

Designing an Online mobile repairing course for AALA an e-learning platform

Project 2

Guide: Prof. Venkatesh Rajamanickam

Ridhima Tapia
Sr. Interaction Design
176330012

IDC School of Design,
Indian Institute of Technology, Bombay

Declaration

I declare that this written document represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources.

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

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.



Name and Signature

Ridhima Tapia | 176330012

Interaction Design, IDC, IIT Bombay

Approval Sheet

The Interaction Design Project 2 titled “Designing an online mobile repairing course for AALA an e-learning platform ” by Ridhima Tapia (Roll Number 176330012), is approved, in partial fulfilment of the ‘Master in Design’ Degree in Interaction Design at IDC , IIT Bombay.

Supervisor:



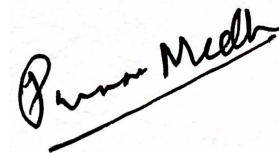
Chairperson:



Internal Examiner:



External Examiner:



Acknowledgement

I would like to express my sincere gratitude to my guide Prof. Venkatesh Rajamanickam for helping through each stage and helping me push my boundaries. Working under him was a great experience as I learnt a lot of things from him, primarily the art of discipline.

I thank the IDC Interaction Design faculty - Prof. Girish Dalvi, Prof. Ravi Poovaiah, Prof. Jayesh Pillai, Prof. Vivek Kant and Prof. Pramod Khambete for their valuable feedback and suggestions. I would also like to thank Mr. Abhijith Shetty and Pratik Majumdar from Yuva Parivartan for helping me out with the content and providing me assistance when needed.

I would also like to thank my family and friends for constantly supporting me throughout the Project and helping me out when needed.

Contents

1. Abstract.....	11
2. Introduction.....	13
3. Topic.....	15
4. Plan.....	17
5. Primary Research.....	19
5.1 User Analysis.....	19
5.2 Major Findings.....	20
5.3 User Needs.....	20
5.4 Content Analysis and Design.....	21
5.5 Final Content Structure.....	22
5.6 Learning Objectives.....	24
6. Secondary Research.....	25
7. Design Goals.....	27
8. Ideas for Learning Design.....	29
9. User Journey Map.....	31

10. User Flows.....	33
11. Information Architecture.....	35
12. Wireframing.....	36
12.1 Lo-fi wireframing.....	37
12.2 Content Delivery Medium.....	38
12.3 Hi-fi wireframing.....	39
13. Evaluation Plans.....	41

1. Abstract

There are many school dropouts in the country who are sitting in their homes and not employed yet, especially in rural parts of India. The reason being lack of confidence in studies and not much aware of the livelihood options they could have around them. An NGO Yuva Parivartan provides vocational training to this economically weaker section of the society and help them grow. To scale their reach they are planning to create an online platform for such people to learn skills online and find the livelihood options. The project is about designing and building the e-learning platform for some of vocational courses provided by the NGO. The platform will be more of an ecosystem of learners, trainers and job providers. It will train users, develop their skills, provide them assistance when needed, connect to nearby centers for advanced course and help users find livelihood options nearby the area they are living in.

2. Introduction

Yuva Parivartan is a 20 year old initiative and one of India's largest NGOs which provides skill based training to school dropouts. Their vision is to create opportunities for school dropouts and deprived youth to help lead productive and socially useful lives. They operate with a mission to give second chance to less educated deprived youth through wage or self employment based on livelihood trainings they provide. *By Yuva Parivartan.*

Yuva Parivartan is looking forward to scale their reach by introducing a third delivery model called AALA. AALA is Anytime Anywhere Learning for Anyone, an e-learning platform for vocational learning courses. The thought behind AALA is to reach people in remote areas and the areas where people don't have much opportunities for livelihood. It aims to deliver skill based courses to people from every part of the country and help them find livelihood options.

Currently they are running two delivery models :

- Livelihood development center (LDC)
- Mobile Livelihood development center (MLDC).

Livelihood development center (LDC)

These are the permanent classrooms located in 18 states throughout the Country. There are around 67 LDCs across the nation. The course duration here is 3 months and fee for the course is approx Rs.3000.

Mobile Livelihood development center (MLDC)

Mobile learning development centers are the temporary camps being organized in rural areas. Since people are not much aware of the livelihood options in rural areas, awareness programs are organized in the villages, and based on the response of people the camp is conducted. The course duration is of 1 month and the fee for the course is Rs.800.

3. Problem Area

AAALA aims to design an e- learning platform which will provide the users an opportunity to explore the livelihood options they could have and will train the users for their desired area of interest. It will make users more aware about the areas they can work in and help them explore more about the course by providing 30 % of the course free to each user. Also after the completion of the course the user will be provided certification for the course completion and will be connected to livelihood options nearby.

Broad Topic :

To design an e-learning platform for one of the vocational courses offered by the NGO.
The design of the e-learning platform contains following elements :

- Course and Content design for a vocational course.
- Providing certification on completion the program.
- Connecting users to nearby centers for further studies.
- Helping users to find livelihood options nearby.
- Evaluation users during and after the course.
- Designing of the free part of the course.
- Providing assistance to the users.

Narrowed Topic :

To design the content and course structure for one of the vocational course ‘Mobile Repairing’ run by the NGO Yuva Parivartan.

4. Plan

Before Proceeding with the project the plan to follow was decided. To better understand the target audience interviews shall be conducted and users from different areas will be chosen for the interviews. Camps in rural areas will be attended to get the sense of the real user. Classes for different courses shall also be attended to understand the different types of users. For the content analysis, the whole content shall be studied inside out. Online sources shall be referred for the same. Interviews with some mobile repairers shall be conducted. Also the content structure will be looked into details. The user and content analysis will further help in defining the goals for the project. Once the goals are set up, the design part of the project shall begin.

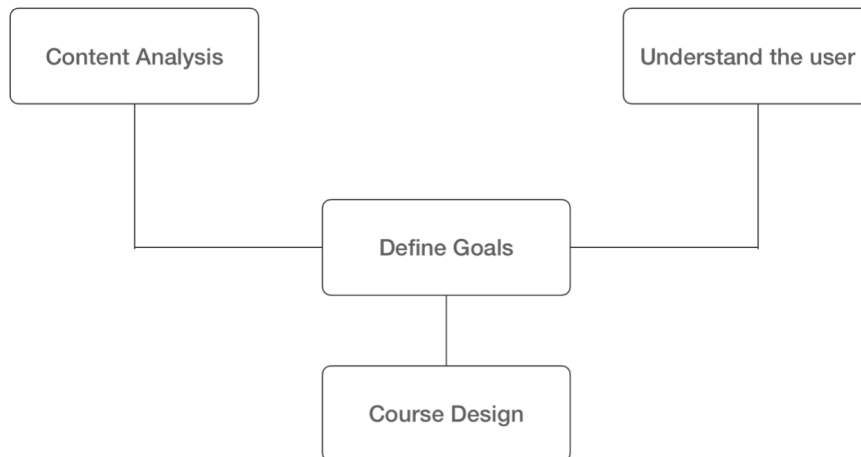


Fig.4.1 Plan to follow

5. Primary Research

5.1 User Analysis

In first round I attended classes for the courses : nursing, beautician, Wireman and Mobile repairing .Their behavior, response in the class was thoroughly observed. Major findings during classes were most of the students were very shy to ask questions even if they don't understand the topic whereas a few of them were very quick to ask questions.

