



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**SECP 1513 - 04**  
**TECHNOLOGY AND INFORMATION SYSTEM**

# **PLAGIARISM DETECTION**

## **Report**

**Team - FantasTech**

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# INTRODUCTION

Design thinking is a method of problem solving and development of innovation that satisfies user needs. It is a creative process to improve an existing product or application or to invent a new thing. This process involves five core stages which are empathize, define, ideate, prototyping and deploy which are used in all fields including software. Design thinking research methodology includes problem statement, empirical study, data analysis, experimentation and result analysis.

In our study, we are mainly focused on the artificial intelligence (AI) field. Artificial intelligence can be defined as a simulation of human intelligence that is being processed by machines like computer systems. AI includes machine learning, neural networks, natural language processing and robotics. After an interview and research we have made, we identify that a lot of people, especially students and lecturers have issues with AI plagiarism detection. The existing applications are discovered to have deficiency and we come up with solutions to fulfill user requirements.

# DETAILED DESCRIPTION

## Our Design Thinking Process

### **Empathy:**

#### Observation:

- We observed lecturers' interactions with plagiarism detection tools, noting their challenges and frustrations.
- We witnessed instances where false flagging and limitations in context understanding affected the accuracy of plagiarism detection.

#### Engage:

- Conducted interviews with lecturers to understand their perspective on the strengths and weaknesses of Turnitin.
- Explored their experiences with plagiarism-related issues, including false accusations and the tool's limitations.

#### Immerse:

- Used Turnitin to gain a deeper understanding of lecturers' need for a more accurate, context-aware, and cost-effective solution.

### **Define:**

In this phase, we worked on creating a clear statement or perspective that sums up the specific users, insights, and needs uncovered during the Empathy phase.

#### Problem Statement:

Plagiarism detection tools, particularly Turnitin, suffer from issues such as false flagging, limited contextual understanding, inability to detect contract cheating, high subscription costs, and language bias.

#### Point of View:

Our point of view is to develop an AI-driven plagiarism detection tool that addresses these challenges, providing accurate, context-aware, and accessible solutions for educators and students.

### **Ideate:**

Our focus was on exploring a wide range of solutions that could revolutionize plagiarism detection.

#### Ideas Generated:

- Refined matching algorithms for accurate paraphrasing recognition.
- Contextual analysis to enhance understanding of text intent.
- AI-driven contract cheating detection through style memorization.
- Cost reduction strategies for wider accessibility.
- Multilingual support to overcome language bias.

### **Prototype:**

Prototyping involves transforming ideas into tangible forms for testing. Our prototypes aim to address the identified problems in Turnitin, ensuring a more effective and user-friendly plagiarism detection AI tool. Inside this makeshift tablet, we placed papers that represented different screens, such as the login page, home page, and plagiarism detection page. This helped us visualize and test our ideas

### **Test:**

- Trying out basic models in the context of academic activities.
- Gathering feedback from educators, students, and others.
- Refining models better based on how people use them and their feedback.
- Doing things in a structured way to design and improve our solution.

# **Addressing Plagiarism AI Tools Challenges: Our Solution and Team Collaboration**

## **Problem**

As stated before, lecturers encounter issues with Turnitin, such as false flagging, limited contextual understanding, inability to detect contract cheating, high subscription costs, and language bias. These challenges compromise the accuracy of plagiarism detection and hinder accessibility for certain users.

## **Solution**

Our team offers a comprehensive solution by refining matching algorithms, enhancing contextual analysis, implementing contract cheating detection through style memorization, reducing costs for accessibility, and ensuring multilingual support. These improvements aim to deliver accurate, context-aware, and globally inclusive plagiarism detection for lecturers, addressing the limitations of existing tools.

## **Teamworking**

Collaborating as a team came with its own set of challenges. As students with different schedules full of quizzes, tests, and assignments, arranging in-person meetings proved to be quite difficult. Additionally, we didn't have the materials needed like pens, markers, and cardboard to create the prototype. However, despite these obstacles, our team has managed to overcome them. We strategically planned meetings at available times, ensuring everyone could participate, and successfully got the necessary materials. During instances where in-person meetings were not doable, we efficiently assigned tasks to team members, allowing each person to contribute remotely. This collaborative approach helped us overcome scheduling and resource limitations, contributing to a successful team dynamic.

