

Task Keeper

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1. Introduction

Procrastination is a battle most are familiar with. It is also a point that is frequently brought up in conversations discussing the impact the COVID-19 pandemic has had on productivity. Our plan is to create a potential solution to this issue that is accessible to most of the population (via their mobile devices). Our idea is to use current research into the use of gamification as a tool to combat procrastination and implement it into a task-tracking or to-do list style mobile application (app).

Why gamification? A study (Kuo-chen Li, 2018) found that certain elements of games can be used to combat procrastination factors. Some key examples being task aversiveness and the use of rewards and punishment. The study notes that the use of "goals in the game" can shift "unpleasant, boring or uninteresting" tasks to being "more interesting and motivating goals". Hence, subtly pushing a user towards the pursuit of successful task completion. Moreover, the study notes that the use of "virtual rewards and role formation" results in a "significant improvement of performance" in an individual. Thus, the use of gamification in a to-do list centric app will help improve upon productivity by making the process of task completion more engaging.

Moreover, upon surveying some of our peers at university the group found that 80% of them believed a gamified version of a task-tracking application would help them work through procrastination. Through the survey the group also highlighted potential game elements that could be implemented into the application and after an analysis of participant feedback, the group found that features such as points/rank systems and character customisation were highly requested due to their ability to create an engaging and competitive game. Thus, linking back to psychological research that emphasises the importance of motivating goals and rewards to increase performance.

Subsequently, through a survey of the current market, most similar applications focus on the development of habits rather than solely focusing on task completion. Another popular type of app that implements some gamification concepts are those looking to help users focus by blocking access to other features on their mobile device and rewarding them for successful completion of the set duration. However, these apps (e.g. Forest, 2020) do not let you create a list of tasks you would like to complete.

The group found that our closest competitor would be the Habitica (Habitica, 2020). This app allows users to complete their tasks and earn points to purchase pets and mounts for a Role-Playing Game (RPG) based approach. Our idea looks at further building off this concept of the use of a game to encourage the completion of tasks. Our team, however, intends on creating a caretaker styled game instead where a user is given a pet to care for. Upon completion of their tasks, a user will earn points. These points can be used to purchase in-game items for their pet or to further customise their pet. The app's priority is to encourage users to complete their set tasks as a means of caring for their virtual pet instead of purchasing equipment for their RPG player character.

2. Aims and Objectives

Project Aim:

Design and develop a gamified task tracking mobile application that helps combat a user's task-completion-related procrastination by making it a more engaging and interactive process.

Objectives:

1. The application should run on an Android device.
2. The application should let the user create, modify and delete a to-do list and its elements.
3. The application should provide a user with points upon task completion based on how soon to the allocated task's deadline they complete it.
4. The application should use the points as currency for the user to purchase unlockable features for the game.
5. The user should be able to customise the look of their character within the application.
6. The user could be able to share an image of their character via social media.
7. Develop a web application that is equivalent to the mobile application.
8. Develop a website to showcase what the application is and does.

3. Functional Requirements of the System

- Users **must** be able to create, modify and delete task lists
- Users **must** be able to earn points based on the type of tasks they have completed and how quickly it was completed
- Users **must** be able to spend task completion points to purchase in-game items
- Users **must** be able to customise their in-game characters
- Users **must** be able to modify their details
- Users **must** be notified of their tasks based on their notification frequency setting
- Application **must** have a friendly User Interface (UI)
- Application **must** have a website outlining what the application/product is and does
- Application **must** reduce the user's character stats when a user does not complete a task by its due date

- Users **should** be able to create multiple task lists and categorise them
- Users **should** be able to set the level of importance for a task and the points awarded should reflect these levels
- Users **should** be able to register and create an account for the application
- Users **should** sign in using their login credentials to get access to their account

- Users **could** be able to share their in-game character via social media
- Application **could** have multiple language options
- Application **could** have a web version
- Application **could** have a leaderboard to compare user stats against

4. Project Management

The Group's Approach to Communication and Online Working

Due to the current situation, in regards to COVID-19 and the migration to online working, the group plans to communicate online through Discord and work online, by utilising free collaborative word-processing software, specifically Google Docs. This was the most convenient way of working because each member knows how to navigate their way through both pieces of software.

