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Date: _____2019

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ACKNOLEDGEMENT

We have put best efforts in our project. However, it would not have been possible without the support of our class mates as well as college friends. We are highly indebted to our guide Prof. Fagun Vankawala for their able guidance and constant monitoring; supervision as well as for providing pivotal information regarding the project and also their humble co-operation for completing our project. This project won't be possible without her encouragement. Our gratitude and appreciation goes to our friends in manifesting the project and other teaching and non-teaching staff (All Stakeholders of Computer Department) who have willingly helped us with their abilities.

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ABSTRACT

In this project "Live Book" we have tried to make efficient & appropriate use of Augmented Reality to make education exciting & lively which would help students to learn better. Also providing affordable education to the rural area's students in efficient way. This would be help full to maintain the interest of students. In this we first scan a photo from the book by just putting live camera on picture and our application will show their video in 3D view. A video is selected from YouTube according to their high ratings. User also have a feature like pause the video, resume the video, forwarding the video, back warding the video. This feature has also no language barrier. Use can shoe video in any language which user will prefer. The other feature is when user put live camera on picture, user will see the whole 3 Dimension view of particular object. User can move this object at 360 degree. Also, when user click on object it will show the name of particular parts of object and also user can see interior parts of object. In short this "Live Book" would make learning an experience a lively one.

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CHAPTER – 1 INTRODUCTION

1.1 Introduction of Domain

A **college** is an educational institution or a constituent part of one. A college may be a degree-awarding tertiary educational institution, a part of a collegiate or federal university, an institution offering vocational education or a secondary school.

Google Classroom is a free web service developed by Google for schools that aim to simplify creating, distributing and grading assignments in a paperless way. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students.

Google Classroom combines Google Drive for assignment creation and distribution, Google Docs, Sheets and Slides for writing, Gmail for communication, and Google Calendar for scheduling. Students can be invited to join a class through a private code, or automatically imported from a school domain. Each class creates a separate folder in the respective user's Drive, where the student can submit work to be a graded by a teacher. Mobile apps, available for iOS and Android devices, let users take photos and attach to assignments, share files from other apps, and access information offline. Teachers can monitor the progress for each student, and after being graded, teachers can return work along with comments.

1.2 Problem definition

A student can’t understand all the things so he/she go for YouTube and searching the video but it’s so tedious job when topics are many also a every student can’t have so good imagination skill to visualize and imagine everything with include internally parts as well as externally parts. As well as same problem occur with professor also.

1.3 Reverse Engineering

Definition:

Reverse engineering, also called **back engineering**, is the process by which a man-made object is deconstructed to reveal its designs, architecture, or to extract knowledge from the object; similar to scientific research, the only difference being that scientific research is about a natural phenomenon.

In other words, the reproduction of another manufacturer's product following detailed examination of its construction or composition.

Reverse engineering is applicable in the fields of mechanical engineering, electronic engineering, software engineering, chemical engineering, and systems biology.

Explanation:

Engineering is the profession involved in designing, manufacturing, constructing, and maintaining of products, systems, and structures. At a higher level, there are two types of engineering: Forward engineering and Reverse engineering. The process of duplicating an existing component, subassembly, or product, without the aid of drawings, documentation, or computer model is known as reverse engineering. Prototypes will be made in order to test, evaluate and validate the conceptual design. For that reason, reverse engineering can become a valuable solution for extracting the dimensions of handmade models, clay model sand prototypes; The critical steps in reverse engineering are acquiring, accurately and efficiently, the dimensions of the object and extracting the necessary information from the resulting scan in order to create the new design with the right look and functionality.

1.4 Selection and disassembling of artifact (Apps)

We have selected Google Classroom mobile application for Reverse engineering. Because it is related to students and professor and our domain is College. In this we see all features of Google Classroom like, distributing assignment by professor and submitting work by students and professor will give marks .But this whole process is connected with Hybrid of **Cloud** Storage and **Cloud Computing**. (Google Drive). In this **Cloud storage** is a service model in which data is maintained, managed, backed up remotely and made available to users over a network (typically the Internet).

Also include some google facility like for assignment Google Docs, Sheets and Slides, also for communication of professor and students done through G-mail regarding problem in submission or late submission and for scheduling and some announcement of deadline use Google calendar. But we found that there are no any features like, when student at home and they can't understand topic or imagine some things in such a condition this application can't give facility. So, we introduce a new feature "Live Book" which is an augmented reality-based education.

CHAPTER – 2 DESIGN ENGINEERING METHODOLOGY

2.1 Design methodology & Analysis

Design Engineering is a general term that covers multiple engineering disciplines including electrical, mechanical, chemical engineer, aeronautical engineer, civil, Computer Engineering, Information Technology and structural/ building/ architectural engineers. The uniting concept is a focus on applying the engineering design process, in which engineers develop new products or processes with a primary emphasis on functional utility.

Design is a plan of a system, its implementation and utilization for attaining a goal. It is to change undesired situation into desired situation means to find solution for undesired /uncomfortable situation. It is based on globally accepted Design Thinking methodology.

Design engineering subject enables us to think something new. Design is a plan of a system, its implementation and utilization for attaining a goal. It is to change undesired situation into desired situation means to find solution for undesired/uncomfortable situation.

Being imaginative is to be able to think of novel things, or regular things with a different perception. Being creative is to be able to bring your imagination on the grounds of reality. Design thinking is a mixture of imagination and creativity. It gives students a taste of the rich internal-remunerations associated with knowledge-creation and in curiosity and problem-driven contexts. Design need to satisfy technical functions, ergonomics functions, aesthetic functions, cost function and environment functions. Designing means evolving goal oriented processes. At the beginning of the design process only goals are known while at the end, both the goals and plans are known and that to with more clarity. Goal and plans evolve together and they influencing each other. In designing process some goals are more important than others and similarly some plans are better than others. Designing does not guarantee that the design will work.

