6BUIS020C – Final Year Project

Project Proposal (PP)

A System to Help with Reading and Understanding the Content in English Medium Academic Texts for University Students of Sri Lanka

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1. Problem Statement, Project Aims and Objectives

1.1. Problem Statement

Academic reading is vital to the success in academics. Currently, most of the academic texts are available in English medium (Dafouz, 2020). This has created an expectation for university students to read English medium texts for academics, even if English is not the official instruction medium in the country (Graddol, D, 2006). In addition, with the increase of English medium degree programs, the need for academic support for students whose first language is not English is highlighted (Mahawattha and Rassool, 2021) due to reasons such as unpreparedness towards doing academic reading in English, lack of vocabulary, grammar etc. (Eriksson, 2022)

Similarly, university students in Sri Lanka also face issues in understanding academic texts due to a lack of needed language proficiency, reading strategy awareness, etc. ((Dhanapala and Hirakawa, 2015) & (Dhanapala, 2010)) since they too have been studying English as a second language (ESL) (Samaranayake, 2016). Also, it can be said that this lack of understanding of the content, created due to the reasons mentioned above, could make the students de-motivated in reading. (Dhanapala and Hirakawa, 2015).

The factors that cause difficulty of reading and understanding content in academic texts that are in English medium are further described below along with the fishbone diagram.

1.1.1. Limited Language proficiency

Sri Lanka can be considered as a country where English is a second language due to various reasons such as Sri Lanka being a country that was colonized and ruled under the British and in present English is taught as a compulsory subject during the entire school time of grades 1 to 12(Samaranayake, 2016). However, as per the EF EPI (EF English proficiency rate) index English proficiency rate is low in Sri Lanka (EF-Education First, 2023) and as per census of population and housing the proficiency rate

for English was around 22% in 2018 (Abhayasekara, 2018). In addition, several research findings shows that there is the language proficiency varies throughout the country due to various reasons such as lack of resources to teach Lack of training in teachers and lack of material etc. (Liyanage, 2012), and that rural areas have a lack of proficiency in English. (Karunaratne, 2003). Lack of needed vocabulary, lack of understanding of Grammer are also caused due to the above-mentioned reasons.

1.1.2. Lack of motivation

Most students in Sri Lanka have negative attitude towards English, this is common among ESL students as well and also causes stress/anxiety among students. (Eriksson, 2022) In addition, research also suggest that students with less English language skills do not do proper reading, gets distracted from reading and loses interest to read and in addition that the lack of Grammer knowledge and vocabulary further demotivates them. (Dhanapala and Hirakawa, 2015). In addition, lack of support and guidance can also demotivate students since support is directly affecting the student's motivation. (Lin et al., 2023)

1.1.3. Lack of preparedness towards reading academic text

In the discussion of preparedness to read academic text in English one main concern is the knowledge in general, basic English. The entry level English in university students is quite low (Abdul Majeed, Mohamed, 2016) due to various reasons that are mentioned above. In addition, in Sri Lankan universities the development programmes to help with preparing, building up literacy, is scarce and that there is a lack of awareness on the relationship between entry level English and academic literacy as well (Mahawattha and Rassool, 2021). In addition, not having knowledge over the structure of academic text, complexity of academic text (Eriksson, 2022) and reading strategies to read academic text (Dhanapala, 2010 is one other concern associated with lack of preparedness of academic text.

1.1.4. Lack of reading comprehension

Research suggests that university students of Sri Lanka lacks knowledge on reading strategies (Dhanapala, 2010), and mostly the students with less language skills do not efficiently use reading strategies. (Dhanapala and Hirakawa, 2015). Also, as per (Dhanapala, 2010), even the high-level readers lacked in important reading strategies self-questioning, summarizing, and critical evaluation (Dhanapala, 2010), and research further confirms that students have more ability in techniques such as skimming and scanning compared to summarizing (Dr. E. Sulochana Neranjani, 2021) even though summarizing is an import technique to shorten and identify key concepts in a text.

In addition, as per a study done at Uwa Wellassa University on reading and understanding texts in English as a second language, it was found that around 52% of the students understood only 60-80% while a very low percentage of 9% only understood 80 -100% of the content (Jayasundara, 2014). This shows the lack of reading comprehension among students.
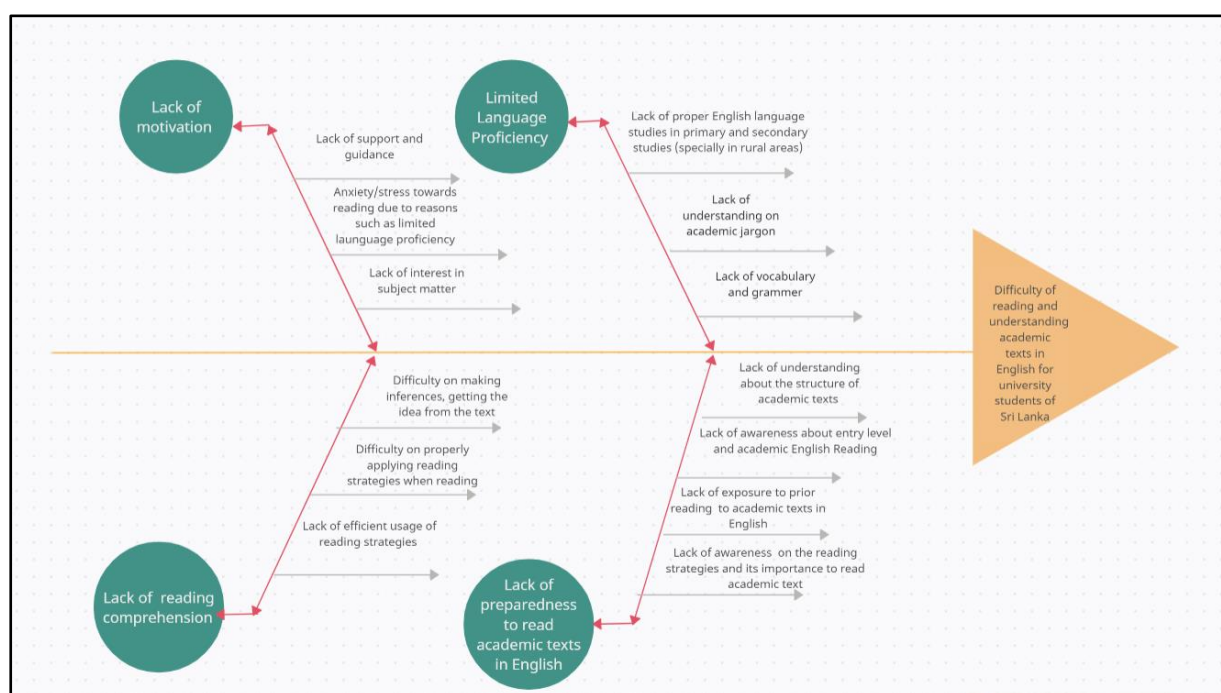