In Second round interviews were set up with teachers teaching different courses at Yuva parivartan. A total 5 teachers teaching the courses beautician, Motor Mechanic, Wireman, nursing and mobile repairing were interviewed. The aim was to about the structure followed for these different courses and knowing about students from teachers point of view. Interesting things were to know about different approaches followed by these teachers and the way they tackle every type of student. Key questions involved were How do they decide the limit of content to be delivered? How do they structure the course? How do they build confidence in students ? What are the motivational activities held in class ? Methods followed to evaluate the student performance ?

In third round the target users were interviewed. These interviews were held at different centers of yuva parivartan. The Centers in Mumbai and camps held in villages Palghar, Usgaon were visited. A total of 25-30 users were interviewed in these visits. It helped a lot in understanding the user. The major key questions involved demographics, course they are undergoing? Why are they taking the course? What are the inspirations behind? What are the main challenges faced? Will they want to take any other course? Later on the users analysis was performed.



Fig.5.1(a) Students attending Nursing class

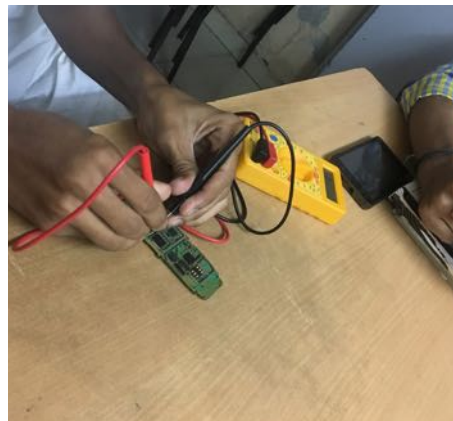


Fig.5.1(b) Student performing a [Practical in mobile repairing class



Fig.5.1(c) Students attending Tally class in Usgaon



Fig.5.1(d) Interviewing Computer class students in village Palghar



Fig.5.1(e) Mobile repairing class practical session



Fig.5.1(f) Beautician class practical

5.2 Major Findings

After the interview process, user statements were classified in an affinity diagram to analyze the users. The findings and insights obtained were as follows :

Lack of Motivation

The users lack motivation for doing the course. Most of them were doing the course because their friends were also doing the same course.

Needs Encouragement

The users were little under confident while they start the course and they hesitate to ask doubts from teacher. They find it uneasy to understand the terminologies. However, with course of time users build confidence by constantly putting efforts.

Lack of Awareness

The users were doing the course because they were told by a friend or a family member that they will find a job after doing that particular course. They were not much aware of the areas they can learn skills in and earn a livelihood option.

Lack of Infrastructure/Facilities

There were users who were doing the tailoring course but were more interested in beautician course. They joined the tailoring course because it was the only course available nearby their area.

User statements and findings helped building user personnas.

Persona 1

Nitin, a 10th drop out 22 years old boy.

- Very shy person
- Not exposed to technology
- Wants a job
- Unaware of types of jobs he can look for
- Is Comfortable talking in his mother tongue
- Don't like reading
- Uses whatsapp to talk to his friends but never used youtube
- Needs motivation
- Learning Mobile repairing and has no prior knowledge of the subject
- He has no special skill set
- Doing the course as he was told by a friend that it might help him find a job

Persona 2

Jyoti, a 19 year old girl. She is a 12th drop out

- Is learning Tally course
- Finding it hard to catch up with the course
- She joined the course because it assures job
- Is interested in learning nursing but no nearby center offers the course
- Finds difficulty reading english
- Not much tech savvy
- Not much aware of the livelihood options she can look for

Persona 3

Aadil, a 30 year old man. He is a 12th drop out.

- Is working at a kirana shop
- Looking for a job change as his current job is not helping him meet his financial needs
- He wants to learn Mobile repairing, inspired by his friend who works at mobile repairing showroom
- Wants to open his own shop
- Has some prior knowledge in the field of mobile repairing
- Aims to gain more of a practical knowledge in the field.
- Motivated enough to learn
- Looks for videos quite often on youtube
- It's hard for him to take out time for class as he is full time worker at the kirana shop

5.3 User Needs

- User wants to feel confident that he/she can learn the course.
- User needs Motivation.
- Looking for a livelihood option
- Can't spend too much time for learning
- A very easy to understand Platform

Constraints :

- Users are not so used to online platforms.
- How to keep them engaged ?
- There is problem with internet in remote areas.
- Teaching a practical course online . How to deal ?

5.4 Content Analysis and Design

The content analysis included two parts : Understanding the content and Designing the content structure. Some primary and secondary research was done for the same. For the secondary research mobile repairing was learnt from online sources. For primary research detailed sessions were set up with 3 mobile repairers and 1 mobile repairing teacher. The sessions mainly aimed at understanding how did they learn Mobile repairing, what all operations they perform to fix the mobile, what approach do they follow, is there any common flow or defined steps to repair mobile and then learning different types of faults and way to fix them.



Fig.5.4 (a), 5.4(b), 5.4(c) Sessions with Mobile Repairers

After the first set of interviews a mockup of the content was made. Major challenges faced were as follows :

- Where to limit the syllabus.
- How much theory should be involved.
- Different terminology used by different people.
- Explaining the types of problems and their solutions.

The Major discovery was chunking of the syllabus. In the first iteration 5 major chunks were identified. The figure below shows the iteration 1.

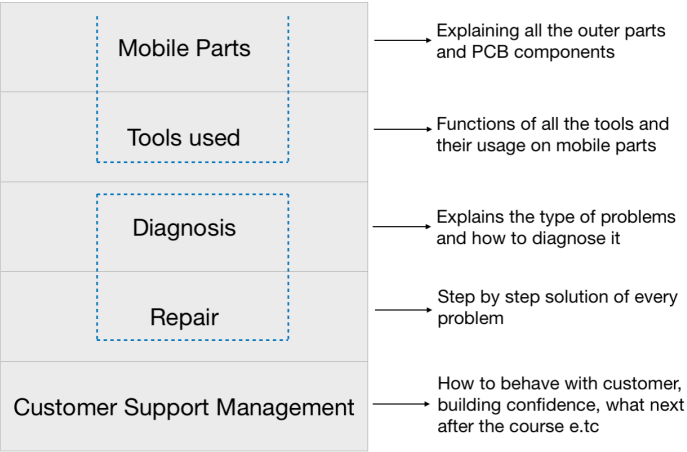


Fig.5.4 (d) First iteration of the syllabus

The first iteration was validated by the mobile repairers and the teacher. As per the feedback new iterations were made. This process of validating and iterating kept happening back n forth until the final iteration was made. The major problem faced was categorization of the content as the shopkeepers themselves were not much clear about structure they follow to approach the problem. So card sorting experiment was done with all these stakeholders to better understand their mental model of categorization.



Fig.5.4(e). Card sorting performed by mobile repairers.