Project Management Roles

The group designated Ethan as the overall Project Manager. This is because one of his responsibilities is to overlook the project's digital workplace (ClickUp); it, therefore, made sense to assign him with the responsibility of task management but also general team coordination to ensure work is completed efficiently and to a high standard of quality. As the project manager of the group, Ethan has been assigned the job of creating a list of talking points for the group's weekly meetings. These talking points are in place to ensure that meetings are conducted in a professional manner, similar to how meetings would be organised in the workplace.

Hannah is going to work as the System Manager and Deputy Project Manager who will be heavily involved in and oversee all system development. This decision came down to her personal experience working on large-scale projects as a leading member of Dev Soc (Developer's Society at Nottingham Trent University) and the fact that she is the only member studying a course specialising in games technology. One of her responsibilities in this role will be to manage the group's code repository through GitHub. Thanks to Hannah, the group's Discord server was up and running pretty much instantly. Discord will act as the main platform of communication and will thus help the group achieve the goals and objectives outlined for this project.

Task Allocation / Distribution

The group agreed to allow each member to pick tasks they are most confident in completing. The skills each member possesses is also taken into account by the project manager before each task is allocated. As the group has a variety of skill sets, it was decided that this was the fairest way to distribute tasks. This is because it will make the member performing it more comfortable, confident, and happy to work. By having members who believe in their aptitude, the work being submitted can be expected to be of higher quality.

The Group's Approach to Monitoring Work and Absences

Due to how busy each member is, in terms of other modules (exams and coursework) this year it is just not practical nor fair to allow members to disregard work that is assigned to them. In recognition of this problem, the group has created a deadline point system to minimise wasted time on this project. For instance, if a member misses three deadlines, either meetings or work-related, they will be assigned less work each time. If they continue

to not submit anything or do not communicate, they will not be assigned any work to do. This will mean the rest of the group will have longer to get on with that member's task and will thus be able to complete it to a higher standard of quality for the final deadline. A group member will only be 'cut out' of the workload if they do not communicate a valid reason for missing a meeting or being unable to complete a task to any other member of the group within the first few days of their work being assigned.

Group Meetings

The weekly meetings will be used to monitor and critique work assigned to each member to ensure the correct structure is being followed. Deadlines need to be stringently followed to guarantee work can be formatted and submitted on time.

5. Team Members and Responsibilities

The group has a plethora of practical skills available for this project. Each member studies a different degree; Ethan is enrolled in Computer Systems (Cyber Security) whilst Hannah Ashna (Games Technology), Ben Teft (Computing), Owen Rennie (Computer Science), and Simon (Information Systems) all study different courses within the Computer Science cluster.

The group believed it was most appropriate to assign both primary and secondary roles for each member of the group. Primary roles will serve as each member's main responsibility based upon the skills that they possess. These skills will be matched with appropriate pieces of work to guarantee that the final deliverable will be completed to a high standard of quality. Rarely, the group will expect members to undertake aspects of another member's primary role (which will be distributed fairly) as their secondary role or responsibility to ensure that important pieces of work will be submitted on time. The word rarely is used here because it is expected that each member will complete the work that is assigned to them within the designated time frame (defined in their primary role). However, the secondary roles are assigned to account for random events that could occur, such as illness or other possible emergencies.

Group Member	Role(s)	Description of Role(s)
Ben Teft	Software Developer, Head of Market Research	As a software developer, Ben will play an essential role in the group by ensuring a robust system will be developed. As head of market research, Ben is responsible for overseeing what information needs to be gathered and analysed.
Ethan Wilde	Project Manager, Head of Documentation	As the project manager, Ethan will coordinate the group's tasks to ensure work is delivered on time. His responsibility in this role will be to organise weekly meetings, draft meeting notes, monitor attendance, and distribute tasks fairly. As head of documentation, Ethan will check, format and write a large number of sections for the documentation part of this project whilst overseeing tasks completed by other members in the group to certify a high standard of quality is uniform throughout.
Hannah Ashna	Technical Lead, Delivery Manager, Deputy Project Manager	Technical Lead, or in more basic terms, the system manager will oversee all work being completed throughout this project's development stage. The Delivery manager will ensure the system is fit for purpose and meets the functional requirements set out on page 4. The deputy project manager role is essentially project manager for the technical side. Part of the responsibility of this role is to manage the code repository through GitHub.
Simon Fincham	Head of User Acceptance, System Tester	As head of user acceptance, Simon's responsibility is to analyse client feedback throughout the project and feed that back to the rest of the team. Simon will work with Owen to thoroughly test the system.