Figure 1:Fishbone Diagram

1.2. Project Aims

The Aims of my project are,

1. Provide the university students of Sri Lanka with a system to read and improve their understanding of the academic text's content, available in English Medium by making the reading process easier by using different strategies.

2. Motivate the students to do more reading and help eradicate the fear or anxiety they have over reading the necessary academic texts.

1.3. Project Objectives

The objectives or the steps that I will take to achieve the project aims are given below,

Id	Objective to achieve deliverables	Description
PO01	Final year project idea selection	Initial research to identify the problem, gaps, and features of the existing solutions that are already available.
PO02	Project idea presentation.	Validate the problem further and add the problem statement. This is to do the project idea presentation.
PO03	Completion of project proposal and Ethics form	The proposal document includes a problem statement, background review of competitors and similar research, tools, skills, challenges, requirements, and project timeline. The two documents are needed to get approval for the project.
PO04	Complete Literature review	This is an in-depth evaluation done using available literature for the particular problem domain/problem and documenting it.
PO05	Complete industrial survey	This is done to gather the relevant data, and requirements from the target group. (university students, lecturers, etc.)

PO06	Complete PSDP document	Contains the requirement elicitation plan, list of requirements, usecase diagrams, stakeholder analysis, and Onion model diagram.
PO07	Design and implement Prototype	Fully functional prototype to demonstrate the features of the system
PO09	Completing the Final Project Report and Viva	Includes a summary of all the work done throughout the period, and the viva called after the report submission will conclude the Final year project module.

Table 1:Objectives Table

2. Background review: similar software/applications, or similar research

Currently, no known applications address the exact problem of helping students to read and understand the content in English medium texts for academic purposes, and check the levels of understanding among students. However, some different applications/systems provide several features that can help students with reading and understanding. This section will describe those similar applications, a feature comparison of the available features of the competitors with the proposed solution, and a literature table that has the summarized points of the knowledge gained through literature research.