The Brahmastra (the ultimate weapon) is observation. And it is true for our project too.

2.2 AEIOU Canvas

(A-Activities E-Environment I-Interaction O-Object U-Users)
The A E I O U framework is very useful, and the most basic sheet required for design engineering.

A-Activity
E- Environment
I-Interaction

O-Object
U- User

It involves observation of the domain selected area with a group of four, each taking their individual observations at same time. The task was performed by each member and we had to go to our selected area for many times. In these activities we all group member had to use our observation skills to perform the task of completing the AEIOU sheet. The frame work of our group is as follows:

Activities:

- Finding books in library
- Faculties taking lectures
- Bringing stationery material
- Taking lunch
- Students were finding faculties
- Perform experiment in lab
- Peon were cleaning lobbies
- Managing event

Environment:

- Cloudy Environment at dome.
- Mud in rainy season
- Noise in stationery, canteen
- Crowdie at admin section
- Silence in reading hall

Interaction:

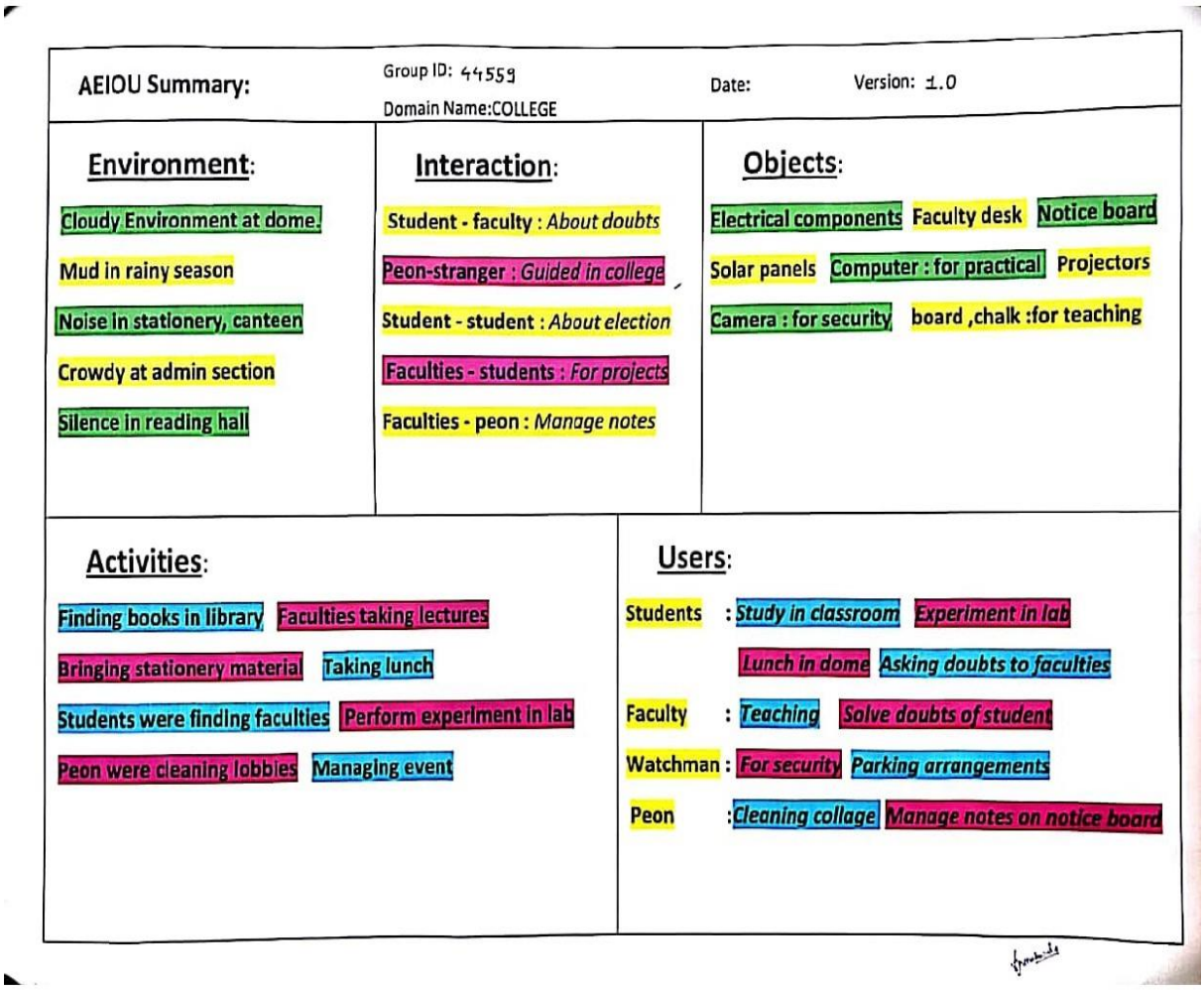
- Student - faculty : About doubts
- Peon - stranger : Guided in college
- Student - student : About election
- Faculties - students : For projects
- Faculties - peon : Manage notes

Objects:

- Electrical components
- Faculty desk
- Notice board
- Solar panels
- Computer : for practical
- Projectors
- Camera : for security
- Board, chalk : for teaching

Users:

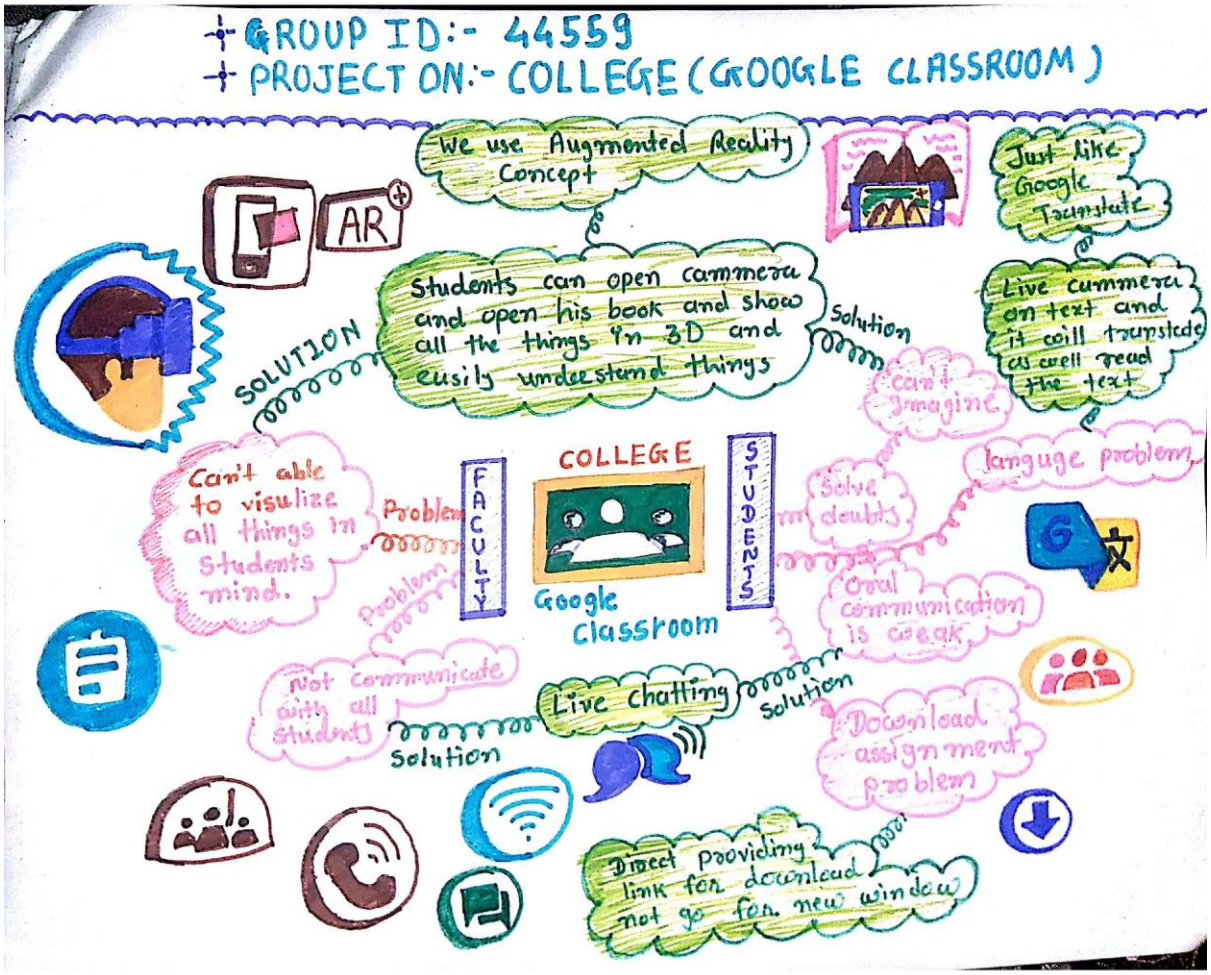
- Students :
  - Study in classroom
  - Experiment in lab
  - Lunch in dome
  - Asking doubts to faculties
- Faculty :
  - Teaching
  - Solve doubts of student
- Watchman :
  - For security
  - Parking arrangements
- Peon :
  - Cleaning collage
  - Manage notes on notice board



2.1 AEIOU Summary

2.3 Mind Mapping Canvas

A mind map is a diagram used to visually organize information. A mind map is hierarchical and shows relationships among pieces of the whole. It is often created around a single concept, drawn as an image in the center of a blank page, to which associated representations of ideas such as images, words and parts of words are added. Major ideas are connected directly to the central concept, and other ideas branch out from those major ideas. Mind mapping is a creative and logical means of note-taking and note-making that literally maps out your ideas. All mind maps have some things in common. They have a natural organizational structure that radiates from center use line, symbols, words, color and images according to simple, brain friendly concepts. Mind mapping converts long list of information into a colorful, memorable and highly organized diagram that works in line with your brain's natural way of doing things.



2.2 Mind mapping canvas

2.4 Empathy Canvas

This canvas is about one particular user and the experience of that user about our domain that is home. It also includes activities, stakeholders and describes the sad and happy stories related to the user about home.

User:

- Students
- Faculties

Stakeholder:

- Peon
- Parents
- Lab assistant

Activities:

- Students were attending lab.
- Students were bringing a file.
- Students were finding faculties.
- Students were parking vehicles.
- Students were reading for exam.

Story Boarding:

 Happy:

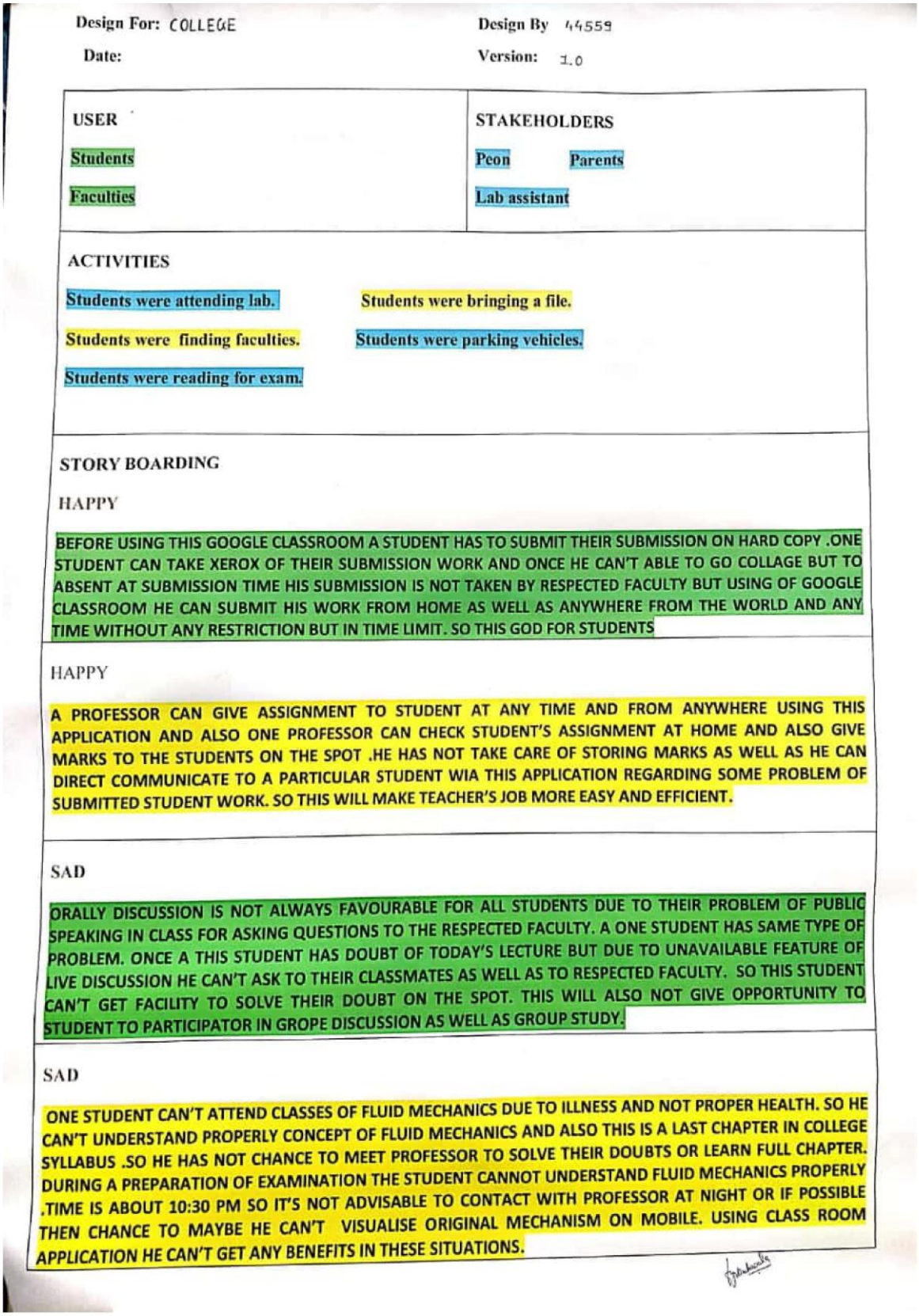
- Before using this google classroom a student has to submit their submission on hard copy .one student can take xerox of their submission work and once he can't able to go collage but to absent at submission time his submission is not taken by respected faculty but using of google classroom he can submit his work from home as well as anywhere from the world and any time without any restriction but in time limit. So this god for students.

- A professor can give assignment to student at any time and from anywhere using this application and also one professor can check student's assignment at home and also give marks to the students on the spot .he has not taken care of storing marks as well as he can direct communicate to a particular student via this application regarding some problem of submitted student work. So this will make teacher's job more easy and efficient.

 Sad:

- Orally discussion is not always favorable for all students due to their problem of public speaking in class for asking questions to the respected faculty. A one student has same type of problem. Once a this student has doubt of today's lecture but due to unavailable feature of live discussion he can't ask to their classmates as well as to respected faculty. So this student can't get facility to solve their doubt on the spot. This will also not give opportunity to student to participator in grope discussion as well as group study.

- One student can't attend classes of fluid mechanics due to illness and not proper health. So he can't understand properly concept of fluid mechanics and also this is a last chapter in college syllabus .so he has not chance to meet professor to solve their doubts or learn full chapter. During a preparation of examination the student cannot understand fluid mechanics properly .time is about 10:30 pm so it's not advisable to contact with professor at night or if possible then chance to maybe he can't visualize original mechanism on mobile. Using class room application he can't get any benefits in these situations.



Design For: COLLEGE Design By 44559

Date: Version: 1.0

USER	STAKEHOLDERS
Students	Peon Parents
Faculties	Lab assistant

ACTIVITIES

Students were attending lab. Students were bringing a file.

Students were finding faculties. Students were parking vehicles.

Students were reading for exam.

STORY BOARDING

HAPPY

BEFORE USING THIS GOOGLE CLASSROOM A STUDENT HAS TO SUBMIT THEIR SUBMISSION ON HARD COPY .ONE STUDENT CAN TAKE XEROX OF THEIR SUBMISSION WORK AND ONCE HE CAN'T ABLE TO GO COLLAGE BUT TO ABSENT AT SUBMISSION TIME HIS SUBMISSION IS NOT TAKEN BY RESPECTED FACULTY BUT USING OF GOOGLE CLASSROOM HE CAN SUBMIT HIS WORK FROM HOME AS WELL AS ANYWHERE FROM THE WORLD AND ANY TIME WITHOUT ANY RESTRICTION BUT IN TIME LIMIT. SO THIS GOD FOR STUDENTS

HAPPY

A PROFESSOR CAN GIVE ASSIGNMENT TO STUDENT AT ANY TIME AND FROM ANYWHERE USING THIS APPLICATION AND ALSO ONE PROFESSOR CAN CHECK STUDENT'S ASSIGNMENT AT HOME AND ALSO GIVE MARKS TO THE STUDENTS ON THE SPOT .HE HAS NOT TAKE CARE OF STORING MARKS AS WELL AS HE CAN DIRECT COMMUNICATE TO A PARTICULAR STUDENT WIA THIS APPLICATION REGARDING SOME PROBLEM OF SUBMITTED STUDENT WORK. SO THIS WILL MAKE TEACHER'S JOB MORE EASY AND EFFICIENT.

