

**A MOBILE APPLICATION TO IMPROVE ONLINE
LEARNABILITY TO VISUALLY IMPAIRED ELEMENTARY
SCHOOL CHILDREN**

Project Id: TMP-23-310

Project Proposal Report

Nayananda W.A.K.D

**BSc (Hons) in Information Technology Specializing in Information
Technology**

Department of Information Technology

Sri Lanka Institute of Information Technology Sri Lanka

March 19th

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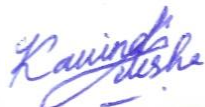
Department of Information Technology

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Declaration of the Candidate and the Supervisor


I declare that this is my own work, and this dissertation does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgment is made in the text.

Name	Student ID	Signature
Nayanananda W.A.K.D	IT20237622	

The supervisor/s should certify the proposal report with the following declaration.
The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

.....
Signature of the supervisor:

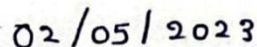
Ms. Chathurangika Kahandawaarachchi


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Signature of the co-supervisor:

Mr. Sathira Hettiarachchi

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Date:


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Date:

Abstract,

This mobile application aims to help visually impaired elementary pupils learn more effectively. The application has a module that recommends tutors according to a student's knowledge level, a vocal calculator and virtual tutor, a brain training game, and a supporting voice bot. The system will be created using Visual Studio code, MongoDB, and React Native. Tutor recommendation for visually impaired primary students is a component that helps to find the most suitable tutor for the students based on factors such as student disability, educational level, subject and tutor availability. Therefore, we will hold an online voice-based examination to measure the student's knowledge level and determine the type of tutor. This project's main objective is to increase the educational outcomes of students with visual impairments by offering them a customized and productive tutoring experience. The system will be tested using a sample of visually impaired primary students, and the outcomes will be evaluated based on factors, including overall marks, time required, and tutor availability. This research is expected to contribute to and focus on the education of visually impaired students and their families, teachers and institutions serving the visually impaired.

Table of Contents

Declaration of the Candidate and the Supervisor	iii
Abstract,	iv
Table of Contents	v
List of figures	vi
List of Tables	vii
1. Introduction	1
1.1 Background Literature	1
1.2 Research Gap	2
2. Research Problem.....	3
3. Research Objectives	4
3.1 Main Objective	4
3.2 Sub Objective	4
4. Methodology	5
4.1 Methodology including the system diagram	5
4.2 Commercialization of the Product	7
5. Software Specifications, Research Review or Design Components	8
5.1 Tool and Technology	8
5.2 Functional Requirements	9
5.3 Non -Functional Requirement	10
6. Conclusion	11
7. References	12
8. Appendices	13

List of figures

Figure 1:Methodology	5
Figure 2 Vs code.....	8
Figure 3 Mongo DB.....	8
Figure 4 React Native.....	8

List of Tables

Table 1 Research gap.....	2
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1. Introduction

1.1 Background Literature

It is rare to find a good e-Learning platform to visual impaired primary students. Therefore, the attention of many researchers has been focused on this side.

Regarding conducting an online voice-based examination there is research called “EEG Based Identification of Words on Exam Models with Yes-No Answers for Students with Visual Impairments”. [1] In here they use an oral examination for visual impaired students. The main aim of this research is to propose a new idea of the testing model with Yes-No responses for visually impaired pupils. In our research also we conduct an oral examination.

Another research called “Voice-based Online Examination System for Visually Impaired Students” [2] also highly focus on who cannot see the questions shown on the display of the computer. The computer screen displays the relevant questions, and the visually impaired student answers by using their voice. The process in our proposed system will be the same for conducting the online voice-based test. They mainly concentrated on the recommended method, which is to develop and supply a more attractive environment for students with visual impairments to participate in online tests by using voice-to-text and text-to-voice technologies.

The research of “VOICE-BASED ONLINE EXAMINATION SYSTEM FOR VISUALLY IMPAIRED” [3] has recommended a fully automated verbalize-based virtual test for the for students with visual impairments. Their aim is to prevent visually impaired students from feeling uncomfortable during the physical examinations. They convert the answers that given by the students by vocally to the text format. After that they stored the answers in a database and give the results after examination is completed.

