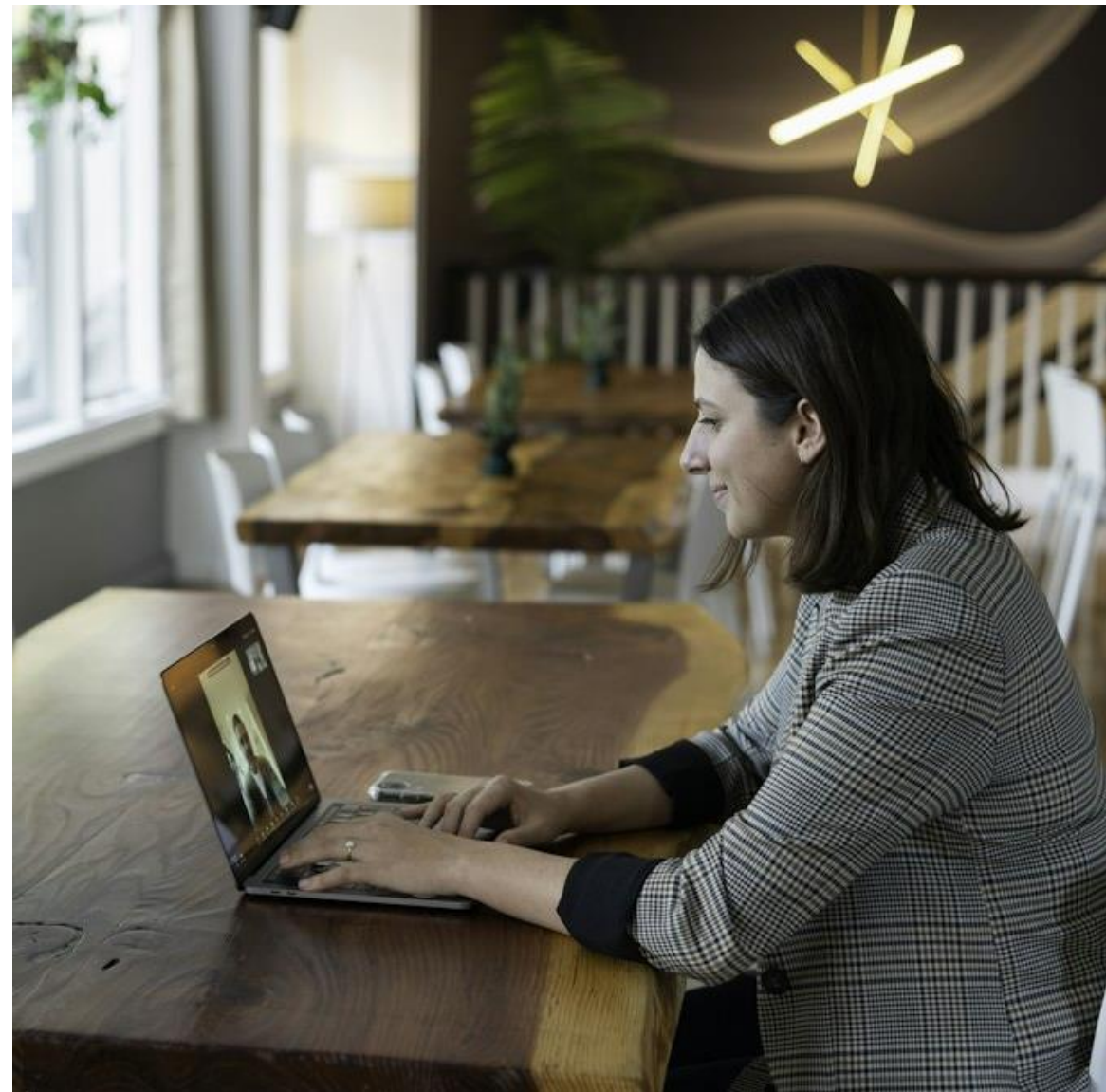




# KnowledgeConnect

Next-Gen Virtual Study Groups Platform

R24-077



# Meet Our Team



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# INTRODUCTION

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- Studying alone can be **boring** and **isolating** for many students, leading to **decreased motivation** and engagement with their studies.
- Some studies suggest that collaborative learning environments can enhance student's engagement, motivation, and academic performance.
- A study in the [Journal of Educational Psychology](#) found that students in collaborative learning settings had [higher engagement and better academic outcomes](#) than those who studied alone.
- Another study in [Educational Psychology Review](#) showed that collaborative learning [improves critical thinking, problem-solving, and information retention](#).
- This study propose a system that provide facilities for students to join a virtual educational environment .



# Research Question

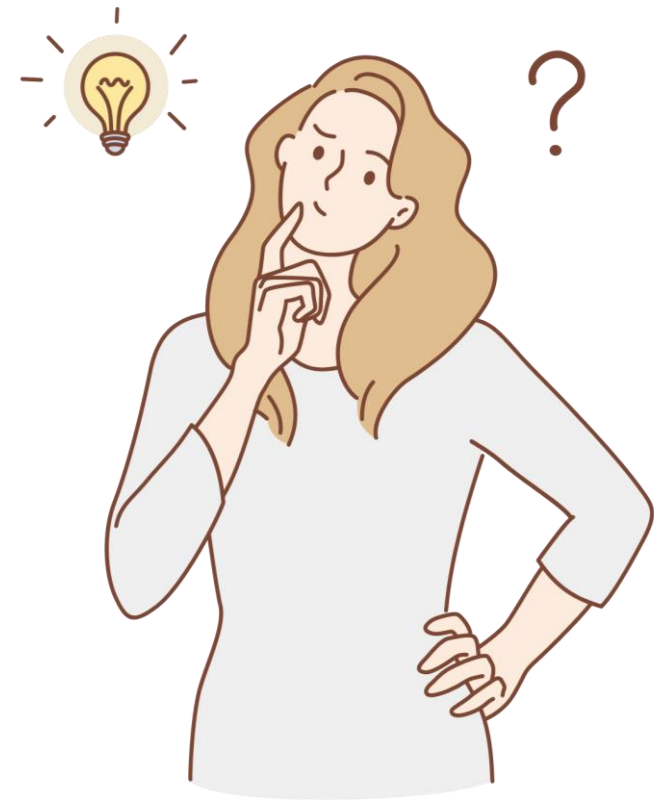
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How does a virtual study platform impact student collaboration and engagement compared to traditional methods?

Which features of a virtual study platform are most effective for enhancing collaborative learning?

Can students collaboratively work within the workspace at the same time?

What difficulties do users encounter when using virtual study platforms, and how can these be resolved to enhance the overall user experience?



