CSC 3150–Systems Design

**System Proposal**

**Template and Instructions**

Cover Page



CLace

The National Education for Statistics reports that student tardiness occurs at a rate of 9.5% for all students under 12th grade. Many students arrive in the classroom after the lecture starts. CLace is the application that motivates students to be on time. CLace is a GPS-based application that lets users know when to go to the class based on the distance to the classroom.

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“Time is what we want most, but we use worst.”CLace is an innovative application designed to help children avoid wasting time and develop productive habits. This document outlines how CLace is engineered to combat time-wasting and instill efficient time-management skills in young users. Discover how CLace transforms students' approach to time, encouraging them to use every moment wisely. Please pay close attention to the features and benefits of CLace as it guides children towards valuing and making the most of their time.

1. Introduction and Overview

Problem Statement

The target of CLace is the students who find it difficult to attend class on time. Their will is weak, and they want a new application that motivates them more to move than Google Maps or Apple Maps. CLace is an app to record their time habit, give them milestones to move, calculate the required time to be there and rank the dashboard to compete for more motivation. CLace will help students reduce their tardiness rate.

## Project Vision and Scope

Time appointments play an essential role for people living in modern society and are closely linked to the individual's reputation, credibility, and friendship.

If the student does not watch 1 YouTube video or some Instagram posts and leaves the house early, he will not be late for class and appointments. People carry what they learn from the cradle to the tomb.

According to the tardiness research by age, young people have less self-control than adults. So, CLace will be a more active application to grow their time-keeping people than the passive current map applications.

## Requirements Summary

*Must have*

- The system must provide time notifications and alarms to remind users of their class schedules.

- It should include a GPS tracker feature to verify if the user has reached the designated classroom location on time.

- Users should be able to set their destination and receive notifications advising them to leave based on calculated travel times.

- A ranking leaderboard feature should display achievements related to arriving early at the destination and streak. The leaderboard will foster healthy competition among users.

*Should have*

- The application should offer a user-friendly interface resembling a racing game, with motivational elements such as countdowns and fast-paced music.

- Different modes of transportation, such as car, walking, and bike, should be considered when calculating estimated arrival times.

- A streak system to encourage users to maintain good time habits.

- The system should allow group matching within the same school, enabling users with similar goals to support each other in improving time management.

- The application should aim to secure users by targeting students and offering tangible benefits, such as in-app advertisements and potential contracts with schools.

- It should also prioritize intangible benefits, such as building good time management habits among students and encouraging them to attend in-person classes.

## Stakeholders and Their Interests

Stakeholders who are benefiting from CLace and benefits are:

-Students can manage their time well, not miss lectures, focus on the class more, and become more successive people in time management. Teachers can begin the class on time and avoid interruptions during the lecture.

-Teachers can start the class on time and not be interrupted during the class time.

-Parents can help children use the phone well and leave the house early so they are not late for school.

-Advertisers can show their advertisements, which target the students on the platform that young people usually use.

-The developing team can grow map-based skills and earn income through advertising.

## Expected Costs and Benefits

Business benefits (intangible benefits)

It can make the platform that most of the users are students, help students to be time-keeping people, improve the class quality, socialize users with healthy custom, and give a good impression to the users as an IT business with good purpose and vision.

Cost areas (tangible benefits)

Earn an income by application advertisements, donations, and partnerships with schools.

Get sponsorship from businesses that want teenage platform advertisements.

## Constraints

## *CLace development is worried about:*

## -CLace is based on the device’s GPS function. It is essential to use the GPS for the entire project. The project will fail if we cannot import the GPS technology to the application. We will use the API offered by Google Android, so it will not be an expert-level development.

## 

## -Considering the shortest path and traffic information. Those functions should be helpful, but making algorithms and getting information are complex tasks for our undergraduate developers. We will keep developing and planning it, but there are limitations for now.

## -We need deeper information than just a map. For example, Google Maps does not show information about the distance from the entrance of the building to the classroom. If we do not consider it, we oversee one of our core values, ‘In time to the classroom’ Our first version of CLace will focus on the class buildings, residence halls, and distances to the classrooms of SPU as a technical demonstration.

