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## D5: Prototype + Evaluation

**PROJECT NAME:** Making navigation apps efficient | TRANSPORTATION

DATE: 02/26/2018

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Project



Welcome

Start  
exit

Navigation  
plus

Navigate  
Add map  
view maps  
Exit

Go to

custom  
address  
Favourites  
Frequently  
Recently  
added  
Back

Add Map

Public  
map

Scan private  
barcode

Back

Public building  
Maps

fourth avenue  
building

~~~~~  
~~~~~  
~~~~~  
~~~~~

Back

camera



Scan

Back

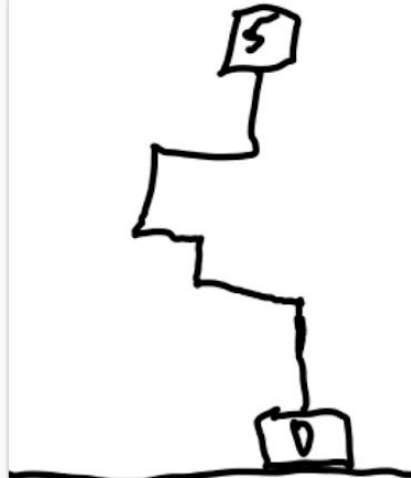


Project



filters  
bathroom

Back



filters

Back

You successfully  
Added

Fourth one  
Building  
map

View  
map

Back to  
Home

Success  
you  
now have  
access to

Home  
view map

Favorites/Recently  
added

Favorites

Recently  
added

Frequently  
visited

Back

View maps

Fourth one  
building

Back

Recently added

Favorites

Frequently visited



Project



## Recently added

Fourth ave  
building.

Back

## Favorites

Back

## Frequently visited

Back

## custom address

Enter address

Navigate

Back

Failed to  
invalid  
Barcode

Home

## Fab map



filter  
bathroom

Back





### Prototype description:

For our groups prototype we attempted to cover as many of the basic use cases like swapping between menus and returning to the previous screen. For more advanced features like the actual maps and navigation we only integrated one full use case for testing. We as a group decided to use the Pop application in order to create an interactive and easy to use prototype for our project; it allowed us to make the application feel a bit more realistic for the user. We choose to only build the prototype with base functionality and the one major use case because if we went much more advanced we would be basically creating the application in full.

## **Summary & Next Steps:**

For our project we choose to conduct two internal heuristic evaluations; these helped us identify some simple flaws that violated some basic usability principles. It also allowed us to see how our finished product compares to user needs we identified in our research phase. Some of the major problems we identified was that the user might have trouble finding out how to obtain the map for a building they are in; if the building is private they might waste a significant amount of time looking for the map in the public database without success. Another issue is that the map transition from overarching outdoor map to the more detailed indoor map requires some form of prompt; We can not realistically expect the user to click on the building to access the map in all cases.

We also conducted two external think aloud evaluations with individuals outside our group; these helped us identify some very obvious flaws with our application that we would have overlooked due to our more extensive knowledge of the application. The major key issues this phase of testing identified include the fact that fact the UI design was difficult to navigate and understand in some parts. They also helped us identified some of the key missing components and design features that we need to integrate to meet the user needs identified in our research; in our research we identified live updates as a desired feature for our uses our prototype had no obvious examples of this functionality. I believe that the think aloud evaluations were by far the most useful because they gave us an outside view from someone without extensive knowledge of our project; this allowed them to give an mostly unbiased view of the functionality.

Next time we design a prototype we will attempt to more accurately roadmap the user experience in order to create a more efficient and overall useful prototype. One of the major things we learned in this exercise was that when creating a prototype we need to stay more focused on what we actually need for

this phase of testing. One thing that may have helped us learn more during this phase would have been some additional evaluations or perhaps more cohesive evaluations; We did not really build upon our prototype during each phase; if we had implemented viable improvements between tests we might have been able to identify more flaws and create more fluid and cohesive design.

## **Reflection:**

Our experiences prototyping varied in many different ways; we had a many successes and many failures throughout the process of testing and designing out prototype. One of our major successes was our testing and use of the pop application in it; Our prototype being interactive allowed our testers to more easily associate it with the purpose of the application. Since the pop application allowed us to create an “app” on an actual device it felt realistic and allowed a more detailed evaluation.