# Objectives

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## Development of the "KnowledgeConnect - Virtual Study Group Platform" application

01

Development of Virtual Study Group platform

02

Development of Collaborative Workspace

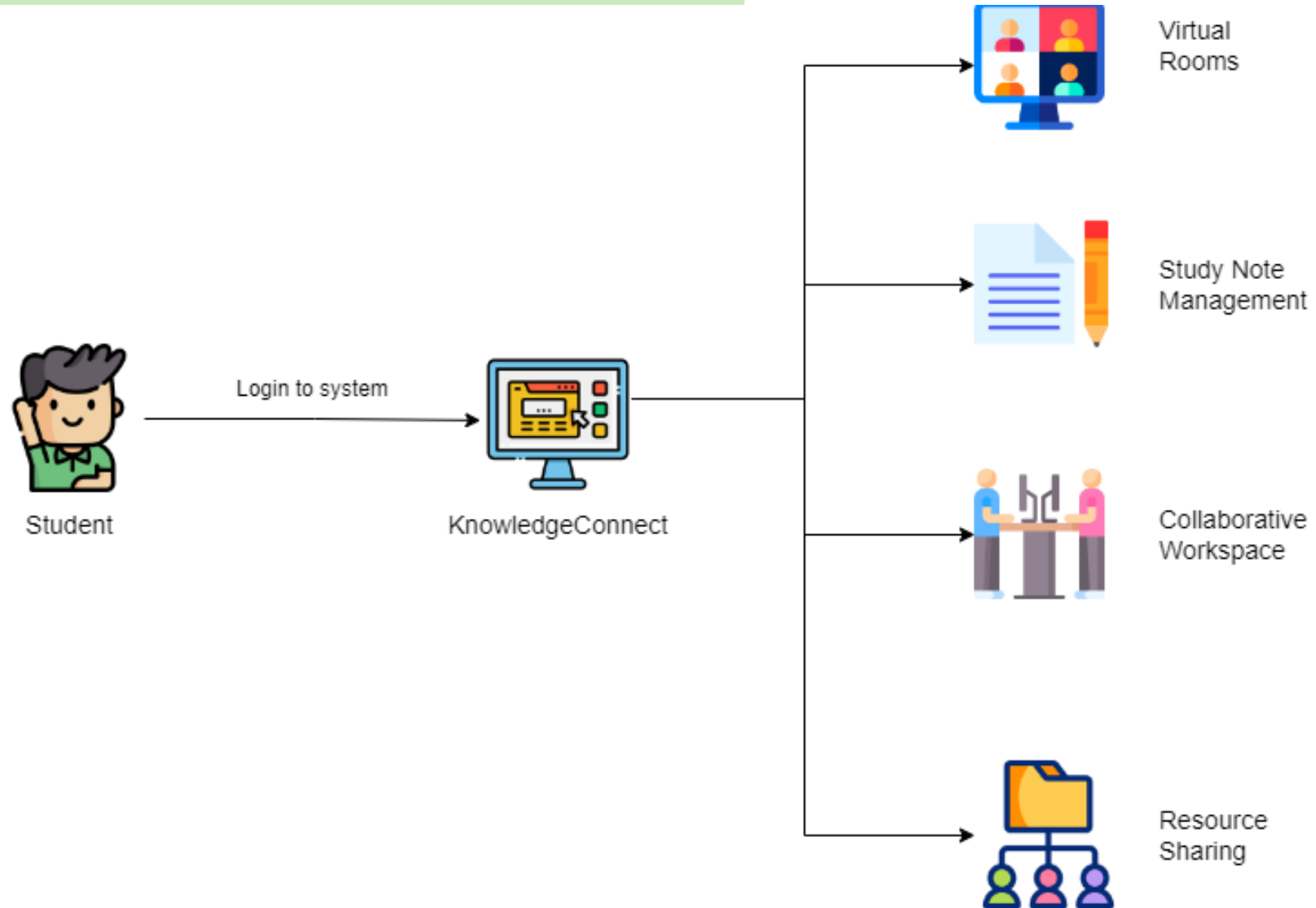
03

Development of Study Notes and management system

04

Development of Resource Sharing platform

# Overall System Diagram







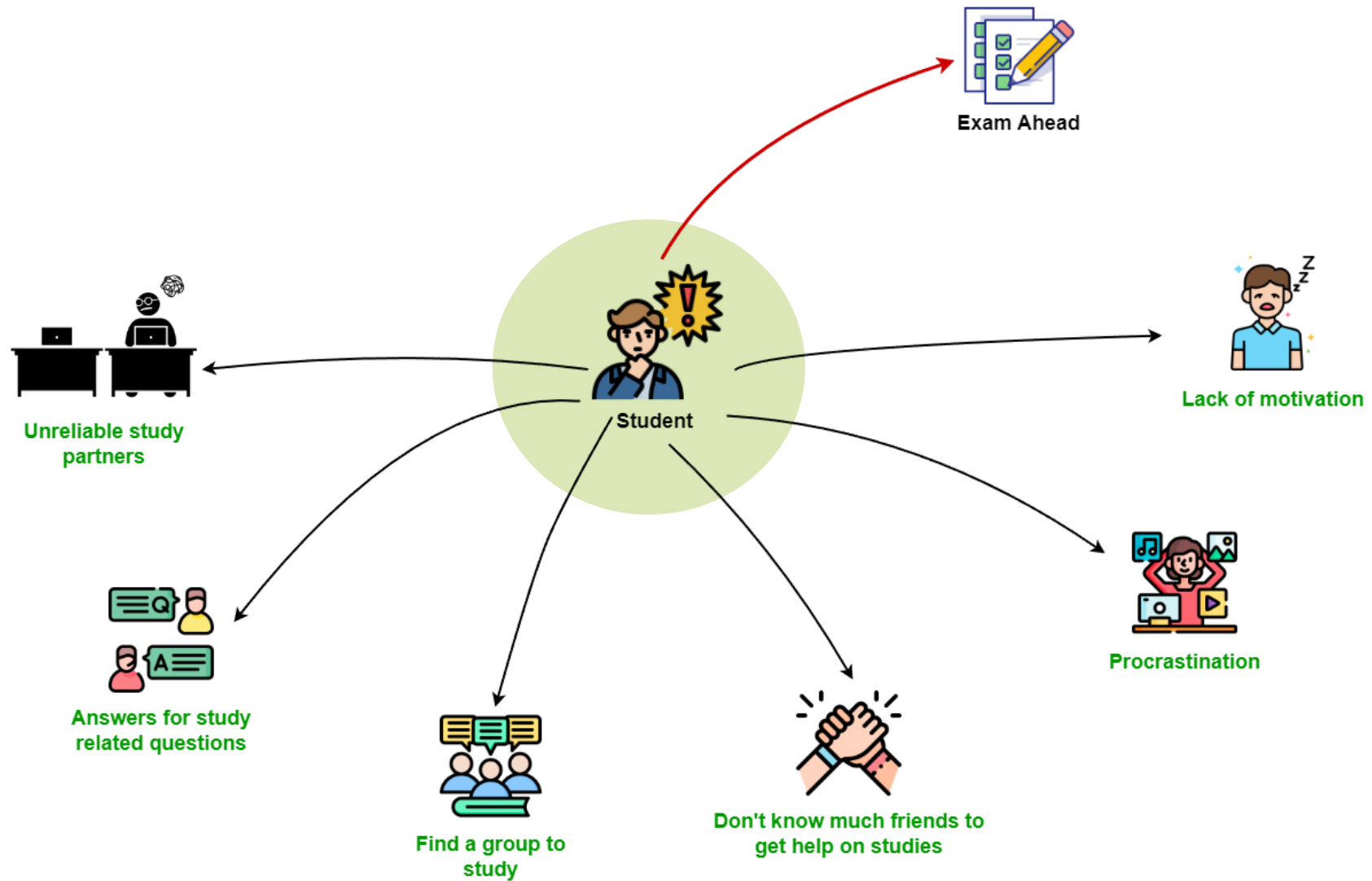
**IT21079740**  
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Specialization : Information Technology