2.1.   Similar Applications

The similar/ competitor applications that were found are listed below,

1. QuillBot
2. Read and Write
3. Wordtune
4. Grammarly
5. ProWritingAid

2.1.1. QuillBot

The main purpose of QuillBot is to help create error-free professional documents that do not have grammar/spelling mistakes, and with no plagiarism. Overall, this is mainly for improving writing. However, certain features available in QuillBot can help users to understand the content in the text's by summarizing, paraphrasing, and translating. This is because summarization lets the readers grab the key ideas, and paraphrasing can be used to simplify the texts, and translation can help non-native speakers of English.
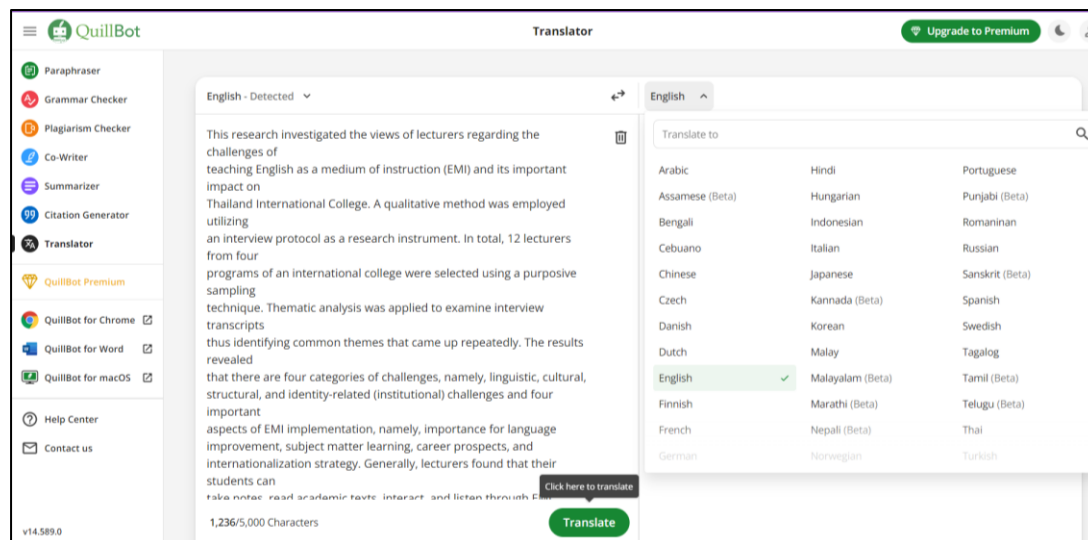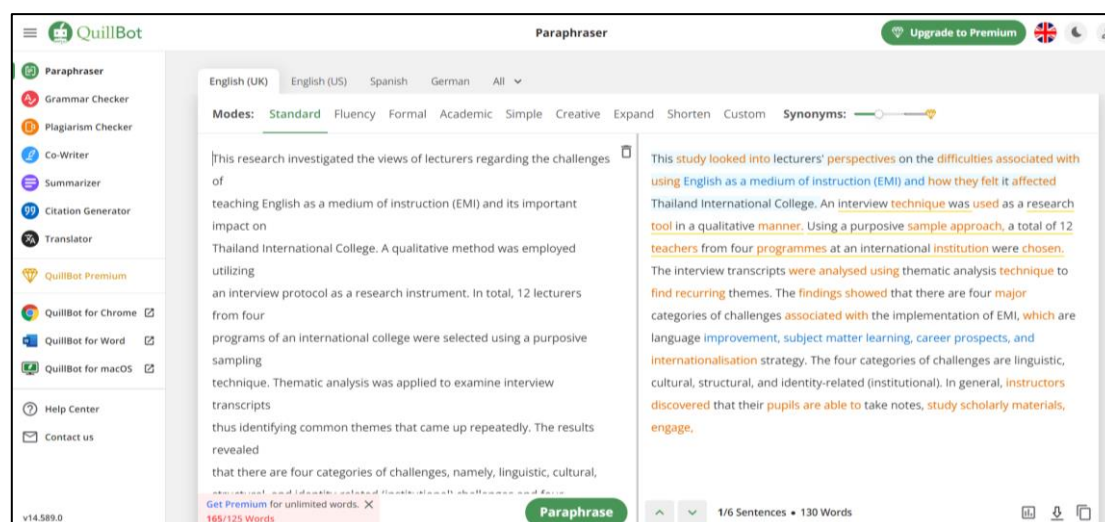
Figure 3:Quill Bot: Translate Feature
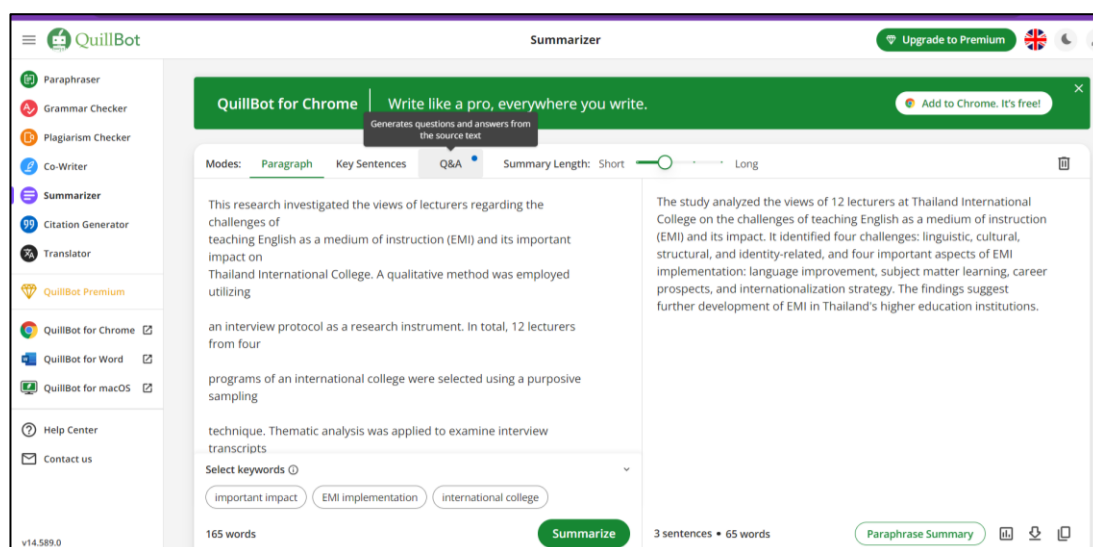

Figure 2:Quill Bot: Paraphrase Feature

Figure 4:Quill Bot: Summarize Feature

2.1.2. Read&write for Google Chrome

Read& write is a free extension for Google. This application offers text-to-speech, screen reading, and a support tool for writing, checking grammar, vocabulary support, and translation to a few languages. This is built to help users with low vision, and learning disabilities such as dyslexia and is also a tool that can be used by ESL students as well since this can be used by readers at any level. Here, features such as a dictionary (pictures and text), translation, and highlighting can help the readers understand the content further.
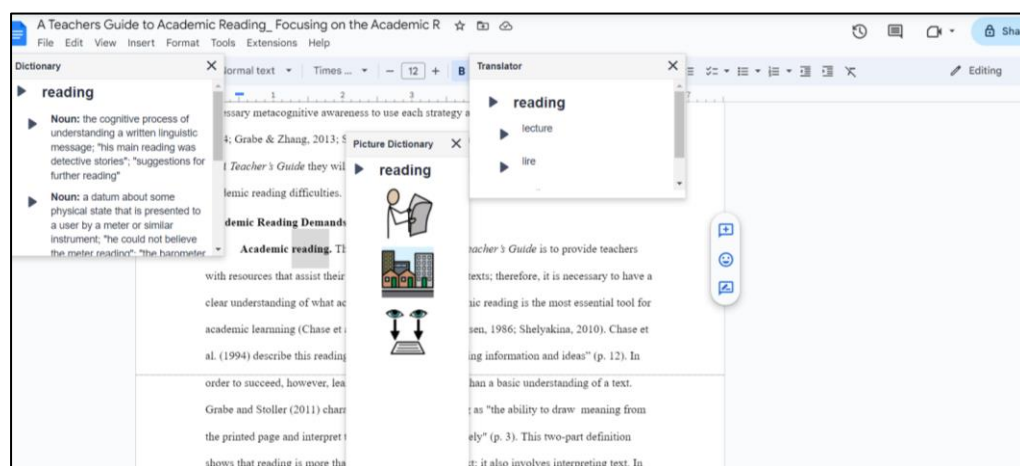