Some of the things that did not work well included our test planning and design planning; both of these had major flaws. In our design planning phase we could not decide what functionality was needed for our testing; this caused us to have a large number of failed or useless prototypes prior to creating a functional and useful one. The other flaw was in our test planning; while our tests went fine and provided extremely useful information we did have trouble finding subjects and collecting our data.

On a high level both phases of our evaluation phase identified many of the same obvious problems with the design. But each of the internal and external evaluations also identified unique issues on top of the obvious issues that both phases showed. The external evaluations by non-group members showed us a lot of the basic mapping and usability issues that we missed internally, they also helped us notice some simple user needs that were identified in our user research that our design did not meet. The internal evaluations helped us identify some missing functionality but were overall more as useful as the external.




While both evaluation processes were extremely useful it was fairly obvious by the end of our testing that we should have planned it out a bit better. The external non-group member evaluations provided us with more overall useful data but it could still be improved. Next time we would conduct our internal evaluations first and hopefully identify some of the obvious flaws; from there we would improve the prototype based on that data prior to conducting our external testing. This would hopefully allow us to get rid of some of the crossover between the two evaluations and get more useful data.

We learned that while prototyping is extremely useful for collecting user data if it not done well it will often just provide a lot of overlapping data. This was a major issue we found during our prototyping; all our evaluations produced a large amount of overlapping feedback on the design. While this does show us that this issue definitely exists if we had fixed it between evaluations we may have been able to collect data on some of the other design or functionality issues that likely exist within our product. Overall the prototyping process was extremely useful for our project. But if we had maybe planned out the process a bit better it could have been potentially even more useful.

## **Internal evaluation 1:**

### **Usability Aspect Report (UAR)**

<b>UAR Number:</b> Xyz123
<b>Product Name:</b> Mobile Application : Maps
<b>Date and Time of Study:</b> 12 March, 2018 / 10am
<b>Experimenters' Names:</b> Neha Gadge
<b>Subject ID:</b>
<b>Subject Details:</b>
<b>Heuristic List:</b> Jakob Neilson's List <a href="https://www.nngroup.com/articles/ten-usability-heuristics/">https://www.nngroup.com/articles/ten-usability-heuristics/</a>

<p><b>No. HE 1001</b></p>	<p><b>Good Aspect</b></p> <p>Match between system and real world</p>
<p><b>Name:</b> Closeness to reality</p>	
<p><b>Evidence:</b> 'Realness'</p> <div data-bbox="110 552 1523 1022"> <div data-bbox="168 569 402 989">  </div> <div data-bbox="477 569 1523 800"> <p>Heuristic evaluation: As we can see that the application is as close to the reality as possible. Each feature of the application is designed keeping in mind the real life situations and each solution is addressed only after considering the real life problems. Here we can see that the real time map of fourth avenue building is provided when users requests its map. Any updates in the building will be done as early as possible in the actual application.</p> </div> </div>	
<p><b>Explanation:</b></p> <p>The heuristic of realness/match with the system and real world is met because users are already familiar with applications like maps and they will not be finding it novel. Users that are using mapping applications daily will definitely like this application due to its added functionalities and added safety features.</p>	

**Severity or Benefit:**

**Rating:** 0

**Justification (Frequency, Impact, Persistence, Weights):**

**Frequency :** This application is always as close to the reality as possible.

**Impact:** users will find the real time data while accessing the maps which will make their commutation easier from one place to the other.

**Persistence:** reality will be kept in mind always while showing the routes to the user. New changed made in the roads and inside of the buildings will be updated periodically in order to keep the users savvy of the mapping application.

**Weight :** N/A

Users will be benefitted because the application is a real time application. Users will be able to make moves in real time and they will be assisted in real time by the application.

**Possible solution and/or Trade-offs:****Tradeoff:**

In order to show real time data, users will have to have a working internet connection at all times so as to pull the real time data from the world. I think this is a possible trade off for closeness to reality.

