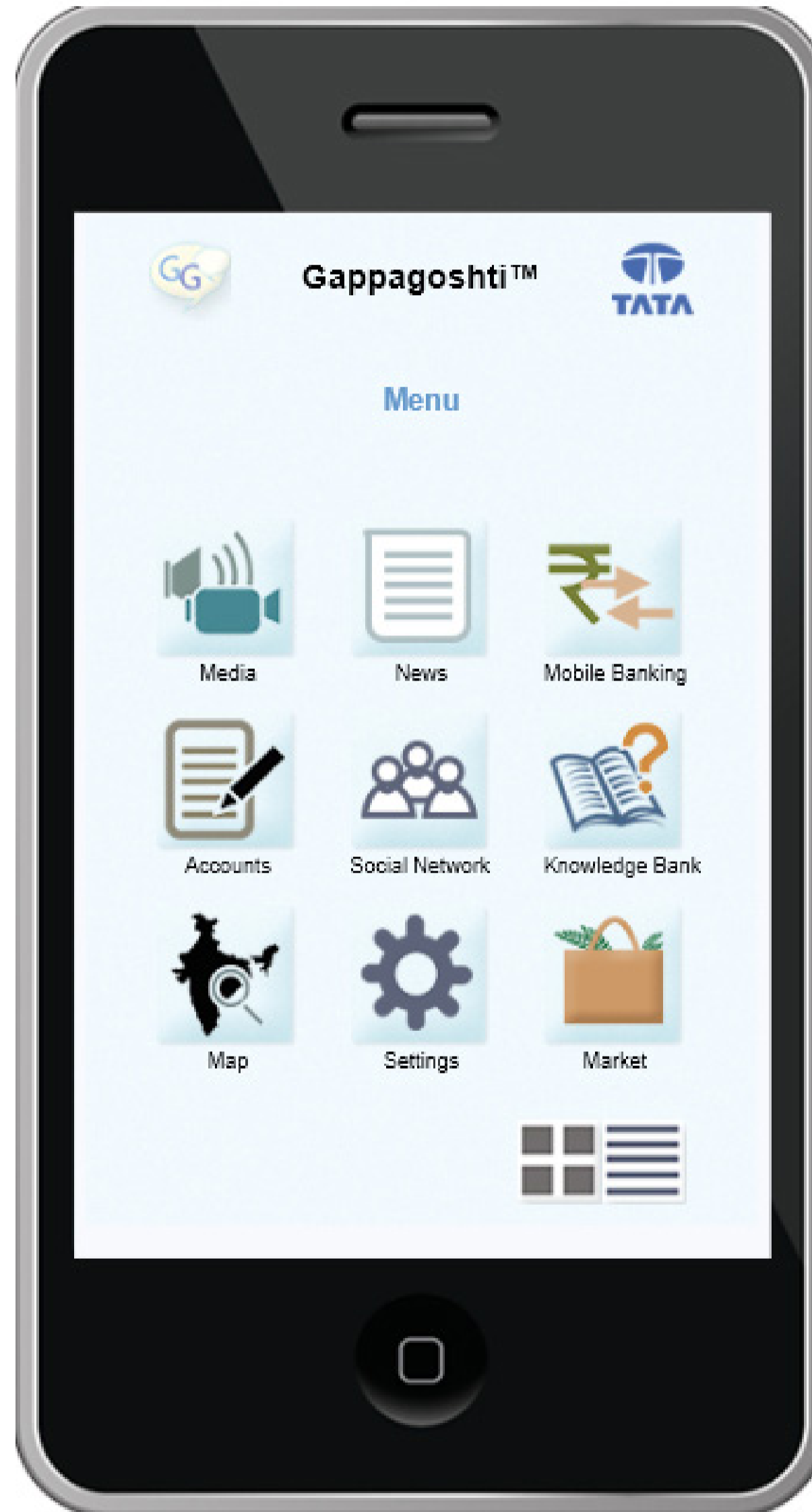
Problems	Solutions
Yellow pages would be inappropriate as it is a brand name	Could be tagged as 'Directory'
Complicated structure - Several clicks involved	Possibility of icon based or visual graphics to add members and delete members.
At present it is sorted farmer wise (restricted to one sorting only)	Could have several sort options. One option could be sort member wise, other groups could be according to crop, seed, etc.
Options not defined according to a fixed standard	Options could be defined by classifying groups, notifications, updates and recent activities.
Not elaborated	Could have search box with voice search and query could be searched through word tags

Task - Money transaction scenario

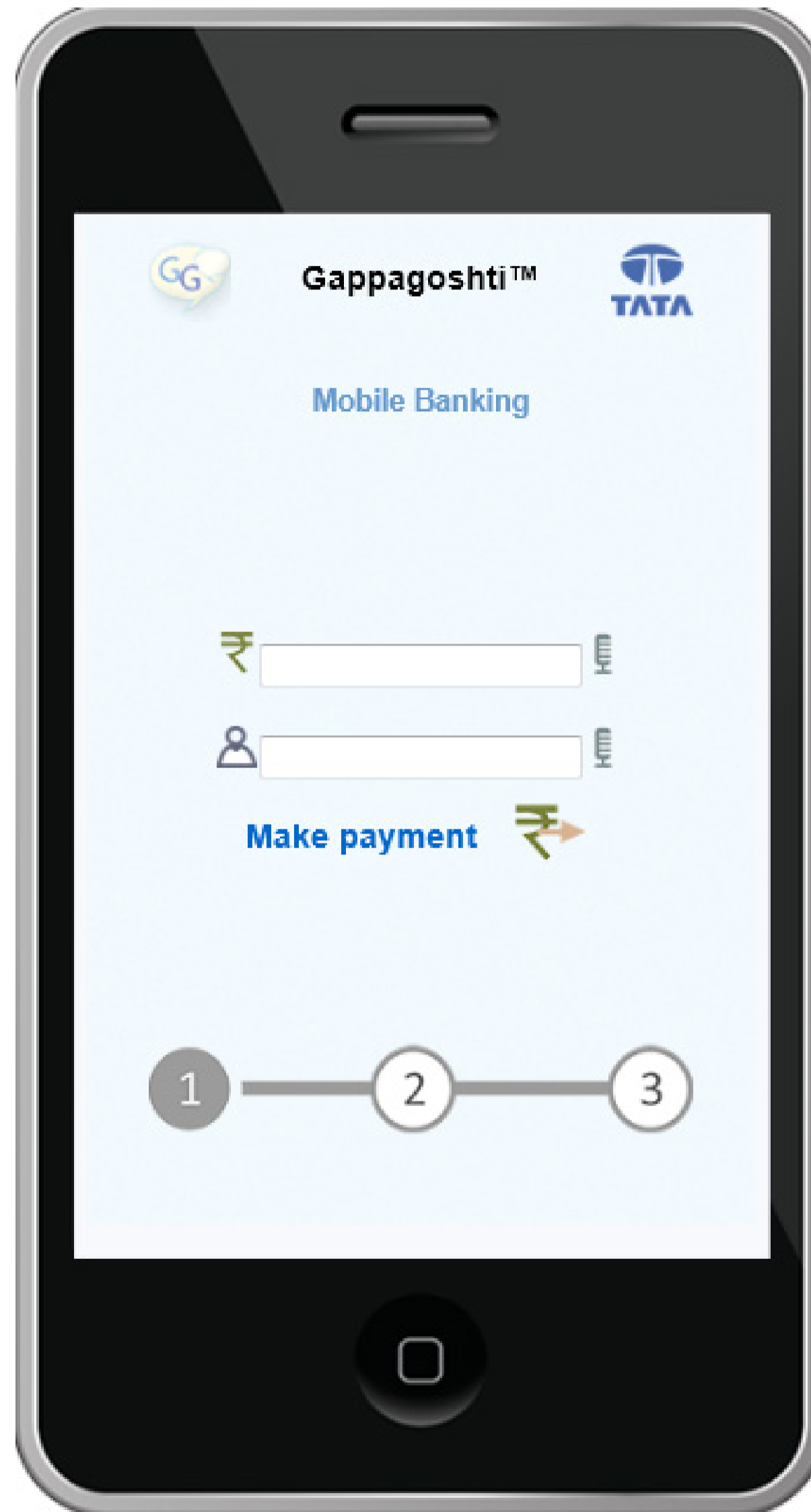
Work done on the money transaction scenario:

1. Information Architecture
2. Coded the frames
3. Visual design

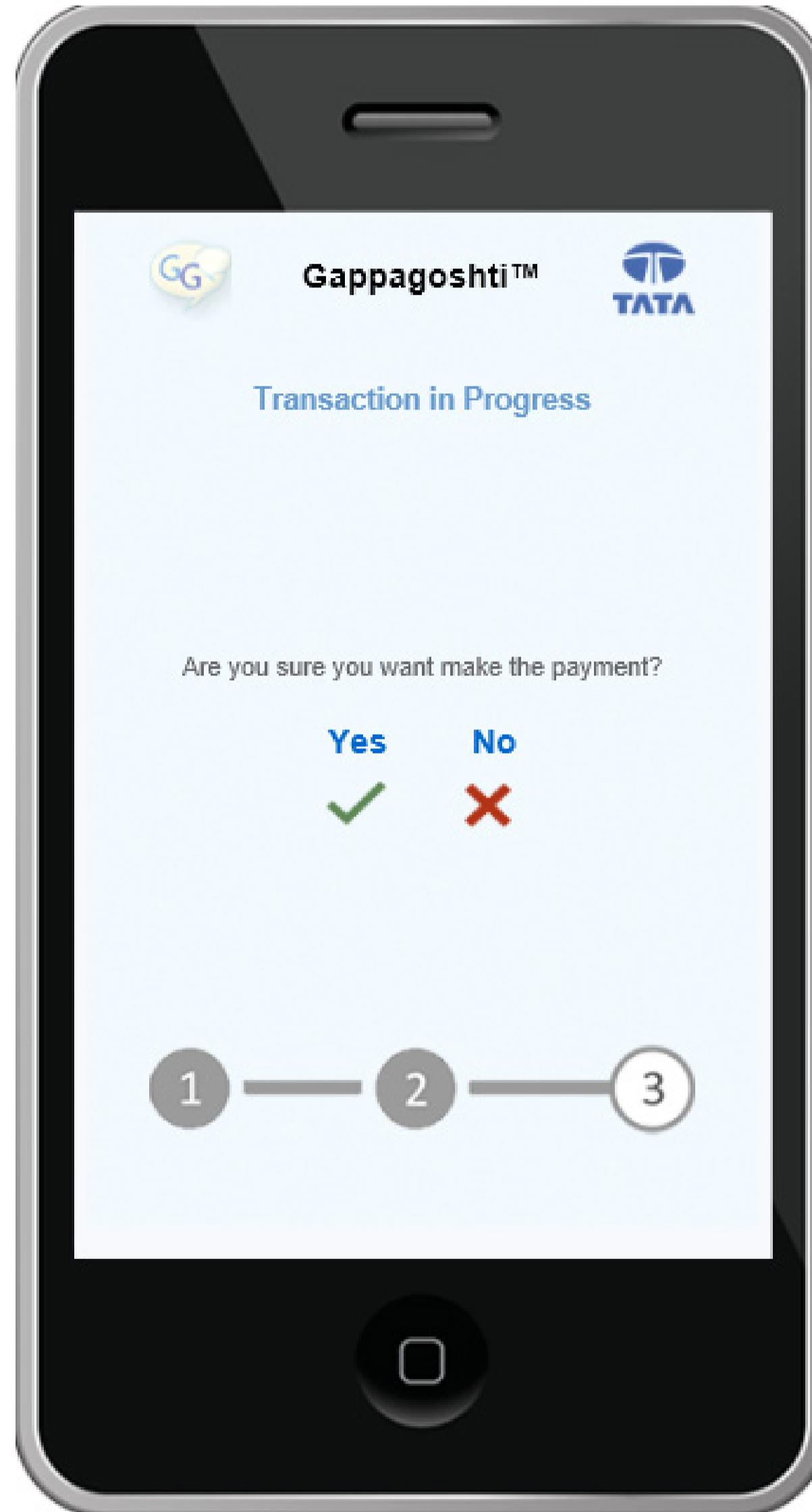
Task - Money transaction scenario



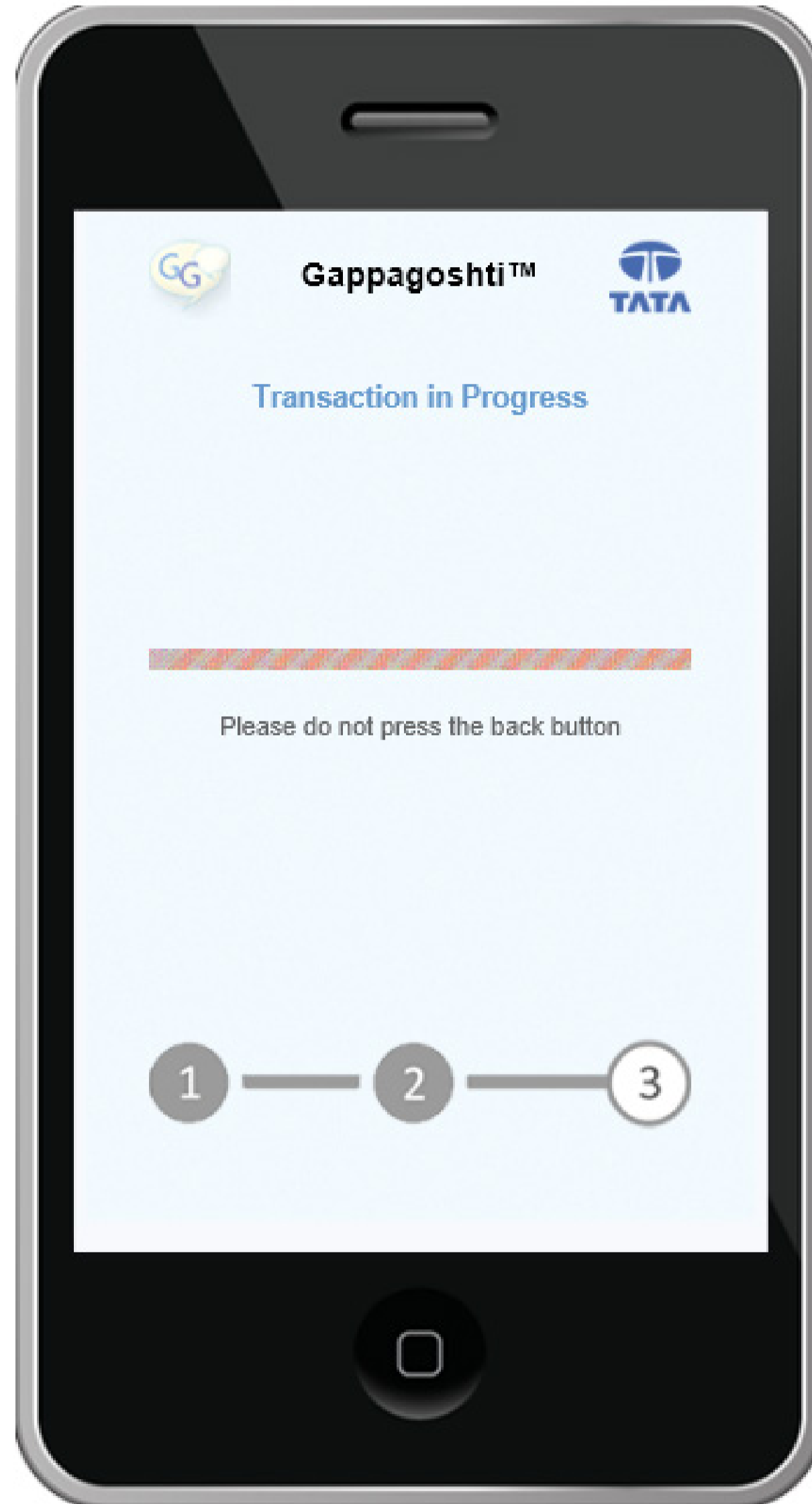
Task - Money transaction scenario



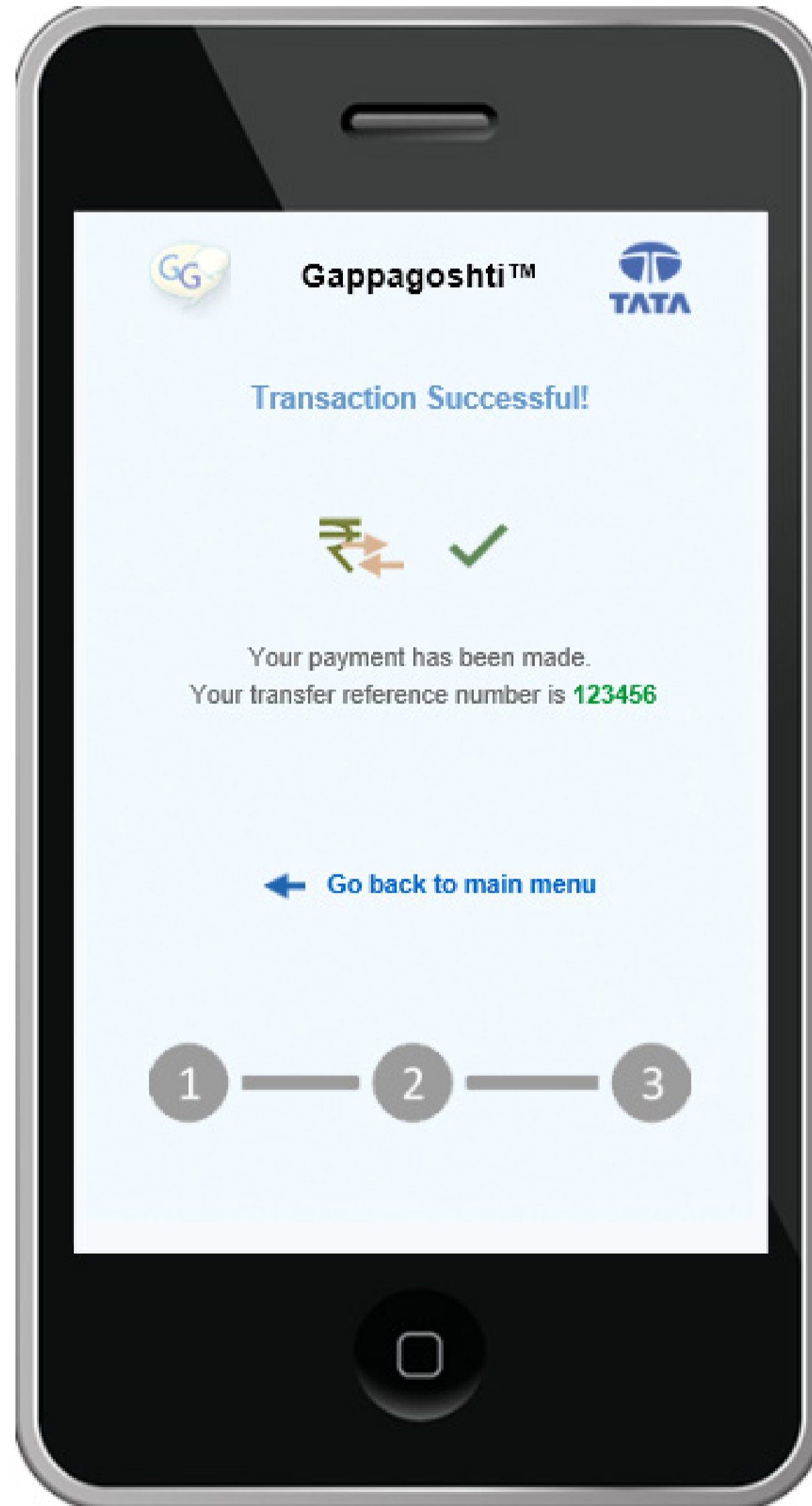
Task - Money transaction scenario



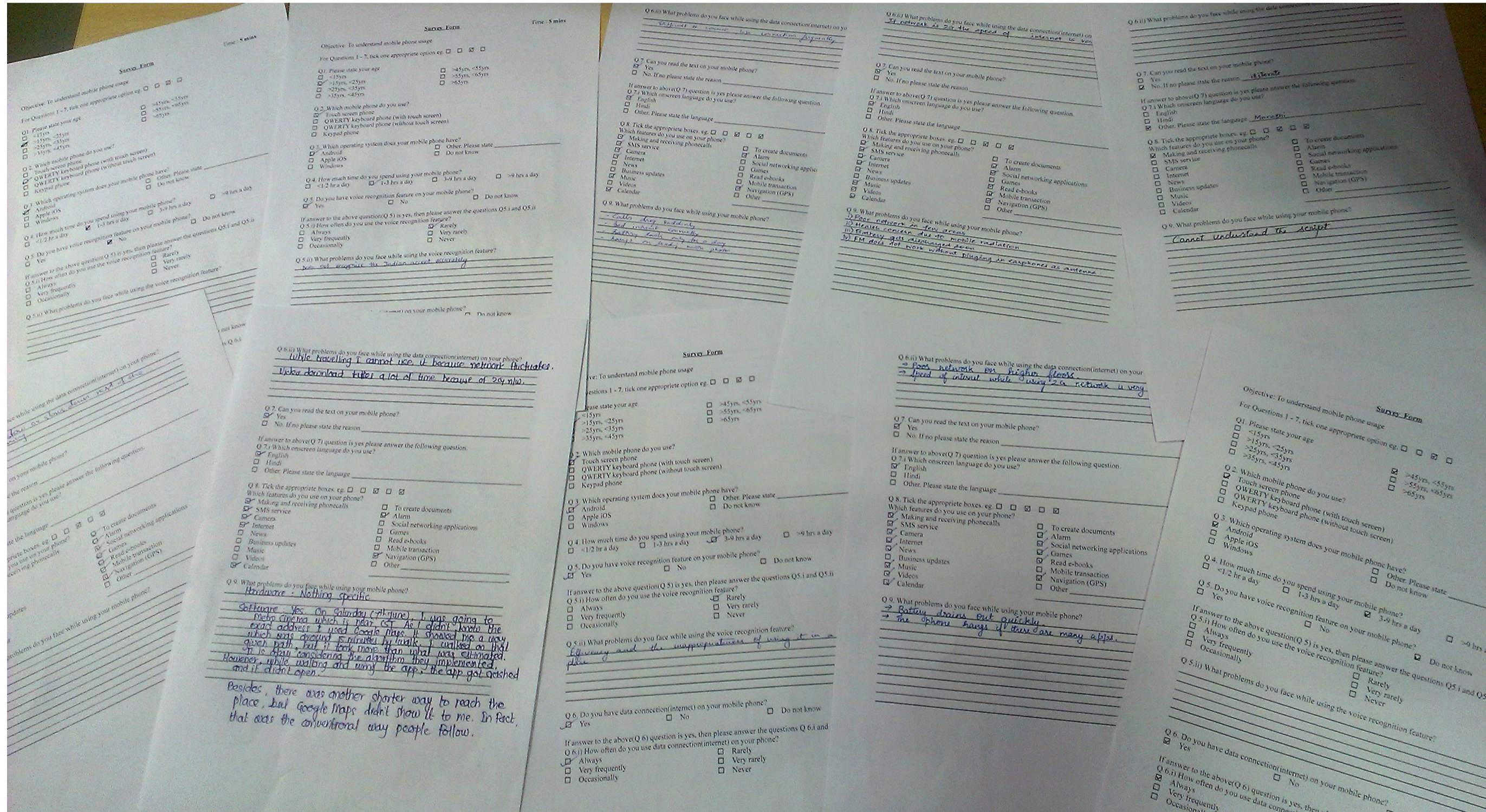
Task - Money transaction scenario



Task - Money transaction scenario



Interview and survey - Urban scenario



Objective: To understand mobile phone usage

For Questions 1 - 7, tick one appropriate option eg.

Q1. Please state your age

- | | |
|---|---|
| <input type="checkbox"/> <15yrs | <input type="checkbox"/> >45yrs, <55yrs |
| <input type="checkbox"/> >15yrs, <25yrs | <input type="checkbox"/> >55yrs, <65yrs |
| <input type="checkbox"/> >25yrs, <35yrs | <input type="checkbox"/> >65yrs |
| <input type="checkbox"/> >35yrs, <45yrs | |

Q 2. Which mobile phone do you use?