5.5 Final Content Structure

After several iterations and the final Content structure was designed. The syllabus was broken down into 4 major Sections and subdivided further into chapters. The figure shows the final iteration of syllabus in details.

Knowing about Mobiles	Major Types of Mobiles and their technologies. - Featured phones and smart Phones. - 3G, 4G compatibility, Apple & Android OS. - Functions and services like 3g, 4g, wifi, Hotspot etc.. Tools Used for mobile repair. - Task specific tools - Everyday tools Disassembling and Assembling of phones. - How to disassemble and assemble mobiles - Different mobiles with cautions and warnings Parts of mobile Phones. - Outer parts and PCB and circuits introduction. How to use tools on circuits		Software Faults & Repair - Phone hang - App Crash Network Faults & Repair - Sim - Antenna Memory card Faults & Repair
Faults & Repair	Audio Faults & Repair - Speaker - Mic - Loudspeaker Camera Faults & Repair Screen Faults & Repair - Display - Touch Charging Faults & Repair - Battery - Port	Troubleshooting	Battery Boosting - How to boost battery - Settings of DC power supply Mobile hot & cold testing - How to perform - Multimeter settings for testing Circuit Testing - How to check the current flow with the help of multimeter Mobile half shorting & full shorting - How it is done ? why it is done

Personal development	Behavioral Etiquettes - How to talk to a customer? - Listening to customer's problem properly - Informing about estimated cost and time taken How to begin? - How to find a job after the course Start your own shop - Raw materials needed - Investment needed
-----------------------------	--

5.6 Learning Objectives

Mager's Model for defining learning objectives was studied. According to Mager it clear that a learning objective is a statement of "what the learner will be able to perform as a result of some learning experience. The following are the learning objectives :

- The user will be able to disassemble and assemble different types of mobile phones.
- The user will be able to recognize all parts of mobile
- The user will able to communicate properly with his clients
- The user will be able to detect the faults in mobiles and can fix it given the tools used for mobile repair.

6. Secondary Research

For secondary research the some of the articles relevant to the field were read and also the Online platforms existing in the same area were studied thoroughly. The articles read are as follows:

Why do learners drop out Online courses? *By Laura Lynch*

The article explained why do users drop out Online courses in details. The reasons that lead users to drop are :

- Unrealistic expectations about the work involved.
- Lack of Prerequisite experience by the user.
- Poor communication from the instructor.
- Bad pacing, students finding hard to cope up.
- Unexpected Course Content.
- Low Motivation.
- Technological glitches.

All the above mentioned reasons were thought about and design decision were taken to address them in the final solution.

A case study on evaluating an e Learning course. *By Nicki Nelson*

The case study was about an evaluation plan for an instructional design course. It explained what steps to be taken and the rationale behind them. It helped in planning of the evaluation for the course and content design. The major insight through the paper was there should be a continuous evaluation of design direct from user for more user centric design. The same was followed while designing the content and the course.

How to convert Content into e Learning material? *By John Laskaris*

The article talked about on how do we convert our content into an e Learning material. The major key taking was that analyzing the content and then defining the learning objectives are the stepping stones for e Learning design.

Some of the platforms in similar field were studied. And the criteria for the study was the major Findings in Primary research. i.e. How are they addressing the factors like Motivation, Encouragement, Creating Awareness and building confidence in user. Also how the information flows and the content is structured was analyzed. The following is the list of platforms studied :

Udemy

The site provides user a short description, talks about requirements of the course and the objectives of the course but the factors like motivation, encouragement are not taken care of. Whereas the content structure is divided nicely and the structure of the course fit into users mental model nicely.

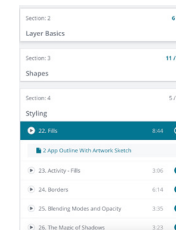


Fig.6a

Instructables

An introduction video is provided to the user to know about the course objectives and content. There are Contests for every topic, which i think is great idea to encourage user learn more. The Course content is divided into steps. But the balance between images, videos and text is not maintained.

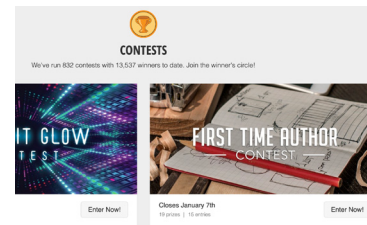


Fig.6b

Interaction design foundation

The site provides a detailed info about the course and informs user about why should he do the course, requirements of the course, and the learning objectives of the course. Also other relevant information like time, pace etc has also been provided.



Fig.6c

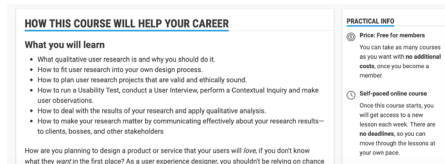


Fig.6d

Khan Academy

The site provides no detailed info about the course. Once a course is selected the summary and the content of the course is displayed.

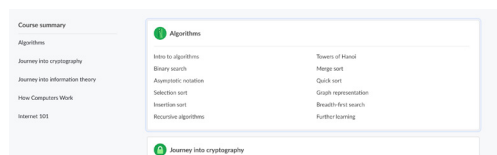


Fig.6e

IFIXIT

The site was referred for content. It provides repair guide for electronics. In the repair guide a step by step instructions are provided.

7. Design Goals

The goal AALA is to reach the audience in every part of country and help them learn the skills to earn livelihood options. The design of AALA needs to be taken into account as it will be used by economically weaker section. So the design should be quite simple and easy for them to understand.

The *functional goals* product should deliver :

- The platform should help users explore the courses and their area of interest
- It should provide a detailed information about the course.
- Evaluation at each stage is must to ensure user learning.
- Certification should be provided.
- Time and effort required for the course and all other prerequisites should be mentioned.

The *user experience goals* product should deliver :

- The navigation of the platform should be very simple to understand.
- User should feel motivated to enroll for the course
- Factors building user Confidence should be involved.
- Immediate feedbacks should be provided so that user does not get lost at any point of time.

8. Ideation

- **Providing a toolkit for learning**
Providing a toolkit which will have puzzle sort of cards to help user learn the procedural knowledge. The idea however was dropped later because of cost issues
- **Practice Quizzes after every chapter**
Quizzes to help users revise and let them know the areas they need to work on more
- **Providing downloadable Pdf's for each section**
Downloadable Pdf's for each section to overcome the issue of internet connectivity
- **Creating curiosity for upcoming chapter**
Leaving something untold in the ending of a chapter to create curiosity user to go to next chapter to find out
- **When stuck, where next ?**
Providing assistance on every page
- **Gamification of troubleshooting section.**
Gamification of the troubleshooting section by creating quizzes or paper puzzles.
- **Warnings and cautions should be highlighted.**
Informing user about the warnings and cautions needed in the particular activity.
- **Using analogies while teaching.**
Using analogies while teaching about the course
- **Test and evaluation after each chapter.**

9. User Journey Map

The journey map of user was drawn which explained users tasks and pain points at various stages. To elaborate in details, once the user lands into the platform he would look for the course he wants to take, the pain point could be not understanding where to go after landing into the home page. The navigation should be intuitive. Next when the user enters into the courses offered, he should get a clear picture of the courses offered. Either the title of the course should be self explanatory or some detail should be provided

The division of the courses should be such that its easy for the user to find out the course. After entering the course user should be informed about the course objectives and all the prerequisites. However, there should not be content overcrowding. The course structure should be such that it fits into users mental model. The user should have a clear idea about the evaluation tests and there should be a right balance between the content media. After the course the user should be able to get instructions for certification.