An online examination for visual impaired students is proposing under “ONLINE EXAMINATION SYSTEM FOR VISUALLY CHALLENGED” [4]. This system has been developed to eliminate the problems that visually impaired students experience when writing an exam physically. Therefore, they have introduced a new system. They are using the voice as the input. Voice commands are used to ask questions, and the visual impaired student responds in the same way. And the system use speech-to-text conversions to preserve the system flow. In here, they have provided a registration to register themselves.

“FindMyTutor: An Android Application for Matching Students and Private Tutors” [5] is research that has designed as an Android operating system. In here, students can be able to select their favorable tutor and vice versa. But in our system tutors are recommended based on the marks that students are gained from an online examination. In this research students are classified depending on their age, score, sex, and the area as same as we classify visual impaired students based on the level of marks and disabilities.

1.2 Research Gap

As was said above, several systems and recent studies have been offered, but it is still impossible to present an entire framework with all of the suggested attributes. However, this system is completer and more efficient.

Table 1 Research gap

Research	Tutor recommendation	Online examination system	Accessibility mode in UI design.	Mobile application
Research 1 [2]	✗	✓	✗	✗
Research 2 [3]	✗	✓	✗	✓
Research 3 [4]	✗	✓	✗	✗
Research 4 [5]	✗	✗	✗	✓
Proposed Research	✓	✓	✓	✓

According to the results of existing studies, currently no tutor recommendation system is available for visually impaired students that is based on the total marks they gain on online voice-based examinations administered by the system. In the proposed solution, we will create a tutor recommendation system in a mobile app. This table shows a summary comparison of the features of the proposed system and the existing system approach.

2. Research Problem

Considering the main research problem is the visual impaired students have no relevant method to study. They do not have the same standard of equality as the other students. On the other hand, because of the COVID-19 pandemic situation, all students are currently required to learn online. As a result, everyone used to learn using an internet platform. Visually impaired students have more difficulties in studying than those with normal vision in this situation.

It is very rare to find tutors who teach specially for the students with visual impairments. Though tutors are appointed for special education they do not engage with the special education due to lack of resources. [6] As well it is a challenge to find who suits for their knowledge level, the disability level, and the subject they required. Some tutors are not matching enough with their knowledge level some are not specific for their disabilities. These children frequently struggle to keep up with other kids their age in terms of knowledge and skill development, resulting in lower performance and fewer future career possibilities for them. Therefore, they need a good guidance for their studies.

3. Research Objectives

3.1 Main Objective

The main objective of this function is to develop a platform that recommends the most suitable tutor for visually impaired students based on the student's disability, educational level, the subject, and tutor availability.

3.2 Sub Objective

- Create an appropriate verbalize-based online test for students with visual disabilities. This system needs to read the question which is shown on display and then use voice commands to get the student's response. Analyze student knowledge level based on exam marks.
- Analyze the level of the student's examination's knowledge and recommend the appropriate tutor automatically.
- Create an accessibility mode and include it in the UI design.