- Touch screen phone
- QWERTY keyboard phone (with touch screen)
- QWERTY keyboard phone (without touch screen)
- Keypad phone

Q 3. Which operating system does your mobile phone have?

- | | |
|------------------------------------|--|
| <input type="checkbox"/> Android | <input type="checkbox"/> Other. Please state _____ |
| <input type="checkbox"/> Apple iOS | <input type="checkbox"/> Do not know |
| <input type="checkbox"/> Windows | |

Q 4. How much time do you spend using your mobile phone?

- <1/2 hr a day 1-3 hrs a day 3-9 hrs a day >9 hrs a day

Q 5. Do you have voice recognition feature on your mobile phone?

- Yes No Do not know

If answer to the above question(Q 5) is yes, then please answer the questions Q5.i and Q5.ii

Q 5.i) How often do you use the voice recognition feature?

- | | |
|--|--------------------------------------|
| <input type="checkbox"/> Always | <input type="checkbox"/> Rarely |
| <input type="checkbox"/> Very frequently | <input type="checkbox"/> Very rarely |
| <input type="checkbox"/> Occasionally | <input type="checkbox"/> Never |

Q 5.ii) What problems do you face while using the voice recognition feature?

Q 6. Do you have data connection(internet) on your mobile phone?

- Yes No Do not know

If answer to the above(Q 6) question is yes, then please answer the questions Q 6.i and Q6.ii

Q 6.i) How often do you use data connection(internet) on your phone?

- | | |
|--|--------------------------------------|
| <input type="checkbox"/> Always | <input type="checkbox"/> Rarely |
| <input type="checkbox"/> Very frequently | <input type="checkbox"/> Very rarely |
| <input type="checkbox"/> Occasionally | <input type="checkbox"/> Never |

Q 6.ii) What problems do you face while using the data connection(internet) on your phone?

Q 7. Can you read the text on your phone?

- Yes
 No. If no please state the reason _____

If answer to above(Q 7) question is yes please answer the following question.

Q 7.i Which interface language do you use?

- English
 Hindi
 Other. Please state the language _____

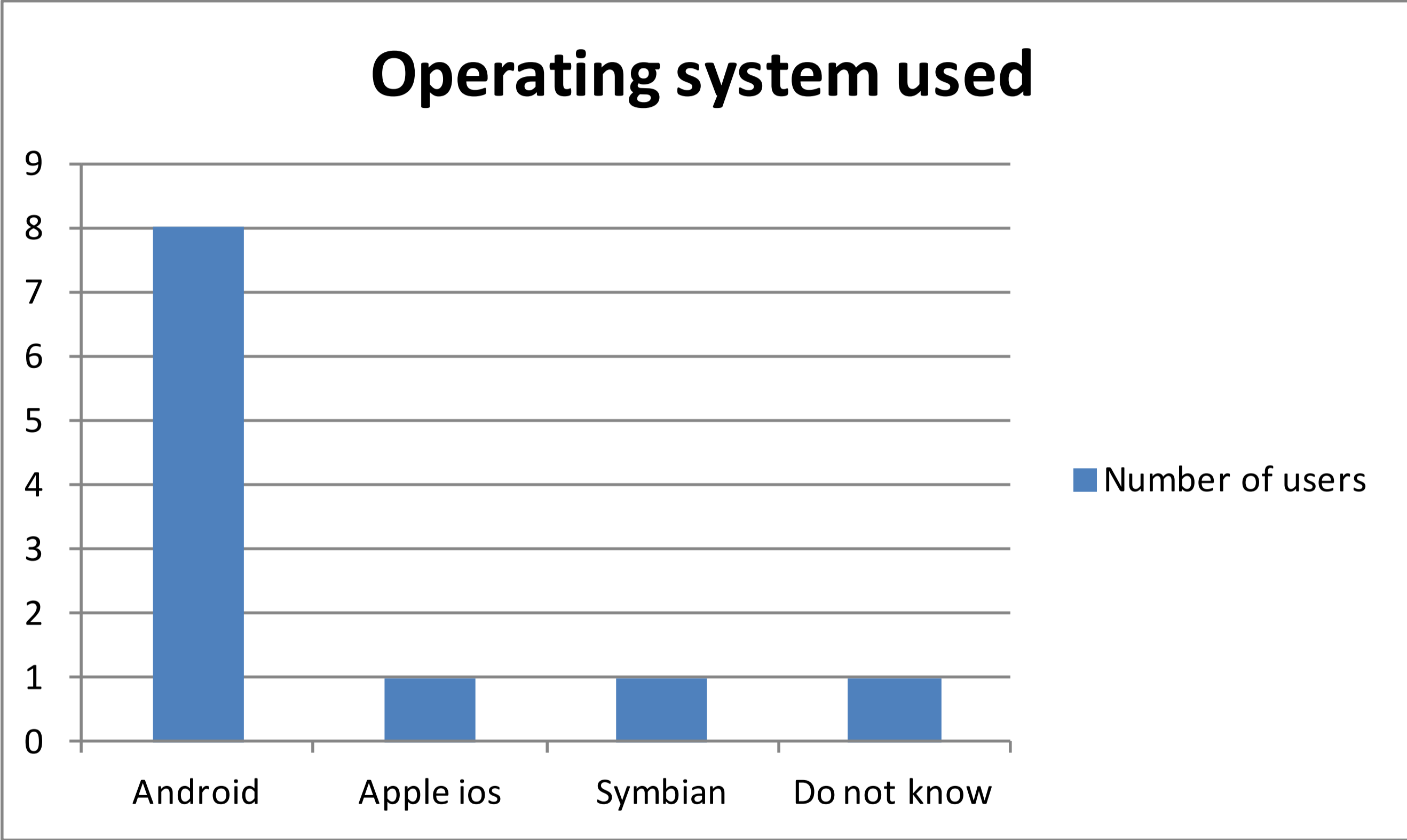
Q 8. Tick the appropriate boxes. eg.

Which features do you use on your phone?