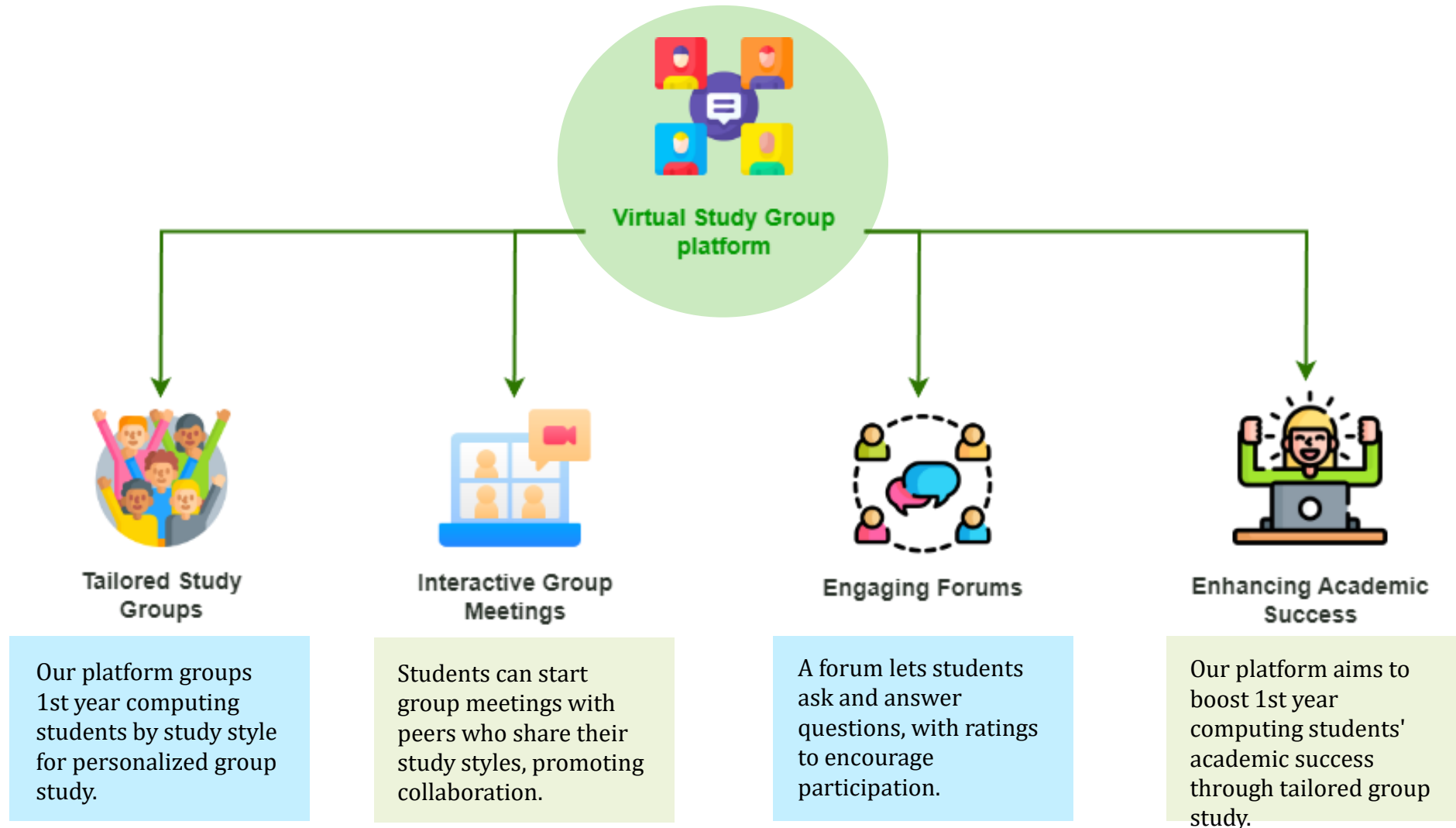
Component : **Virtual Study Group**

# Background: Virtual Study Group





# Introduction: Virtual Study Group



# Research Problem

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What is the effectiveness of grouping?

What is the long-term impact on Academic Success?

What is the impact of peer learning?

What motivates students to actively engage in collaborative learning activities?



# Specific and Sub Objectives

## Main Objectives

- Enhance 1st year computing students' academic success by grouping them based on their study styles, facilitating effective group study, and fostering peer support.



## Sub Objectives

1. Developing a questionnaire to identify students' study styles.
2. Creating a system to group students based on their study styles.
3. Implementing a virtual room function for students to start group meetings.
4. Establishing a forum where students can ask and answer questions.
5. Designing a rating system to evaluate students' participation and contributions.

# Research Gap

Compared to other research papers in this area, our component covers:

- Utilizing a questionnaire to identify study styles.
- Grouping students on their study styles.
- Incorporating a forum for student questions and answers.
- Introducing a rating system for student participation.

