

GNG2101 Final Report

Time Task

Submitted by

B2C

Zachary Provost, 8524938

Billal Zazai, 8572975

Charles Choinière, 30035661

Santos Gagbegnon, 300010769

Graydon Hope, 300045044

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University of Ottawa

Abstract

The Android smartphone application titled “Time Task” described within will allow for the coaches taking care of the workers, and the workers themselves, within the organization Performance Plus Rehabilitative Care Inc. to enforce certain restrictions on how much time is to be spent on certain activities that are assigned to them. The app also tracks performance and presents data by email relating to every work day. The app will also allow the coach or user to assign customizable amounts of time allotted for the completion of any task as well as the amount of time which triggers the reminder before the end of the task. The app warns the user if the allotted time is exceeded and the user is to mark any activity completed as so within the app to move on to the next one. The app generates a report at the end of every working day which is sent by email to any email address as specified within the options menu of the app.

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List of Acronyms

Acronym	Definition
PPRC	Performance Plus Rehabilitative Care Inc.
ODSP	Ontario Disability Support Program

1 Introduction

Time Task

Many people in the world suffer with a staggering array of various mental and physical disabilities. As a generally healthy member of society one may not perceive these disabilities and the people dealing with them at first glance and it is easy to forget that many people suffer every day as they try to make it through a simple day at work. Modern technology allows for many of these people to accomplish much more than what may have been previously accessible to them by facilitating certain aspects of daily life or by changing the way a common task is approached introducing a new perspective and solution.

Through a collaboration with five students from the University of Ottawa and Performance Plus Rehabilitative Care Inc. (PPRC) an approved service provider for the Ontario Disability Support Program (ODSP) an Android smartphone application was generated allowing for people with various mental and physical disabilities to better plan out their workdays. These people may have a hard time keeping track of time or are simply incapable of staying focused for long periods of time. This can lead to a decrease in workplace performance and could potentially jeopardize the employment and livelihoods of these individuals. These individuals may also never be capable of working in certain situations without the kind of support this app may bring forth, thus allowing for new opportunities and a novel and outlook on life and an overall increase in perceived quality of life.

The need for an application that would allow for a high level of customization in making a schedule for every working day was described. The user must be able to seamlessly generate tasks for the workday that is beginning and set fixed times when they will start and end. Once the day begins, the countdown for the first task also begins and the user is thus within his scheduled day. As the day progresses, the user can indicate that tasks have been completed and will be reminded if the time allotted for a task is running out or if the time has completely run out at which point the timer for the next task will begin. At the end of the day, the application is to email a basic report of the daily performance based on whether tasks were completed on time or not. A visually clear, color coded system allows for quick interpretation of the email and an effortless experience for the user and the user's assistant if applicable.

Other applications available in the Google Play Store offer some features present in Time Task, but notably none include an email report generation system and none include a day of time based timer system which also includes flexible reminder alarm scheduling and end of task notification systems. Our application also features a high contrast and voiceover capable user interface designed with people who may have any type of visual, physical, mental or other disability in mind. The app is also completely free to use with no advertisement or cost whatsoever to the user.

2 Engineering Design Process

In order to efficiently learn how to make an Android application with essentially no prior knowledge and actually complete and publish in application to the Google Play Store within approximately 3 months, our team decided the Iterative Engineering Design Process would be the right path to follow.