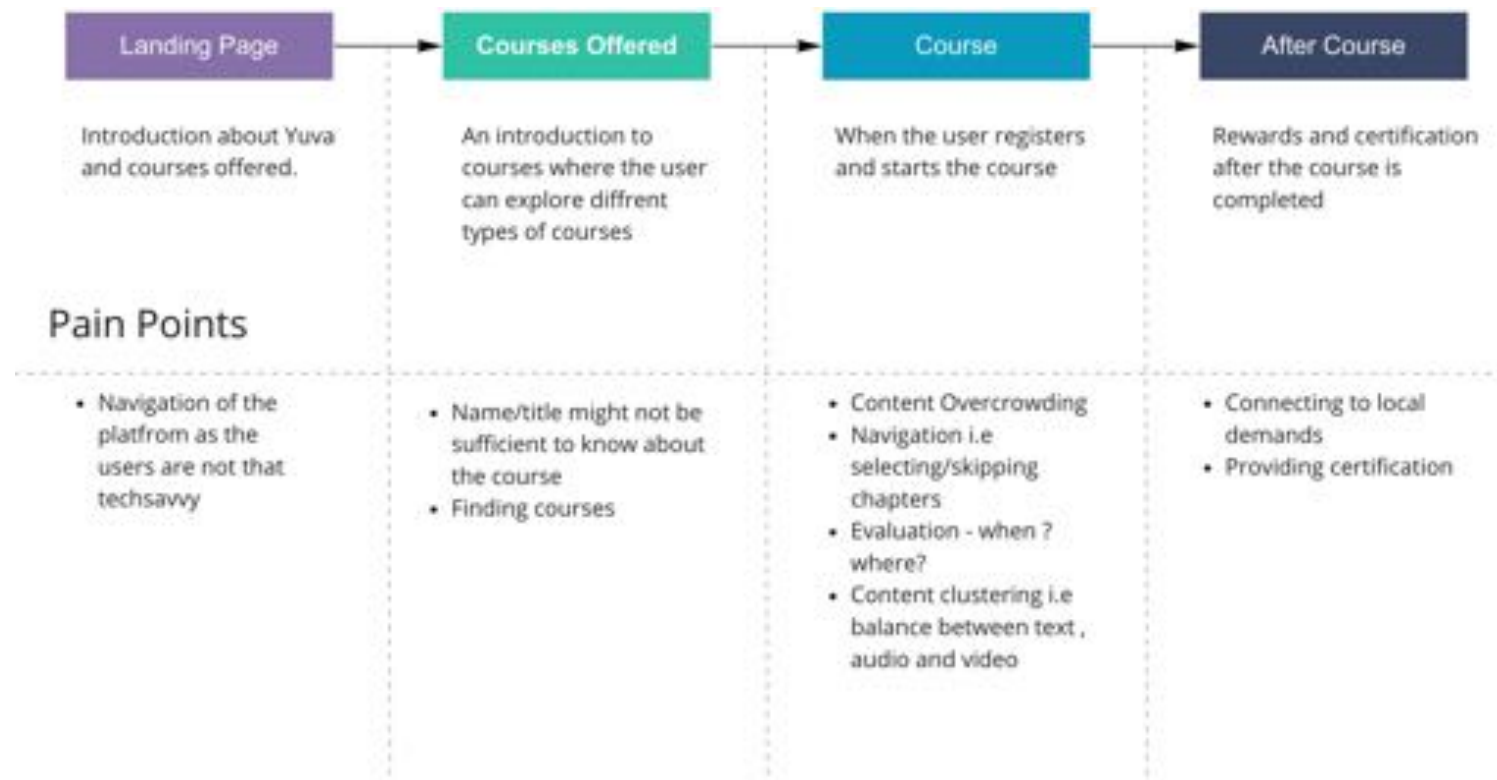


Fig.9.(a). User Journey Map

10. User flows

User flows for a new user and an existing user were made. The user needs were addressed in the flow. The main purpose of the user flow was to visualize how the information should flow through out the platform and to identify the areas where navigation could be improved. While the user flows helped identify the key problem areas, it also helped in developing the information Architecture of the platform.

