Proposal for UniCoop

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March 31, 2023

1 Introduction

UniCoop is a collaboration service that supports team building and collaboration for university team project classes for all majors. In this proposal, we will discuss the motivation behind UniCoop, our objectives, background, proposed solution, and planning.

2 Motivation

The world today values collaboration as an essential skill in various aspects of life, including education and the workplace. It plays a crucial role in achieving success in various fields, such as education, business, and research. In modern society, people are expected to work collaboratively with others towards a common goal. It is rare for an individual to succeed in isolation, and instead, people are expected to work collaboratively with others.

This is particularly true in university team project classes, where students and professors face several difficulties in team building and cooperation. Students often need to build teams with people they are not familiar with, while professors have to organize teams quickly and fairly, depending on the purpose of the class.

UniCoop aims to address these challenges by providing a collaboration service that supports team building and all aspects of collaboration. UniCoop will address this issue by allowing students to find and connect with other students who share similar or diverse interests, skills, and goals. Furthermore, UniCoop will provide a range of collaboration tools that will support teams throughout their entire project lifecycle. Our team consists of, and our goal is to develop a service called UniCoop that addresses these needs. We are committed to providing a comprehensive platform that will support all aspects of teamwork and promote collaboration.

3 Objectives

UniCoop has the following objectives:

- Provide an intuitive UI/UX to enable users to participate and collaborate easily.

- Support effective team building by taking into consideration participants' interests and characteristics, and automatically matching them into teams to encourage active cooperation.

- Functionality provided for aspects such as task management and meeting scheduling in team project activities.

- Offer project post-management to allow participants to easily track and manage project outcomes.

- Providing services for all universities and majors.

4 Related Work

We researched collaboration services considering following issues:

- Is it suitable for university class?

- Is it based on user preference?

- Dose it have feedback features?

- Does it have team building feature?

- Does it have project management/progress check feature?

- Is it possible to set duration?

Therefore, based on these questions, we have conducted research on related projects to see what is available. Here is the information we have found:

Service	Team Matching	Project Management	Scheduling	Task Management
Asana(Trello)	No	Yes	Yes	Yes
Google Docs	No	No	No	No
iCampus	Yes (random)	No	Yes	No
Beside	Yes (manual)	No	No	Yes
BeginMate	Yes (manual)	No	No	No
UniCoop	Yes (automatic)	Yes	Yes	Yes

Table 1: Comparison of Collaboration Services

- Asana and Trello: project management tools for task collaboration and progress tracking. Does not have team formation functions

- Google Docs and Microsoft Teams: real-time document collaboration and team communication tools. Does not have team formation functions

- iCampus : it is suitable for university class, has team building feature but with a random approach, and is possible to set duration. However, it is not based on user preference, does not have feedback, project management, progress check feature.

- Beside : provides good team matching but lacks project management and progress tracking features. specifically, it is not suitable for university class, does not care user preference(only care users; experience and skills), does not have automatic matching system. Team building process is done by human

- BeginMate: It provides a team building system based on user preference, but is not suitable for university class and is done by human. Also, it lacks other features like feedback, project management, progress check, duration check.

- Google Docs and Microsoft Teams: real-time document collaboration and team communication tools. Does not have team formation functions.

Despite the existence of these collaboration services, there is still a gap in the market for a platform that can provide all necessary features for university team projects. UniCoop aims to fill this gap by offering a platform that includes team matching, project management, progress tracking, and peer evaluation features, tailored specifically for academic team projects.

5 Problems

Problem situations are divided into student and professor's perspective:

5.1 Student Perspective:

Students want to form teams smoothly with people they have never met before and want to progress smoothly even after team project initiation. They may want to form a team with students who have a compatible personality or with people who do not have overlapping roles. Above all, team formation is closely related to grades and since long projects continue for a semester, we hope that the teams are formed as well as possible. They also want to easily access information on when they need to solve a task during team project progress and want to easily schedule team meetings.

5.2 Professor Perspective:

From the professor's perspective, there is a desire to form teams according to the purpose of their class. Looking at the existing team play progress methods, the professor assigns teams randomly without knowing information about the students. This makes it impossible to form teams that best match the purpose of the class. Even if it is possible, there is an inconvenience of the professor having to conduct a survey and assign teams one by one.