**Relationships:**

Abc123

Aishwarya

<p><b>No. HE 2002</b></p>	<p><b>Problem</b></p> <p>Consistency and standards</p>
<p><b>Name:</b></p> <p>Variation in standards of outdoor and indoor maps</p>	
<p><b>Evidence:</b></p> <p>Heuristic: Consistency</p> <p>User evaluation: The problem of consistency lies in the representation of various common elements which lies both indoor and outdoor. Due to change in maps, depending on indoor or outdoor, common places like washrooms can be represented differently in indoor maps and outdoor maps.</p>	
<p><b>Explanation:</b></p> <p>This consistency aspect is violated because this application will provide two different maps : indoor and outdoor, for which different sets of markers and icons will be used. Due to variation in usability of markers and symbols, users might get confused while switching from outdoor maps to indoor maps. Eg. Drinking water location can be shown differently on the roads (outdoor) and inside a building which might confuse the users which exact icon is meant to show drinking water inside and outside a building.</p>	

**Severity or Benefit:****Rating:****Justification (Frequency, Impact, Persistence, Weights):**

**Rating:** 2. Minor. Can be fixed. Hence, low priority.

**Frequency:** when people normally drive cars, mostly it is for short distance trips. Having the own water bottles eliminated need to search water coolers. If the trips are short distance, users might not find the need to search the washrooms as well. In case of inside the buildings, depending on how long the work is taking, users may or may not use washrooms and water coolers. Thus, frequency of encountering this problem is rare.

**Impact:** the impact will not be much on users because once they understand the convention of places both inside and outside, they will remember it throughout the usage of the application.

**Persistence:** if detected early, this is a onetime problem. If not detected, users may encounter this problem again in future.

**Weight:** Since the frequency of encountering this problem is rare, impact is not severe and has low persistence value, this problem is weighted as minor problem. It can be easily rectified by either keeping both conventions same or explicitly mentioning the name of locations in order to avoid confusions.

**Possible solution and/or Trade-offs:**

**Solution:** One possible solution is to explicitly mention the names of places in order to avoid confusion. Second possible solution is to follow the same conventions throughout the application for both indoor and outdoor maps. This will not create confusion among the users.

**Relationships:**

Abc123

Aishwarya

Internal evaluation 2 :

## Cognitive Walkthrough Report (CWR)

**CWR Number:**

*CW-001*

**Product Name:**

*MOBILE APPLICATION-MAPS*

**Task Name:**

*Find a Indoor Location*

**Date and Time of Study:**

*March 11 ,2018 - March 11, 2018*

**Experimenters' Names:**

*Zhan Li*

## Task Description:

I want to get a indoor map of a public building. And I want to locate the bathroom on the map.

## Task Action Sequence:

1. *User: Open the Apps.*  
*System: Present Home Page*
2. *User: Press 'Start' Button*  
*System: Jump into Function Page.*
3. *User: Press 'Add Map' Button*  
*System: Jump into Add Map page. Present 2 ways of adding Map.*
4. *User: Complete Selection(Public Maps)*  
*System: Jump into Maps available page.*
5. *User: Choose 'Fourth Avenue Building'*  
*System: Download the Map page. Then present the map of FAB.*
6. *User: Choose bathroom with filter*  
*System: Present all the bathrooms on the Map*
7. *User: Walk according to the map.*  
*System: show the track of users' routine.*

## Interface/tool/system description:

It is a mobile map apps available on Google and Apple Stores. It will use GPS and WiFi to help locate and download Maps.

## Streamlined cognitive walkthrough (Spencer et al, 2000):

- 1 *User: Open the Apps.*  
*System: Present Home Page*

CW Question	Issue ?	Notes
Will the user know what to do at this step?		Basic skills of using smartphone
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		



- 2      *User: Press 'Start' Button*  
*System: Jump into Function Page.*

CW Question	Issue ?	Notes
Will the user know what to do at this step?		Basic skills of using smartphone
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		

- 3      *User: Press 'Add Map' Button*  
*System: Jump into Add Map page. Present 2 ways of adding Map.*

CW Question	Issue ?	Notes
Will the user know what to do at this step?		They may choose view the map. When they find there is no maps, tap back to add map.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		

- 4      *User: Complete Selection(Public Maps)*  
*System: Jump into Maps available page.*

CW Question	Issue ?	Notes
Will the user know what to do at this step?	X	In this situation , users know it is a public map. In some case, users don't know the building is public or not.