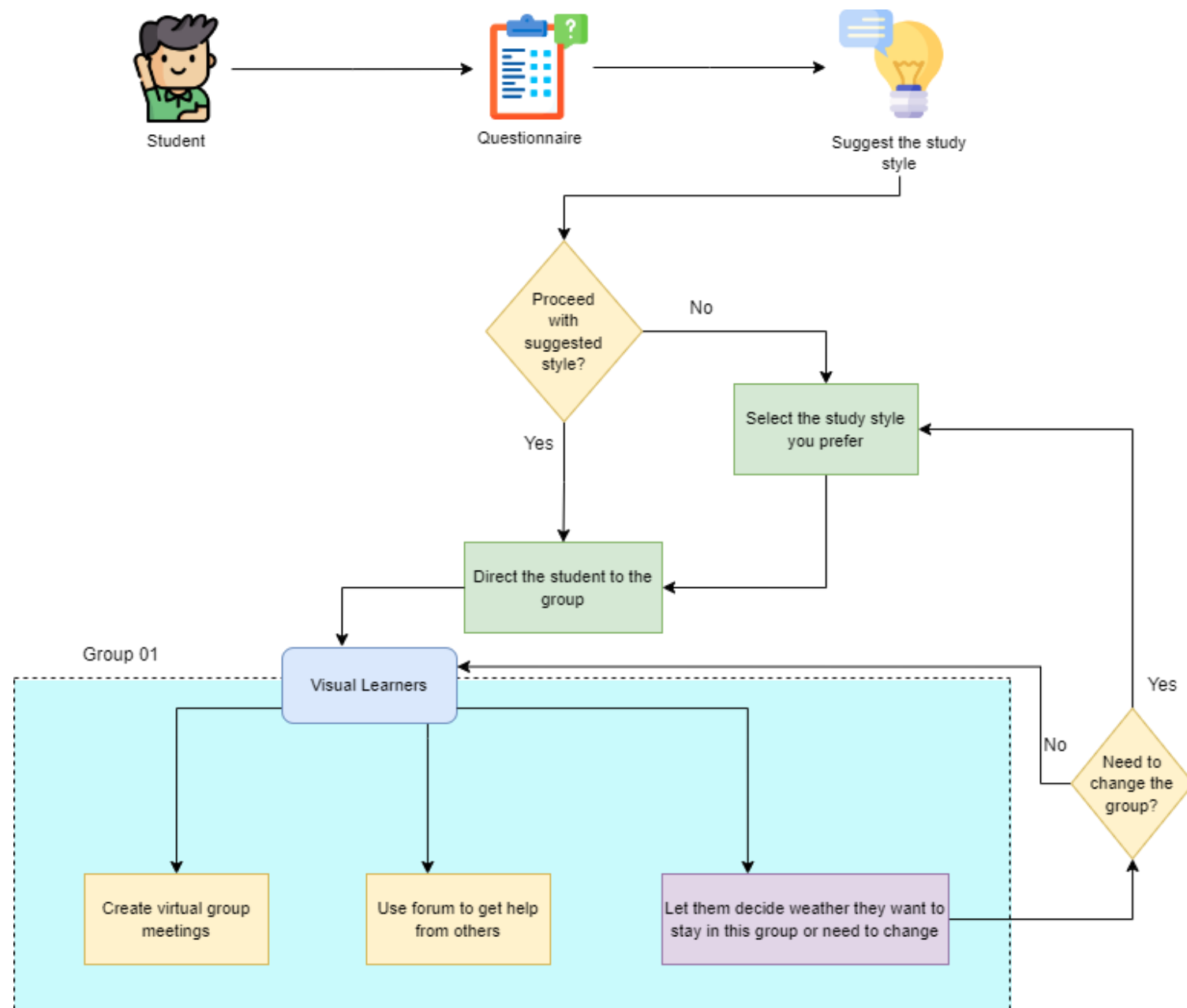


# Methodology

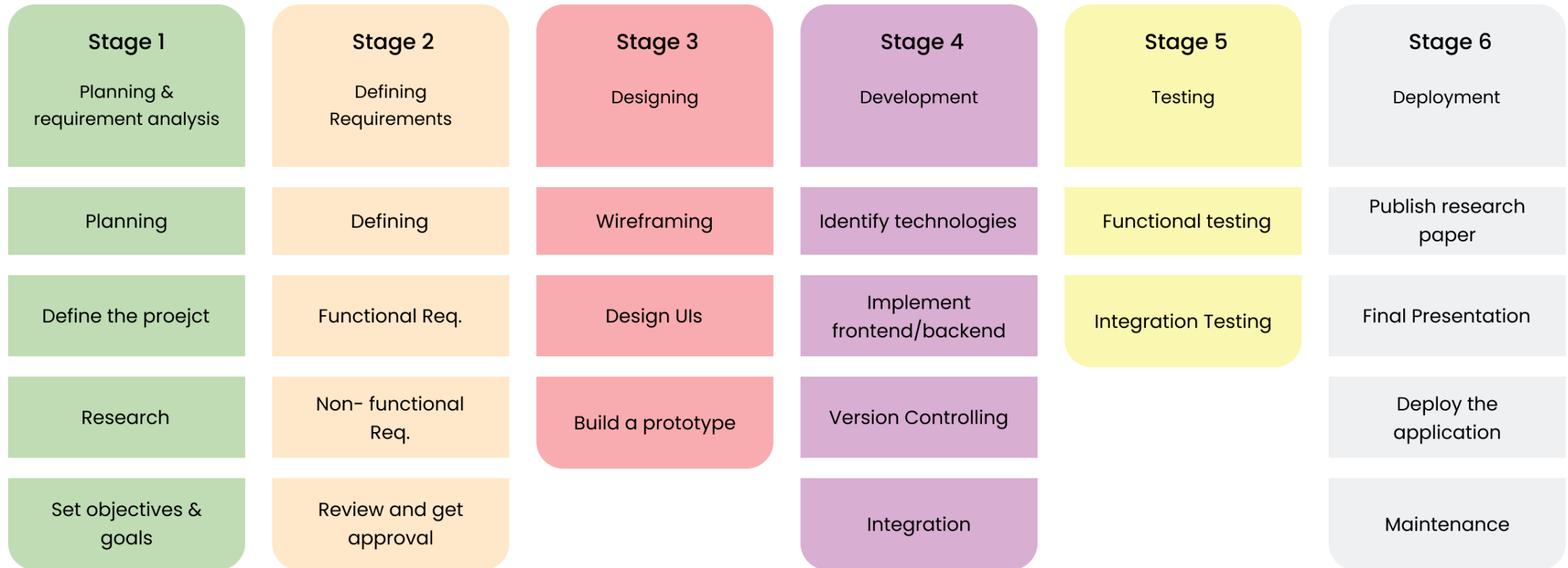
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- User Grouping : Divide registered 1st year computing students into study style groups using a questionnaire.
- Group Interaction : Enable students to start group meetings with others in the same study style group.
- Forum Creation : Establish an open forum for all students to ask and answer questions related to their studies.
- Rating System : Implement a system to rate students based on their responsiveness and frequency of participation.
- Technology Implementation : Use suitable technologies to support the functionality of the platform.

# System Diagram



# Work Breakdown Structure





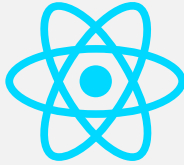
# Technologies to be Used

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Figma



React



Node.js



Browser APIs

Web Sockets

Mongo DB



HTTPS



Web RTC



Git



# References

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- [1] Chiong, R. & Jovanovic, J. (2012). Collaborative Learning in Online Study Groups: An Evolutionary Game Theory Perspective. Journal of Information Technology Education: Research, 11(1), 81-101. Informing Science Institute. Retrieved February 20, 2024 from <https://www.learntechlib.org/p/111494/>.
- [2] I Widiaty<sup>1</sup>, D Wahyudin<sup>1</sup>, A G Abdullah<sup>1</sup>, C Riyana<sup>1</sup> and S R Mubaroq<sup>1</sup>, "Designing Virtual Reading Room (VRR Digi\_Litikon) for learning batik in Vocational High Schools: Curriculum material improvement", 2019 Journal of Physics: Conference Series, Volume 1402, Issue 7, I Widiaty et al 2019 J. Phys.: Conf. Ser. 1402 077047, DOI 10.1088/1742-6596/1402/7/077047
- [3] Jin, Lina, "Virtual Study room on social media "Study with me" videos on Bilibili among Chinese university students", 2022-08-18, Identifier etd22132 from <https://summit.sfu.ca/item/35339>



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# Background: Resource sharing platform

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\*A resource-sharing platform helps people share different things like software, documents, and research papers to work together and learn from each other.

users can make their profile that highlights their resources, areas of expertise, and interests.

- Users are capable of uploading their own resources and downloading other people's resources.
- Typically platform has the capability of searching things using tags, categories, be keywords.
- The resources are categorized. ed to make it easier For users to browse and also the users can rank and review materials.
- to keep user safe, Platforms use things like passwords, coding data and access limits.

# Research Problem

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1. How can we make platforms that share study materials better so that students from different backgrounds can easily access high-quality learning resources?

2. What things can make people more interested in and working together on platforms where they share learning materials, so that knowledge can spread effectively?

3. How can platforms that share learning materials make sure people's information stays private and secure, while still being open and clear about sharing educational resources?