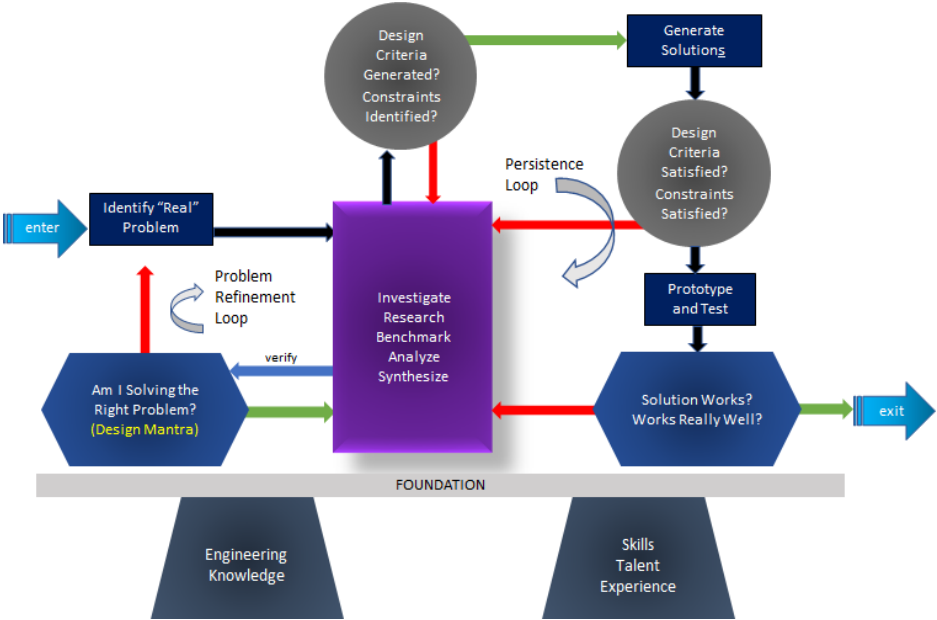


Figure 1: Iterative Engineering Design Process

3 Need Identification and Product Specification Process

Our client expressed the need for an Android based application capable of acting as a sophisticated customizable chronometer and task scheduler. The problem is that several of the workers involved with the program have a hard time focusing on the time spent on many of their daily work tasks. This app allows for the coaches taking care of the workers to enforce certain restrictions on how much time is to be spent on certain activities that are assigned to them. The app also tracks performance and presents performance reports allowing for comparative and relative improvement or regression conclusions to be drawn over time. The app also allows the coach or user to generate and save custom tasks and the related time allotted for their completion. The app is to warn the user if the allotted time is exceeded and the user is to mark any activity completed as so within the app. The app needs to make use of high contrast design guidelines and be usable with voiceover technology.

Initially expressed client needs with according level of importance:

High: Needs application to allow him to gain more independence and to ensure that with the minimum wage continuously increasing, he does not end up losing his job because he is unable to work fast enough.

High: Application built for Android because that is the phone the client has. He will keep his phone in his pocket during his.

High: Easy to use user-interface because it can be too overwhelming for the user if the layout is over complicated with features.

High: Very customizable (change times, name tasks, insert and remove tasks) to allow user to use the app for his needs, as well as let others use the app for their own needs.

Medium: Track progress of task completions to see how they may improve, areas they excel in as well as allow employers to see progress.

Medium: Ensure the application does not necessarily drain phone battery life since the application will be used during shifts that are up to 10 hours long.

Low: Able to work with voiceover for other people with vision lose to be able to benefit from this app as well.

There are many apps on the Google Play Store which satisfy one or many of the criteria requested by the client, but none that satisfy them all. One of the most successful examples is the app “Stopwatch & Timer”. With nearly 150,000 generally favorable reviews this app certainly helps many people with timing and countdowns every day.

However, this app does not allow for the assignment of a level of priority levels to different timers and it does not allow for a system of cascading timers summing to an entire day of work. It also no statistical analysis component and no visual presentation of any metrics or performance related tracking. No app was found that is capable of tracking variation in performance over time relating to the use of similar timer layouts for multiple days of work.



Stopwatch & Timer

Jupiter Apps Tools

★★★★★ 147,175

E Everyone

Contains ads

i This app is compatible with your device.

Installed

Figure 2: Stopwatch & Timer

List of Metrics/Target Specifications (no metrics possible):

1. Possibility of easily checking off completed tasks
2. 3 to 10 hours shift configurations
3. Possibility of infinitely many time slot divisions during the day of work
4. User programmable time slot length
5. Simple and intuitive interface design for severely impaired individuals
6. Compatibility with all Android devices with OS higher than or equal to 4.4 (KitKat)
7. Easily viewable countdown timer display in order to track progress
8. Names assignable to each task
9. Must be able to include blocks of time as breaks
10. Inclusion of time until next break feature
11. Tracking of data over customizable time in order to see improvement or regression of performance