# DESIGN THINKING ASSESSMENT

## 1. During the end of the project demonstration

Upon the project completion, we recognize that design thinking is a pivotal process demanding meticulous attention to detail to achieve the desired goal. It necessitates critical thinking skills, as we must evaluate the effectiveness of our prototype and the proposed AI-driven plagiarism detection tool. This includes assessing how well the refined matching algorithms, contextual analysis, and other features address the identified issues with Turnitin.

## 2. During the transition between design thinking phase

The transition between design thinking phases requires a seamless flow of insights and ideas. As we moved from Empathy to Define, we ensured a clear articulation of the identified problems, user needs, and our point of view. This transition involved synthesizing observations into a cohesive problem statement and developing a well-defined point of view to guide our ideation.

Continuing into the Ideate phase, we demonstrated creativity and collaboration in generating a variety of innovative solutions for plagiarism detection. The transition from Ideate to Prototype involved translating these ideas into tangible forms. Although despite a lot of challenges, our team still adapted and successfully created the prototype.

We're committed to gathering feedback and iterating on improving solutions. To do this, we incorporated feedback from educators and students to improve the usability and effectiveness of the prototype.

Overall, our smooth transitions between design thinking phases demonstrate adaptability, collaboration, and commitment to solving the identified challenges in plagiarism detection tools.