Figure 5: Read and write: Dictionary, Translate Feature
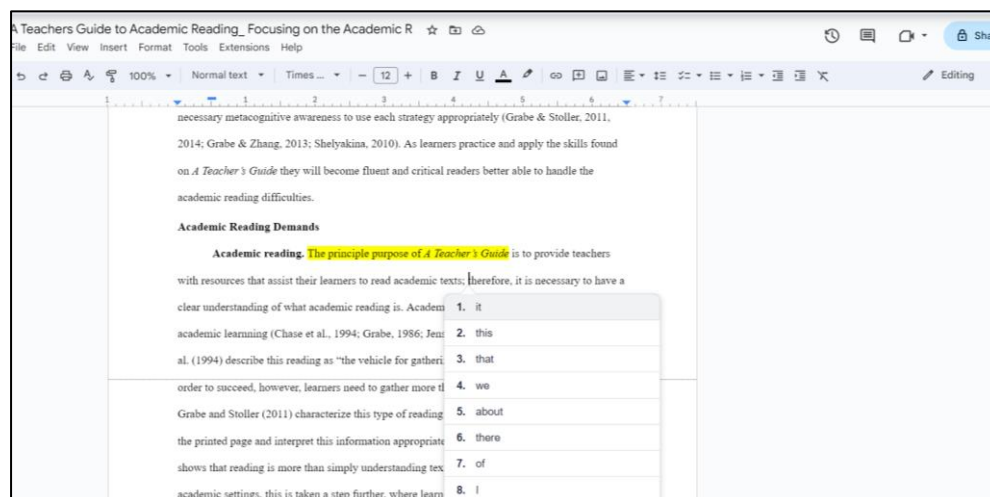
Figure 6: Read and Write: Text prediction and highlighting

2.1.3. Wordtune

Wordtune is an AI-based writing assistant that offers features such as summarization, paraphrasing, and translating. Similar to Quill Bot, Wordtune helps with reading and understanding since summarizing and paraphrasing simplify and gives the key concepts of the content. In addition, users can make their notes using the summarized content if necessary, and also, the user can write in a foreign language and get Wordtune to rewrite it in English. However, there is a limited number of languages.

Figure 7:Wordtune - Paraphrase feature
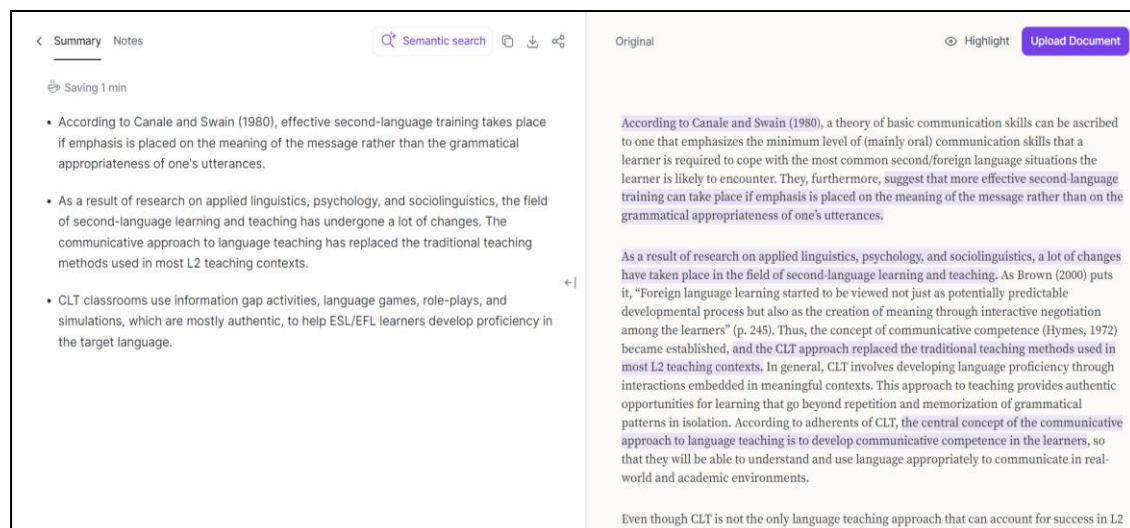
Figure 8: Wordtune -Summarize Feature
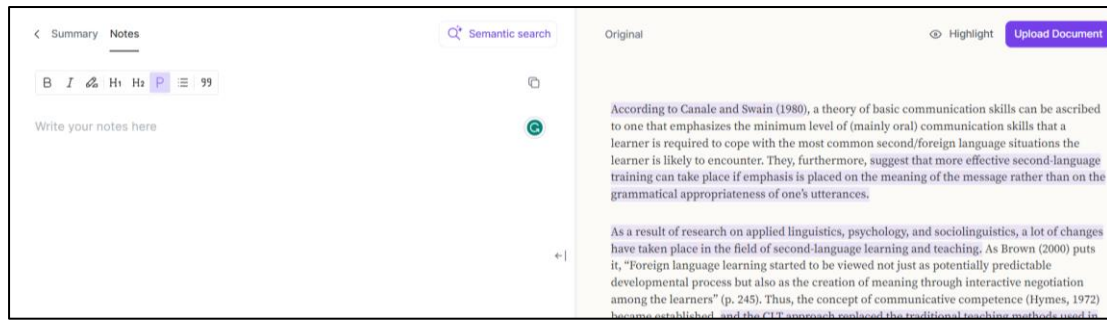
Figure 9:Wordtune - Note-taking feature
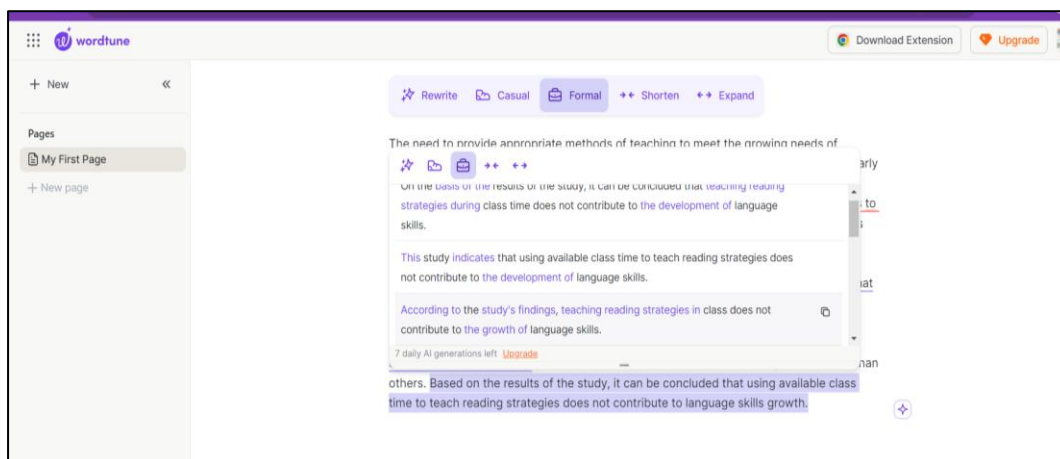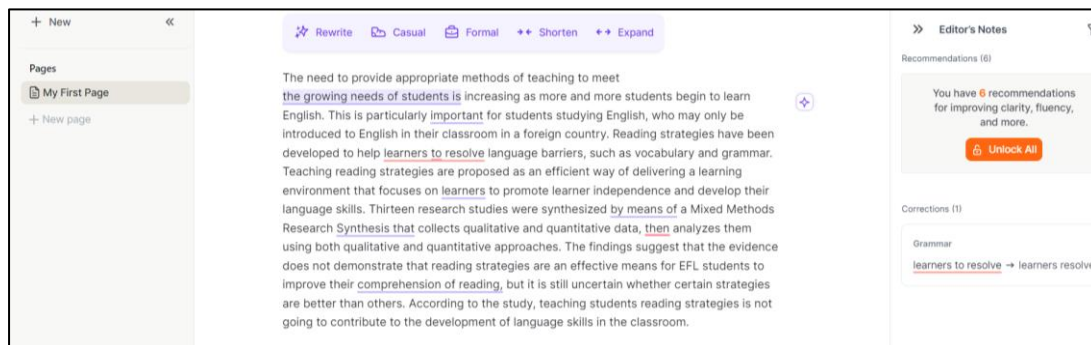