## Recommendation

Before going to the actual blueprint of CLace, we have found the purpose, core value, and some requirements and constraints. We recommend you take care of our efforts to make CLace possible and overcome its limitations. CLace is made for public interests. After reading, if you like the goal and way of CLace, please support us in making the plan to become real and be a member to help the growing kids.

Document Overview

PIR, Project Initiation Request, will show the project overview, business problem, justification/importance, and requirements. Feasibility Assessment will analyze risks and feasibility in technical, resource, schedule, organizational, legal, and contractual views. The requirements definition will cover the functional, data, and non-functional requirements that CLace needs to meet. The required model section will visualize the use case diagram and describe it in the use case description section. The system evolution chapter will list the further update plans not built into the initial plan. The conclusion and recommendation section will finish the document. At last, there will be appendices, a glossary, and references.

2.0 System Initiation

Project Initiation Request (PIR)

**0. General Project Information**

|  |  |
| --- | --- |
| **Project Name:** | *CLace (class + race)* |
| **Two Sentence Request Description:** | *Make the users attend the class on time. Stimulate them to keep the time appointment with various features.* |
| **Requested Launch Date(s):** | *Before the quarter starts.* |
| **Department(s) Affected By Project:** | *Students* |
| **Project's Customers:** | *College students and high school students. Especially those who are struggling with time schedules.* |
| **Date Request Submitted:** | 4/16/24 |

1. **Project Sponsor and Manager**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Sponsor** | |  | **Business Project Manager & Requestor** | |
| **Name:** | Andy Cameron |  | **Name:** | *Yehan Suh* |
| **Title:** | Professor |  | **Title:** | *Student, project team leader* |
| **Department:** | Computer Science - SPU |  | **Department:** | *Computer Science - SPU* |
| **Email:** | acameron@spu.edu |  | **Email:** | *suhy@spu.edu* |

1. **Business Problem or Opportunity: The motivation for this request**

| *For people struggling to keep time appointments and have bad habits, this project will give them the milestone of being a time-leading person, not a time-following person.*  *To grow the time-keeping habit for young people, which is essential to them, this project is a mobile application that allows the user to set the destination and check if the user arrives there on time by GPS.*  *Recording helps people to know their status and habits that are hard to realize. This application will be a checker to remind them about small time habits that people easily ignore.* |
| --- |

1. **Justification, Impact, and Importance**

**Assumptions**

|  |
| --- |
| * *Many people want to fix their time habits.* |
| * Students have lousy time habits and are harder to change than adults. |

**Competitive Landscape / Context**

|  |
| --- |
| * *Secure the users by targeting the students.* |
| * By giving them a good habit, prevent them from quitting the application. |

**Tangible Return, Opportunity, or Value One Time On-Going**

|  |  |  |
| --- | --- | --- |
| * In-app advertisement. | $ 0 | $ 10-30 |
| * Contract with the schools. | $ 0 | $ 0 |

**Intangible Benefits Impact or Value**

|  |  |
| --- | --- |
| * *Building good habits for students.* | $ 0 |
| * Encourage the students to take the in-person class. | $ 0 |

1. **Product Requirements** 
   1. **Must Haves**

|  |
| --- |
| * + 1. Time notification, alarm |
| * + 1. GPS tracker to check if the user is in the building |
| * + 1. Different time calculations based on the method to go to the classroom – car, walking, bike |

* 1. **Could Haves** (Nice to Haves)

|  |
| --- |
| * + 1. *R*anking and streak system and account |
| * + 1. Group matching with the same goal in the same school |
| * + 1. Leaderboard that shows the achievements – how early they arrive at the destination |
| * + 1. “Leave now” notification based on the time to go to the destination |
| * + 1. The interface looks like a race game to motivate the user, including a countdown and fast music |

* 1. **Won't Haves** (Don't Do's aka Out of Scope)

|  |
| --- |
| * + 1. *Dating matching* |
| * + 1. Speedometer |

3.0 Feasibility Assessment

Introduction

The feasibility Assessment section will include a feasibility analysis that covers technical, resource, schedule, organizational, legal, and contractual aspects of CLace. The risk scale used in the analysis will be 5 steps 1-5 scale. 5 stands for high, 4 for little high, 3 for medium, 2 for little low, and 1 for low. The feasibility scale is also 1-5 steps. 5 is for very good, 4 is for good, 3 is for medium, 2 is for bad, and 1 is for terrible.