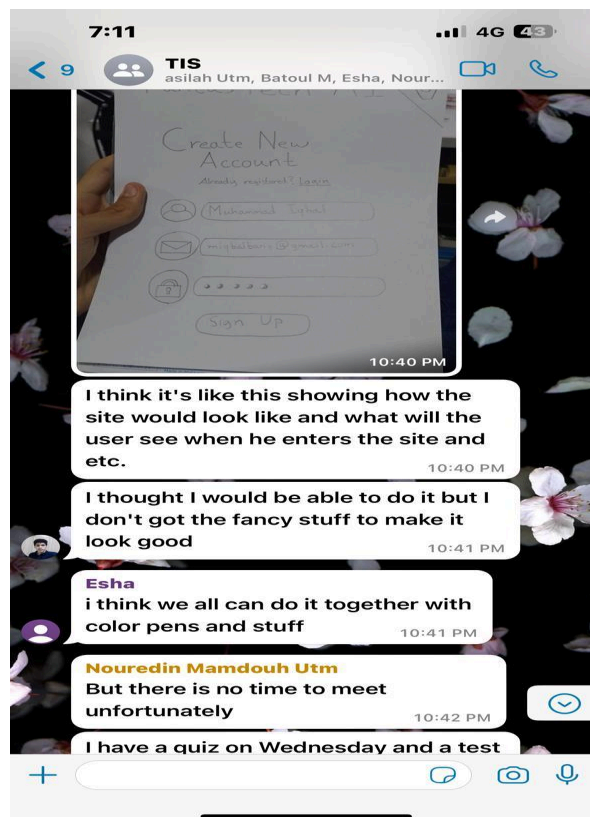
# DESIGN THINKING EVIDENCE

## Sample Work

### Interview in the Empathy stage

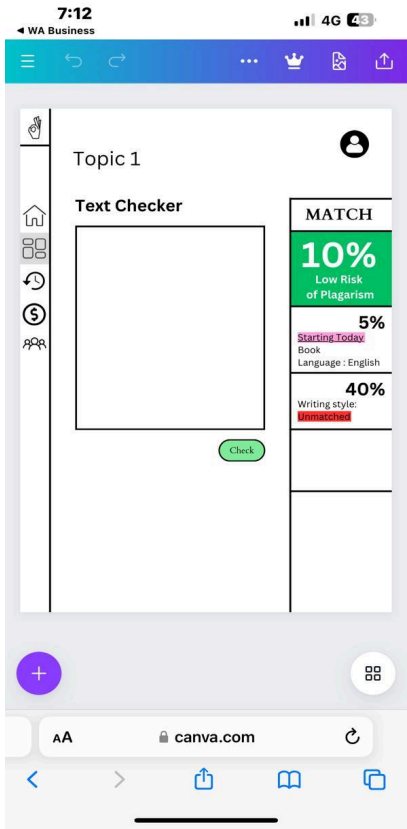
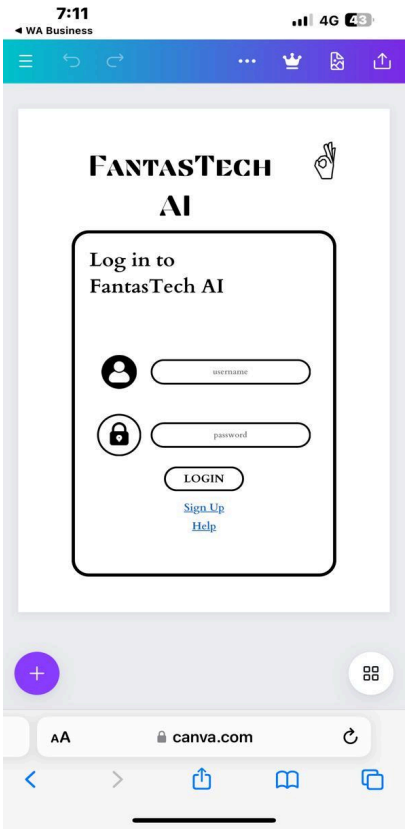
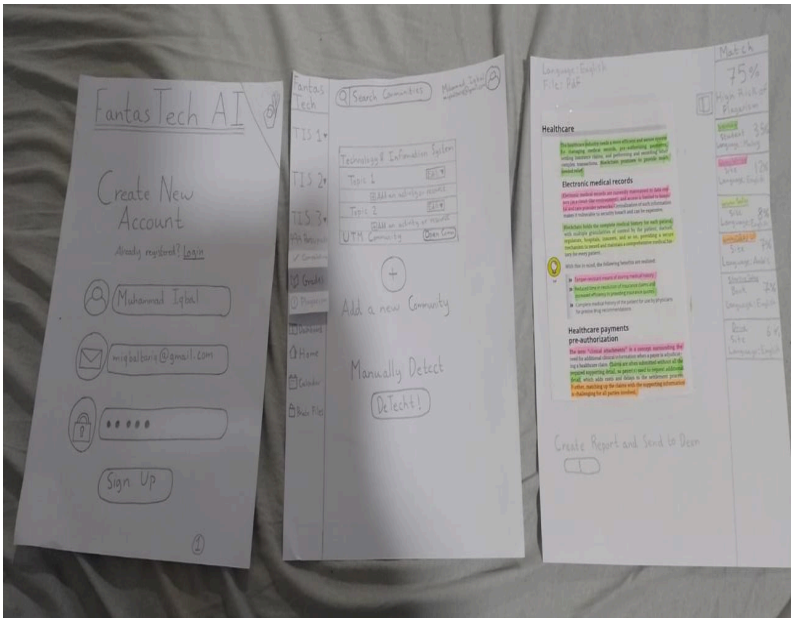
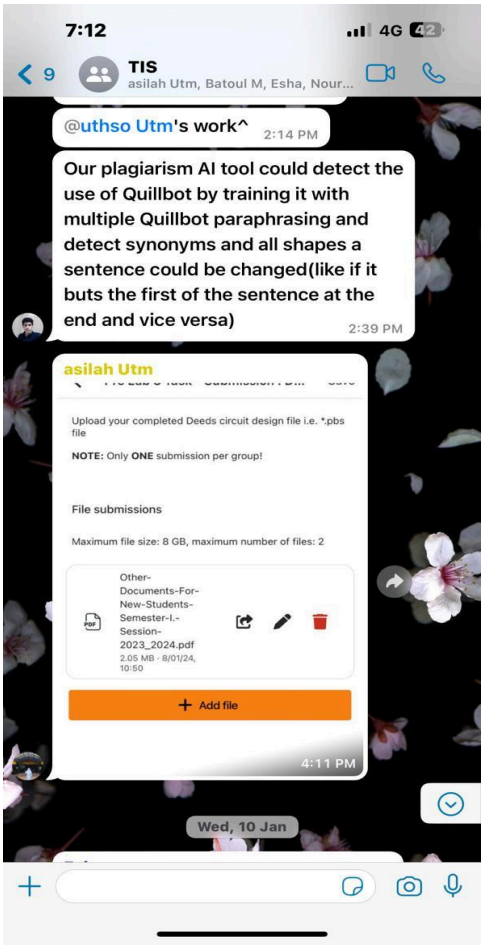