SAD

ORALLY DISCUSSION IS NOT ALWAYS FAVOURABLE FOR ALL STUDENTS DUE TO THEIR PROBLEM OF PUBLIC SPEAKING IN CLASS FOR ASKING QUESTIONS TO THE RESPECTED FACULTY. A ONE STUDENT HAS SAME TYPE OF PROBLEM. ONCE A THIS STUDENT HAS DOUBT OF TODAY'S LECTURE BUT DUE TO UNAVAILABLE FEATURE OF LIVE DISCUSSION HE CAN'T ASK TO THEIR CLASSMATES AS WELL AS TO RESPECTED FACULTY. SO THIS STUDENT CAN'T GET FACILITY TO SOLVE THEIR DOUBT ON THE SPOT. THIS WILL ALSO NOT GIVE OPPORTUNITY TO STUDENT TO PARTICIPATOR IN GROPE DISCUSSION AS WELL AS GROUP STUDY.

SAD

ONE STUDENT CAN'T ATTEND CLASSES OF FLUID MECHANICS DUE TO ILLNESS AND NOT PROPER HEALTH. SO HE CAN'T UNDERSTAND PROPERLY CONCEPT OF FLUID MECHANICS AND ALSO THIS IS A LAST CHAPTER IN COLLEGE SYLLABUS .SO HE HAS NOT CHANCE TO MEET PROFESSOR TO SOLVE THEIR DOUBTS OR LEARN FULL CHAPTER. DURING A PREPARATION OF EXAMINATION THE STUDENT CANNOT UNDERSTAND FLUID MECHANICS PROPERLY .TIME IS ABOUT 10:30 PM SO IT'S NOT ADVISABLE TO CONTACT WITH PROFESSOR AT NIGHT OR IF POSSIBLE THEN CHANCE TO MAYBE HE CAN'T VISUALISE ORIGINAL MECHANISM ON MOBILE. USING CLASS ROOM APPLICATION HE CAN'T GET ANY BENEFITS IN THESE SITUATIONS.

2.3 Empathy canvas

2.5 Ideation Canvas

Ideation is the process of creating new ideas. Ideation is often the most exciting stage in a Design Thinking project, because during Ideation, the aim is to generate a large quantity of ideas that the team can then filter and cut down into the best, most practical or most innovative ones in order to inspire new and better design solutions and products. Ideation is the mode of the design process in which you concentrate on idea generation. Mentally it represents a process of 'going wide' in terms of concepts and outcomes. Ideation provides both the fuel and also the source material for building prototypes and getting innovative solutions into the hands of your users. In this canvas we have mentioned about different users, activities, situation with context to the location and the possible props related to it.

People:

- Student
- Teacher

Activities:

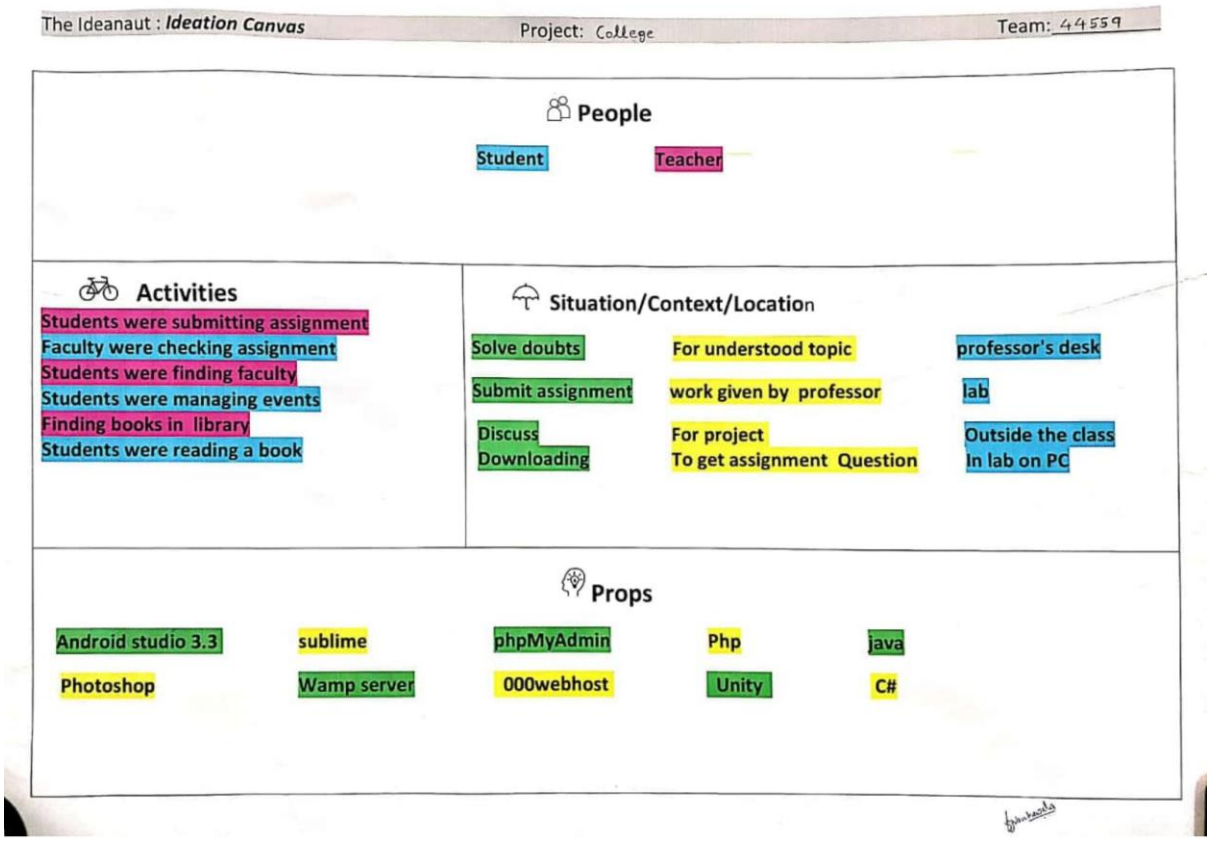
- Students were submitting assignment
- Faculty were checking assignment
- Students were finding faculty
- Students were managing events
- Finding books in library
- Students were reading a book