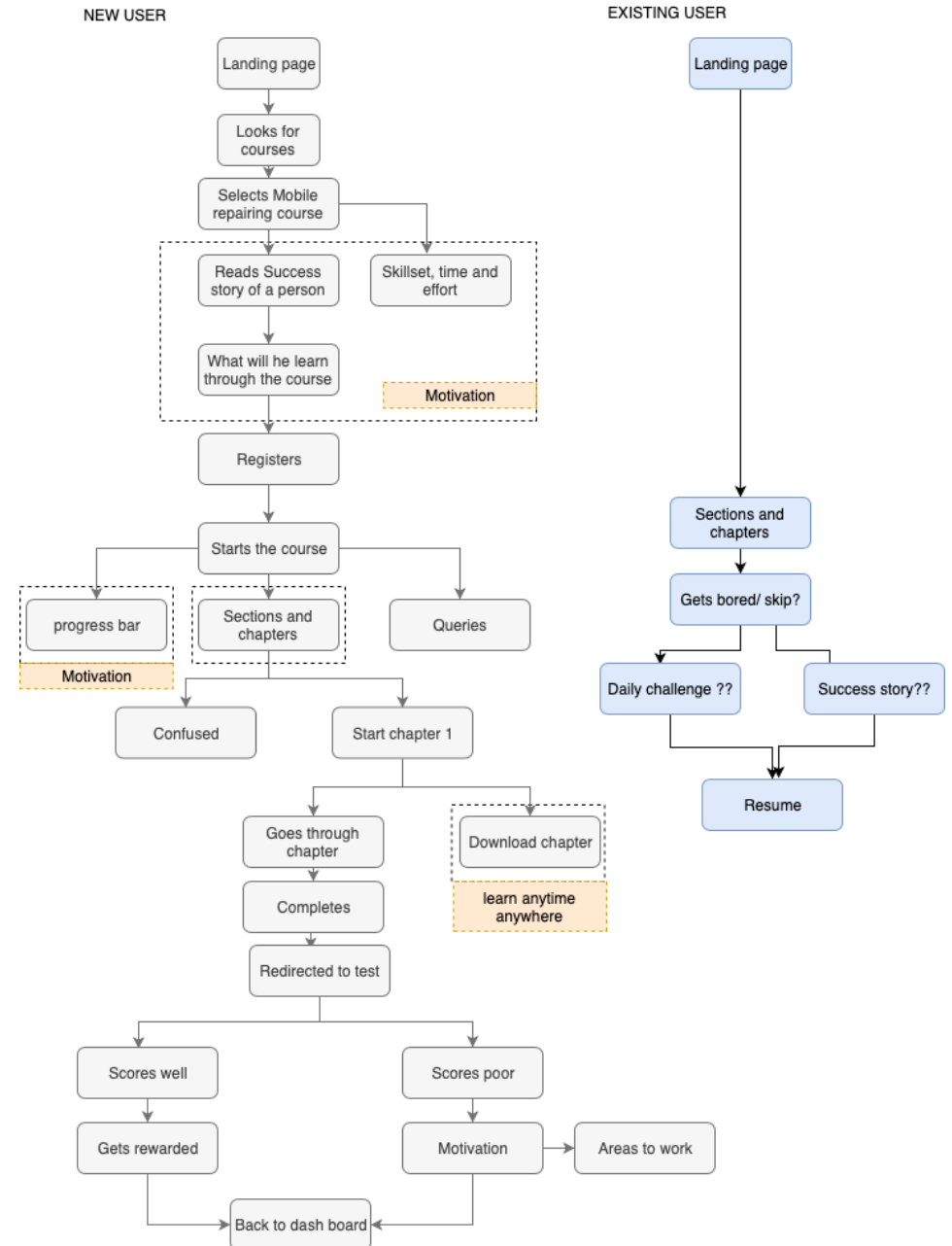


Fig.10(a). User flows for new user and existing user

11. Information Architecture

The architecture has been broken down into four layers. First layer involves the landing page and the courses offered. Second layer is once a user selects a course. Third layer is when a user starts the course and fourth layer is the evaluation stages. The information architecture was an iterative process and was being tested with some users to understand if there is something missed. The figure on the right shows the final structure of the information flow.

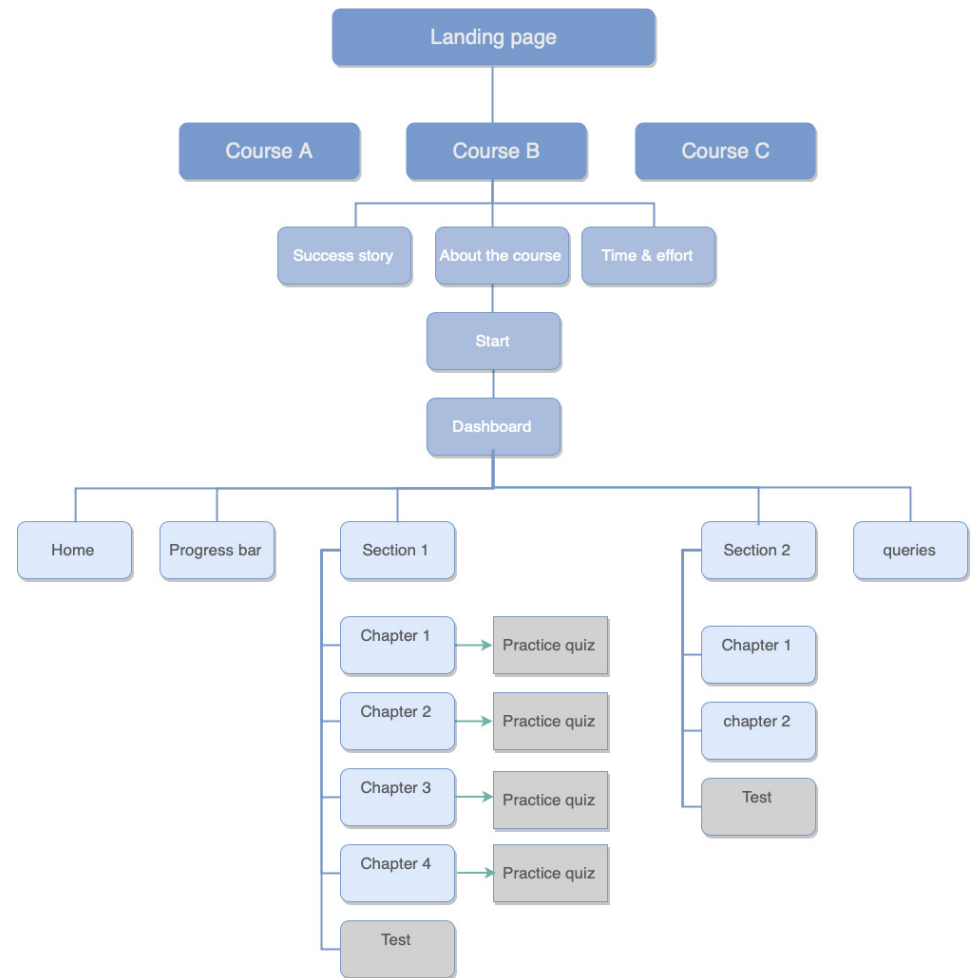


Fig.11.(a). Information Architecture

12. Wireframing

Considering the users needs, pain points, content structure, constraints and following the information architecture the low fidelity wireframes were made. Out of which one final design was chosen for final prototype.