# Research Gap

Application Reference	Uploading and downloading resources	Searching resources based on keywords categories and tags	Rating and reviewing resources	Privacy & security about user profiles	Categorizing study materials into specific fields
Research A	✓	✗	✗	✗	✗
Research B	✓	✓	✗	✗	✗
Research C	✓	✓	✗	✗	✗
Proposed System	✓	✓	✓	✓	✓



# Specific and Sub Objectives

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## Main Objectives

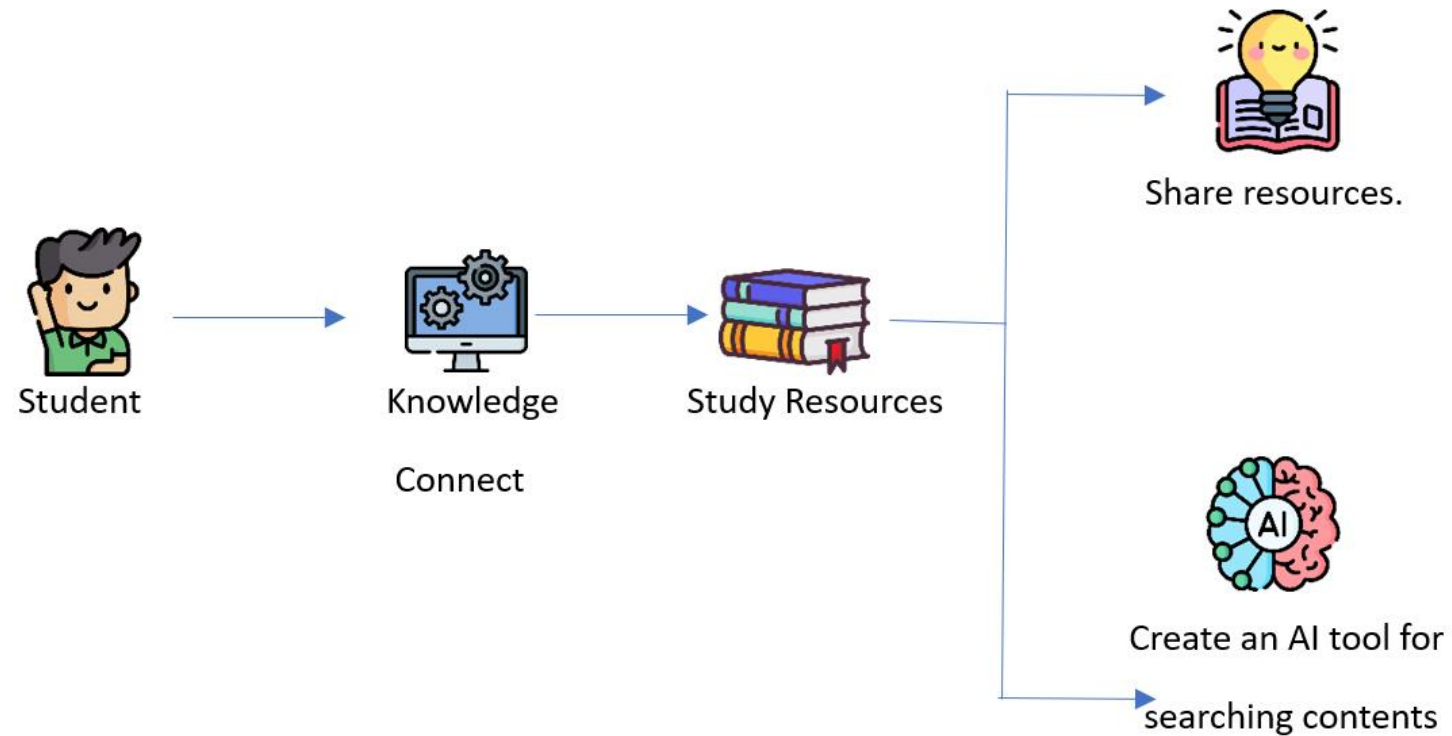
- To make sharing platforms better for learning materials so that people can learn more and have a better experience.

## Sub Objectives

- Content Curation and Quality Assurance
- User Experience and Interface Design
- Community Engagement and Collaboration
- Accessibility and Inclusivity
- Data Privacy and Security
- Metrics and Evaluation



# System Diagram

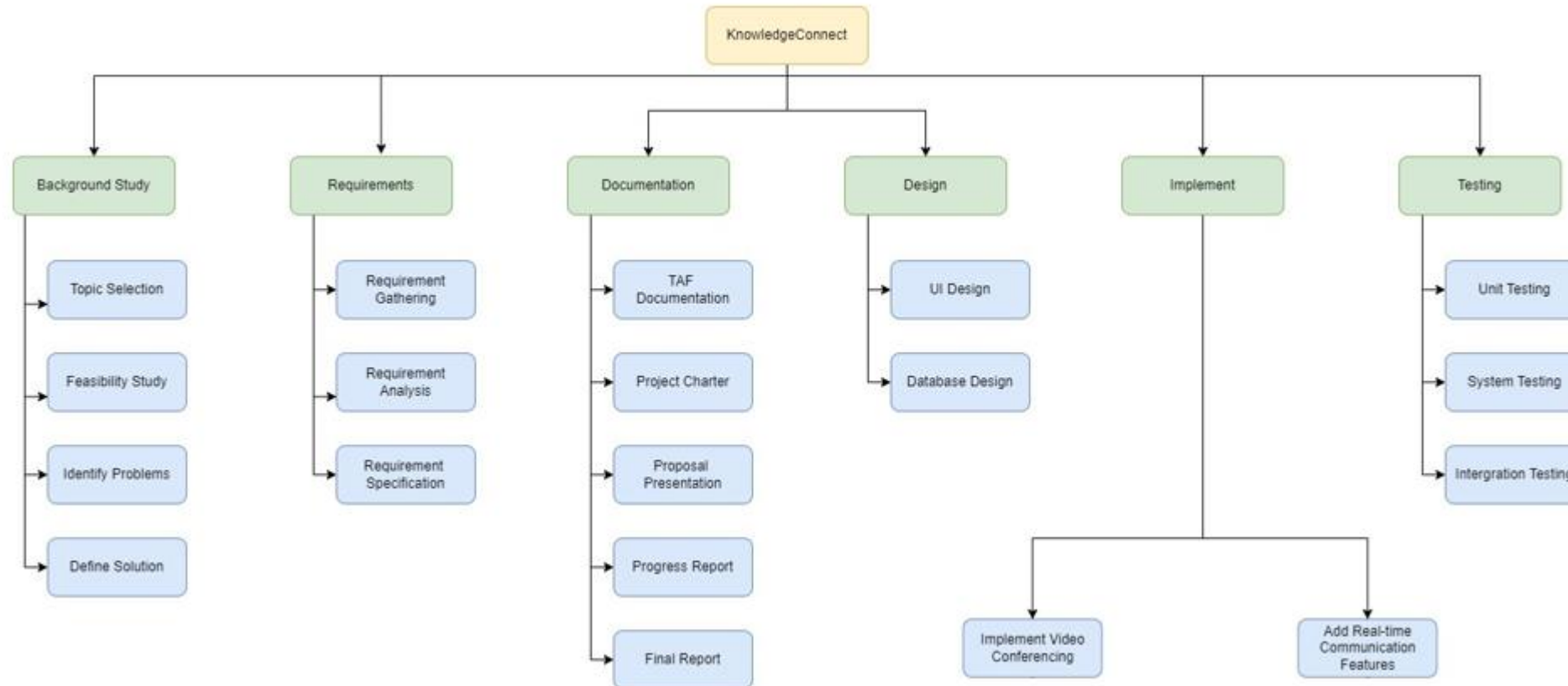


# Methodology

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- Creating a platform enhanced with an AI tool that organizes the resources users upload into specific categories, making it easier for everyone to find what they need. This tool will efficiently coordinate resources, ensuring they are properly categorized and readily accessible to users based on their individual needs. By utilizing this AI-powered system, users will experience improved efficiency in locating relevant resources, ultimately enhancing their overall experience on the platform. Additionally, regular evaluations and user feedback surveys will help us continually refine and improve the platform, ensuring it remains effective and user-friendly over time.