### Discussion stage

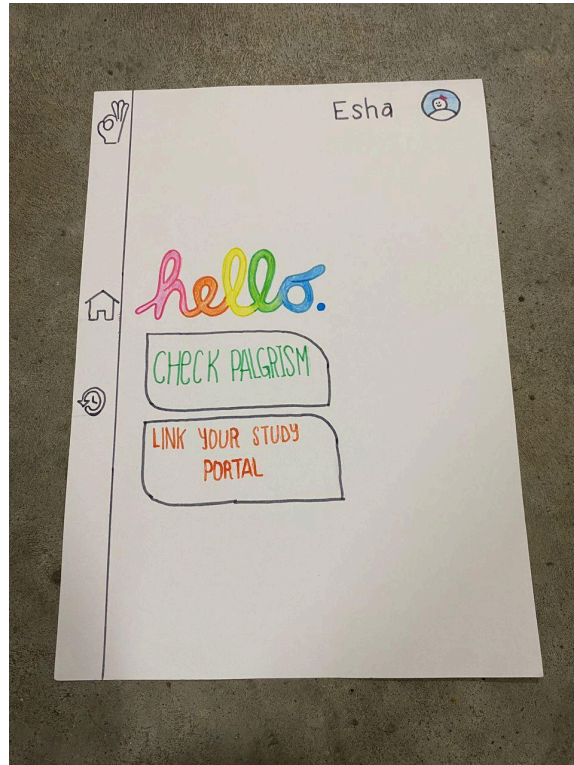




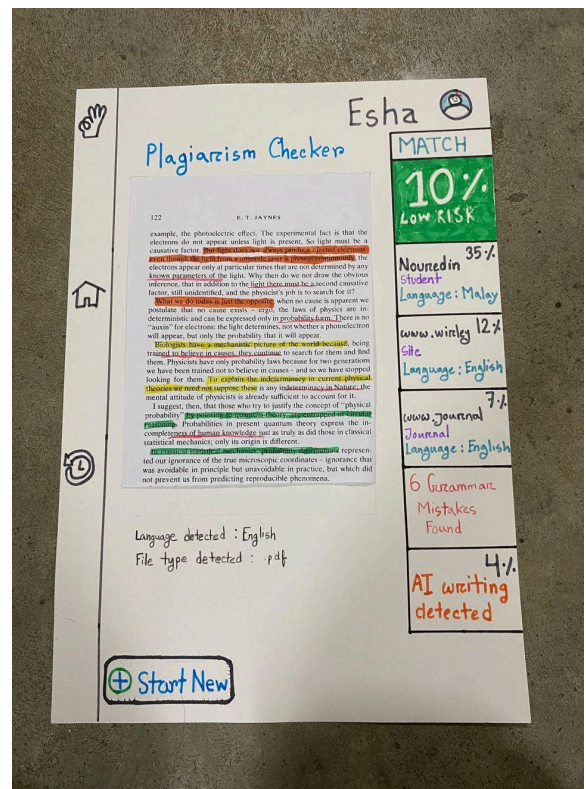
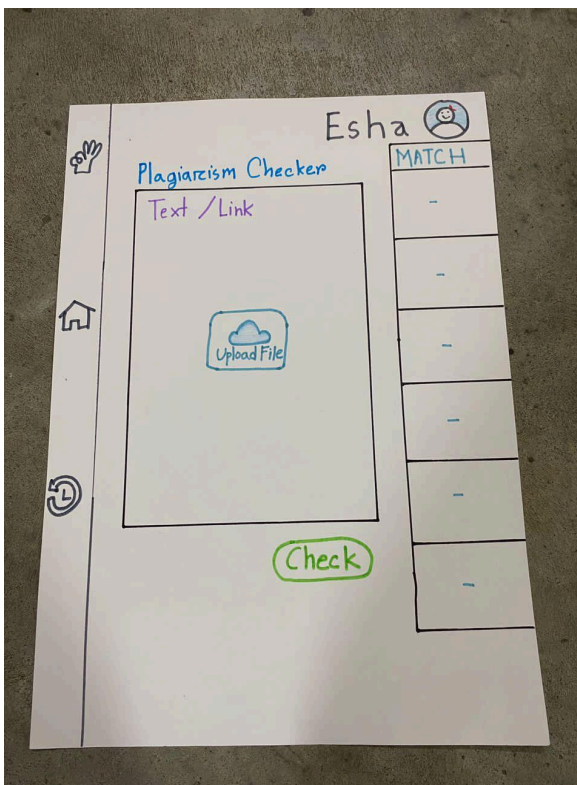
# Prototype stage and working