4. Methodology

4.1 Methodology including the system diagram

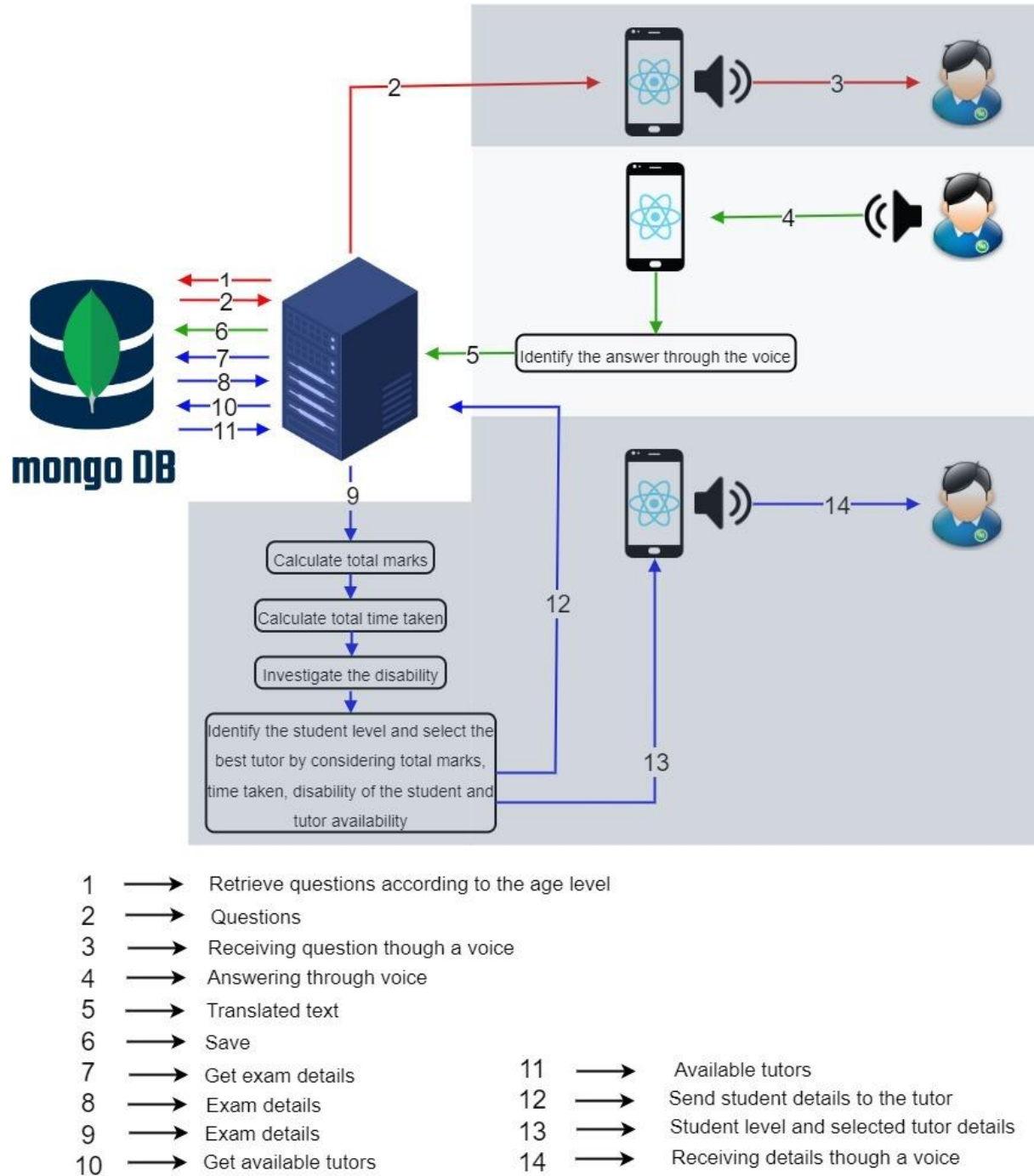


Figure 1:Methodology

The recommended e-learning system process for visually impaired primary school kids focuses on offering appropriate teaching resources and specialized tutoring online. The solution offers a couple of technologies, including MongoDB for database management and React Native for the mobile application.

According to the student's grade level, the process starts by obtaining questions from the MongoDB database. The learner is then given the questions using voice commands through the React Native app. The front-end recognizes the student's answers and converts them into text as they spoke in response to the questions. After being returned to the server, the text is saved in the database there.

Afterwards completion of the test, the server retrieves the test's information from the database, mentioning the student's overall performance and amount of time spent on it. It also determines the student's level of disability. The server uses the details to select and recommend the best tutor from the pool of tutors that are available.

The system notifies the tutor with the student's information after the tutor has been recognized. If the tutor agrees to teach the appropriate student, tutoring sessions can begin when the student receives information about the suggested tutor via voice commands using the React Native application.