Figure 10: Wordtune - Spelling and grammar checking
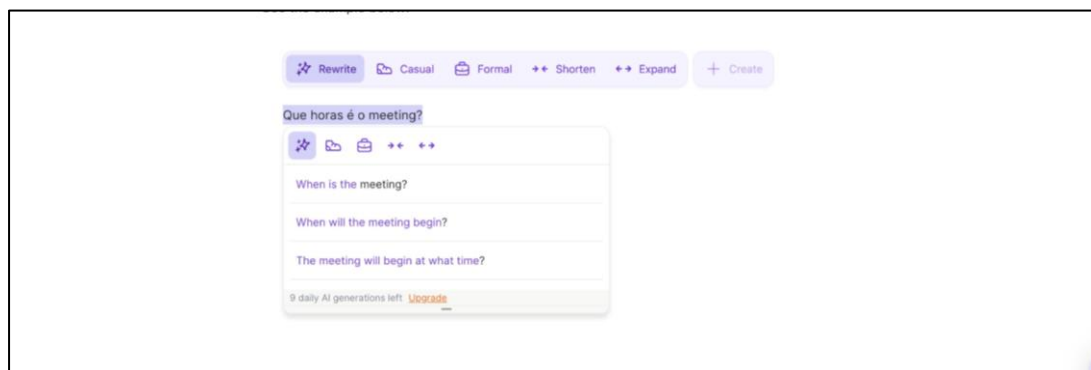
Figure 11: Wordtune - Translate Feature   '

2.1.4. Grammarly

Grammarly is an AI-based writing tool as well, which provides features such as grammar and spelling checking, vocabulary support, and plagiarism checking. In addition, features such as translation are available in Grammarly. In addition, Grammarly offers a summarizing feature too. The summarizing, and translation features help make the content understanding easier, similar to QuillBot, and Wordtune.
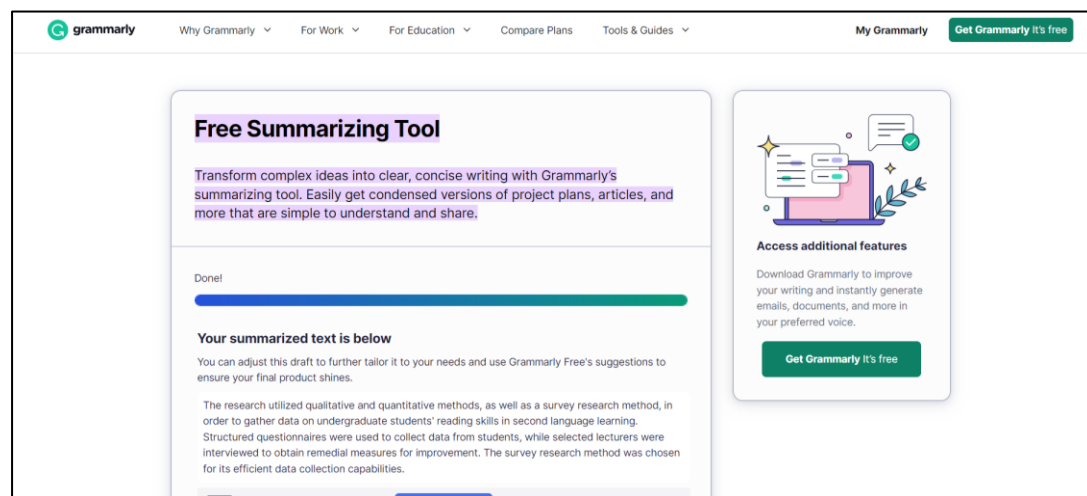
Figure 12:Grammarly - Summarize feature
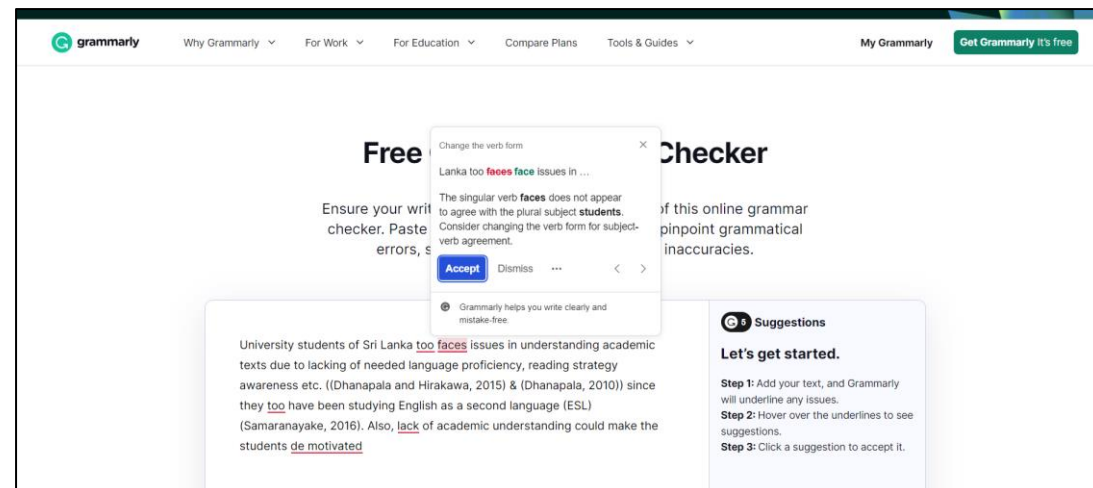
Figure 13:Grammarly: Grammer and spelling checking