## User interface

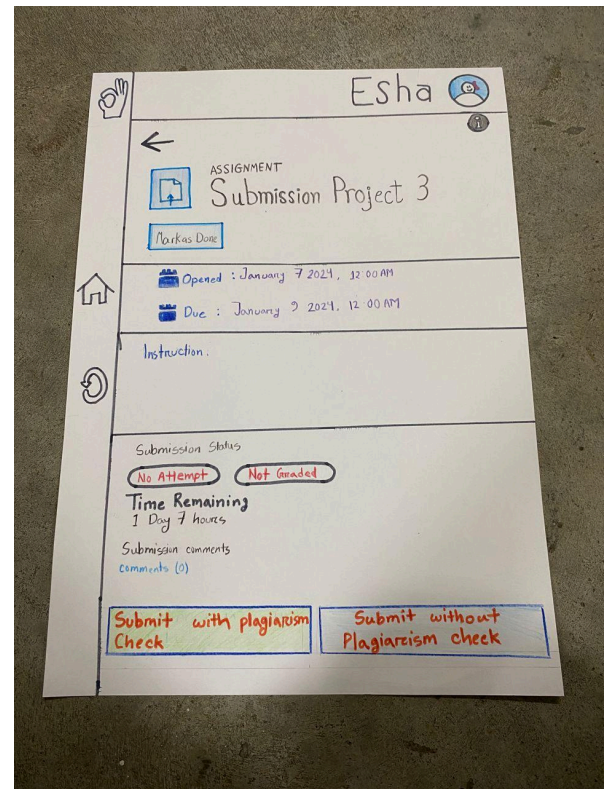
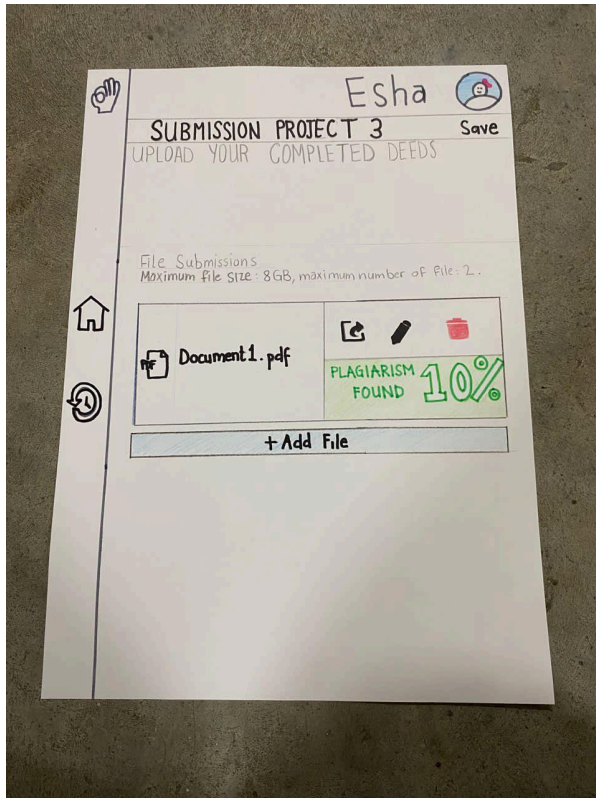


## User interface for plagiarism checking





## User interface for submission



## Fantastech logo



## Record for each phase

### 1. Empathy

The table shows all the questions asked in the interview.