Feasibility Analysis

**Technical Feasibility**

CLace has medium technical feasibility technically, along with some risks.

CLace's risk regarding familiarity with maps and GPS is a little high

-Compatibility with GPS in devices is essential, and developers must build requirement functions based on it.

-Developers will use abundant educational materials on the map application.

*CLace's risk regarding compatibility with both AOS and IOS is medium.*

-According to the Fobes, 65% of school-age users use IOS. For further business, the developer team needs to develop CLace for the IOS devices, which differs from the AOS application development.

-The first version of the application will be Android.

*CLace's risk of the project size and structure is a little low.*

-The primary goal of the development is the application working in SPU.

-The project has two main parts. Functionality in map and interface for users. Two conditions need to be satisfied.

-The team members will be fewer than 7 people.

*CLace's risk of correctness about the location is low.*

-CLace uses Google Map API to track the walking courses with precise tracking under 20m.

-The primary target, SPU, is a familiar place for developers.

*CLace's risk regarding familiarity with the application is low.*

-SPU has an Android application development class in the curriculum, and our developers should have completed it before starting the senior year.

**Resource Feasibility**

CLace has very good resource feasibility in human resources, hardware/software, and the environment.

*CLace's risk in human resources is low.*

-Group members for the project are enough to build the small application project.

-Group members are appropriate for the project because they have trained in the SPU curriculum.

CLace's risk in hardware is low.

-hardware is not required for CLace.

*CLace's risk in software and environments is low.*

-CLace development team will use Android Studio, React Native, Visual Studio, and NodeJS. They do not have many requirements to use for developers.

**Schedule Feasibility**

CLace's schedule has good feasibility in terms of time and preparation.

*CLace has a low risk in available time for development.*

-The deadline is visible and solid. The project needs to be done before the Erickson conference.

-The development team has a whole senior year to work on CLace.

-SPU winter break is no longer available.

*CLace has a medium risk in preparing resources and essential systems.*

-The team should implement the map into the project and ensure it works well before starting it.

-The developing resources are available before the start.

**Organizational Feasibility**

CLace has medium organizational feasibility in change adopters and motivation to use the project.

*CLace has a medium risk in change acceptance rate.*

-The National Library of Medicine reports that 77% of successful rates were recorded in the first week but only 40% after six months. It will affect CLace's usage after the launch if users give up on changing their time habits.

*CLace has a medium risk in terms of income structure and usage rate.*

-CLace's income depends on the in-app advertising and donation.

-CLace's main target users are students with lower budgets than adults.

-Users will keep using Google Maps if they dislike CLace.

**Legal Feasibility**

CLace has very good legal feasibility in copyright and authorization.

*CLace has a low risk in copyright.*

-Google Maps API is free and has no usage limit.

-CLace is a habit improvement app with unique features.

*CLace has a low risk in authorization.*

-CLace will ask only the required information to sign up and store them properly under the standards.

-CLace will get permission to get the user's information about the location and authorization needed to run the app before starting.

**Contractual Feasibility**

CLace has very good contractual feasibility in ownership.

*CLace has a low risk of distributing ownership.*

-Ownership distribution will occur among the members taking part in the development, and the team will have a group contract for a percentage.

-The licenses of the software used during the development are fine.

Additional Comments

- We measure the feasibility of the primary goal, which is to make a working application for SPU students.

-Feasibility can be updated after the actual development starts and expanding the service area.

-The developer's standard used to examine the feasibility is the SPU students who fished the junior year.

Conclusion

The feasibility is good, with a few medium and low risks in various feasibility analyses. The feasibility of the project can be updated after the actual development starts. The team plans to convene a group meeting to identify and implement better solutions proposed in the analysis. All functional, data, and non-functional requirements are also feasible and will be covered in the next step.