2.1.5. ProWritingAid

ProWritingAid is similar to Grammarly and helps correct complex grammatical errors, check plagiarism, and provide vocabulary support. However, ProWritingAid does not have a translation option or summarizing option. The students can use this application to rephrase and simplify academic text to help with better understanding.
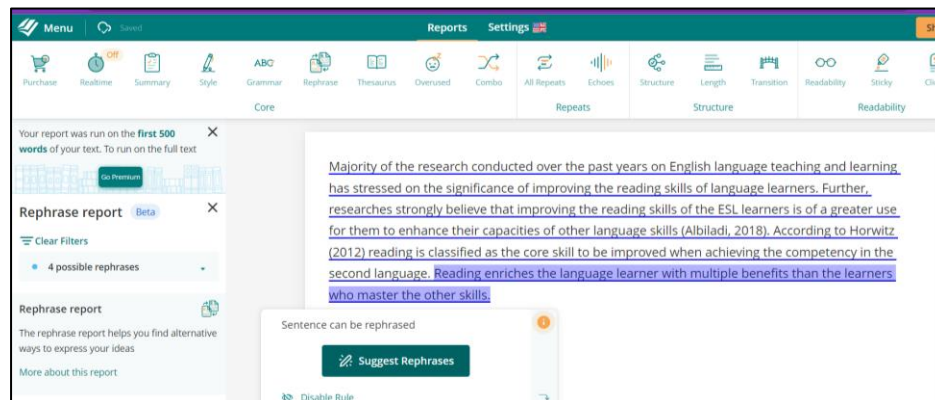
Figure 14:ProWritingAid : Rephrase Feature
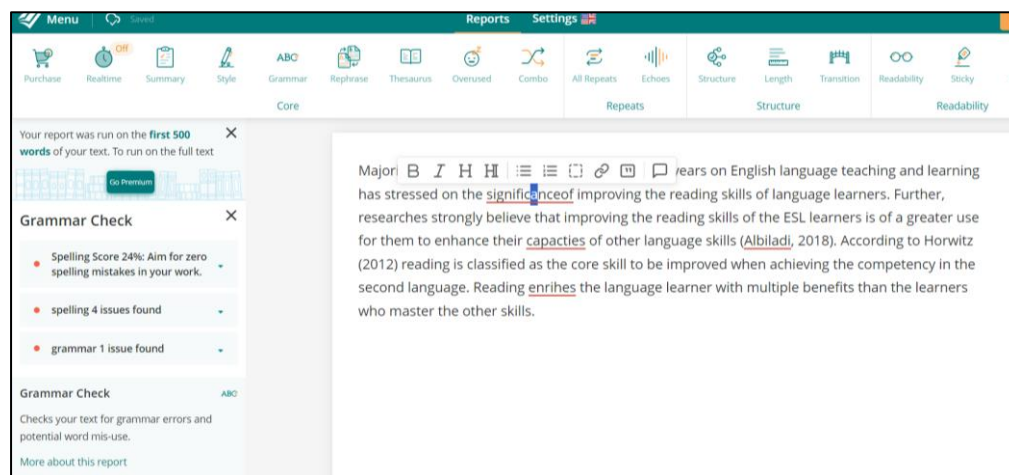
Figure 15:ProWritingAid: Grammar and spelling check

2.2. Gap Analysis

The feature comparison for similar applications and the proposed solution is given below. **The Green color represents the feature's availability while the Reddish-brown color represents that the particular feature is unavailable.**

Feature	Quillbot	Read& write	Wordtune	Grammarly	Pro-Writing Aid	Proposed Solution
Paraphrasing						
Summarizing						
Translating	The Sinhala Language is not supported	Limited Languages are supported	Limited Languages are supported			Sinhala and Tamil will be the supported languages for now.
Grammer and spelling checking						
Plagiarism Checker						
Screen Reader						
Text to speech Feature						
Dictionary				The feature isn't available on Mac and Windows.		