Questions for Dr. Alif Ridzuan Khairuddin	Answer	Composite character (user)
What is your background and expertise?	I am a Programming Technique lecturer with a Ph.D. in Computer Science. My research interests include AI, Machine Learning, and Data Analytics.	Dr. Alif, age, background
How long have you been teaching at UTM?	I have been teaching at UTM for one year.	Dr. Alif, teaching duration
What plagiarism-related issues have you encountered in your academic activities?	I occasionally encounter issues with false flagging, limited contextual understanding, and difficulties in detecting contract cheating.	Dr. Alif, plagiarism issues
Why do you believe Turnitin has problems?	I believe Turnitin faces issues like false flagging, limited contextual understanding, challenges in detecting contract cheating, high costs, and language bias.	Dr. Alif, Turnitin issues
How does Turnitin currently detect plagiarism?	Turnitin compares submitted assignments against a database, generating a similarity report for instructors.	Dr. Alif, Turnitin usage
What improvements would you like to see in a plagiarism detection tool?	I would like to see improved algorithms for accurate paraphrasing recognition, enhanced contextual understanding, better contract cheating detection, cost reduction for wider access, and support for multiple languages.	Dr. Alif, tool improvements

What challenges do you face with Turnitin's current functionality?	Challenges include false flagging, limited understanding of context, difficulties in detecting contract cheating, high subscription costs, and language bias.	Dr. Alif, Turnitin challenges
How do you think improved algorithms could benefit plagiarism detection?	Refined algorithms would reduce false positives, ensuring more accurate plagiarism detection without unnecessary flags.	Dr. Alif, algorithm benefits
How important is contextual understanding in plagiarism detection?	Contextual understanding is crucial to differentiate between legitimate paraphrasing and plagiarism, improving the accuracy of detection.	Dr. Alif, contextual importance
What is the significance of detecting contract cheating in academic integrity?	Detecting contract cheating is vital for maintaining academic integrity, ensuring that students produce their own work rather than outsourcing assignments.	Dr. Alif, contract cheating importance
How do subscription costs impact the usage of plagiarism detection tools?	High subscription costs may limit access to plagiarism detection tools, particularly for smaller institutions or individuals with budget constraints.	Dr. Alif, cost impact
How does language bias affect the effectiveness of plagiarism detection tools?	Language bias may result in less accurate results for content in languages other than the tool's primary language, reducing overall effectiveness.	Dr. Alif, language bias impact
Would you prefer a plagiarism detection tool with reduced costs or a free version?	Yes, reducing costs or providing a free version with advertisements would ensure wider access to the tool.	Dr. Alif, cost preference
How do you see improved language support benefiting plagiarism detection?	Improved language support would enhance inclusivity and effectiveness worldwide, addressing language bias concerns.	Dr. Alif, language support benefits

## 2. Define

The table shows the problem and description for each problem.

Problem	Description
False Flagging	Plagiarism detection tools, like Turnitin, often incorrectly flag content as plagiarized, leading to false positives. This can result in unfair consequences for students or content creators, impacting their credibility and academic or professional standing.
Limited Contextual Understanding	Plagiarism detection tools may lack the ability to fully grasp the context of the content, resulting in the misinterpretation of legitimate use of language or ideas. This limitation can hinder the tools from accurately distinguishing between original work and instances of appropriate citation or paraphrasing.
Inability to Detect Contract Cheating	The current tools may not effectively identify cases of contract cheating, where students or individuals hire others to produce academic or professional work on their behalf. This poses a significant challenge in maintaining academic integrity and fairness.
High Subscription Costs	Plagiarism detection tools often come with high subscription costs, making them financially burdensome for educational institutions or individuals. This can limit access to effective plagiarism detection, particularly for smaller institutions or individuals with budget constraints.
Language Bias	Plagiarism detection tools may exhibit bias towards specific languages, potentially leading to less accurate results for content in languages other than those the tool is primarily designed for. This bias can hinder the effectiveness of the tool in a diverse linguistic environment.