4.0 Requirements Definition

Introduction

This section describes the requirements of CLace to bring our core values to the stakeholders. A functional requirement is our train to get to the destination. It will explain what functions CLace has to make the student be in the class on time. A non-functional requirement is the fuel to make the train move. It will include budget, schedule, resources, hardware/software, maintainability, environment, etc.

Functional Requirements

CLace must:

*About Map*

-Have an alarm and notification with the time calculated based on the distance between the class and the user' location.

-Track the user' location based on the GPS.

-Check if the user arrives at the class on time.

-Get the user's destination and class time.

*About leaderboard*

-Have a ranking leaderboard based on streak days and the difference between desired and actual arrival times.

-Offer individualized service based on the account saved on the database. (username, password, email)

CLace should:

*About Map*

-Have a countdown and fast music.

-Offer different modes based on the transportation. Transportation will be walking, bicycle, and car.

-save customs in the database.

-Calculate the distance between the entrance of the building and the classroom door.

*About leaderboard*

-Have social features like group making.

-Show achievement with the reporting system based on days.

CLace could:

*About Map*

-Show motivational quotes.

-Show the achievements in each class building.

*About leaderboard*

-Add friends.

-Write personal notes on the days.

-Upload profile photos.

CLace won't

*About Map*

-Add more locations outside of the class routine for the first version.

-Show multiple themes.

*About leaderboard*

-Show too much information that is unnecessary for time habits. Ex) current location, email.

CLace is an innovative application designed to help students manage their time and class attendance more effectively. It combines GPS tracking, time management, and social features to ensure users arrive on time and stay motivated throughout their academic journey.

**Data Requirements**

This section will discuss the data essential to run CLace in each step, which is not covered in functional requirements.

Data for functional use cases:

*When the user adds the class time, class time should have:*

Input:

-Class name, class time, class days, class building location, and user's location.

-Class time.

Output:

-The class schedule that is visible to the user.

*When the countdown starts for the classroom, the countdown should have:*

Input:

-Required time in the classroom, user's method to go to the class building, class building location, current time, class name, and class time.

Output:

-alarm sound, countdown.

*When reporting the success/failure after arriving at the classroom, CLace should have:*

Input:

-User's location, user's arrival time, current time, class time, countdown, and class building location.

Output:

-Success sign and updated dashboard.

Data for social use cases:

*When the user makes the group:*

Input:

-User's name, email, and password.

-Group name, group capacity, group category, group keywords, and dashboard theme.

Output:

- User in CLace group, group invitation code.

*When the user searches the group:*

Input:

-User's name, email, and password.

-Group name, group keywords, group category, group invitation code, and group lists in CLace.

Output:

-User in CLace group, group invitation code.

*When the user checks the group dashboard:*

Input:

-Users' information in the group, their reports of success/failure, and the group information.

Output:

-Group ranking, group user information, and group information.

**Non-functional Requirements**

This section will discuss the requirements not covered in functional requirements and data requirements.

Product requirements:

*User Interface and Human Factors:*

-The user interface should resemble the race game.

-The user interface should not be old enough to appeal to the students, the primary target.

-The user interface provides short instructions on what action to take.

*Hardware Considerations and Physical Environment:*

-Be compatible with Android devices.

-be on the devices with GPS features.

-Have a connection to the internet.

-Have enough memory size and storage to run the Google Maps.

-Work in every Seattle Pacific University building perfectly.

*Performance Characteristics:*

-Record the result in seconds to avoid exceeding the time limit.

-Show the group lists immediately after searching.

*Error Handling and Extreme Conditions:*

-Have a user self-correction on the records that are recorded wrong.

-Make the error rate lower than 10% in extreme conditions by simulations. Ex) high speed (100mph)

Organizational Requirements:

*Delivery:*

-Update CLace to the Google Play Store.

-Share the APK file in Seattle Pacific University.

*Implement and Standard:*

-Build CLace under the Android environment.

-Follow the Google Play Store guidelines.

External Requirements:

*Ethical:*

-Does not have age limits.

-Made for the public interest.

*Security Issues:*

-Take a security seminar for developers.

-Do not take the data and user information outside of the project.

-Make the project developers’ guidelines.

*Resources and Management:*

-Take the user survey and user rating to implement CLace.

-Maintain CLace regularly.