# Work Breakdown Structure (WBS)



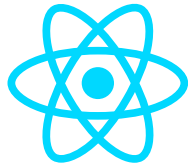
# Technologies to be Used

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Figma



React



Node Js



python



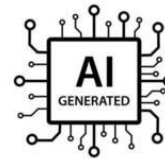
Mongo DB



HTTPS



generative AI



Git



# References

1. Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. *The International Review of Research in Open and Distributed Learning*, 12(3), 80-97.
2. Wiley, D., & Hilton III, J. L. (2018). Defining OER-enabled pedagogy. *The International Review of Research in Open and Distributed Learning*, 19(4), 133-147.
3. Beldarrain, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education*, 27(2), 139-153.
4. Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review*, 12, 45-58.
5. Hilton III, J. L., Wiley, D., Stein, J., & Johnson, A. (2010). The four 'R's of openness and ALMS analysis: Frameworks for open educational resources. *Open Learning: The Journal of Open, Distance and e-Learning*, 25(1), 37-44.



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Component : **Study notes management system**

# Introduction: Study notes and management System



- This involves building a simple academic note management system that users can easily access and use. Notes can be categorized by adding tags and notes will be synced across all devices and note history will manage to reverse changes to notes.
- Also, users will be able to get the support of AI to gain insight on their study notes, like further study areas, missing points and how the notes can be improved.
- Include a function that keeps track of and shows note revision histories, assisting students in tracking modifications and making necessary revisions.
- Note history can be attained through a version control system that allows to see previous versions of notes.



# Research Gap

Compared to other research papers in this area this approach covers,

- Generative AI to enhance study notes by making suggestions and finding out what are the missing points.
- A version control system to see previous versions of the saved notes.



# Research Problem

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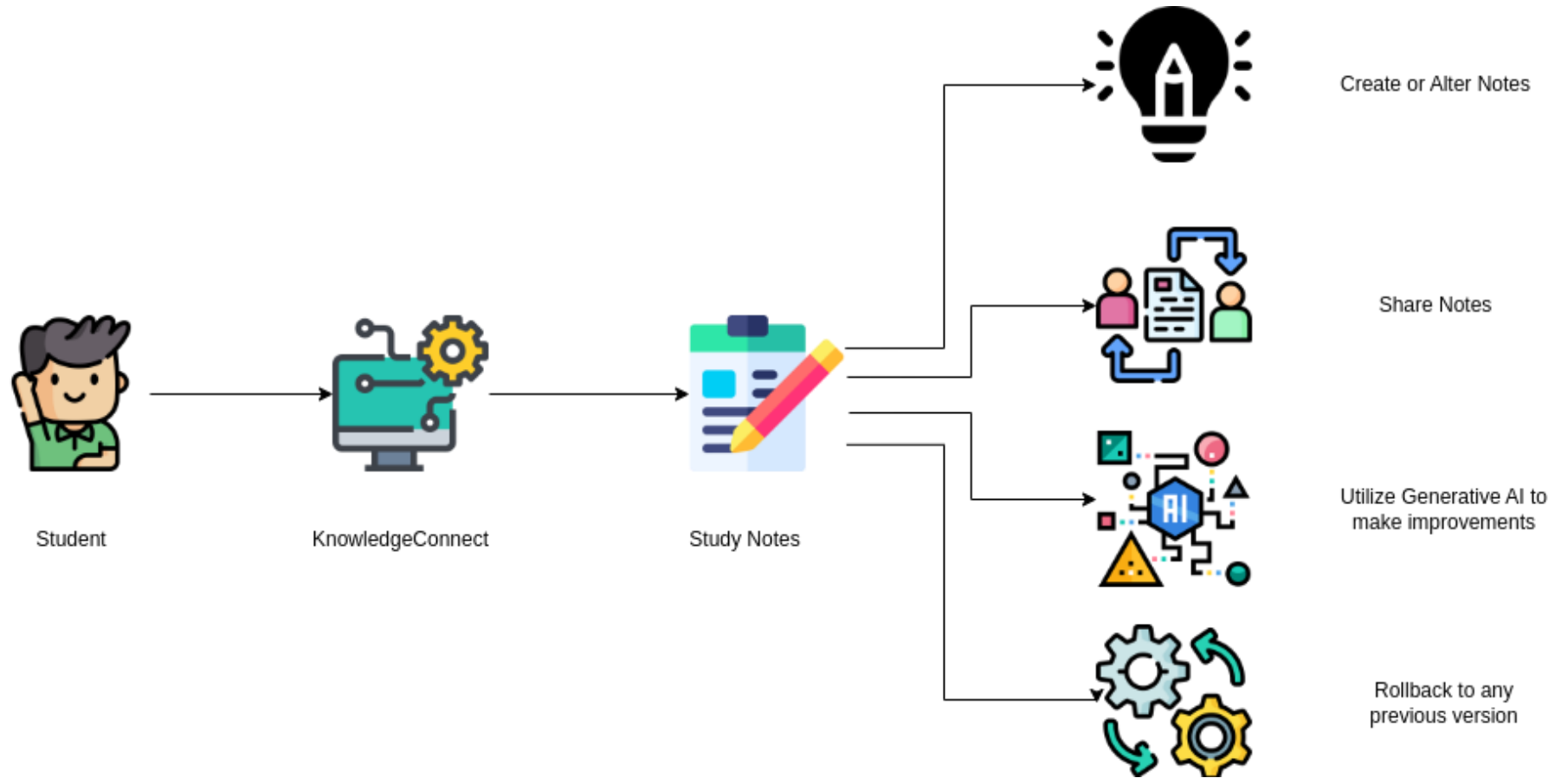
figuring out the most effective and dependable synchronization strategy to minimize latency and possible conflicts and guarantee smooth note updates across all devices

How to manage the version controlling of the notes?

How to optimize the Generative AI model to make suggestions on the notes?



# System Diagram



# Specific and Sub Objectives

## Main Objectives

- To develop a simplified study notes management system that enables users to easily access, categorize, synchronize, and manage their study notes across multiple devices.



## Sub Objectives

1. Provide a simple, intuitive design that makes it quick and unnecessary for users to write, organize, and access their study notes.
2. Put in place a strong system for labeling notes that helps users organize them effectively and facilitates searching and retrieving particular themes or subjects.
3. Create a smooth synchronization system to guarantee that notes are automatically updated and available on PCs, tablets, and cellphones.
4. Include a feature that lets users keep track of the changes they've made to their notes over time and, in case they need to, roll back to earlier versions.
5. Integrate a Generative AI model to make suggestions on how to improve, what are the missing points, and further study areas of the notes individually.

# Methodology

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- Students can navigate to Knowledge Connect and add notes as their preference in the web interface.
- Once added these notes can be categorized into relevant categories.
- Students can utilize Generative AI to generate further study areas, suggestions on how to improve notes.
- Generative AI analysis will be done via an opensource Large Language Model Mistral 7B available on hugging face.
- Also, users can revisit any of the previous versions with the version control system. Version Control system currently planning to implement is based on Git.
- User are also allowed to share the notes with other users.

# Component Requirements

## Functional Requirements

- Notes can be categorized by adding tags.
- Notes will be synced across all devices.
- Note history will be manage to rollback to previous versions.
- Users will be able to get the support of Generative AI to gain insight on their study notes, like further study areas, missing points and how the notes can be improved.