### 3. Ideate

The table shows the solutions and description for each solution.

Solution idea	Description
Refined Matching Algorithms	Develop advanced matching algorithms capable of recognizing paraphrasing more accurately. This would improve the tools' ability to identify legitimate use of language and reduce false positives in plagiarism detection.
Contextual Analysis	Implement contextual analysis techniques to enhance the tools' understanding of the intent behind the text. This would enable the detection of content within its proper context, reducing misinterpretations and improving overall accuracy.
AI-Driven Contract Cheating Detection	Integrate artificial intelligence (AI) algorithms that can memorize writing styles, enabling the detection of contract cheating where individuals may hire others to produce content. This advanced approach would contribute to maintaining academic integrity.
Cost Reduction Strategies	Explore and implement strategies to reduce the subscription costs associated with plagiarism detection tools. This could involve optimizing resource usage, adopting open-source technologies, or developing cost-effective licensing models.
Multilingual Support	Enhance the tools to support multiple languages effectively, overcoming language bias. This would make plagiarism detection more accurate and inclusive, catering to diverse linguistic environments in academic and professional settings.

## 4. Prototype

### Prototype Development

The table encapsulates essential steps in crafting a user-friendly prototype, from initial ideation to hands-on testing, highlighting the iterative nature of the design process and the creation of tangible representations for effective solutions.

Step	Action	Purpose
Empathize	Observe and interview to understand challenges	Gather insights on user needs.
Define	Clearly articulate the problem and need	Define the scope of the design challenge
Ideate	Prioritize ideas for effective solutions	Brainstorm potential solutions.
Prototype (Handmade)	Sketch our prototype on paper	Create tangible representations for testing.
Test	Conduct hands-on testing, gather feedback	Validate the prototype

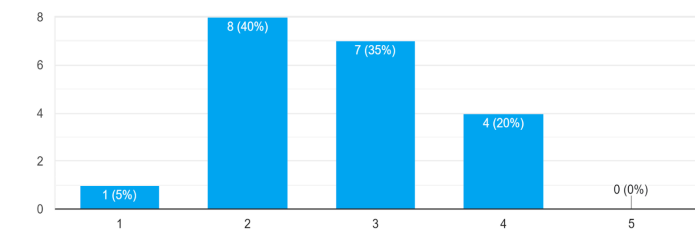
Characteristics	Description
Plagiarism checker	To upload the file and give the user the check result
Check	Bottom to help the user to check their text/link
Submission with plagiarism checker	Bottom to help the user to submit the file with using the Plagiarism checker
Submission without plagiarism checker	Bottom to help the user to submit the file without using the Plagiarism checker
Link your study portal	Bottom to help the user to link the portal and submit their files



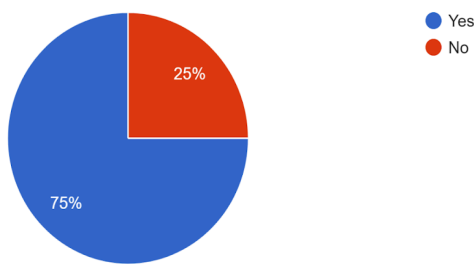
## 5. Test

In evaluating the performance of our plagiarism detection app, Plagiarism Detector Fantastech, we conducted a thorough testing process. By scrutinizing interview responses, we systematically identified potential challenges and cross-verified the app's functionalities. The comprehensive testing affirmed that our app effectively addresses identified issues, providing a reliable and robust solution for educators and students in the realm of plagiarism detection.