If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		
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5 *User: Choose 'Fourth Avenue Building'*

*System: Download the Map page. Then present the map of FAB.*

<b>CW Question</b>	<b>Issue ?</b>	<b>Notes</b>
Will the user know what to do at this step?	x	There is a chance that public maps is not available either. We could add a failure page.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		

6 *User: Choose bathroom with filter*

*System: Present all the bathrooms on the Map*

<b>CW Question</b>	<b>Issue ?</b>	<b>Notes</b>
Will the user know what to do at this step?		
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		

7 *User: Walk according to the map.*

*System: show the track of users' routine.*

<b>CW Question</b>	<b>Issue ?</b>	<b>Notes</b>
Will the user know what to do at this step?	x	Users may have difficulty finding the routine. Add the user face direction on the map.

If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?		
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## Potential fixes for discovered problems:

*The biggest problem is the users might don't know where they are. It is a private location or not.*

*This can be fixed in one of two ways:*

- 1 Keep an up-to-date database of all the buildings' attribute*
- 2 Users can update the type of the building (private or public) when they have figured out*

*Compare the two solutions. The first solution requires too much work. It is not realistic to keep a uptodate database of all the buildings around the country. We could offer some tips for users to observe the signals of building. They can upload what they find about the building.*

**External evaluation 1:**

**Think-aloud exercises**

**Usability Aspect Report (UAR)-1**

Complete this form *once*, as the first page of your report:

**UAR Number:**

Abc123

**Product Name:**

MOBILE APPLICATION- MAPS

**Date and Time of Study:**

3/8/2018

5:30PM to 6:00PM

**Experimenters' Names:**

Aishwarya and Srilakshmi

**Subject ID:**

932148201

**Subject Details:**

This subject is a PSU student who is a masters student and has classes which are at different university buildings and she finds it hard to remember all the routes to her classes.

If the application were to be implemented, she would be a frequent user-on a daily basis.

Age: 22; Occupation: student.

**Heuristic List:**

<https://www.nngroup.com/articles/ten-usability-heuristics/>

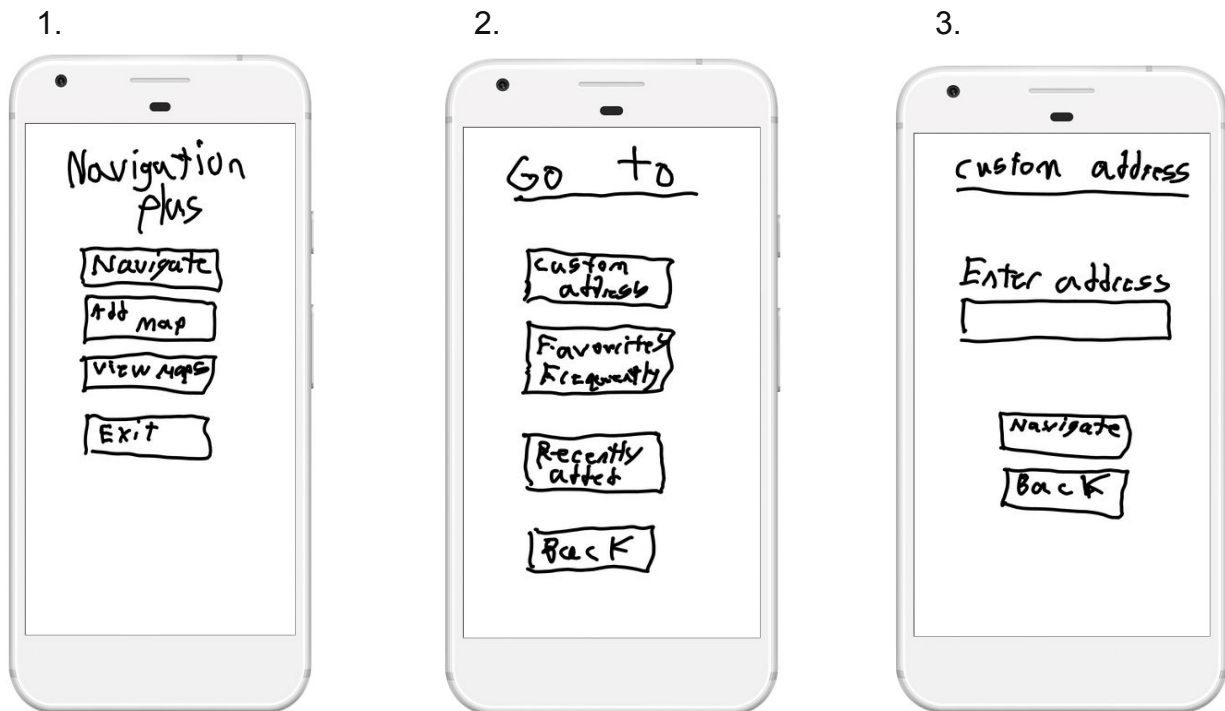
For heuristic evaluations, you should include one of the following forms *for each heuristic* and state whether your design satisfies this heuristic.