Owen Rennie	Head of System Testing, System Debugger	As head of system testing and system debugging, Owen will work with Simon to ensure the system is developed the same way it was designed. These two roles are essential to ensure the system is delivered to the high standards that have been set.
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6. Sources of Information, Resources Required

For the project, as mentioned in section two, the group has decided to create an app on android to track tasks and combat procrastination. In order to develop the app, suitable software will need to be located and utilized with an appropriate coding language for the type of app being made. For developing android apps, the primary languages used are Kotlin, Java, C# and C++, however this also depends on the development software used. Other languages may also be used for the application.

For the purpose of developing the application, the group will need a software application specifically designed for that end. An integrated development environment (IDE) would be ideal as such software often has useful integrated features such as a debugger, which would help streamline and quicken the development process. An example of an integrated development environment would be android studio, an open source piece of software specifically designed for the development of apps for the google play store. This software, among other IDE's, can be obtained for free online as well as on the university's software hub. The software for app development will either be run on group members' home PCs or the computers at the university. It may also be used via the remote desktop NTU anywhere service should technical issues be had on home PC.

7. Risk Assessment

Over the course of the project, there will inevitably be a number of risks with varying likelihoods, impacts and preventative measures that will all need to be considered in order to have effective contingency plans should any of the outlined risks occur. These risks may range from technical issues such as compatibility and hardware failure, group member inadequacy to meet deadlines and potential illness, especially due to the current evolving COVID-19 situation.

It is critical that work is being done towards the project by all members and that contact is maintained so as to prevent a lack of work. It is also very important that work that has either been not done due to illness or due to other reasons be completed by another so as not to fall behind and potentially miss deadlines. Below are the potential risks the group may encounter during the development cycle of our application and how the group can mitigate and prevent it:

Risk:	Probability:	Impact :	Measures in place to avoid and minimise impact:
Unexpected Illness	Low	Medium	The group have a weekly meeting to check progress as well as frequent text chat. This will allow us to communicate with the member and determine what is wrong and assign a secondary role to another member of the group to ensure the work is still completed. The weekly meeting is further outlined under task four, and the secondary role system under task five.
Group member not delivered work	Low	Medium	The weekly meeting and text chat will allow us to determine why the member has not done the work and if they are reachable. The group also has a deadline point system in place, as outlined under task four. This will allow the group to produce work to a higher standard and ensure it is finished for the final deadline.
Group member drops out of the project	Low	High	All group members are assigned both primary and secondary roles so as to allow for other members to cover work if necessary.
Hardware and Cloud-based failure	Low	Medium	Use a cloud-based storage, such as google docs, to prevent significant work being lost due to a single group member's computer not functioning. In addition to this, the team will use GitHub to store all project files as a backup.
Coding language incompatibility issues	Medium	Medium	Conduct extensive research before an appropriate coding language is picked and test it out to ensure the language is compatible with the software the group will use and the application the group plans to develop.

8. Professional, Social, Ethical and Legal Issues

Introduction

When planning, developing and implementing a system for purpose a number of issues that need to be taken into account such as: Professional, Social, Ethical and Legal Issues. As a group, the group has collated a list of issues that must be followed in order to ensure integrity and confidentiality throughout this project. To achieve this, the group has agreed to develop and implement a gamified task tracker mobile application. By working out the potential risks, our group can aim to reduce the chance of these risks occurring as much as possible, in particular the ones that have been highlighted to link with the project. When the professional issues were first brought to light within the group, it was evident that the British Computer Society's (BCS) Code of Conduct and Code of Good Practice had to be evaluated. These Codes provide a set of guidelines that professionals within the computing industry must adhere to and so as a group it was agreed they were important. As a group, it was also agreed to investigate the Software Engineering Code of Ethics, published by the Institute of Electrical and Electronic Engineers Computer Society (IEEE-CS).

Professional Issues

The first aspect of this project that was identified was that the consumers would expect the group to keep any data collected by the group from them, to be kept secure. In the BCS Code of Conduct, it states that the group should "have due regard for public health, privacy, security and wellbeing of others and the environment" (BCS, 2015). This means that the users of the product can be comfortable with disclosing their personal information and details when signing up to and using our gamified task tracker mobile application, provided the data is secure and provided security measures are met. This will be achieved through the product as there will be fields that will require the user to enter their details before they are able to view the data that is collected by the product. When developing the project, it was ensured that the project defined did not breach the Equality Act 2010. This act protects people, whether in the workplace or in the wider society, from all varieties of discrimination. This has been considered for all aspects of the project including the group as well as the product. In relation to group equality, the project manager ensured that each member's voices were heard and ideas were considered for each member. When developing this product, there was no particular target audience as this product can be universally utilized by people of all ages, within reason. This was ensured with the guidelines set by the code of conduct within the IEEE, in particular principle 1, "Software engineers shall act consistently with the public interest."