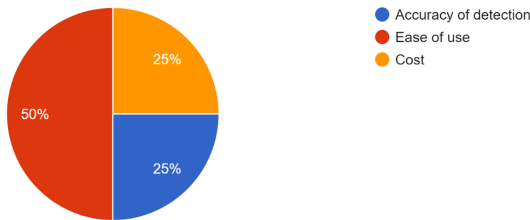
How effective are Plagiarism Detection tools in detecting Plagiarism in other languages than English?  
20 responses



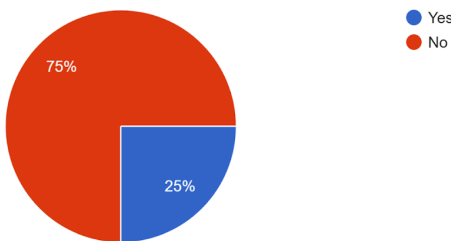
Have you struggled with incorporating AI-generated content into your academic work while avoiding plagiarism?  
20 responses



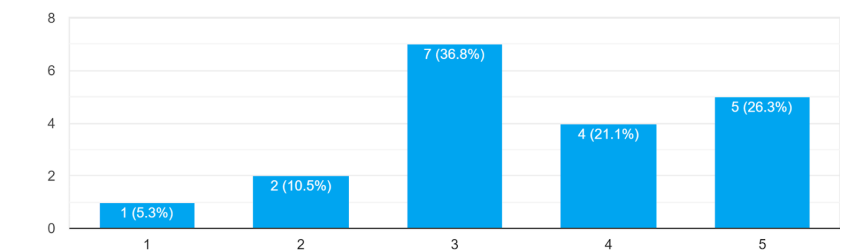
What factors influenced your choice of plagiarism detection tool(s)?  
20 responses



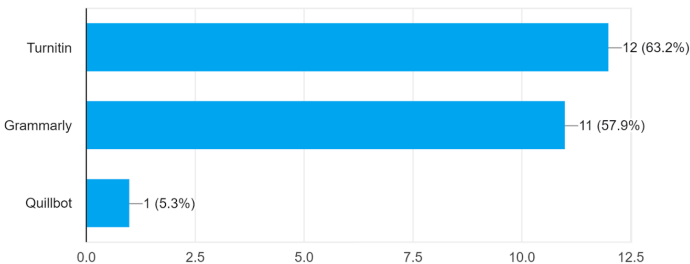
Have you ever submitted AI-generated content without proper citation, risking plagiarism?  
20 responses



How do you feel about Plagiarism Detection tools subscription costs?  
19 responses



Which plagiarism detection tool(s) have you used?  
19 responses



## REFLECTION

Our aim is to create good and useful software during our study. We want the software to work well and be easy for people to use. We also want to use the latest technology and keep everything safe and secure for the user. We hope our future software can grow as more people use it, and we care about the people who use it. We want to be a friendly community and help everyone. We will explain things clearly and be there to help if there are any problems. Our dream is to make software that is helpful now and in the future.

Using design thinking in our software engineering program really helps us make better and more user-friendly solutions. Our main goal is to create innovative and useful software that people can easily use. In a recent project about AI plagiarism detection, we learned a lot about the challenges faced by users like teachers and students. By understanding their problems and working together as a team, we are trying to fix issues in existing tools. The step-by-step process, from figuring out the problems to testing ideas and putting them into action, fits well with our goal of always getting better. Even when our team faced challenges, we found ways to collaborate and solve problems. Design thinking guides us to create software that not only solves current problems but also looks ahead to what might come in the future in the world of artificial intelligence.

To raise our potential in the industry as a team, our focus lies in continuous learning and creative thinking. We plan to stay aware of the latest industry trends, technological advancements, and best practices through, research, and workshops. Actively participating in industry communities, attending conferences, will keep us connected with experts and informed about the latest trends. Seeking lessons from experienced people will provide valuable guidance, while engaging in collaborative projects will not only broaden our collective skill set but also expose us to diverse challenges and innovative solutions. Being an active person may approach problem-solving and increasing each team member's strengths will be good for our study growth and success within this industry.

## TASK FOR EACH MEMBER

Name	Tasks	
Esha	Organizing	Detailed Description
Aqilla	Organizing	Reflection
Shams	Designing Prototype	Design Thinking Evidence
Albatoul	Designing Prototype	Design Thinking Evidence
Asilah	Topic Research	Introduction
Nouredin	Topic Research	Detail Step and Descriptions
Someyo	Visits Info and Media	Detail Step and Descriptions
You An	Reviewing	Design Thinking Assessment