The recommended method ensures that visually impaired students receive appropriate educational resources and specialized teaching, enabling them to keep up with their peers and increase their job opportunities.

4.2 Commercialization of the Product

As the world becomes more and more computerized, it is critical that educational institutions stay up with technological developments. As a result, we believe it is essential to create an e-Learning mobile application that primarily targets primary schools, institutions for special education, and groups that assist children who are blind or visually impaired.

Primary school kids should not only be the focus of the e-learning system, but also their instructors and guardians and parents, who take a significant role in supporting their academic growth. They would be the audience and target market for an online learning program for primary pupils who are blind or visually impaired.

Generating revenue is one component of commercializing mobile applications. This can be done by charging for premium features, selling the software, or advertising using in-app advertising. Social media can also be used to advertise the application.

5. Software Specifications, Research Review or Design Components

5.1 Tool and Technology

Tools

I. Vs code



Figure 2 Vs code

A source-code editor created by Microsoft is called Visual Studio Code, or VS Code. It may be used for numerous tasks like creating, editing, and debugging code because it is made to handle a broad variety of programming languages. The free and open-source VS Code is accessible on a variety of operating systems, including Windows, macOS, and Linux.

Technology

I. Mongo DB



Figure 3 Mongo DB

A document-oriented database system called MongoDB is free to use. A NoSQL database program called MongoDB uses documents with schema that resemble JSON. For usage with MongoDB, creator MongoDB Inc. provides the Server-Side Public License.

II. React Native



Figure 4 React Native

React Native is a popular open-source framework for developing mobile applications for iOS, Android, and the web which was built by Facebook. React Native is built on top of the ReactJS library, which is used to create web applications.

5.2 Functional Requirements

Exam Creation

- The system should enable a verbalize-based online test for elementary pupils with visual impairments.

Knowledge level identification and exam scoring

- The system should determine the student's level of knowledge, based on the final grade the student obtained from the examination and time they got.

The tutor recommendation

- The system should recommend the most suitable tutor for each student based on disability, knowledge level, availability of tutors and subjects.

Tutor Availability

- The system should be able to check the availability of recommended tutors.

User Profiling

- The system should have the ability to build a profile for each student, with their learning preferences and type of disability.

5.3 Non -Functional Requirement

Usability:

- The system should be easy to use and navigate for visually impaired students, who may have different interaction preferences and limitations.

Flexibility:

- The system should be flexible enough to adapt to changes in the student's disabilities or knowledge levels, allowing for adjustments in the recommended tutors.

Security:

- The system should protect the privacy and security of student data, including disability and knowledge level information.

Accessibility:

- The students who have different types of impairments should be accessible to the system.

Scalability:

- The system should have an ability to manage the huge number of users, especially when busy periods like examinations or tutoring periods.

Maintainability:

- The system needs to be simple to keep up to date, with clear instructions and guidance for bug fixes and upgrades.

Performance

- The system should have the ability to react efficiently and quickly, with the least amount of latency, to reduce frustration and confusion for students who have visual impairments.

6. Conclusion

Considering the above-mentioned proposed e-learning system for visually impaired primary students, it can be stated that the system provides novel solutions to the problems that visually impaired primary children have when looking for a leading education. The tutor recommendation module is an important component of the e-learning system, since it gives visually impaired primary students with access to high-quality tutors who can provide the help they want to study effectively. It provides personalized recommendations based on each student's specific requirements. The module provides customized recommendation by considering the students' knowledge level, unique disabilities, tutor availability. I will build this mobile application by using React Native and Mongo DB. It supports students to succeed their academical works and engage in with the online platform same as students who are with the good sight.

The existing systems have not provided for visually impaired primary school children with relevant educational resources and customized tutoring online to ensure they receive the same level of education as their peers. As the result of this, this mobile application focuses on this.