For user evaluations with subjects, you should complete the following form *for each problem or good aspect that you observe*.

(An empty form, suitable for actual use, is on the last page. These are the instructions).

<p style="text-align: center;"><b>No.</b></p> <p style="text-align: center;">UE-001</p>	<p><b>Problem/Good Aspect</b></p> <p>User control and freedom</p>
<p><b>Name:</b></p> <p>User is given a choice to choose options according to his/her choice and is free to choose from available values</p>	

**Evidence:**Heuristic: User control and freedom



1. User Evaluation: Once the user decides to start the application, they are directed to the navigation page where again options are presented to either:

Navigate to a particular location

Add a new map to the application

View existing maps

Or Exit from the current page.

This gives the user enough freedom to move through various available options

2. If the user chooses to NAVIGATE, he/she is further given a choice to either:

Enter a new address to navigate to;

Choose from the users favorite addresses

Recently changed address or even go back to the previous page if the user is not interested to choose from the above options.

With the BACK option is available as one of the options the current page and thus the user benefit's from navigating to the previous page. This gives enough flexibility to the user and prevents unnecessary confusion as well.

3. Assuming user chooses to ENTER ADDRESS from the previous page; it further navigates the user to the page where the address can be entered manually adding flexibility to add any address.

And also the NAVIGATE button takes the user back to the page2 of NAVIGATION so this is more useful if the user wants to skip the previous page and move directly to the first page of navigation.

Also the option of BACK button is provided to move to the immediate previous page as well.

This page shows that the user is given enough freedom and flexibility to move to previous or other pages.

**Explanation:**

The user found it flexible to navigate among various features of the application and suggested to make the UI more colorful.

The Heuristic Analysis about freedom shows that the user is given a lot of flexibility with the options available for the user to navigate within the application and add details such as location address without any restrictions.

If the user wishes to add new addresses the user would have to find the barcode of the particular building and scan it to add to his/her list. This ensures secure access to building and isn't publicly available.

The user might unlikely be able to add any live updates or changes made to the location he/she visits.



**Severity or Benefit:**

**Rating:** 2 = Minor usability problem: fixing this should be given low priority

**Justification (Frequency, Impact, Persistence, Weights):**

**Frequency:** Common. It is common that the users might not be able to add the live updates of the maps to the application. All the users would experience this problem. Although most users want the freedom to make changes to the application features, letting all users make frequent changes to the application would cause problem in maintaining the application.

**Impact:** It's not a major issue for the user and it can be overcome easily because the live updates are not very frequent. Also the user can wait until the application gets the automatic updates. This saves each of users time and effort to make live updates.

**Persistence:** The live updates is automatic from the application and the user need not put effort into that.

**How I weighed the factors:**

The LIVE updates are weighted based on how frequently they are available from the system, and the impact it has on the user and also the persistence.

Considering all the three factors, the live updates are not very frequent from the system and it does not affect the user on a daily basis. Also it's automatic from the application which means user need not concern over it.

**Possible solution and/or Trade-offs:**

Possible solution for the live updates is that the updates from system should be once a month or on a frequent basis. Along with consistent INTERNET connection to the user's device.