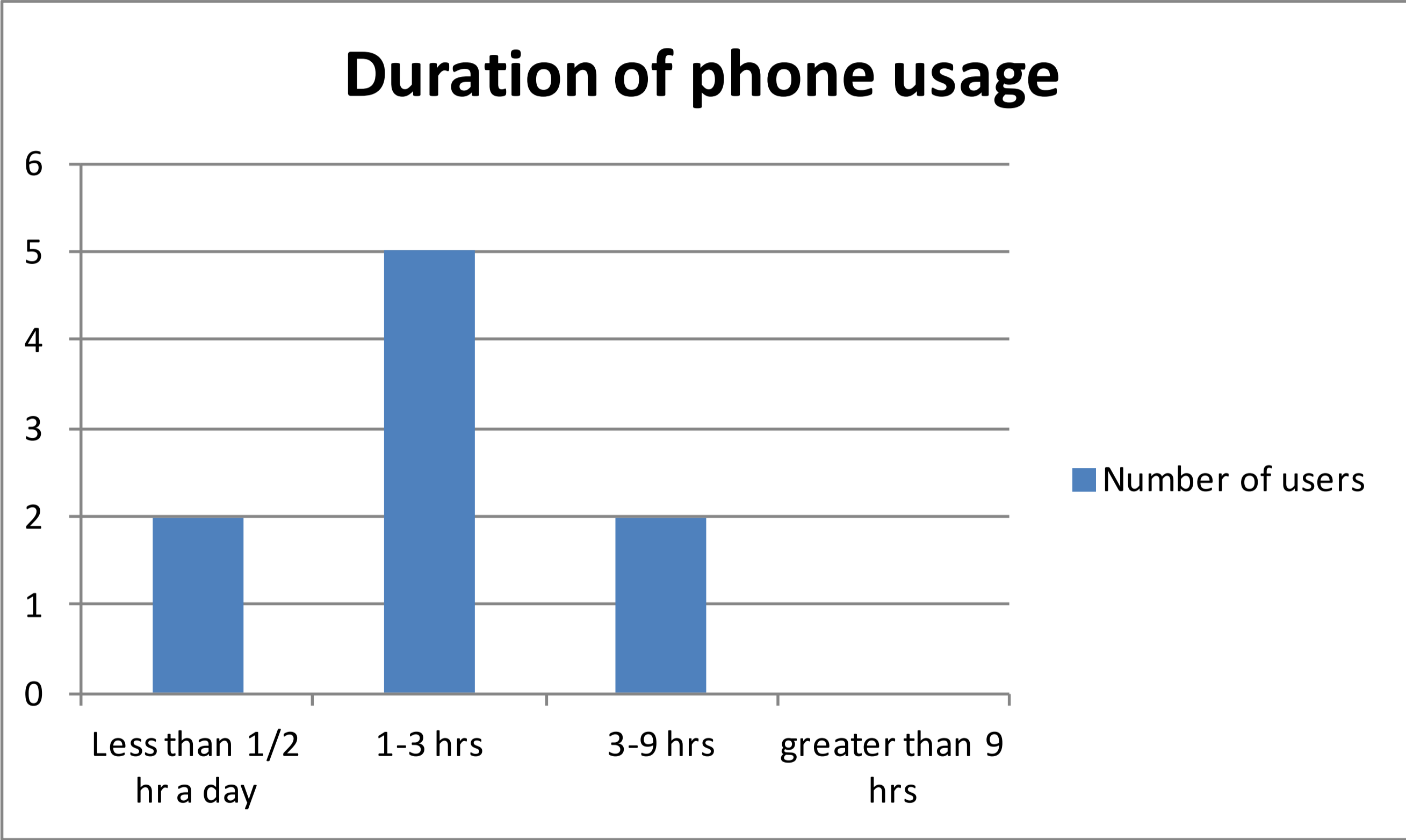
- | | |
|--|---|
| <input type="checkbox"/> Making and receiving phonecalls | <input type="checkbox"/> To create documents |
| <input type="checkbox"/> SMS service | <input type="checkbox"/> Alarm |
| <input type="checkbox"/> Camera | <input type="checkbox"/> Social networking applications |
| <input type="checkbox"/> Internet | <input type="checkbox"/> Games |
| <input type="checkbox"/> News | <input type="checkbox"/> Read e-books |
| <input type="checkbox"/> Business updates | <input type="checkbox"/> Mobile transaction |
| <input type="checkbox"/> Music | <input type="checkbox"/> Navigation (GPS) |
| <input type="checkbox"/> Videos | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Calendar | |

Q 9. What problems do you face while using the phone?