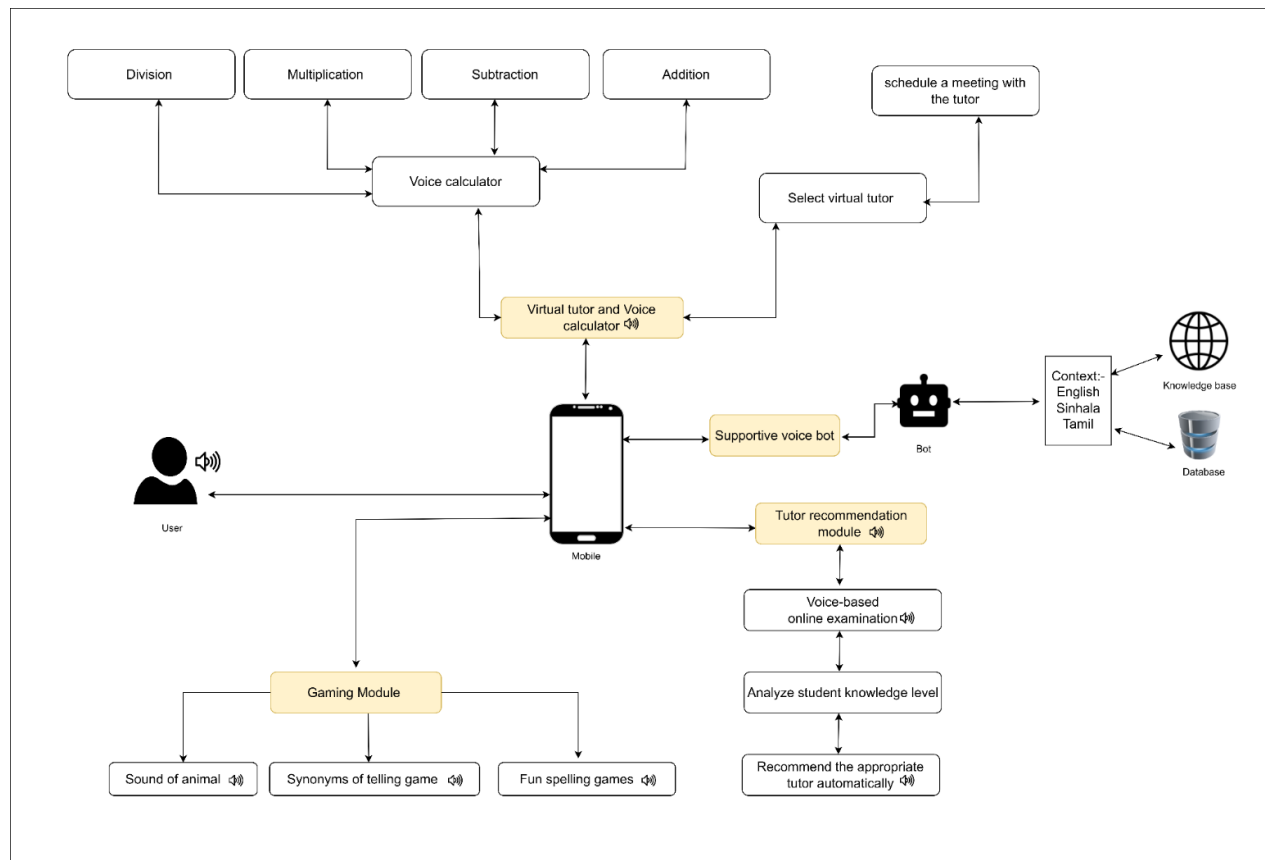
7. References

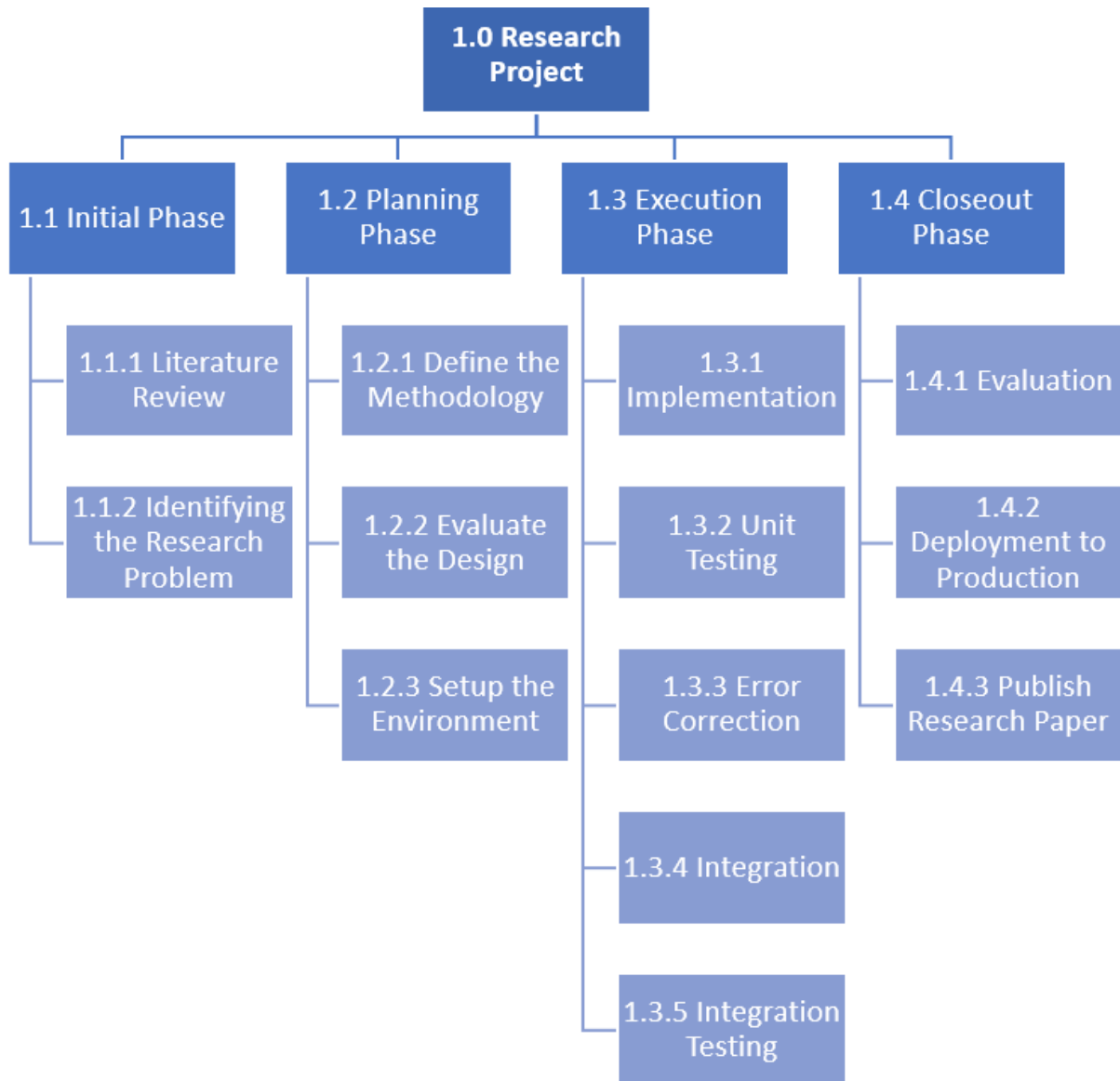
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- [5] R. L. N. K. V. V. Warit Taveekarn, "FindMyTutor: An Android Application for Matching Students and Private Tutors," 2014.
- [6] A. Abayasekara, "How Disability-Inclusive is Education in Sri Lanka? A Preliminary Look," 2018.
- [7] R. L. N. K. V. V. Warit Taveekarn, "FindMyTutor: An Android Application for Matching Students and Private Tutors," 2014.

8. Appendices



In order to gather details, we visited School for the Blind, Ratmalana. There, we were able to collect a lot of data.





Gantt Chart