Reward system	Premium Feature					
Question and answering						

Table 2:Gap Analysis Table

2.3. Literature Table

Title	Author	Published date/year	Type of source	Summary Points
Investigating Understanding of Academic Literacy in English Medium Degree Programmes Among Stakeholders in Sri Lankan Higher Education	N. Mahawattha and R. Rassool	2021	Journal Article	Increased need for academic support due to rise in English Medium Degrees. Discuss the lack of academic literacy awareness in the Sri Lankan higher education system.
The role of academic Reading to Be: The role of academic reading in emergent reading in emergent academic and professional student identities	Maguire, Reynolds, and Delahunt,	2020	Journal Article	Discuss the challenging nature of academic reading and why students do not do enough reading.
L2 Reading Motivation among Sri Lankan university students	K.V. Dhanapala, and Y. Hirakawa,	2015	Book	Discuss the factors that affect the motivation of reading among university students, such as unpreparedness, complex grammar, and vocabulary.

Challenges faced by Students in English Medium Undergraduate Classes: An Experience of a young University of Sri Lanka Introduction	M. Navaz	2016	Journal Article	Addresses the weak language proficiency among the students and certain factors that might cause it in Sri Lanka
Sri Lankan University Students' Metacognitive Awareness of L2 Reading Strategies	K.V. Dhanapala	2010	Journal Article	Describe reading strategies and awareness for using them for reading among Sri Lankan students. Also, it concludes that high-level readers are more aware of strategy usage.
Assessment of the knowledge and the use of Metacognitive reading strategies among ESL learners	W.S. Sudusinghe	2022	Conference Paper	Assess the awareness of metacognitive reading strategies. As per the study, only 18.9% had a high metacognitive awareness of reading strategies.
Acquiring Reading Skill by Second Language Learners	J. Jayasundara	2014	Conference Paper	Discuss how students learn English as a second language and the rate of understanding.
Difficulties in academic reading for EFL students: An initial investigation	L. Erikkson	2022	Book	Discusses the difficulties faced by ESL university students based on a Sweden case study.

Table 3:Literature Table

3. Tools and skills

3.1. Hardware Requirements

Processor	Core i5 or above processer since it has good processing power and is suitable for tasks that need high processing power.
RAM (Random Access Memory)	A minimum of 16 GB RAM is needed since much data can be processed.
Hard drive	1TB hard drive to store all the data etc. needed for final-year project development.
GPU (Graphic Processing Unit)	GPU with 4 GB RAM to help with parallel processing and also since it is efficient when working with machine learning, etc.

Table 4: Hardware Requirements Table

3.2. Software Requirements/Other Tools

Category	Tool
Project Planning	Microsoft Project
UI/UX Design	Figma
Programming	HTML, CSS (front-end) React Native Python (Can be used for summarizing using the Python library Spacy and then to do a Machine learning model for Question and answering) Google Cloud (API for translating)
Referencing	Zotero
Testing	Selenium
Database	MySQL
Documentation	Microsoft Word

Table 5: Software Requirements/Other Tools Table

3.3. Skills needed

The skills that are needed to carry out the project are,

- Research and requirement elicitation skills.
- Requirement Analysis skills.
- Academic writing or report writing skills.
- Programming skills in front-end and back-end development to code the application.
- Understanding more deeply about Machine Learning Concepts.
- Understanding further on object-oriented concepts.
- Time management skills.

4. Initial list of requirements

The initial list of requirements is listed below. These requirements may change later on with the results of the industrial survey.

4.1. Functional Requirements

Id	Requirement	Priority
F01	Student shall be able to upload academic documents, such as research papers, to the system.	Must Have
F02	Student shall be able to summarize the content in the documents.	Must Have
F03	Student shall be able to Translate certain parts of text in the document.	Must Have
F04	The System shall be able to generate a set of questions to check the level of understanding once the students complete the reading.	Must Have
F05	Student shall be able to make their notes while reading the texts.	Should Have
F06	Students shall be able to annotate the texts while reading.	Must Have
F07	The System shall be able to give rewards based on the points taken by the student.	Should Have
F08	The System shall be able to track the overall progress of student's reading and understanding.	Must Have
F09	Student shall be able to save the notes or the texts with annotations for future reference.	Could Have
F10	Students shall be able to login to the system.	Must Have

Table 6:Functional Requirements Table

4.2. Non -Functional Requirements

Id	Type	Requirement
NF01	Security	The system should be accessed by authorized personnel only.
NF02	User-friendliness	The user interfaces should be attractive The user navigation flow should be easy (smooth flow).
NF03	Availability	The system should be available all the time (24/7).
F04	Compatibility	The system should be compatible with Windows Operating System.
F05	Maintainability	The system should recover from system failure in less than 10 minutes.

Table 7: Non-Functional Requirements Table

4.3. Requirement gathering Methodology

The initial list of requirements is mainly gathered by analysing the problem domain, and existing systems through available literature. These requirements may change later on with the results of the survey. In the industrial survey, the requirements will be gathered through questionnaires.

5. Challenges

The challenges that should be faced while doing the project are mentioned below.

- The basics of programming languages that were practiced during the first three years are not enough to build the application for the final year project hence one, challenge would be enhancing skills in programming languages, databases, etc, and also learning further on objected-oriented principles and about machine language, etc.

- Requirement gathering would be another challenge because it can be difficult to get face-to-face interviews with participants from the target group, and some people might be reluctant or not motivated to fill out questionnaires.

- Another challenge would be coming up with a unique, complete solution to the problem and developing the prototype for the solution. This can be difficult due to technical advancement in the existing similar applications.