Interview and survey results

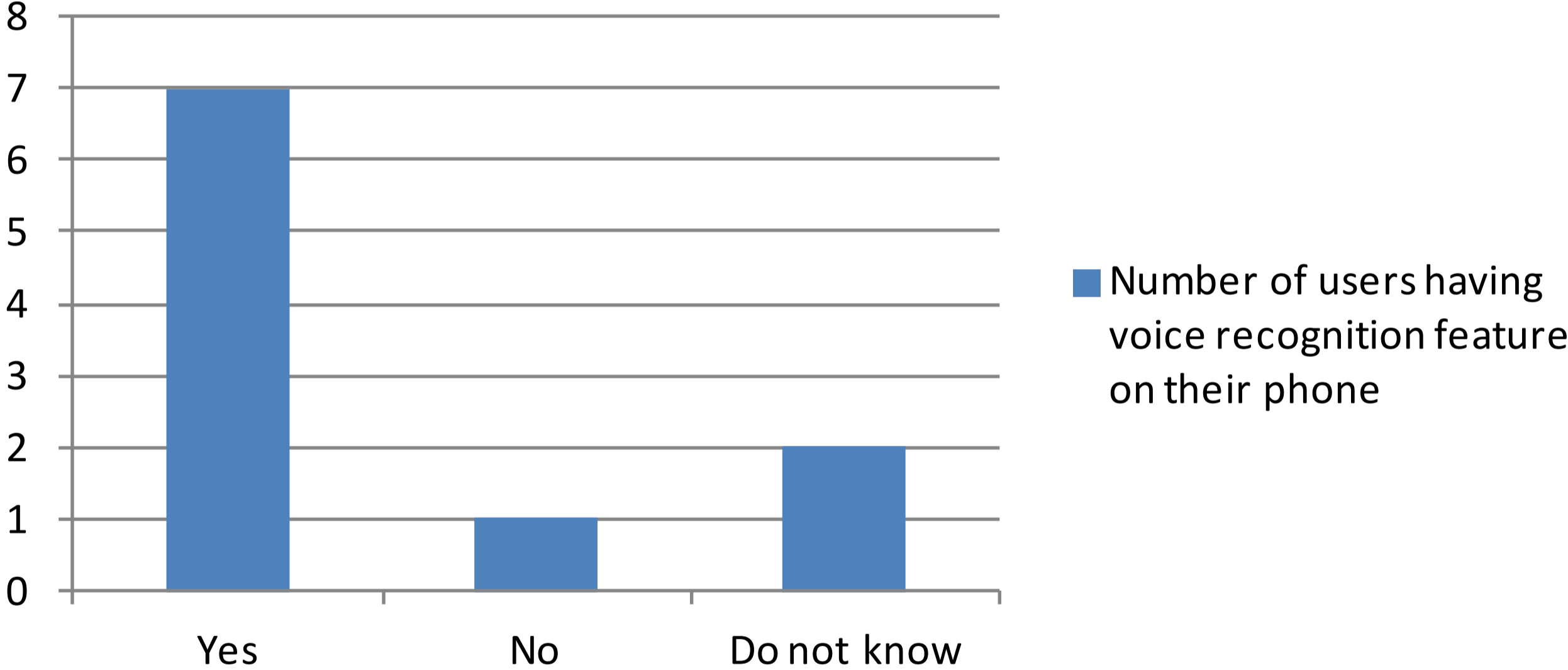


Interview and survey results

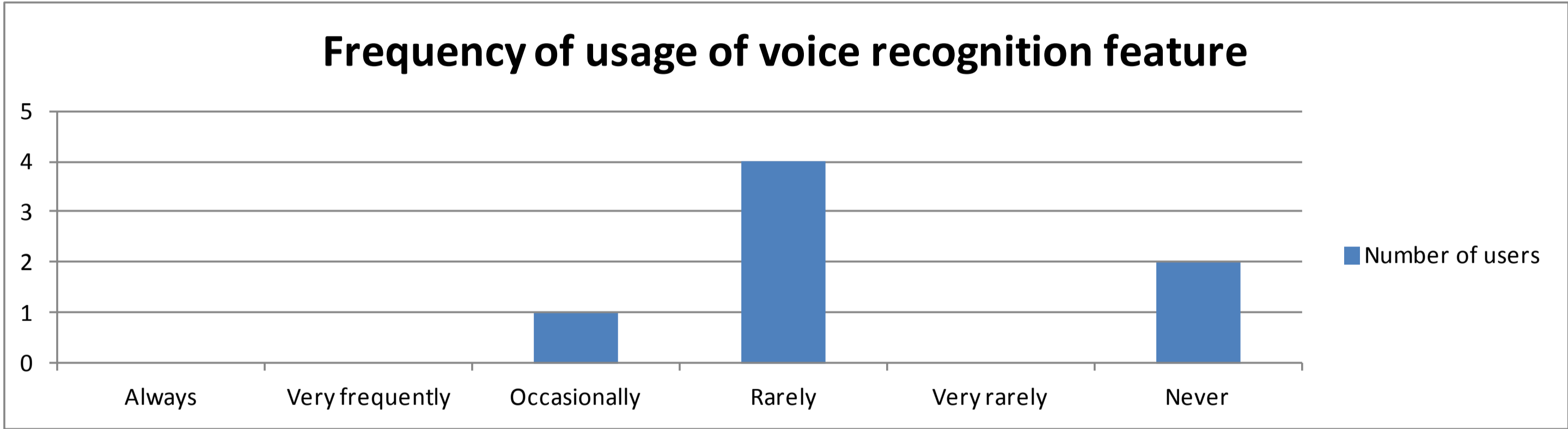


Interview and survey results

Number of users having voice recognition feature on their phone

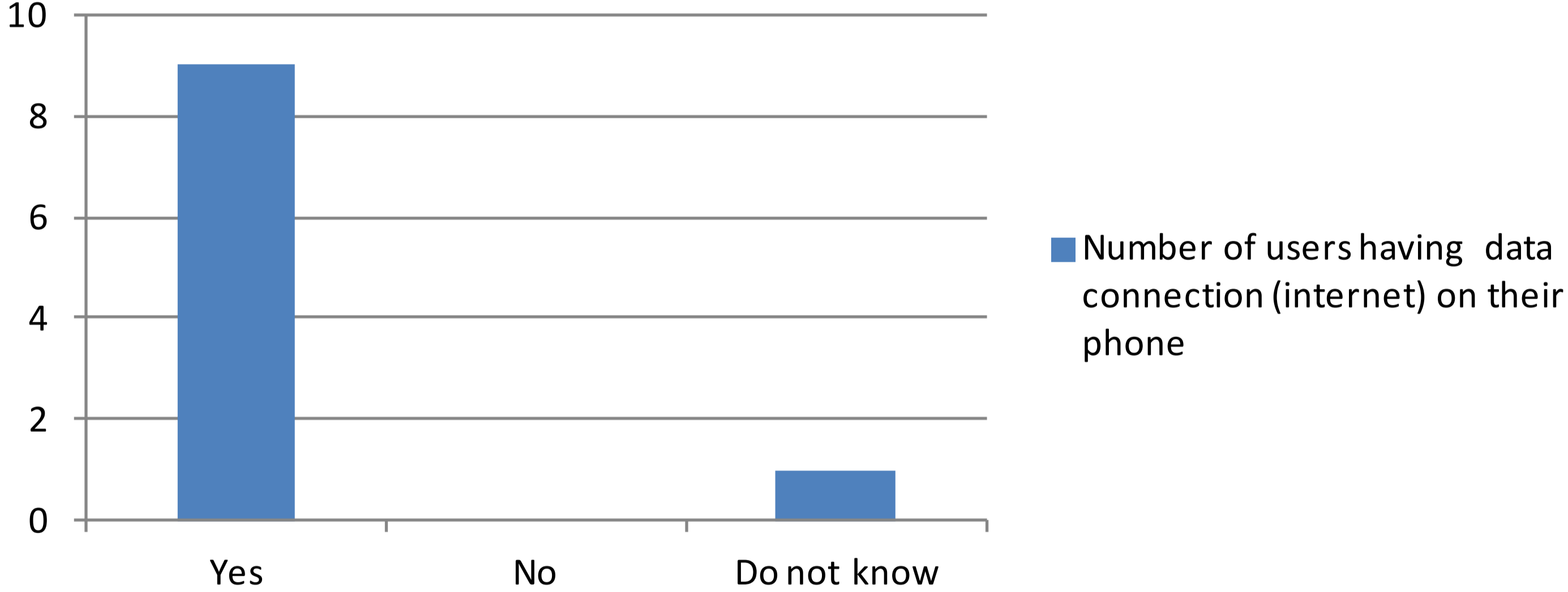


Interview and survey results

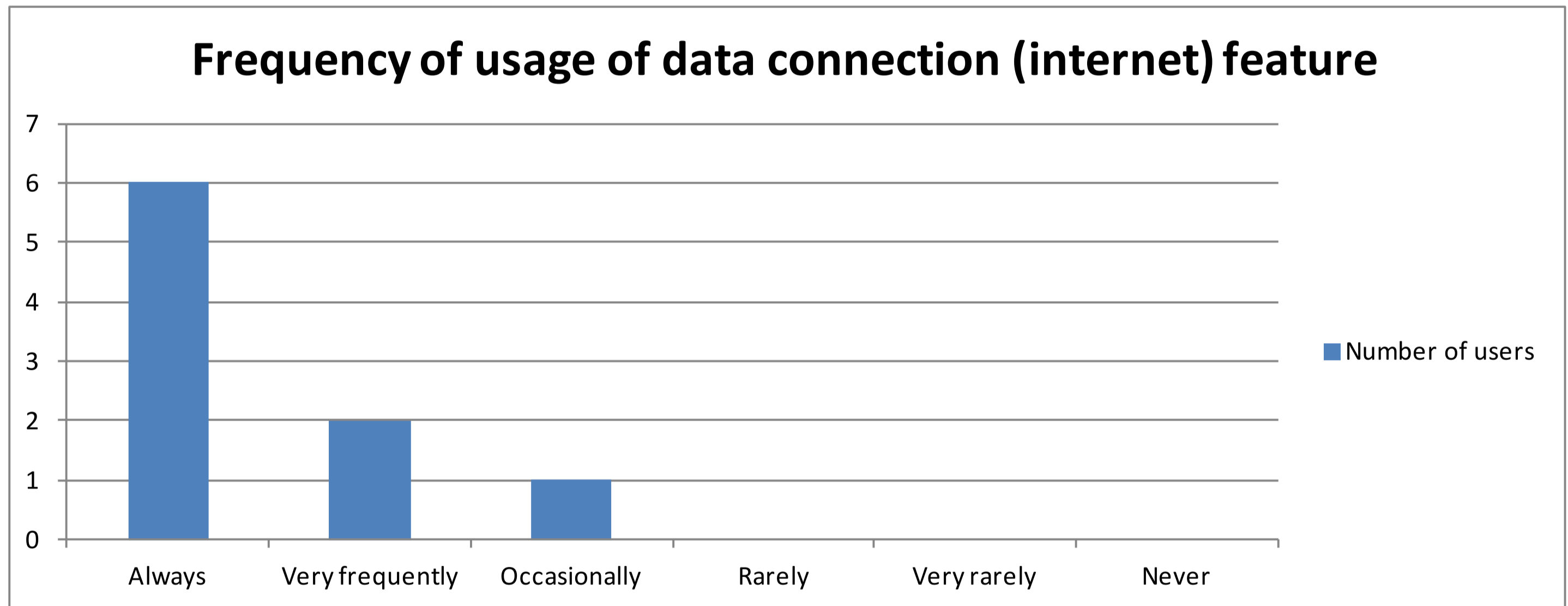


Interview and survey results

Number of users having data connection (internet) on their phone