Situation /Context /Location:

- Solve doubts - For understood topic - professor's desk
- Submit assignment - work given by professor - lab
- Discuss - For project - Outside the class
- Downloading - To get assignment Question - In lab on PC

Props/Tools/Objects/Equipment:

- Android studio 3.3
- sublime
- phpMyAdmin
- Php
- java
- Photoshop
- Wamp server
- 000webhost
- Unity
- C#



2.4 Ideation canvas

2.6 Product Development Canvas

Product development typically refers to all of the stages involved in bringing a product from concept or idea, through market release and beyond. In other words, product development incorporates a product's entire journey.

We have to design a product based on a key solution. A key solution accordingly to our understanding was a solution which solves a key problem. Out of many possible solutions for multiple problems that were listed down in the Ideation phase, we recognized some problems that if solved would be very useful to everyone. In this canvas, we mentioned purpose of our domain, product function and features, product experience, components.

Purpose:

A visualization of things in a new way to understand a difficult topic easily through augmented reality based book

People:

- Student
- Professor

Product Functions:

By putting live camera on picture

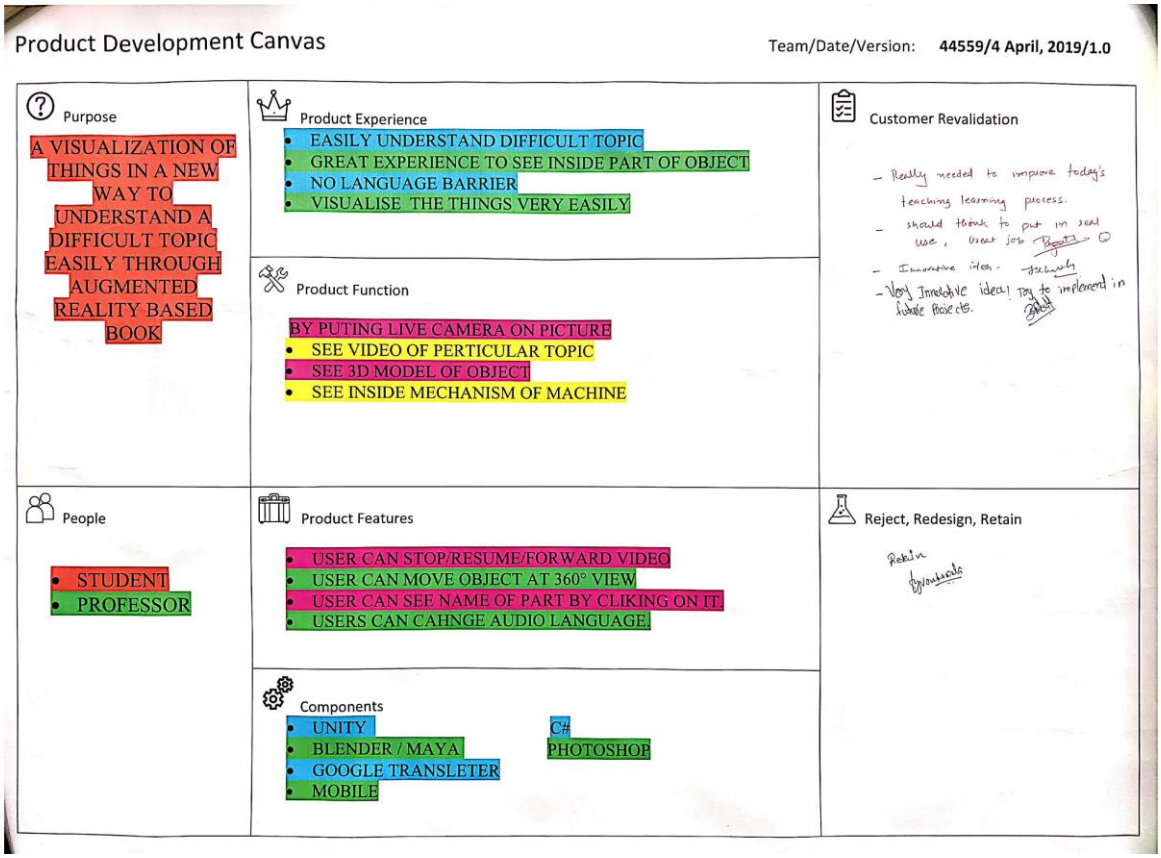
- See video of particular topic
- See 3d model of object
- See inside mechanism of machine

Product Features:

- User can stop/resume/forward video
- User can move object at 360° view
- User can see name of part by clicking on it.
- Users can change audio language.

Components:

- Unity
- C#
- Blender / Maya
- Photoshop
- Google translator
- Mobile



2.5 Product Development Canvas

2.7 Feedback Analysis

After completing the whole activity we also tried to take reviews and feedback of different people by explaining them our final product. After getting to know about our product all of them gave different ideas and suggestions to make our project a better one. This helped to make our work a successful one. Some reviews of our project is: 1) it operates by any age person effectively. 2) Increase comfortless of life. 3) Easily accessible. 4) It is easy to set comfortable gestures for user, to what they won't for operates any electronic devices. 5) Accessible from any place of house (The device which is operate it should be in this place) is big advantage of this system

CHAPTER – 3 STUDY & ANALYSIS

3.1 Prior Art Search Summary

What is prior art search?