Social Issues

When considering the social issues linked with the project, it was most important that the group focused on the gamification side of things, as that is what this project is solely based on. With this being the case, it had to be made sure that the game side of the application is not addictive and does not outweigh the social side of the users life. An example of this

issue is the user seeing the application as more important than their general health and social life. This would be a breach of the BCS public health section of their code of conduct conditions, therefore not of the best interest of the public. To comply with these conditions, the group shall test the elements thoroughly, developing and Implementing them in a way that will not interfere with the users immersion and/or engagement with the application without the application becoming unhealthily addictive. An additional element, which the group had found, was that the application must have an incentive and motivational element applied to it for the user.

Ethical issues

When identifying the ethical issues linked with this project, it was agreed that the group had to consider all issues and ensure all were acted upon appropriately. One of these issues that were identified, was that the user may not want their information on incomplete tasks or missed deadlines to be stored and/or disclosed with other third party organizations, i.e. other users. Within the British Computer Society Code of Conduct, it states that the group must, "have due regard for the legitimate rights of Third Parties", meaning that third parties, in this case, the end users, must be allowed to have a say on what happens with this data. To tackle this issue, the application must inform the user what data is being collected, and how it will be used. The application will also let the user know that they do not need to make use of the gamified task tracker, however as a group, it is believed that the application has a positive impact on the work that is produced by the user.

Legal issues

In regards to legal issues, the group agreed to investigate and analyze all the issues faced with the legalities within this section. One of the issues faced when developing and planning this product, was in relation to the collection of data made by the gamified task tracker. This product will be collecting data based on the users productivity and competence in completing tasks on time and that this information will be presented to the user, so the user can confide in the group that this data is all that it is used for. As a result of this, it is paramount that members in the group do not breach the Data Protection Act 2018. This Act declares how the data must be legally used, making sure that the data is misused or abused. This means that it would comply with the standards of BCS Code of Conduct, as confidential information that is collected is not disclosed, ensuring data protection. A way the group shall achieve this, is by providing the users information on what data is being collected, as well as enabling the user to give consent to the data being collected from the application. Finally, this will be prevented on the web application as it will require the user to enter their username and password assigned to their account. This prevents unauthorized users from gaining access to this information.

9. Project Plan, Milestones, Effort & Timescale for the Whole Project

Project Methodology

The group has decided to follow a methodology influenced by Agile for this project. This is because weekly meetings are currently in place to act as a review for the work completed since the last. If necessary, and to match the 'agile' way of working, more, shorter meetings could be organised on a more frequent basis. Working in this way encourages transparency and promotes more efficient communication between each member in the group.

The Group's Approach to Research

As an agile-type methodology is being followed, the group has devised a very useful way to receive opinions and data from potential end-clients. An anonymous online survey will be used as the group's main method for primary source information. The group thought it was crucial to enforce anonymity due to how it encourages honesty; honesty is crucial to allow the group to start developing an understanding of realistic client expectations. When relevant secondary sources are used, they will be referenced appropriately and in the desired format (Harvard).