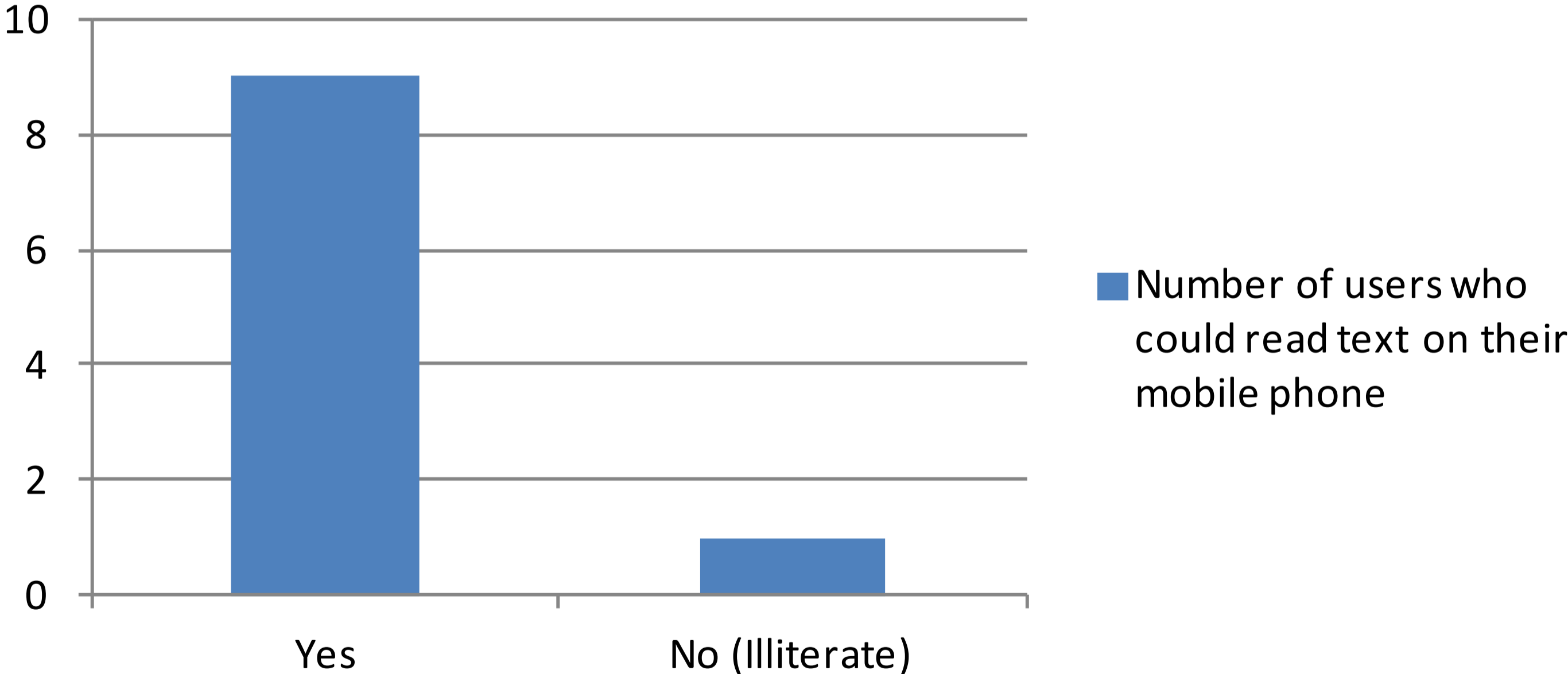


Interview and survey results



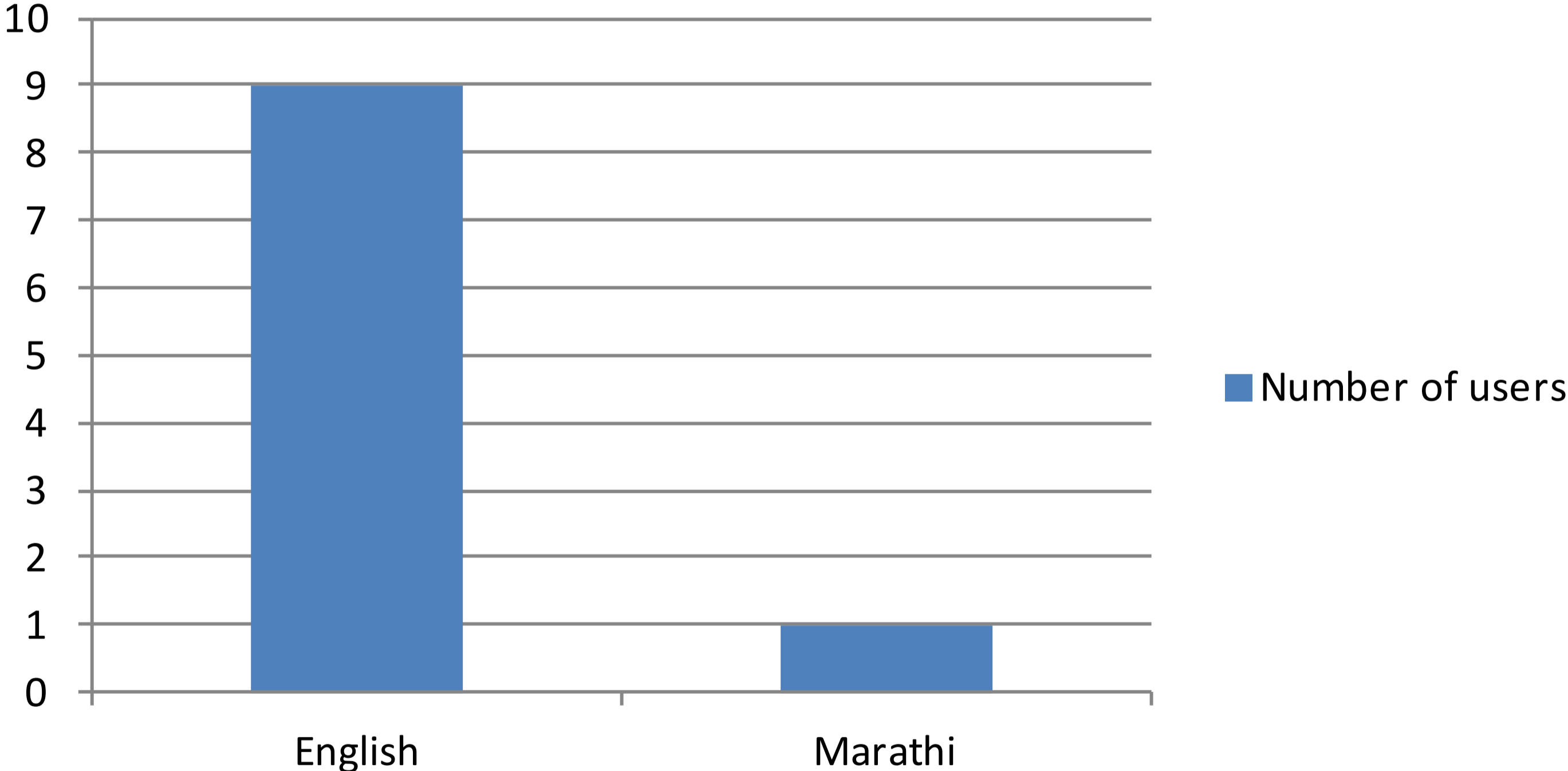
Interview and survey results

Number of users who could read text on their mobile phone



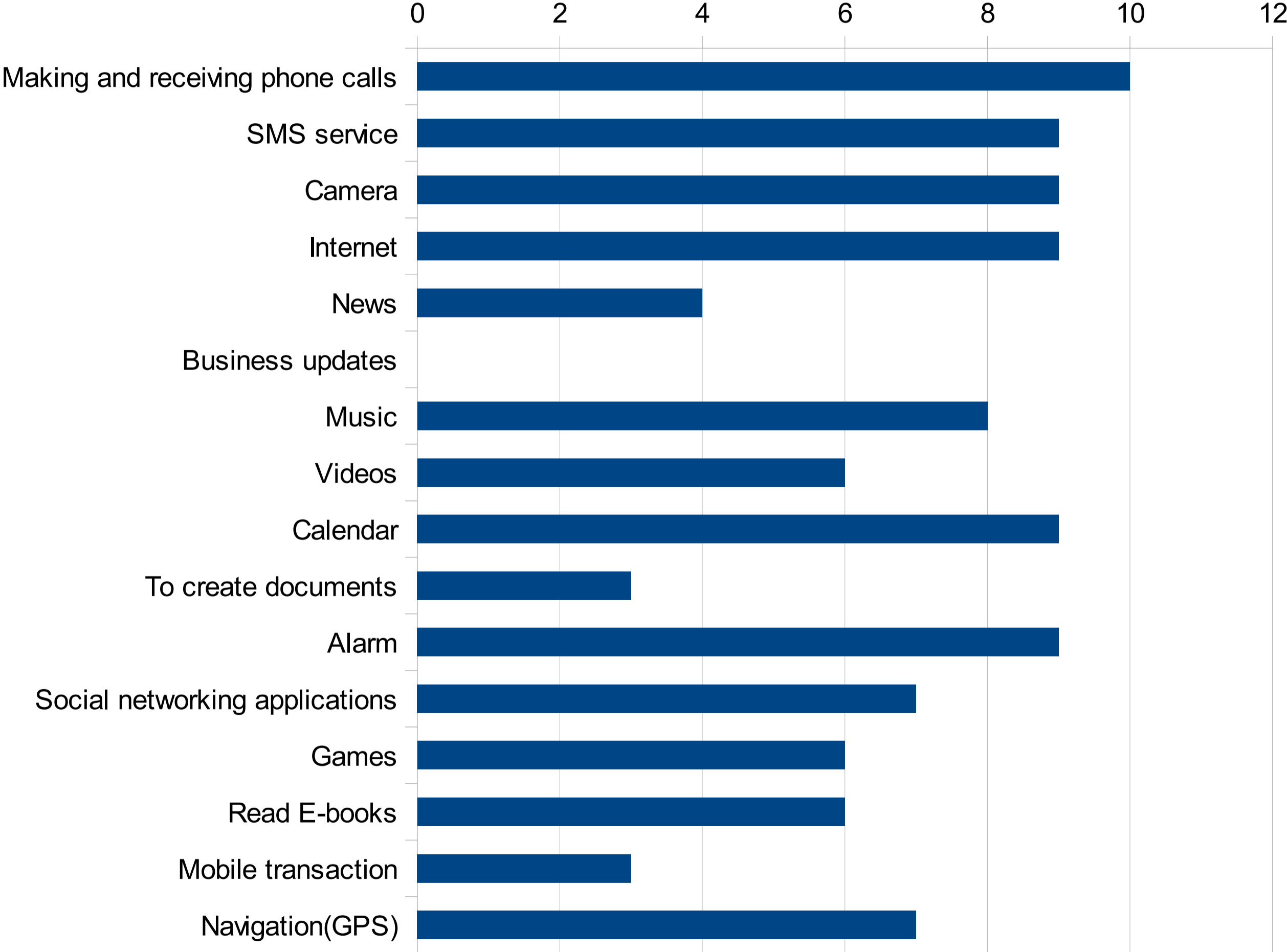
Interview and survey results

Language used on screen



Interview and survey results

Features used on the phone



■ Number of users

Experiment 1

Aim: To study the problems faced by users while completing a task using different phones.