-Updates the features in System Revolution consistently.

5.0 Requirements Model

Introduction

This part will talk about the use cases of CLace. CLace is a service heavily based on student users, so this part will show how the users interact with CLace's system not to be late to class. The use case diagram will show CLace's functional and social features with a visual overview. The use case description will go deeper into each use case.

Use-Case Diagram

<https://lucid.app/lucidchart/845bbb59-069f-4a64-bad1-47c7362e5a20/edit?viewport_loc=-779%2C-632%2C2094%2C989%2C0_0&invitationId=inv_36a2d5b6-a233-492c-b234-7630e9ad4530>

A diagram of a diagram

Description automatically generated

Use-Case Descriptions

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Name**: Set the class time. | | **ID**: a1 | **Importance**: Must have |
| **Primary Actor**: User 1 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** - | | | |
| **Stakeholders and Interests**:  User 1 can get information to avoid being late to the classroom.  CLace can offer the services to the users. | | | |
| **Brief Description**: User 1 writes his class time to CLace. CLace stores the time the class starts. | | | |
| **Trigger**: User 1 gets a class schedule.  **Type** (mark one): \_V\_ External \_\_\_ Temporal | | | |
| **Relationships**:  **Association**: It includes actor user 1.  **Include**. It does not have a mandatory use case.  **Extend**: It does not have an optional use case to check.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  User 1 gets a class schedule for the quarter. User 1 writes the class time, days, location, and the class's name into CLace. CLace saves the class information and displays it. | | | |
| **Sub-flows**:   1. User 1 gets a class schedule for the quarter. 2. User 1 types the information of class time, day, location, and class name into CLace. 3. CLace saves the information and displays it. | | | |
| **Alternate/Exceptional Flows**:   1. User 1 changes the class schedule or drops the class. 2. User 1 can update the class information. 3. CLace saves the changed information and displays it. | | | |
| **Special Requirements:**  Performance: CLace should have enough storage to store the users class schedules under 20 credits each quarter.  User Interface: CLace shows the Monday to Friday calendar. User 1 can add the class schedule, and CLace will display it on the calendar.  Security: The users information must be secured. | | | |
| **To do/Issues:**  The class schedules need to be saved by the quarter.  The calendar should have the holidays. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Name**: Start the countdown. | | **ID**: a2 | **Importance**: Must have |
| **Primary Actor**: User 1 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** - | | | |
| **Stakeholders and Interests**:  User 1 can prepare and leave the room before the class starts so as not to be late to the classroom.  CLace can offer the services to the users. | | | |
| **Brief Description**: CLace will ring the alarm with the time calculated by the distance to the classroom. If User 1 leaves, CLace starts the countdown. | | | |
| **Trigger**: When the class time comes.  **Type** (mark one): \_\_ External \_V\_ Temporal | | | |
| **Relationships**:  **Association**: It requires User 1 to set a time and go to the classroom.  **Include**. It requires a1. Set the class time to know the time to ring the alarm.  **Extend**: It does not have an optional use case to check.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  The classroom is 10 minutes away. CLace rings the alarm 30 minutes before the class to notify User 1 to prepare. 10 minutes before the class, CLace rings a different alarm to notify User 1 to leave. User 1 leaves the room. CLace starts the countdown. | | | |
| **Sub-flows**:   1. CLace calculates the time to take to the classroom and gets the required time. 2. The time is 30 minutes before the class time. 3. CLace rings the alarm to notify User 1 to prepare. 4. The time is 10 minutes before the class time. 5. CLace rings the alarm to notify User 1 to leave the room. 6. User 1 leaves the room. 7. CLace starts the countdown. | | | |
| **Alternate/Exceptional Flows**:   1. User 1 does not leave the room after the alarm ring. 2. CLace changes the alarm sound to the emergency sound. 3. User 1 leaves the room. 4. CLace starts the countdown. | | | |
| **Special Requirements:**  Performance: CLace should access the device's clock and calculate the time by the distance between User 1 and the classroom.  User Interface: CLace should show the alert on the screen and the remaining time.  Security: The users' location information must be secured. | | | |
| **To do/Issues:**  The time is calculated by the walking time and can be updated to the cycle or car. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Name**: Reports the success. | | **ID**: a3 | **Importance**: Must have |
| **Primary Actor**: User 1 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** - | | | |
| **Stakeholders and Interests**:  User 1 knows he can manage his time well, plans ahead, and finds motivation.  CLace can offer the services to the users. | | | |
| **Brief Description**: If the User arrives at the classroom on time, report the success to the CLace dashboard and User 1. | | | |