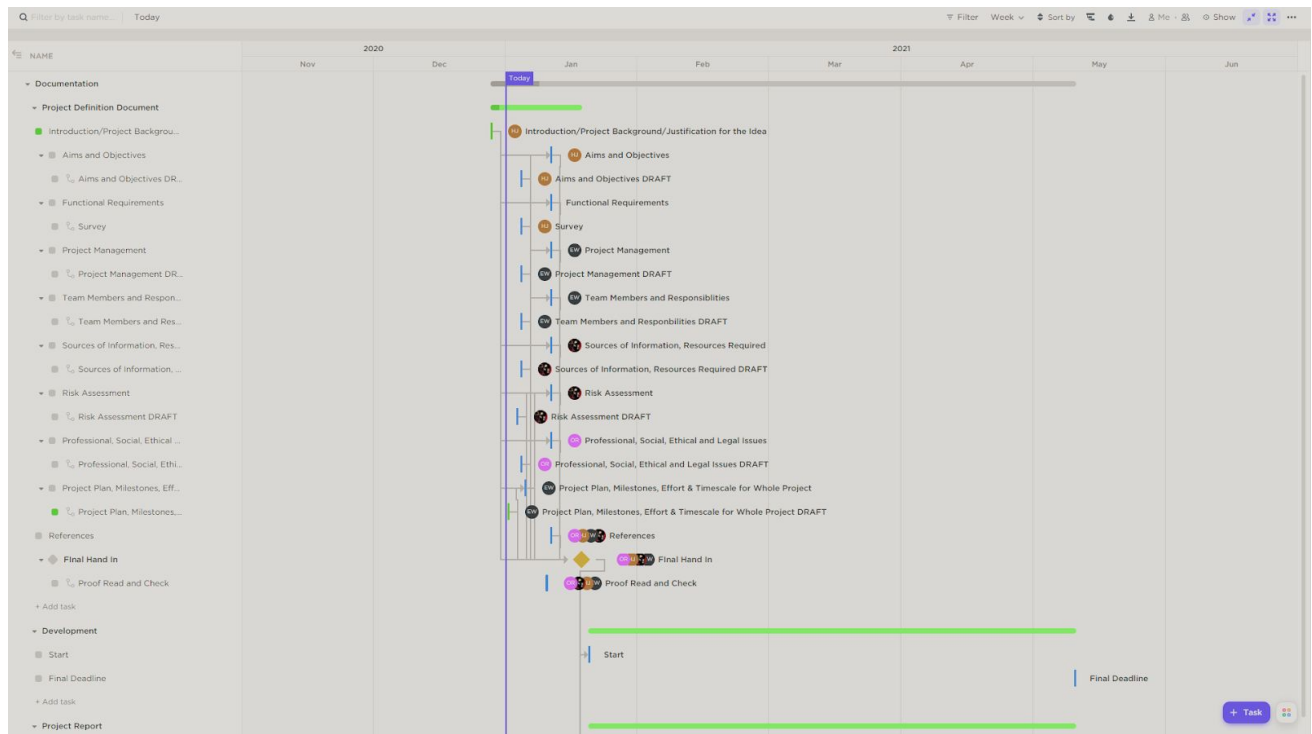
ClickUp

The group understands that there is an abundance of software available to manage a digital workplace. However, due to how both textual and verbal communication is primarily facilitated through Discord, ClickUp seemed like the most appropriate software to use. It is versatile and has other uses on a variety of different platforms, especially for Discord. Specifically, a ClickUp bot has been added to the group's Discord server to send automatic notifications when a piece of work has been marked as complete.

Gantt Chart and Milestones

The Gantt chart for this project is shown below. This chart was illustrated through ClickUp. A Gantt chart created for a project of this calibre through Microsoft Project or Excel is typically extremely difficult to export and fit into a few pages. The group decided that presenting the Gantt chart through ClickUp in this way is far easier to follow and aesthetically, looks much more professional. Also, using the Gantt chart provided by the same software where the group's digital workplace is being managed will encourage each member to constantly look back through it and follow the deadlines that have been set by the project manager. As the project progresses, milestones will be assigned to tasks that are deemed as important, or as a good point to mark as a position of progress. For instance, the 18th of January (the first formal deadline) will act as the first milestone for this project due to how important the project definition document (PDD) is. Specifically, the PDD ensures good communication and working habits are adopted early on by defining the infrastructure in place to facilitate it. As can be observed, there are not many tasks within the development and report stage

of the Gantt chart due to them being set to begin on the 20th January (2 days after the PDD is due to be submitted). Milestones will be set as these stages progress.



Effort and Timescale

To ensure each member inputs as much effort as they can into each piece of work, the group decided that it was appropriate to set up draft deadlines to go alongside the final deadline for each task, as shown in the Gantt chart above. This system is in place to prevent a late start to work and will be used to check work. By doing so, the member responsible for the work can amend sections (subject to feedback) in a fair and appropriate timeframe, depending on how demanding the job is. For the PDD specifically, the group thought it was fitting to require work submission a week before the final deadline but a week after the draft is due, the 11th of January 2021 and the 4th of January respectively, to allow the group to host a few meetings over that final week to make changes that are required. Essentially, this is to assure a high standard of quality is present throughout.

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