Prior art is any evidence that your invention is already known. Prior art does not need to exist physically or be commercially available. It is enough that someone, somewhere, sometime previously has described or shown or made something that contains a use of technology that is very similar to your invention.

In prior art search we find some research paper related to our project which consists of some keywords like: Augmented Reality, 3D Object, Unity, Audio in AR, AR Exhibition, AR in Medical, AR in Maths, Language Barrier.

Summary of this research papers are:

1. **A Survey of Augmented Reality: [1]**

   This paper surveys the field of augmented reality (AR), in which 3D virtual objects are integrated into a 3D real environment in real time. It describes the medical, manufacturing, visualization, path planning, entertainment, and military applications that have been explored. This paper describes the characteristics of augmented reality systems, including a detailed discussion of the tradeoffs between optical and video blending approaches. Registration and sensing errors are two of the biggest problems in building effective augmented reality systems, so this paper summarizes current efforts to overcome these problems. Future directions and areas requiring further research are discussed. This survey provides a starting point for anyone interested in researching or using augmented reality.

2. **Animation of 3D Human Model Using Marker less Motion Capture Applied to Sports: [2]**

   Marker less motion capture is an active research in 3D virtualization. In proposed work we presented a system for marker less motion capture for 3D human character animation, paper presents a survey on motion and skeleton tracking techniques which are developed or are under development. The paper proposed a method to transform the motion of a performer to a 3D human character (model), the 3D human character performs similar movements as that of a performer in real time. In the proposed work, human model data will be captured by Kinect camera, processed data will be applied on 3D human model for animation. 3D human model is created using open source software (Make Human).

3. **Developing Virtual Reality Applications with Unity:[3]**

   Unity is a feature rich multi-platform game engine for the creation of interactive 3D content. It includes an intuitive interface while at the same time allowing low level access for developers. Thousands of assets provided by other content creators can be

reused to quickly develop immersive experiences. Because of its intuitive interface, well designed architecture, and ability to easily reuse assets, 3D software can be developed in a fraction of time compared to traditional development. Consumer-level virtual reality hardware combined with Unity have recently empowered hobbyists, professionals, and academics to quickly create virtual reality applications.

4. **Audio Augmented Reality: A Prototype Automated Tour Guide[4]**

   Augmented reality (or computer augmented environments as it is sometimes called) uses computers to enhance the richness of the real world. It differs from virtual reality in that it doesn't attempt to replace the real world. Our prototype automated tour guide superimposes audio on the world based on where a user is located. We propose this technique for use as an automated tour guide in museums and expect it will enhance the social aspects of museum visits, compared to taped tour guides.

5. **Building Virtual and Augmented Reality Museum Exhibitions[5]**

   A system that allows museums to build and manage Virtual and Augmented Reality exhibitions based on 3D models of artifacts is presented. Dynamic content creation based on pre-designed visualization templates allows content designers to create virtual exhibitions very efficiently. Virtual Reality exhibitions can be presented both inside museums, e.g. on touch-screen displays installed inside galleries and, at the same time, on the Internet. Additionally, the presentation based on Augmented Reality technologies allows museum visitors to interact with the content in an intuitive and exciting manner.

6. **Mathematics and Geometry Education with Collaborative Augmented Reality[6]**

   Construct3D is a three-dimensional geometric construction tool specifically designed for mathematics and geometry education. It is based on the mobile collaborative augmented reality system "Studiers tube". We describe our efforts in developing a system for the improvement of spatial abilities and maximization of transfer of learning. In order to support various teacher-student interaction scenarios we implemented flexible methods for context and user dependent rendering of parts of the construction. Together with hybrid hardware setups they allow the use of Construct3D in today's classrooms and provide a testbed for future evaluations. Means of application and integration in mathematics and geometry education at high school as well as university level are being discussed. Anecdotal evidence supports our claim that Construct3D is easy to learn, encourages experimentation with geometric constructions and improves spatial skills.

7. **Augmented reality in medical education [7]**

   Learning in the medical domain is to a large extent workplace learning and involves mastery of complex skills that require performance up to professional standards in the work environment. Since training in this real-life context is not always possible for reasons of safety, costs, or didactics, alternative ways are needed to achieve clinical excellence. Educational technology and more specifically augmented reality (AR)

have the potential to offer a highly realistic situated learning experience supportive of complex medical learning and transfer. AR is a technology that adds virtual content to the physical real world, thereby augmenting the perception of reality. Three examples of dedicated AR learning environments for the medical domain are described. Five types of research questions are identified that may guide empirical research into the effects of these learning environments.

8. **Technology in Language Education: Benefits and Barriers [8]**

Technology, especially e-learning technology, is being increasingly employed in instruction to enhance teaching and learning. This paper is a preliminary discussion of the advantages of and barriers to the use of technology in language instruction. Understanding the benefits and barriers of technology integration is a crucial step in integrating technology into education successfully. Lack of this knowledge may significantly impede stakeholders and educational centers from meeting the challenges of introducing and supporting the extensive use of technology by teachers in the classroom. Findings from empirical research in this area, as well as implications for language practitioners, are included in the discussion.