| **Trigger**: User 1 arrives at the classroom.  **Type** (mark one): \_V\_ External \_\_\_ Temporal | | | |
| **Relationships**:  **Association**: It includes actor user 1 to see the report.  **Include**. It requires a2 to get a conclusion.  **Extend**: It does not have an optional use case to check.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  User 1 arrives at the classroom before the countdown runs out. CLace detects that the user's location is in the classroom. CLace reports the result to the dashboard and User 1. User 1 sees the CLace screen that says today was successful. | | | |
| **Sub-flows**:   1. User 1 arrives in the classroom before the class starts. 2. CLace checks that User 1 is in the desired location. 3. CLace reports the success to User 1 and the dashboard. 4. User 1 can see the result. | | | |
| **Alternate/Exceptional Flows**:   1. CLace could not detect User 1's location. 2. User 1 checks the arrival manually. 3. CLace reports the success. 4. User 1 can see the result. | | | |
| **Special Requirements:**  Performance: CLace must know User 1's location information and if User 1 arrived well in the classroom on time.  User Interface: CLace shows the blue and big success sign on the screen with congratulatory music.  Security: The users' location information must be secured. | | | |
| **To do/Issues:**  The report will be added to the streak. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Name**: Reports the failure. | | **ID**: a4 | **Importance**: Must have |
| **Primary Actor**: User 1 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** - | | | |
| **Stakeholders and Interests**:  User 1 knows he did not do well, reflects on himself, and plans for a better tomorrow.  CLace can offer the services to the users. | | | |
| **Brief Description**: If the User cannot arrive at the classroom on time, report failure to the CLace dashboard and User 1. | | | |
| **Trigger**: User 1 could not arrive at the classroom.  **Type** (mark one): \_V\_ External \_\_\_ Temporal | | | |
| **Relationships**:  **Association**: It includes actor user 1 to see the report.  **Include**. It requires a2 to get a conclusion.  **Extend**: It does not have an optional use case to check.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  User 1 arrives at the classroom after the countdown runs out. CLace detects that the user's location was not in the classroom on time. CLace reports the result to the dashboard and User 1. User 1 sees the CLace screen that says today was unsuccessful. | | | |
| **Sub-flows**:   1. User 1 arrives in the classroom after the class starts. 2. CLace checks that User 1 was not in the desired location. 3. CLace reports failure to User 1 and the dashboard. 4. User 1 can see the result. | | | |
| **Alternate/Exceptional Flows**:   1. CLace reports failure even though User 1 arrived in the classroom on time. 2. User 1 fixes the wrong result on the dashboard. 3. CLace reports the success. 4. User 1 can see the correct result. | | | |
| **Special Requirements:**  Performance: CLace must know User 1's location information and if User 1 did not arrive well in the classroom on time.  User Interface: CLace shows the red and big failure sign on the screen with disappointing music.  Security: The users' location information must be secured. | | | |
| **To do/Issues:**  The report will be added to the streak. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Use Case Name**: Make the group. | | **ID**: b1 | **Importance**: Should have |
| **Primary Actor**: User 1 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** - | | | |
| **Stakeholders and Interests**:  User 1 can gather people to achieve the goal of being a time-managing person together.  CLace can offer the services to the users. | | | |
| **Brief Description**: User 1 creates a group to gather the people to compete and motivate each other. | | | |
| **Trigger**: User 1 wants to achieve the goal together.  **Type** (mark one): \_V\_ External \_\_\_ Temporal | | | |
| **Relationships**:  **Association**: It includes actor user 1.  **Include**. It does not have a mandatory use case.  **Extend**: It does not have an optional use case to check.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  User 1 wants to do the time management challenge with friends. He makes the group with the name, capacity, and categories. CLace makes the group room and dashboard. CLace also posts it to the public. | | | |
| **Sub-flows**:   1. User 1 makes the group with a specific name, category, and capacity. 2. CLace makes the group and posts it in the application. | | | |
| **Alternate/Exceptional Flows**:   1. User 1 only wants his friends to join the group and does not want to post it to the public. 2. User 1 sets the room setting to private. 3. CLace makes the group invisible to strangers and makes inviting codes. | | | |
| **Special Requirements:**  Performance: The group should get and show the participants' information successfully.  User Interface:  User 1 will choose one of them to get into the group: make or search the group.  User 1 will have the write boxes to type the group information.  Security: Only group members can see the information of the group. | | | |
| **To do/Issues:**  Each participant will have the account and account code to invite and join the group. | | | |