6. Project timeline

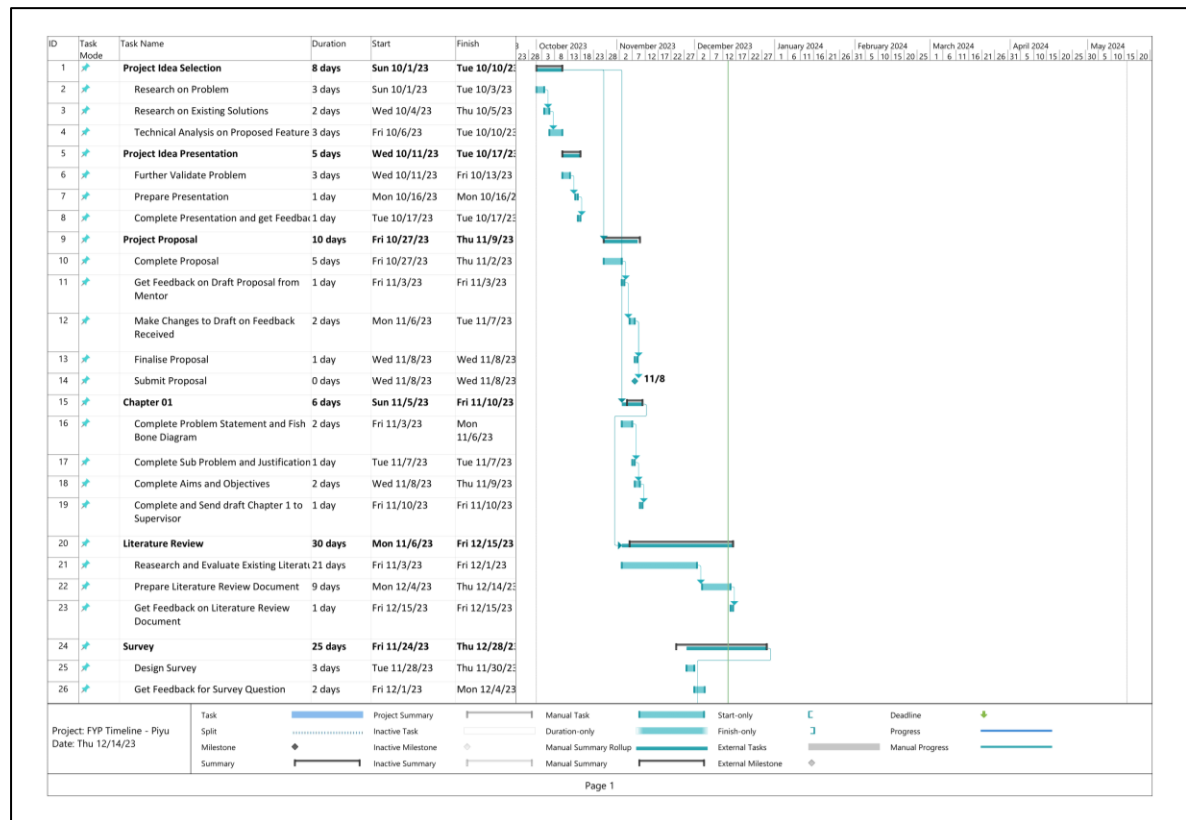The project timeline for the final year project is described in the below Gantt chart.

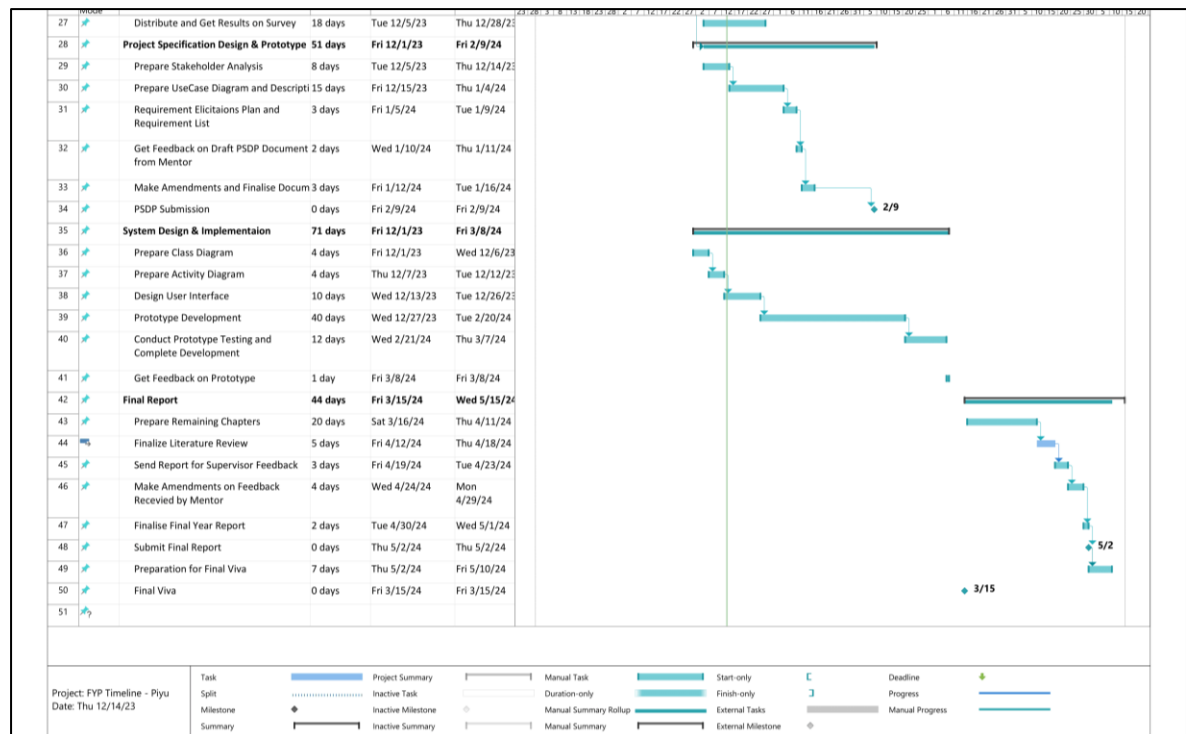

Figure 16: Gantt Chart Page 1

Figure 17:Gantt Chart Page 2

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