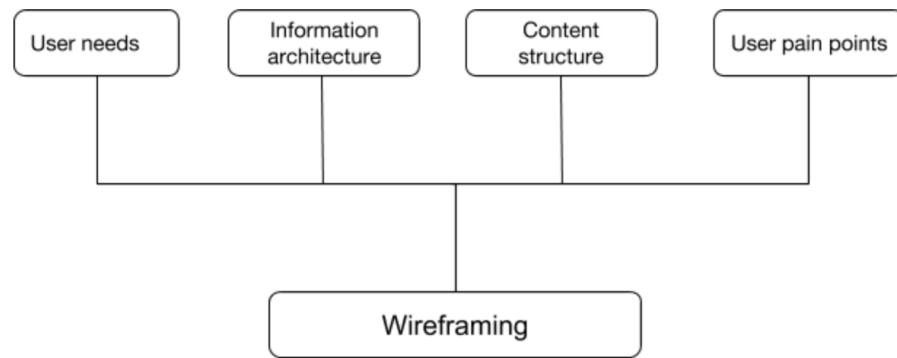


Fig.12(a). Process followed for wireframing

12.1 Lo-fi Wireframes

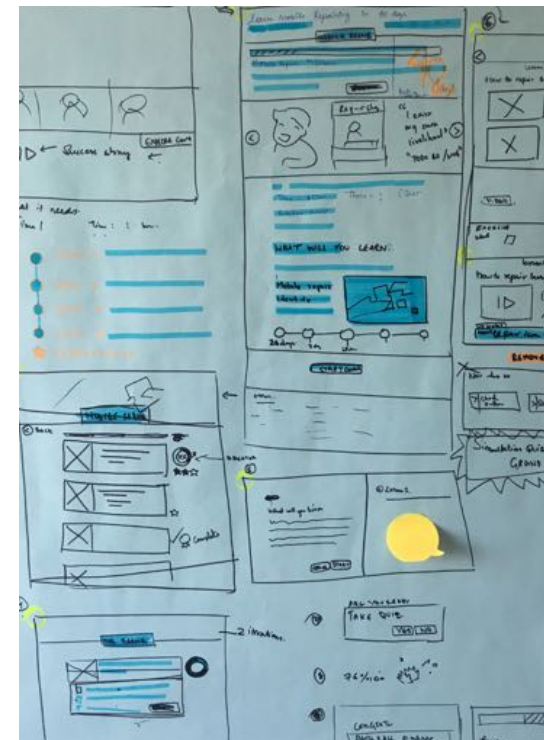
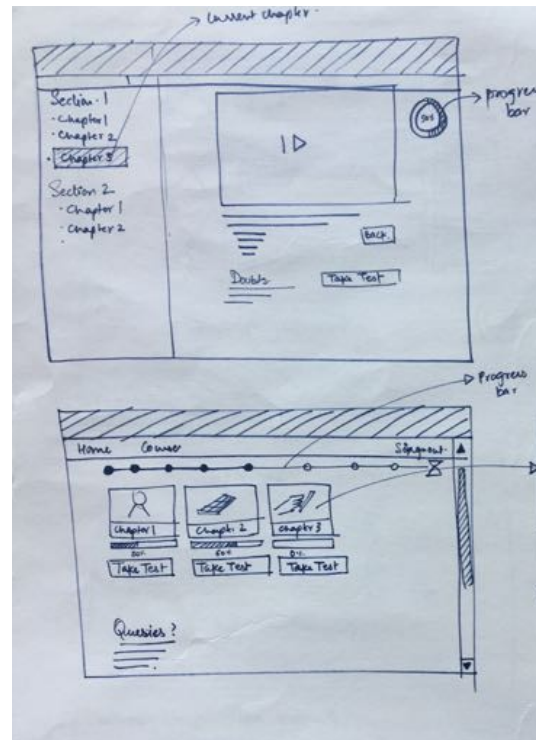
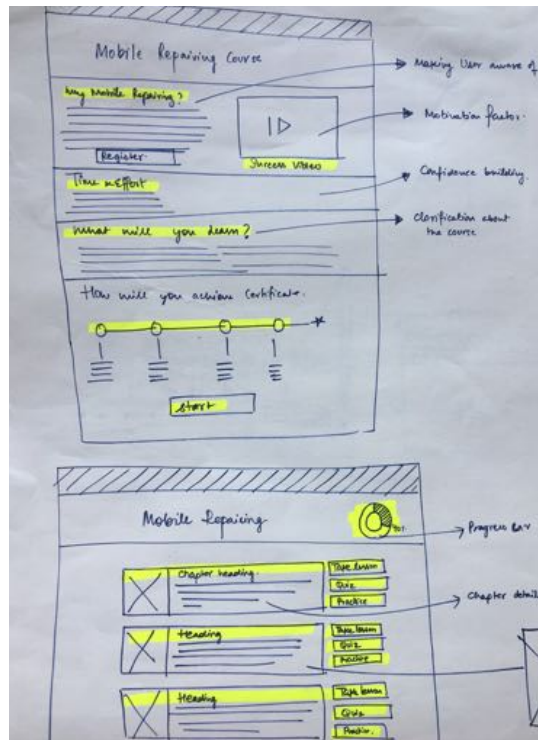


Fig.12.1(a), 12.1(b), 12.1(c). Lo-fi wireframing

12.2 Content delivery medium

For the final delivery of content an activity with students taking the mobile repair class was conducted. These students had already completed half of the course with Yuva parivartan and were aware of Mobile repairing topics. In the activity the topics for mobile repairing were displayed in front of students and each one of them was asked to write about the medium (images, text, videos etc) he/she thinks would best help him understand the course. This helped in better design of content delivery structure for the final course.



Fig.12.2(a), 12(b), 12.2(c). Students performing the Activity

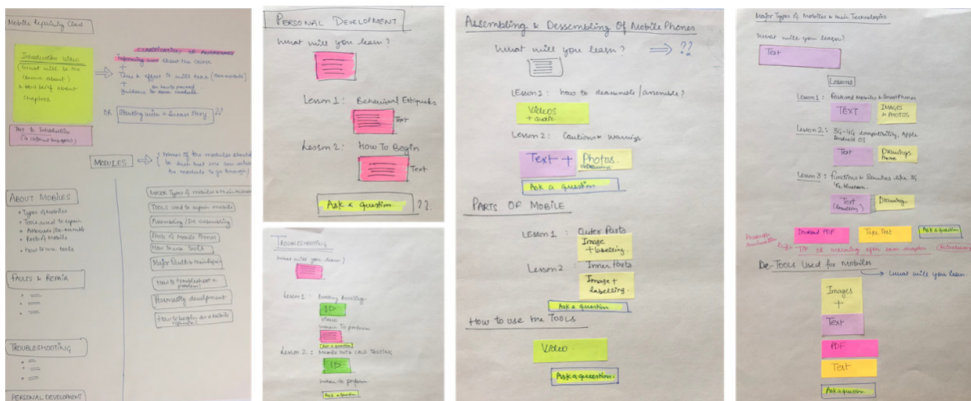


Fig.12.2(d), 12.2(e), 12.2(f). Lo-fi wireframing for content design

12.3 Hi-fi Wireframes

Making Hi-fi wireframes was an iterative process. The wireframes were continuously tested with the users and the changes were made as per the feedback by the users. The major feedback taken was that they want the interface to be more simpler and more number of clicks were making them loose patience. So the final iteration was made considering all the user feedbacks. Here are some of the zoomed pictures which address the users needs.



Fig.12.3(a)

Encouragement and Motivation

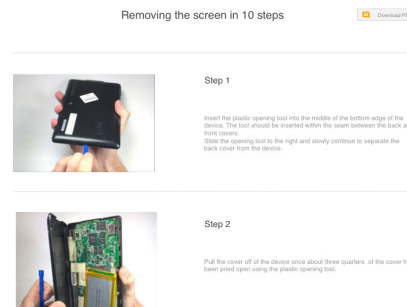


Fig.12.3(b)

Building Confidence

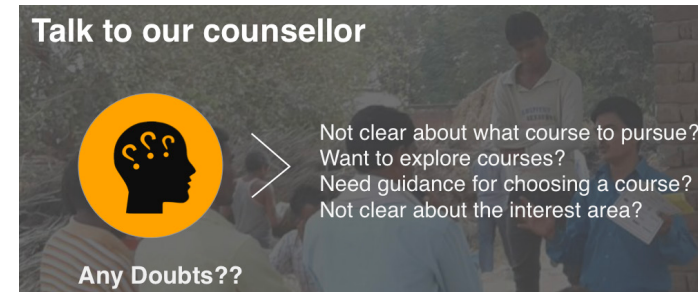


Fig.12.3(c)

Providing Assistance

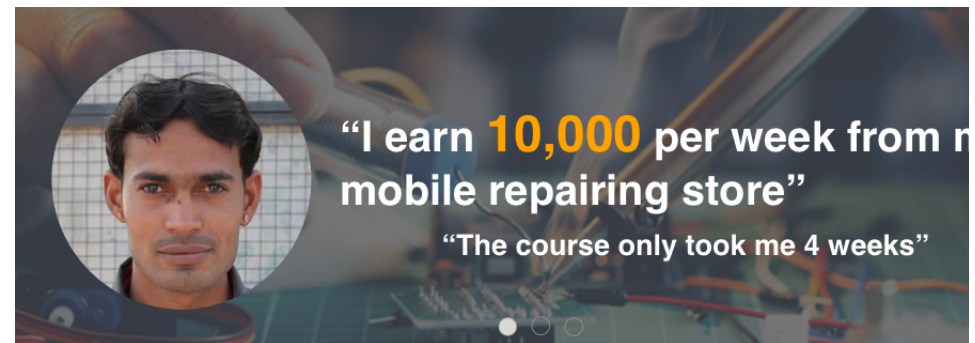


Fig.12.3(d)