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| --- | --- | --- | --- |
| **Use Case Name**: Search the group. | | **ID**: b2 | **Importance**: Should have |
| **Primary Actor**: User 2 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** User 1 | | | |
| **Stakeholders and Interests**:  User 1 can have the group members in his group.  User 2 can find the categorized people with the same interests and share the results.  CLace can offer the services to the users. | | | |
| **Brief Description**: User 1 can see the list of the groups and search the groups by keyword. | | | |
| **Trigger**: User 2 starts to find the group.  **Type** (mark one): \_V\_ External \_\_\_ Temporal | | | |
| **Relationships**:  **Association**: It includes actor user 2 to start the search.  **Include:** It requires the group to get in made by b1.  **Extend**: It does not have an optional use case to check.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  User 2 searches the groups. CLace shows the group list to User 2. User 2 could not find an interesting group. User 2 searches the category of Computer Science. User 2 gets into the group with CS major students. | | | |
| **Sub-flows**:   1. User 2 searches the groups. 2. CLace shows the group list to User 2. 3. User 2 searches the category of Computer Science. 4. User 2 finds the interesting public group. 5. User 2 gets into the group. | | | |
| **Alternate/Exceptional Flows**:   1. User 2 wants to join his friend's group. 2. User 2 searches for his friend's group code. 3. User 2 gets into his friend's group. | | | |
| **Special Requirements:**  Performance: The group should get and show the participants' information successfully.  The search should show every group that contains the keywords.  User Interface: The list of groups should show the participants' number, keywords, and name.  Security: The invite code should be secured. | | | |
| **To do/Issues:**  If the group is not good, User 2 can leave the group and search for a different group. | | | |

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| --- | --- | --- | --- |
| **Use Case Name**: Check the group dashboard. | | **ID**: b3 | **Importance**: Must have |
| **Primary Actor**: User 1, User 2 | **Use Case Type**: Detail, Essential | | |
| **Supporting Actors:** User 1, User 2 | | | |
| **Stakeholders and Interests**:  User 1 can have a group challenge to motivate each other and share the results with friends.  User 2 can have a group challenge to motivate each other and share the results with friends.  CLace can offer the services to the users. | | | |
| **Brief Description**: Users check the dashboard to see the group members' progress and UUsers'place in the group. | | | |
| **Trigger**: Users check the group dashboard.  **Type** (mark one): \_V\_ External \_\_\_ Temporal | | | |
| **Relationships**:  **Association:** It includes actor User 1 and User 2 checking the dashboard.  **Include:** Itincludes b1 and a3 to make the dashboard and fill in the contents.  **Extend**: b2 is not essential but gives more value to it. a4 gives more variety to the  dashboard.  **Generalization**: It does not have sub-cases. | | | |
| **The Normal Flow of Events**:  Users check the group dashboard. The group dashboard shows the ranking, success/failure report, and group members' status. Users get peer pressure to be better at managing time. | | | |
| **Sub-flows**:   1. Users check the group dashboard. 2. The group dashboard shows the group contents. 3. Users get motivated by group members and the dashboard. | | | |
| **Alternate/Exceptional Flows**:   1. User 2 does not have a group to check the dashboard. 2. User 2 searches for his friend's group code. 3. User 2 gets into his friend's group. 4. User 2 checks the group dashboard. 5. The group dashboard shows the group contents. 6. User 2 gets motivated by group members and the dashboard. | | | |
| **Special Requirements:**  Performance: It should have a calculating system to rank the group members.  User Interface: The group members should be listed by ranking.  Security: The group information should be only seen by the group members. | | | |
| **To do/Issues:**  The users who joined the group lately should be on ranking after the next week starts.  The winner can get a small prize, which can be seen next to his profile. | | | |