CHAPTER – 4 PRE-DESIGN CALCULATIONS

4.1 Design Specification

Component name	Cost of component (in ₹)
Unity Plus	30,000.00/- (1 Year)
Autodesk Maya	42,500.00/-
Photoshop	2,840.00/- (2 month)
Total	75,340.00/-

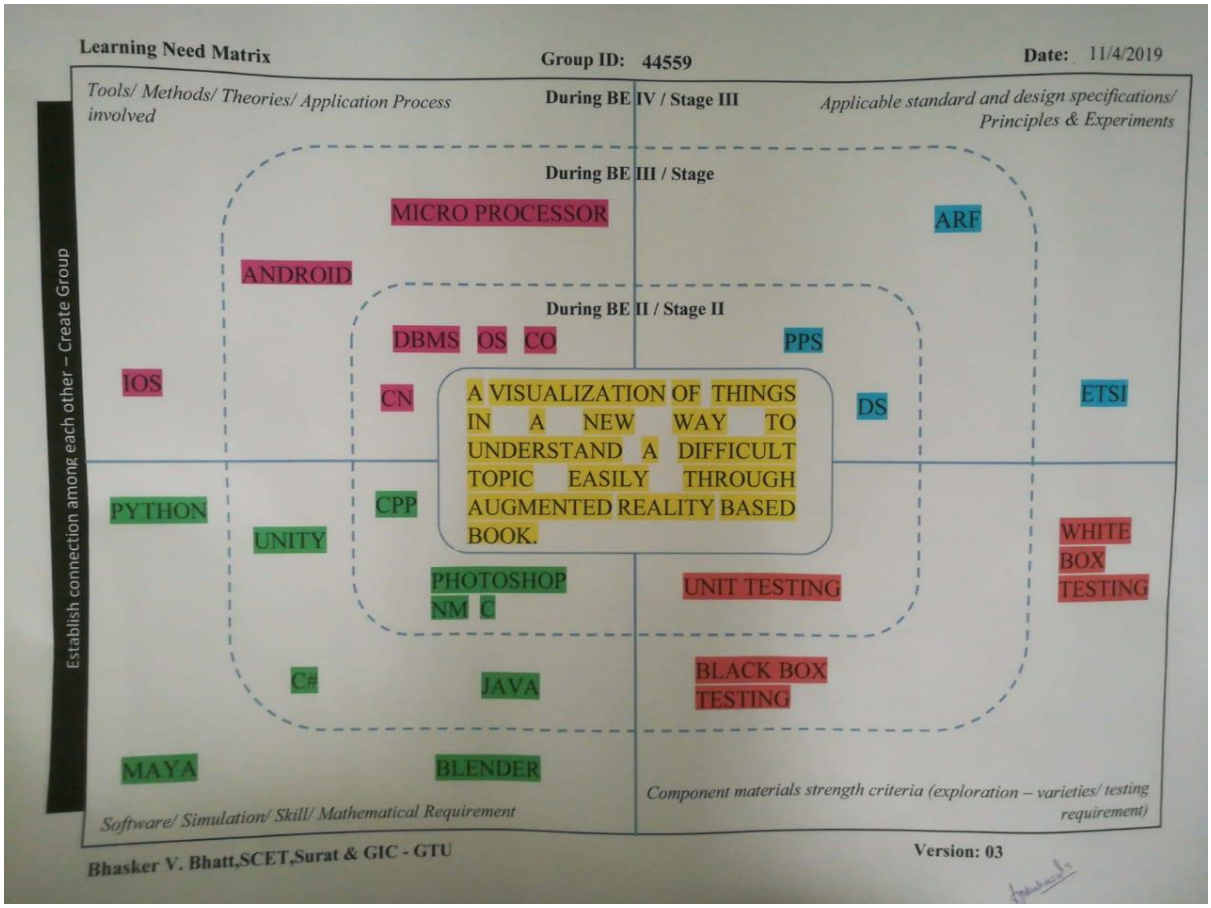
1: Design Specification with costs

CHAPTER – 5 Learning Need Matrix (LNM)

5.1 Learning Need Matrix

LNM – Learning need matrix will help students to identify the learning requirement at an early stage along with prioritization of specific learning along with defined time duration/time allocation for each.

- **Purpose/ Product concept**
    - A visualization of things in a new way to understand a difficult topic easily through augmented reality based book.
- **Tools/Methods/Theories/Application process involved**
    - BE-IV :- IOS
    - BE-III :- Android, Microprocessor
    - BE-II :- DBMS, CO, OS, CN
- **Applicable standards and design specifications/Principles & Experiments**
    - BE-IV :- ETSI
    - BE-III :- ARF
    - BE-II :- PPS, DS
- **Component material strength criteria (exploration – varieties/ testing requirement)**
    - BE-IV :- White box testing
    - BE-III :- Black box testing
    - BE-II :- Unity testing
- **Software/ Simulation/ Skill/ Mathematical Requirement**
    - BE-IV :- Python, Maya, Blender
    - BE-III :- Unity, C#, Java
    - BE-II :- C, CPP, Photoshop, NM



5.1 Learning Need Matrix

CHAPTER – 6 CONCLUSION

6.1 Conclusion

A student/professor those who can't understand topic or can't imagine the things, can easily understand the topic through video and 3 Dimension view of any object also include with their interior and external look and without language barrier using this augmented reality based "Live Book" product.

6.2 Future Scope

- In future we extend this " Live Book " with virtual reality to user can go to in virtual world and see like our history and feel like he is the part of that time world.
- Also implement for newspaper to see live and updated news by just putting live camera on headline of news.

CHAPTER – 7 REFRENCE

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1. https://www.mitpressjournals.org/doi/abs/10.1162/pres.1997.6.4.355
2. https://arxiv.org/abs/1402.2363
3. https://ieeexplore.ieee.org/abstract/document/6802117
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5. https://dl.acm.org/citation.cfm?id=985060
6. https://dl.acm.org/citation.cfm?id=1242086
7. https://link.springer.com/article/10.1007/s40037-013-0107-7
8. https://pdfs.semanticscholar.org/a883/942f39c7555feaa3e37f90fa3859bf45c537.pdf