Task: Make a phone call to another person

Sr. No.	Participant	Age Group	Type of phone	Time taken to make phone call	Task completion status	Method of completing task	Problems faced by user	Observation
1	Participant 1	40yrs - 60yrs	Smartphone - Touchscreen phone	26 seconds	Yes	using call history	Targeted action was not being carried out easily due to problem with the screen.	Screen was not target sensitive and responsive.
2	Participant 2	40yrs - 60yrs	Smartphone - Keypad phone	20 seconds	Yes	using phonebook	Scrolling difficulty, had to navigate with buttons	Difficulty scrolling
3	Participant 3	15yrs - 25yrs	Smartphone - Touchscreen phone	19 seconds	Yes	using number dial	No problem	No problem
4	Participant 4	15yrs - 25yrs	Smartphone - Touchscreen phone	4 seconds	Yes	using speed dial	No problem	No problem
5	Participant 5	30yrs - 40 yrs	Basic handset	42 seconds	Yes	using phonebook	Difficulty reading	Difficulty reading hence had to rely on count and script as visual cue.

Experiment 2

Aim: To study problems faced by users while using voice service offered by the phone.

Task: Use voice interactive service

Sr. No.	Participant	Age Group	Type of phone	Phone operating system(OS)	Availability of the feature on the phone	Task completion status	Method of completing task	Problems faced by user	Observation
1	Participant 1	40yrs - 60yrs	Smartphone - Touchscreen phone	Android 4.0	Yes	No	i) Used WIFI	i) User had to repeat the word and speak loudly.	After 2 failed attempts at using the voice feature, user typed the words
2	Participant 2	40yrs - 60yrs	Smartphone - Keypad phone	Android 4.0	Yes	No	i) Used Phone data connection	i) User had to repeat the word and speak loudly.	After 3 failed attempts at using the voice feature, user typed the words.
3	Participant 3	15yrs - 25yrs	Smartphone - touch screen phone	Android 4.2	Yes	Yes	i) Used WIFI	i) User had to repeat the word and speak loudly.ii) Could not access the internet to use WIFI.	After 1 failed attempt at using the voice feature, the word was recognised.
4	Participant 4	15yrs - 25yrs	Smartphone - touch screen phone	Android 4.2	Yes	Yes	i) Used Phone data connection	i) User had to repeat the word and speak loudly.	After 2 failed attempt at using the voice feature, the word was recognised.
5	Participant 5	30yrs - 40 yrs	Basic handset		Not Applicable	Not Applicable	Not Applicable	Not applicable	Not applicable

Experiment 3

Aim:

To study problems faced by users while using data service offered by the mobile network operator.

Task: Use web browser on a mobile phone to book a ticket.

Sr. No.	Participant	Age Group	Type of phone	Time taken to book ticket.	Task completion status	Method of completing task	Problems faced by user	Observation
1	Participant 1	40yrs - 60yrs	Smartphone - Touchscreen phone	12mins 24 seconds	No	3G	Webpage not available	After viewing 4 webpages, user could not proceed due to the displayed error.
2	Participant 2	40yrs - 60yrs	Smartphone - Keypad phone	17mins 52seconds	Yes	3G	Tough to navigate with the keypad.	Task could be completed, but the user was inconvenienced due the complicated keypad navigation.
3	Participant 3	15yrs - 25yrs	Smartphone - Touch screen phone	7mins 42 seconds	No	2G	Webpage not available	After viewing 2 webpages, user could not proceed due to displayed error message.
4	Participant 4	15yrs - 25yrs	Smartphone - Touch screen phone	14mins 21seconds	Yes	3G	i) Used installed application.ii) The interface was complicated.	Task could be completed, but the options that a webpage provides were missing in the application.
5	Participant 5	30yrs - 40 yrs	Basic handset	Not applicable	No	Not applicable	Not applicable	Not applicable

Design Intervention

Based on the research the following problems were identified and solutions suggested.

1. Problem: Battery draining quickly due to over usage of applications.

Solution: Using phone on power saving mode and closing background applications.

2. Problem: Network problem indoors where walls act as barriers and on higher floors.

Solution: To switch to better mobile network service providers and to move to an open area for better network reception.

3. Problem: People with hearing impairment cannot hear with the normal hearing aid in their ear.

Solution: Devising mobile phone features that will help people with hearing disabilities.

4. Problem: Mobile radiation health concern.

Solution: The health concern regarding mobile radiation can be eliminated by following safety rules to avoid radiation hazards.

5. Problem: Language cannot be understood by illiterate users.

Solution: Audio recognition and visual menus need to be incorporated.

6. Problem: Non sensitive touch screen phones

Solution: Use of capacitive touch screen.

7. Problem: Unable to view phone under daylight conditions

Solution: Using Super AMOLED Screens since they are brighter than the regular screens since it uses one less layer than regular AMOLED display.

Visit to Saguna Baug - Studying the rural scenario



Saguna Baug

Visit to Saguna Baug - Studying the rural scenario



SRT Technique being used at the Saguna Baug

Visit to Saguna Baug - Studying the rural scenario



SRT Technique being used at the Saguna Baug

Visit to Saguna Baug - Studying the rural scenario



Banana field

Visit to Saguna Baug - Studying the rural scenario



Vegetable farming

Visit to Saguna Baug - Studying the rural scenario



Fish farming

Visit to Saguna Baug - Studying the rural scenario



Mango farming

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

1. Empowering rural people

This project would empower rural people due to the practical application of technology in their daily life. eg. SRT, and the digital mobile application.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

2. Upliftment of rural economy

The implementation of the technological advancements in the practical application

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

3. Development of a self reliant rural model

It would help people in rural areas live a self-reliant and sustainable life by empowering them with the required latest information regarding technological breakthrough in agriculture and business, and their communication needs.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

4. Self sustainable rural model

It would help the rural community to develop a self sustainable model within their village without migrating to the urban areas for better facilities.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

5. Application of technology would help in dissolving the urban rural divide

When self sustainable rural models would be created it would help in bridging the economic gap between the rural and urban areas.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

6. High quality of education in rural areas

Empowering rural areas with the latest technology will also enable them to get educated through new e-learning techniques which will help them become independent educated citizens with high quality of education.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

7. Eliminating middlemen from the selling and distribution process

It would enable farmers to maximise their profits efficiently by eliminating middlemen and brokerage charges in the selling and distribution of their farming produce. Technology would help the farmers to directly connect with the consumers.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

8. Would encourage urban people to migrate to rural areas

When rural areas become equipped with the latest technology and self-reliant resources, urban people would be encouraged to migrate to rural areas, hence further helping to eliminate the rural-urban divide.

IMPACT OF ENABLING TECHNOLOGY REACH RURAL PEOPLE

9. Increasing productivity of farmers - With technology reaching rural masses farmers would be able to maximise their output through use of latest weather information systems, agricultural seeds, ploughing techniques, etc.

CONCLUSION

Based on the study it can be concluded that technology can help people from different demographic, geographic and psychographic backgrounds to improve their productivity in various tasks. The main tasks that technology can help in accomplishing are:

- 1. Communication needs.**
- 2. Receiving and disseminating information.**
- 3. Education purposes.**
- 4. Bridging the urban rural divide in India.**

Thank you