6 Proposed Solution

UniCoop will offer the following solutions:

1. Register Project
2. Team Matching
3. Meeting / Working Time
4. Task Timeline
5. Projects Management

6.1 Register Project

UniCoop's team matching algorithm is designed to help users participate in collaboration according to their roles and contribute to a smoother collaboration process. Professors can directly register projects and input basic information such as class name, project name, period, number of groups, and participants. Moreover, professors can select specific details about the project, such as prohibiting students of the same major from being in the same group or forming groups of students with diverse backgrounds rather than similar ones. The following is the actual process that users, that is, the professors, go through:

- The professor can set default and customized questions, with some questions already answered by students' user information, and others left unfilled. Customized questions can be added according to several features, helping the professor minimize manual processes.

- The professor can add options for general questions and decide whether to enable students' own input or not.

- The professor can also select a setting for a certain question, which can be either similar or diverse, and this will be applied to the algorithm.

- If the professor checks a question as mandatory, it means that the property is included as mandatory when computing the algorithm.

- The professor sets the questions, options, and even the number of groups, and finally sets priority among the optional questions.

Question	Type	Mandatory or Optional
Major	default	Mandatory
Age	default	Optional
MBTI	default	Optional
Semester	default	Optional
AI or NON-AI	customized	Mandatory
Linux or Windows	customized	Optional

Table 2: Example table for Computer Science class

6.2 Team Matching

Our team matching algorithm matches people with similar or different preferences based on the purpose of the class. Here is how it works:

1. Form groups: The algorithm begins by forming groups based on criteria specified by the professor as mandatory. If group formation is not possible due to an imbalance of characteristics, the algorithm runs without that characteristic, with two options given – to run the algorithm without that characteristic or to specify the characteristics on a first-come, first-served basis.

2. Form teams within the groups: The algorithm then initializes by randomizing the teams within the divided groups. Now there would be several teams for each group.

3. Compute the team matching scores: The algorithm computes the team matching scores by checking the distribution of each characteristic of the team members. This helps measure the compatibility of the team members.

4. Confirm the teams: The algorithm confirms the team formation when the teams' matching scores are most evenly distributed, ensuring that the team members are well-matched and have a higher chance of succeeding. The team matching algorithm aims to enhance the efficiency and performance of team projects, with an aim to receive feedback and further develop it to make it even more precise.

6.3 Meeting / Working Time

This feature suggests the best time for a meeting by considering the schedules of all participants. Since the information is shown and shared to every team member, users can easily arrange meeting times and minimize unnecessary time wastage during meetings.

6.4 Task Timeline

UniCoop will also provide a feature for task timeline, which will provide information on when and what tasks need to be completed. Users can share their personal task timelines with their team members and make their to-do lists accessible to everyone to facilitate effective collaboration.

6.5 Projects Management

Projects Management allows users to view all projects they have participated. They can see the project participation period, class name, roles, scores, and final project files. This feature can also be used to share and export the information as part of their portfolios.

7 Planning

We have the following timeline. First, the frontend development will be handled by Myungha Cho and Haim Nam, while Joonsun Baek and Jaebum Cho will handle the backend development. To summarize the timeline, we will implement the login and registration functionality and landing page in weeks 4

Tasks	w4	w5	w6	w7	w8	w9	w10	w11	w12	w13	w14	w15
Register	All											
Login		All										
My Page			Back	Front	Front							
Team Formation				Back	Back	Front	Front					
Team Scheduling						Back	Back	Front	front			
Team Activity								Back	Back	Front	Front	
Landing Page	Front											

Table 3: Task Timeline

Myungha Cho	Frontend
Haim Nam	Frontend
Joonsun Baek	Backend
Jaebeom Cho	Backend

Table 4: Roles

and 5, and implement the my page from weeks 6 to 8. After that, we will focus on features related to team activities. Specifically, we will first introduce a team formation algorithm to create teams, and then implement features to assist with team activities, such as team scheduling and displaying team tasks.

7.1 Tech Stack

Frontend	ReactJs + Typescript
Backend	NodeJs
DB	MongoDB
Server	Cloud Type (Paas)
Design	Figma

Table 5: Tech Stack

We are planning to use the following tech stack. For the frontend, we will be using TypeScript language and React framework. CSS will be mainly implemented with Material UI, and we will also use the Kakao Map API for sharing meeting locations and other data statistics libraries. For the backend, we will use Node.js and MongoDB to design a noSQL-based database. The server will be hosted on using Paas like CloudType, and design will be created using figma

8 Reference

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