Building confidence (success story)

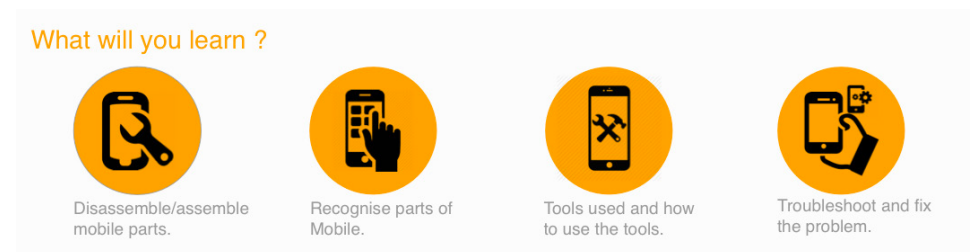


Fig.12.3(e)

Informing User (Learning objectives)



Fig.12.3(f) course home screen

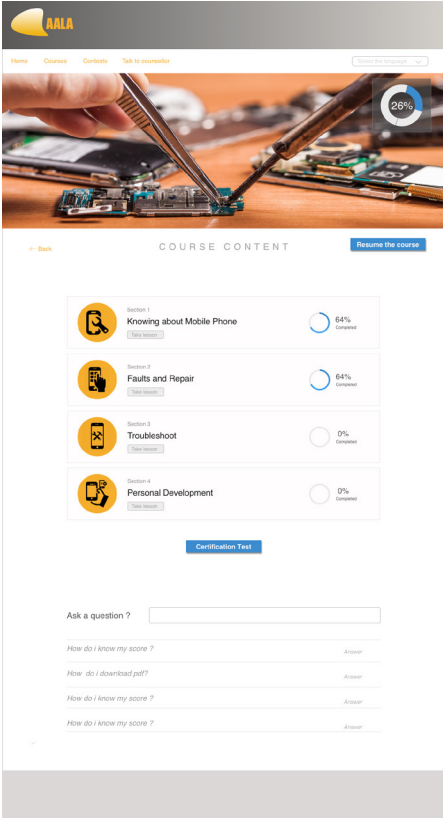


Fig.12.3(g) course sections

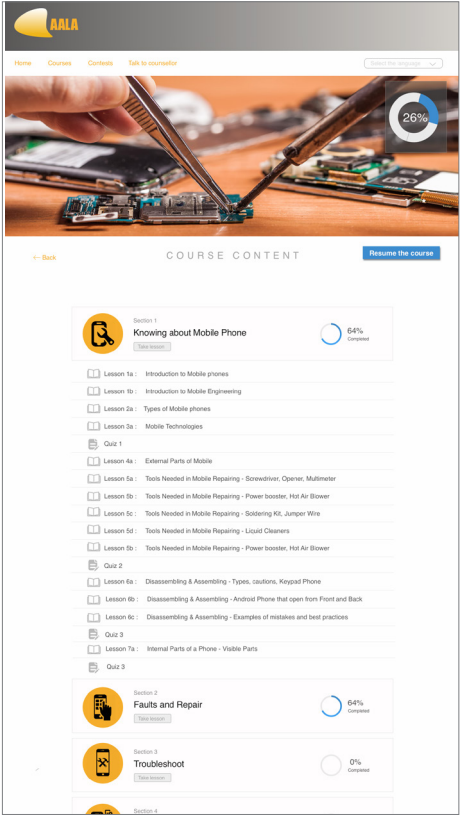


Fig.12.3(h) Lesson Details

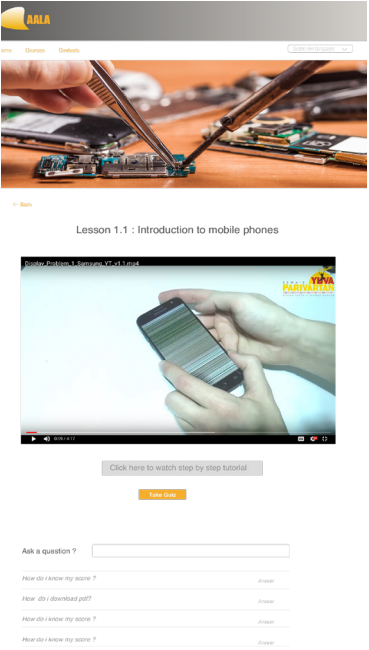


Fig.12.3(i) Lesson

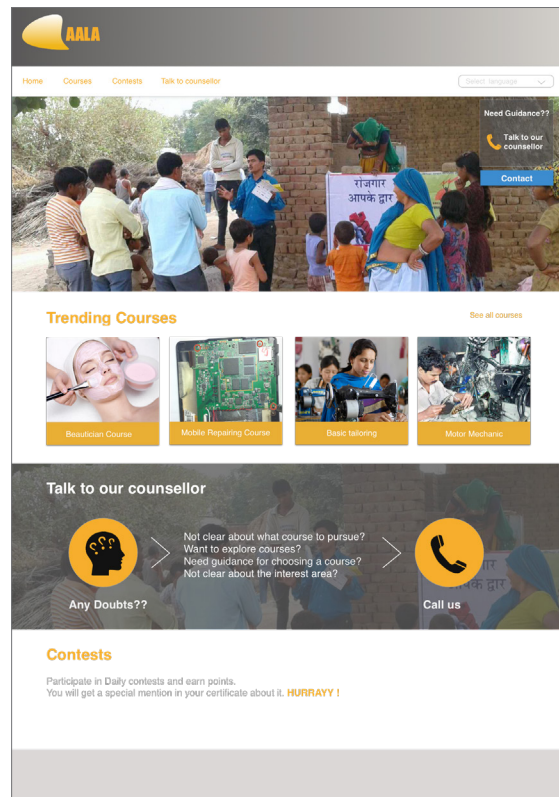


Fig.12.3(j) Home screen

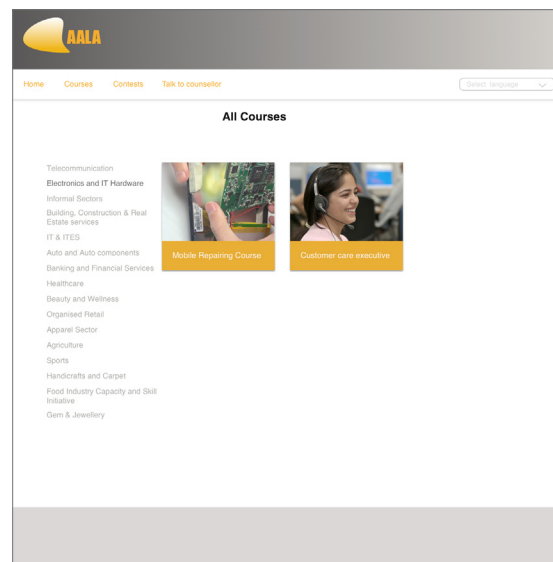


Fig.12.3(k) Courses Offered

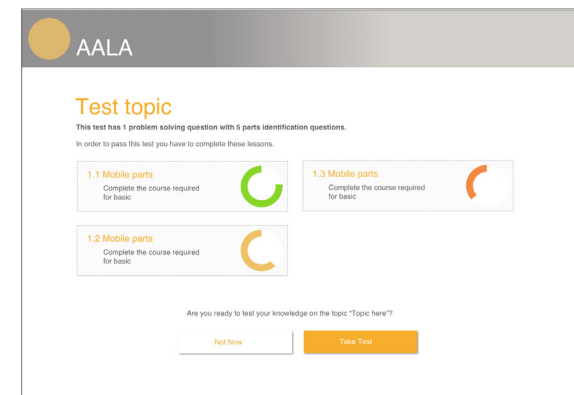


Fig.12.3(l) Test Screen

13. Evaluation Plan

Claims :

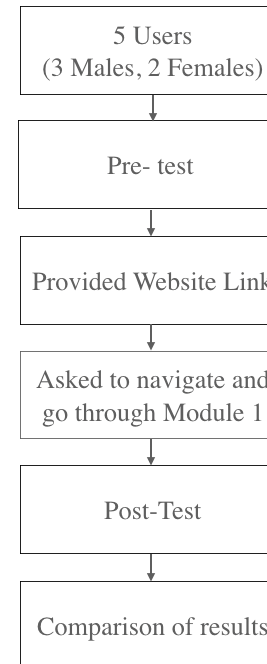
- Anybody with no prior knowledge about mobile repair after undergoing the course will be able to detect the faults and repair mobile on his own.
- Users will be able to apply their learning in practical.

What to evaluate ?

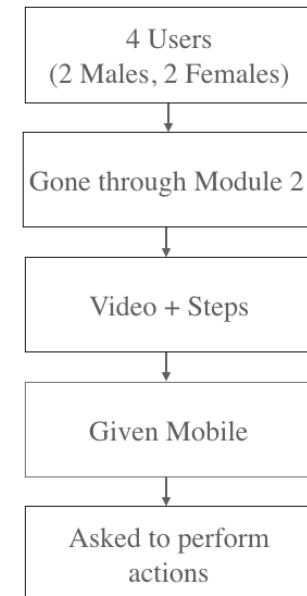
- **User Learning**
User learning will be divided into 2 parts : Conceptual learning and Practical learning. Conceptual learning will evaluate whether the course has helped user clear his concepts and Practical learning will be evaluate whether the user is able to apply the learned knowledge into practical. A design experiment will be conducted to test the same.
- **Layout Design and Navigation**
How easily does the user navigates through the platform. This could be tested side by side while testing the User learning.

Design Experiment :

- 5 users with no prior knowledge of mobile repairing will be taken .
- A Pre test will be taken to ensure the level of users is same and Knowledge of the users prior testing will be tested.
- All the users will go through the course (Specific chapters will be decided).
- A post test will be held and scores will be compared to Pre test.
- The difference in scores of Pre and post test will show the learning of the user.
- Then for the second part practical based content shall be shown to user .
- A dummy mobile with some problem identified based on specific content shall be provided to user and user will asked to repair that fault.