## Non-Functional Requirements

- Make the Generative AI Optimized for faster generation.
- Implement caching functions to speed up the website.

# Supporting Items

## Commercialization

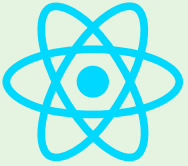
### Target Group

- **Students:** Targeting students at various educational levels, from high school to university, can be a lucrative market.
- **Professionals:** Professionals in various fields, such as researchers, academics, and business professionals, often need to take and manage notes as part of their work.
- **Educational Institutions:** Targeting schools, colleges, and universities as potential customers can lead to large-scale adoption of your product.



# Technologies to be Used

React



Figma



Node.js



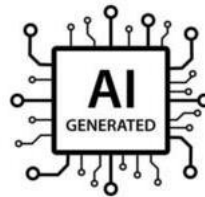
python



Mongo DB



generative  
AI



Git



# References

- [1] Alavi, M., & Leidner, D. (1999). Knowledge Management Systems: Issues, Challenges, and Benefits. Communications of the Association for Information Systems, 1, from <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=2486&context=cais>
- [2] Alavi, M., D. E. Leidner. 2001. Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. MIS Quart. 25(1) 107–136.
- [3] Cabrera, A., W. C. Collins, J. F. Salgado. 2006. Determinants of individual engagement in knowledge sharing. Internat. J. Human Resource Management 17(2) 245–264.



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Component : **Collaborative Workspace**

# Background: Collaborative Workspace

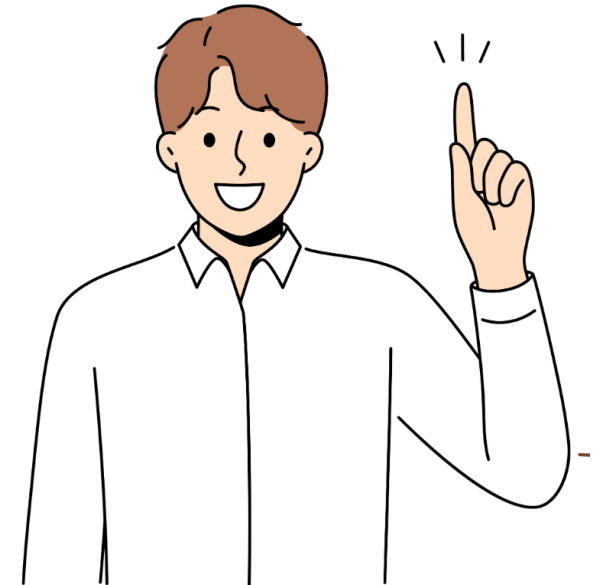


- A collaborative workspace for students to work together in document related group projects to achieve a common academic objective.
- The users will be able to use speech to text feature within the workspace where the mic will detect their speech and it will be displayed the workspace. This will be a main benefit to disabled students to work in projects.
- The documents could be read by speech of the system proposed where the it will be effective for students.
- Currently the documents are being saved as a current version, but they are not able to rollback for a previous version if required.

# Research Gap

**Compared to other research papers in this area, the component covers:**

- Implement a voice to text generating capability in the workspace with using Tenserflow.js.
- Improve the efficiency of the reading the documents created in the workspace by a text to speech generating.
- Implementing task management to distribute the workload among members.
- Providing a version controlling facility with enabling to revise previous changes.



# Research Problem

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How to capture the user voice as a text input?

How to train a model to speech to text generation using TensorFlow.js?

How to implement an effective way to review the content created?

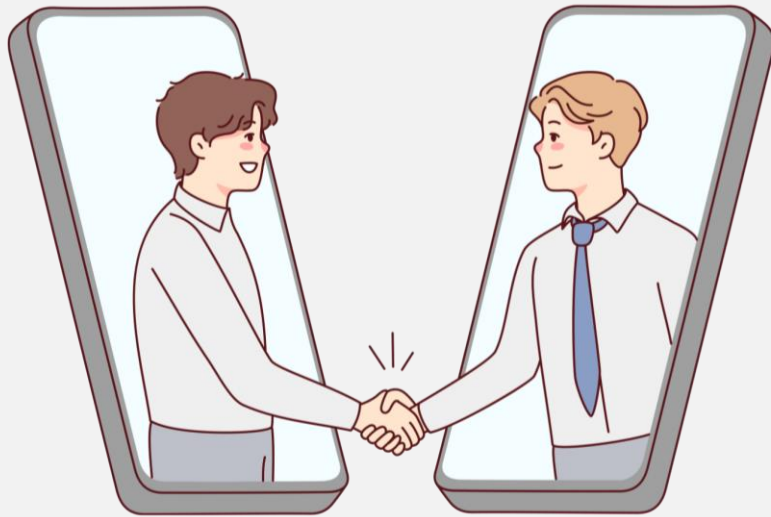
How to auto correct the grammar errors of the text generated by the voice?



# Specific and Sub Objectives

## Main Objectives

- Developing a Collaborative workspace for students to facilitate working on document related group projects.



## Sub Objectives

1. Implement a task management feature within the workspace.
2. Include version controlling ability.
3. Create a voice to text generating capability where the users voice will be displayed as text and mistakes will be auto corrected by the system.
4. Implement a feature to improve the efficiency of the user reading by providing a text to voice generation of created content .