**Relationships:** Xyz123

Neha

## External evaluation 2:

# Usability Aspect Report (UAR)-2

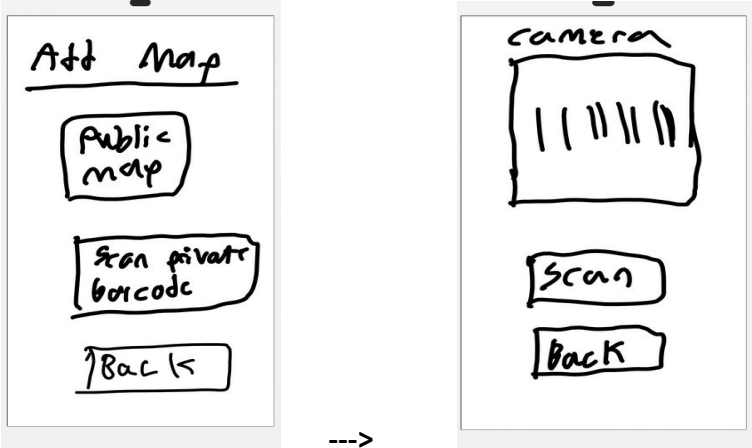
Complete this form *once*, as the first page of your report:

<b>UAR Number:</b> abc345
<b>Product Name:</b> Mobile application-maps
<b>Date and Time of Study:</b> 3/9/2018 6:30PM to 7:00PM
<b>Experimenters' Names:</b> Aishwarya and Kavita
<b>Subject ID:</b>
<b>Subject Details:</b> <b>945834839</b>
<b>Heuristic List:</b> This subject is a PSU student who is a masters student and attends classes which are at different university buildings and she finds it hard to remember and navigate to all of the classes. If the application were to be implemented, she would be a frequent user-on a daily basis.  Age: 24; Occupation: student.

For heuristic evaluations, you should include one of the following forms *for each heuristic* and state whether your design satisfies this heuristic.

For user evaluations with subjects, you should complete the following form *for each problem or good aspect that you observe*.

(An empty form, suitable for actual use, is on the last page. These are the instructions).

No. UE-002	Problem/Good Aspect
<p><b>Name:</b> Flexibility and efficiency of use. The application is flexible to use and can be used efficiently by scanning the barcode to access various building maps</p> <p><b>Evidence:</b></p> <p>With the feature to '<i>scan the barcode</i>' of the building, the user can efficiently obtain the building maps and need not struggle to get the building maps.</p> <div data-bbox="196 506 943 951">  </div> <p>After scanning the barcode the barcode it either gives a valid building plan to navigate through the building or if its an invalid barcode, shows error message to scan a valid barcode.</p> <p>This shows that the building maps can be obtained in an efficient manner without any glitches.</p>	
<p><b>Explanation:</b></p> <p>According to Kavita, she thought that the application was very efficient and effective to use with all the features a new student could use. But said she had problems understanding the UI design and could work on improving the design of the application rather than the features.</p> <p>With Heuristic Analysis, the efficiency and flexibility of the application to navigate from one page to another and obtains the barcode and building maps in an easy manner with just scanning using the camera.</p> <p>The user would have trouble with the design of the application and not much interactive but contains all the features.</p> <p>Also the users are unlikely to miss getting the maps of the building with barcode unless the barcode is invalid.</p>	

**Severity or Benefit:**

**Rating:** 1 = Cosmetic problem only: need not be fixed unless extra time is available on project

**Justification (Frequency, Impact, Persistence, Weights):**

**Frequency:** The design of the application is not the major concern that needs fixing at the moment. Since the functionality of the application is in a good condition.

**Impact:** It's not difficult for the user to overcome since it's a design issue and not the functionality problem.

**Persistence:** Once the user knows how the functionality of the application works; that is navigating between the pages-adding barcode, navigating to class, the design is a minor concern.

***How I weighed the factors:***

The application working with all the features, and design being the only concern.

**Possible solution and/or Trade-offs:**

Redesign the UI to make it more user friendly.

**Relationships:**

Abc123

Aishwarya

Xyz123

Neha