- This will ensure that whether the users are able to apply their learnings in practical.
- Hence the results will evaluate the claims.



Experiment 1



Experiment 2

Results :

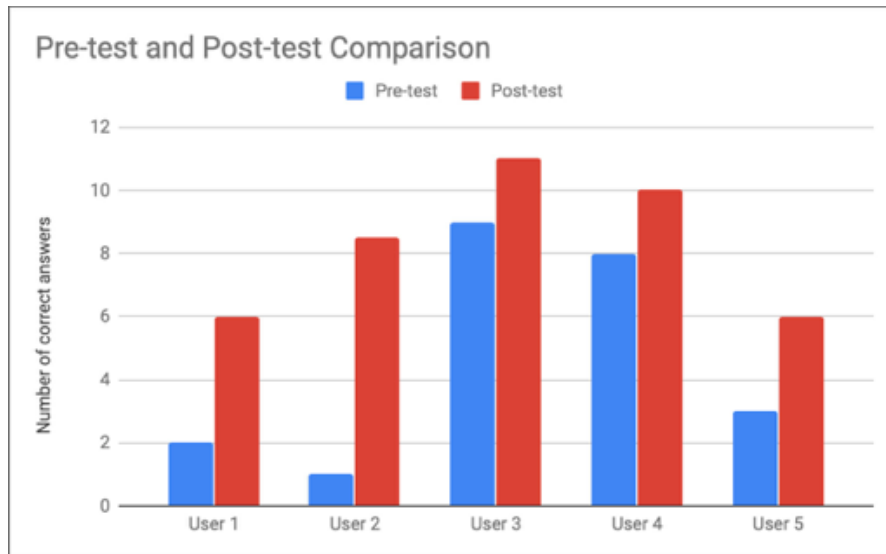


Fig. 13 (a) Pre test and post test comparison

- Navigation and findability was easy for users.
- Users performance increased after going through the course.
- Users preferred watching a video than watching steps.
- Users were able to perform practical to a certain extent.
- Users were able to perform better after a demo or human assistance.

Conclusion:

- The platform was able to deliver the content to the users.
- After a certain point, presence of a physical instructor might help develop the confidence of the users to perform real-time repairs.

References

- Yuva Parivartan,
<https://www.yuvaparivartan.org>
- Santosh Das, Mobile Phone Repairing Tutorial, Tips, Free PDF Download,
<https://www.mobilecellphonerepairing.com>
- Mobile Phone Repairing Course Syllabus: Guwahati, January 12, 2011,
<http://www.datacomes.com/it/mobile-phone-repairing-course-syllabus.html>
- Convergence Training,
<https://www.convergencetraining.com>
- National center for biotechnology Technology
<https://www.ncbi.nlm.nih.gov>
- Laura Lynch, Why do learners drop out online courses?
<https://www.learndash.com/why-do-learners-drop-out-of-online-courses/>
- John Laskaris, 5 Simple Ways to Convert Content into eLearning Material
<https://www.talentlms.com/blog/convert-content-into-elearning-material/>
- Nicki Nelson, A Case Study On Evaluating An eLearning Course, March 18, 2018,
<https://elearningindustry.com/evaluating-an-elearning-course-case-study>
- Udemy,
<https://www.udemy.com>
- Jeffrey Dalto, Robert Mager's Performance based learning Objectives,
<https://www.convergencetraining.com/blog/robert-magers-performance-based-learning-objectives>
- Instructables,
<https://www.instructables.com>
- Khan Academy,
<https://www.khanacademy.org>
- Interaction Design Foundation,
<https://www.interaction-design.org>
- IFIXIT,
<https://www.ifixit.com>