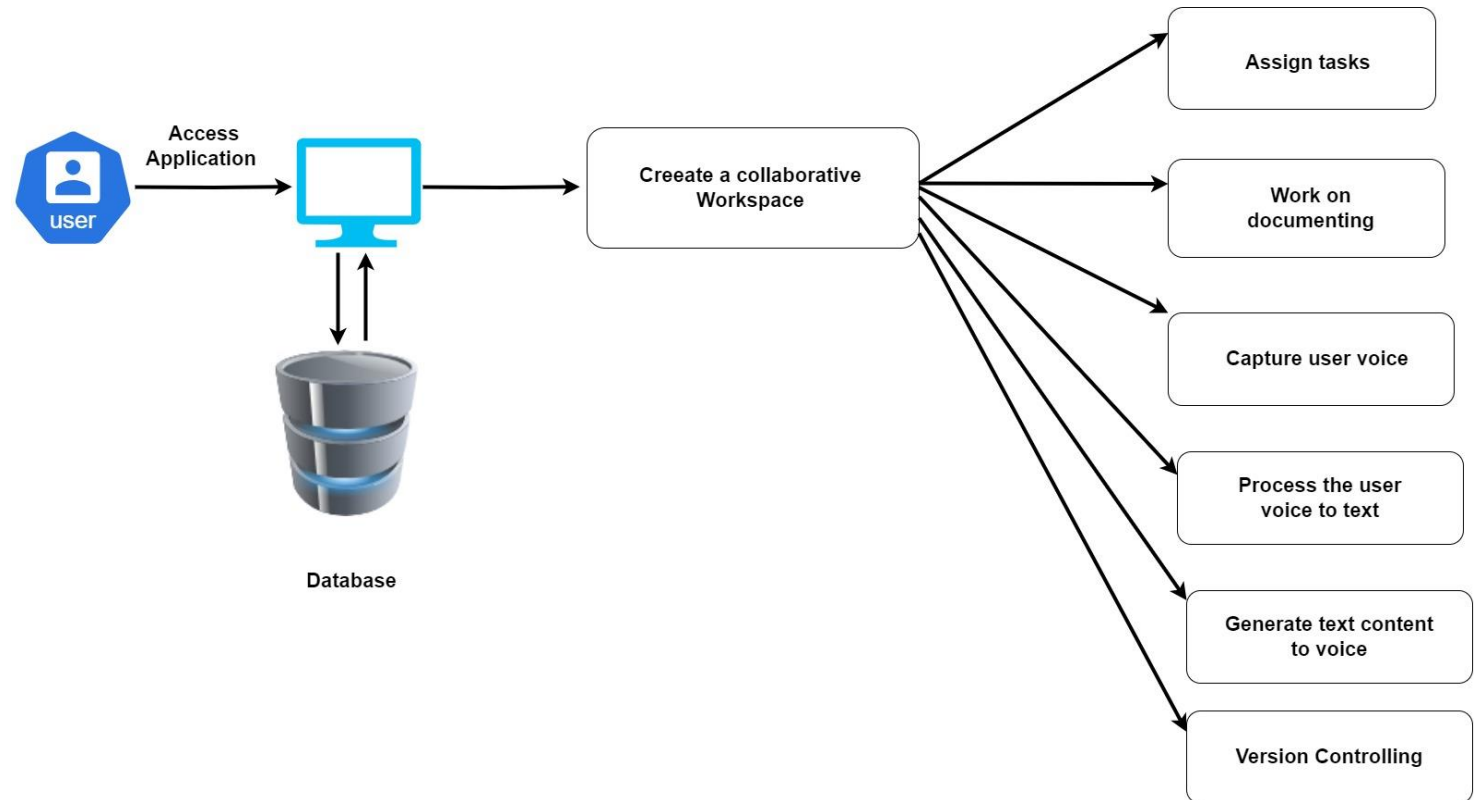
# Methodology

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- A workspace will be created where all students can work on documents related to group projects with editing tools.
- A task management capability is within the workspace to assign tasks for members
- A browser API (getUserMedia) will be used to capture the voice of the user.
- A trained model created using Tensorflow.js will be used to process the voice to text.
- The grammar errors will be checked and auto corrected by the system itself.
- The text content will be .



# System Diagram



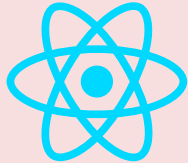
# Technologies to be Used

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Figma



React



Node.js



Gitlab



Mongo DB



VS Code



Postman



# Component Requirements

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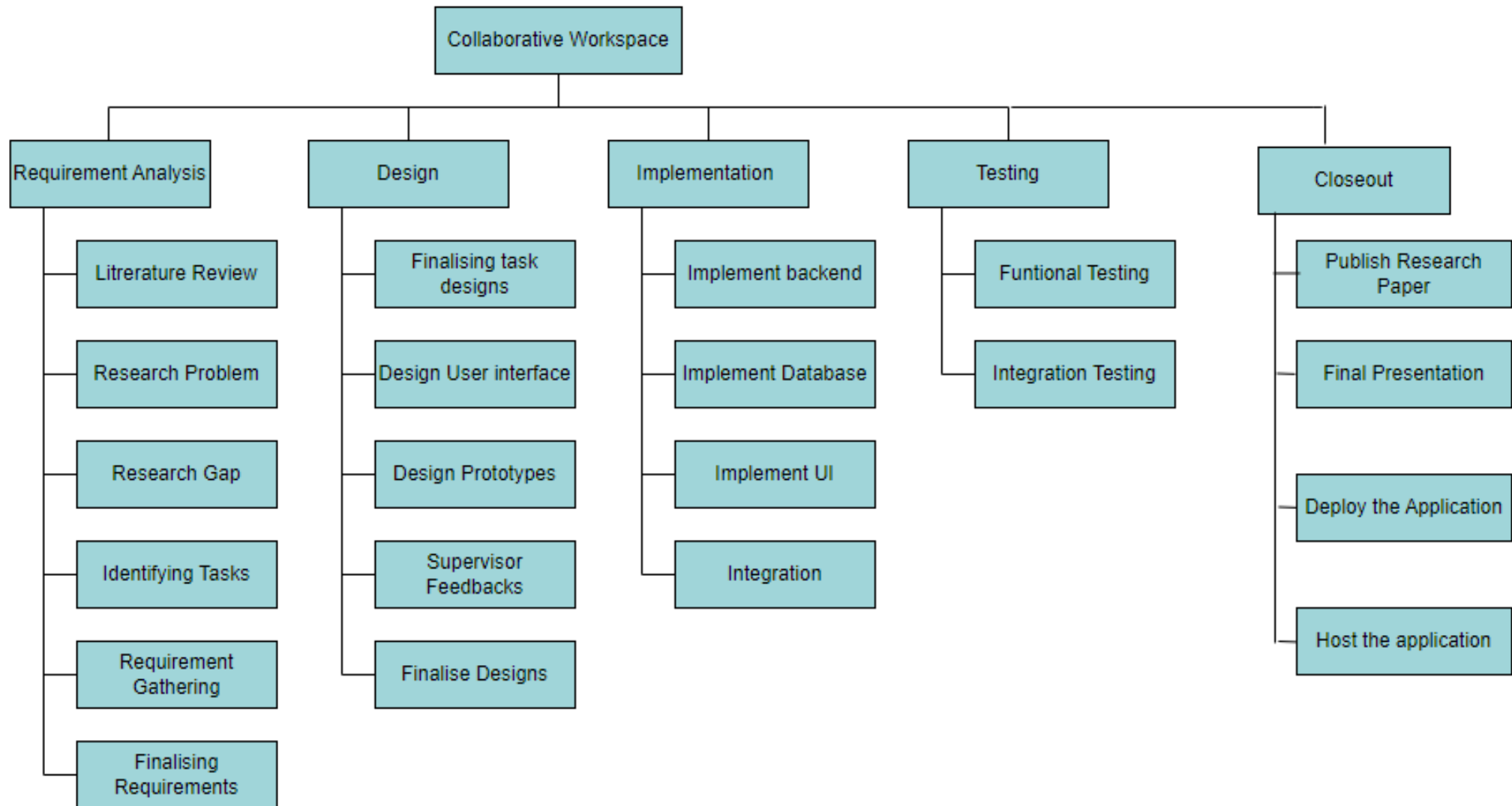
## Functional Requirements

- Ability to work collaboratively within the workspace using collaborative editing tool
- Version Controlling with rollback feature enabled
- Ability to capture the user speech using a Web API .
- Ability to convert voice generated speech to text.
- Ability to optimize reading experience by converting the document text to voice generation.

## Non-Functional Requirements

- Usability
- Availability
- User Friendliness
- Performance
- Accessibility

# Work Breakdown Structure (WBS)



# Supporting Items

## Commercialization

### Target Group

- Students
- Educationists

### Marketplace

- No need of advanced knowledge in technology
- No Age limit for users

### Marketing Strategies :

- Identifying the target audience
- Social media marketing
- Distribution of flyers among students and educational institutions



# References

- [1] V. M. P. J. A. G. Félix Albertos Marco , Víctor M.R. Penichet and José A. Gallud, "Collaborative e-Learning through Drag&Share in," *Journal of Universal Computer Science*, vol. 19, p. 18, 2013.
- [2] Maria Altebarmakian and Richard Alterman, "A study of engagement and collaborative learning in a virtual environment," in *2017 IEEE Frontiers in Education Conference (FIE)*, 2017.
- [3] L. Xiao, "A Virtual Group Workspace for Rationale Sharing in Distributed," in *2008 International Conference on Computer Science and Software Engineering*, 2008.