6.0 System Evolution

The desired features can be separated into two sections. The first is the functional features. CLace will update the functional features of GPS. It will analyze the user's speed and update the required time to the destination. It will make the required time more precise. CLace will also expand the service region. The user can set up the destination and schedule the routine outside of the university campus. The user can use CLace not only for classes but also for any appointments they do not want to miss. Second, the social features. CLace's group-making feature will be stronger. It will suggest the desired group based on their major, age, and preference for the solo user without the group. CLace will create a group competition to encourage participation from all group members.

7.0 Conclusions and Recommendations.

This is all about CLace. CLace will help the students be on time by adding more features than traditional map applications and social features to motivate them. Time appointment is the most important thing to have in the adult society. CLace will improve students' time management skills and learning experience.

Use CLace for yourself, your children, and your friends. CLace is not just the application. Use the precise countdown based on the accurate time data to the classroom. Make the group and compete with friends to be better timekeepers. CLace is the start of the change and will bring a bright future for those struggling with time management.

# **Appendices**

Include (at least) a copy of any completed questionnaires or surveys, plus any other applicable reference materials.



Free-to-use artwork by Mifune Takashi.

A graph of age and age

Description automatically generated with medium confidence

ZIPPIA The Career Expert research. Tardiness rate by the ages.

A graph with numbers and lines

Description automatically generated

The National Library of Medicine research. It shows the percentage of successful people who maintain the change over a year. It supports the needs of the application to help people to keeping the time habit and usage of the application in long-term.

A calendar with numbers and a circle with a red circle with white text

Description automatically generated

Athos Academy Utah research. The impact of tardiness on student success.

# **Glossary**

-CLace: the GPS application to track the user to be in the classroom on time. It means Class + Race.

-Feasibility: The measure of how beneficial or practical a new system will be to our stakeholders.

-Requirements: Requirements are what clients, users, and suppliers of a SW product must determine and agree on before the software can be built.

-time-keeping person: The person who is not late to the appointment time.

-developers: student development team who are going to build the CLace next year.

-SPU: Seattle Pacific University.

-API: Application Programming Interface. It enables two software components to communicate.

-AOS/IOS: Android Operating System/iPhone Operating System

-Use case diagram: it visualizes the actor and actions on the system.

-Actor: who does the use cases on the system.

-Use case: sequences of interactions between systems and users.

-Use case description: It describes how a system can achieve specific goals or tasks.

# **Bibliography**

(1) Tsegazab, B. (2022, November 14). Being late is a global problem in our society – MTV News. https://mtvnews.org/2645/entertainment/uncategorized/being-late-is-a-global-problem-in-our-society/

(2) Anders, G. (2016, October 5). *Android or iPhone? teens' favorites hint at college plans*. Forbes. https://www.forbes.com/sites/georgeanders/2016/10/04/android-or-iphone-teen-dilemma-sways-college-choices/?sh=2a142d513317

(3) Brown, J. C. (2020, December 9). *A large-scale experiment on New Year's resolutions: Approach-oriented goals are more successful than avoidance-oriented goals*. National Center for Biotechnology Information.

(4) Cameron, A. (2024, April 19). *Feasibility Assessment, CSC3150 System Design.* Seattle Pacific University.

(5) Cameron, A. (2024, April 24). *Requirements Analysis: What We Are Seeking. CSC3150 System Design.* Seattle Pacific University.

(6) Flynn, J. (2023, September 8). *15+ shocking late for work statistics [2023]: How often + why are Americans late for work?*. Zippia. https://www.zippia.com/advice/late-for-work-statistics/

(7) AthlosAcademyofUtah. (2022, February 2). *Attendance matters: The impact of tardiness on Student Success*. Athlos Academy of Utah. https://www.athlosutah.org/attendance-matters-the-impact-of-tardiness-on-student-success/