4 Conceptual Designs

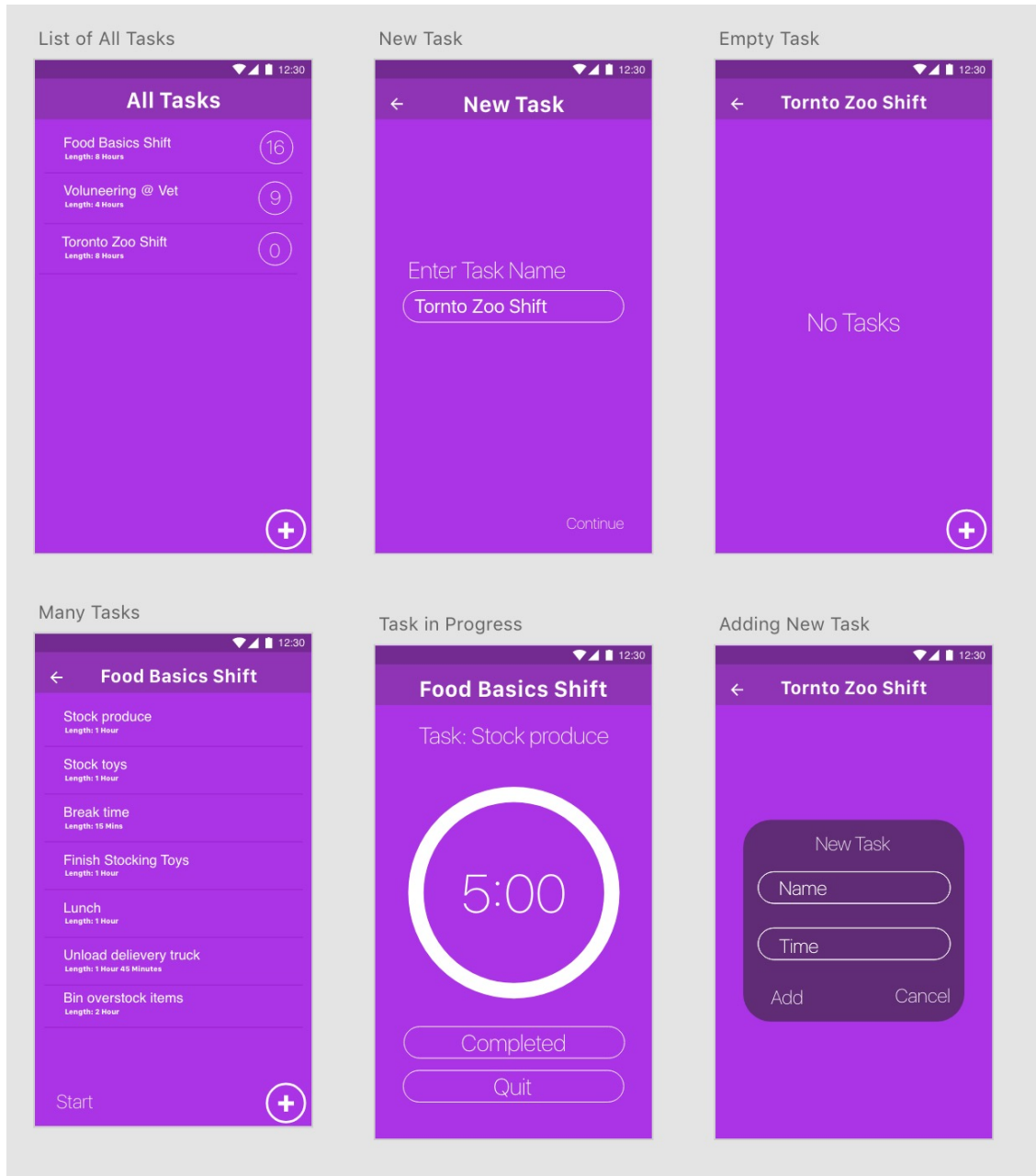


Figure 3: Conceptual Design

The above figure presents a first look into the development of the Android Application and is an illustration of how the user interface of the application was going to look. As described by the subtitles above each panel, many menus are shown here with an emphasis on ease of use and a simple minimalist visual presentation. These panels were developed for the Android operating system and will retain full functionality with the targeted devices. Throughout the design selection process many draft versions of the application were developed. Eventually all but one was abandoned. The process of abandonment took place whenever consensus was reached regarding an individual component, addition or removal of the application. This version is thus the result of an iterative design process that inevitably whittles the superfluous components of the interface away in order to maximize the room available for basic functionality. The importance placed on this simplification process is once again due to the fact that the users will not only be disabled but also be inflicted with a vast array of wide ranging disabilities

Further development is required in the cascading order of the menus and which menus can be accessible from where. The goal is to eliminate user error by leaving little room for incorrect or unintended menu selections. Further development concerning the statistical data menu, gathering system and format of data presentation is also required. Alert sounds will also need to be selected as well as notification screen designs and settings menus.

Through the first client meeting it was possible to determine some of the needs of the client. There was also much discussion surrounding the possibility of making this app available to the thousands of other workers in the disability-work program who may potentially benefit from it. This has also determined much of the direction taken from a design point of view since it must be easily accessible by many people with different disabilities that may differ greatly. Some examples

of relevant conditions are ADHD, OCD, blindness as well as several other emotional, behavioral and mental disorders.

5 Project Planning and Feasibility Study

List of initial tasks denoted as well as the time allotted for the completion of each:

1. Client meet I (1 hour)
2. Get Android Developer Membership (15-minute sign-up process)
3. Learn Java and working with Android Studios (2 weeks)
4. Design user-interface (1 week)
5. Client meet II (1 hour)
6. Build prototype I (1.5 weeks)
7. Present prototype (1 hour)
8. Review modifications suggested by client and build prototype II (1 week)
9. Present prototype II to client (1 hour)
10. Deliver final working application (1 hour)
11. Publish final working application on the Google Play store (1 week)

Milestones to be completed:

1. Client meet and approval of user interface design
2. Functional prototype I with basic features
3. Reach consensus with client about goals to achieve for prototype II / final application
4. Deliver final application to client and publish in google play store

Gantt Diagram:

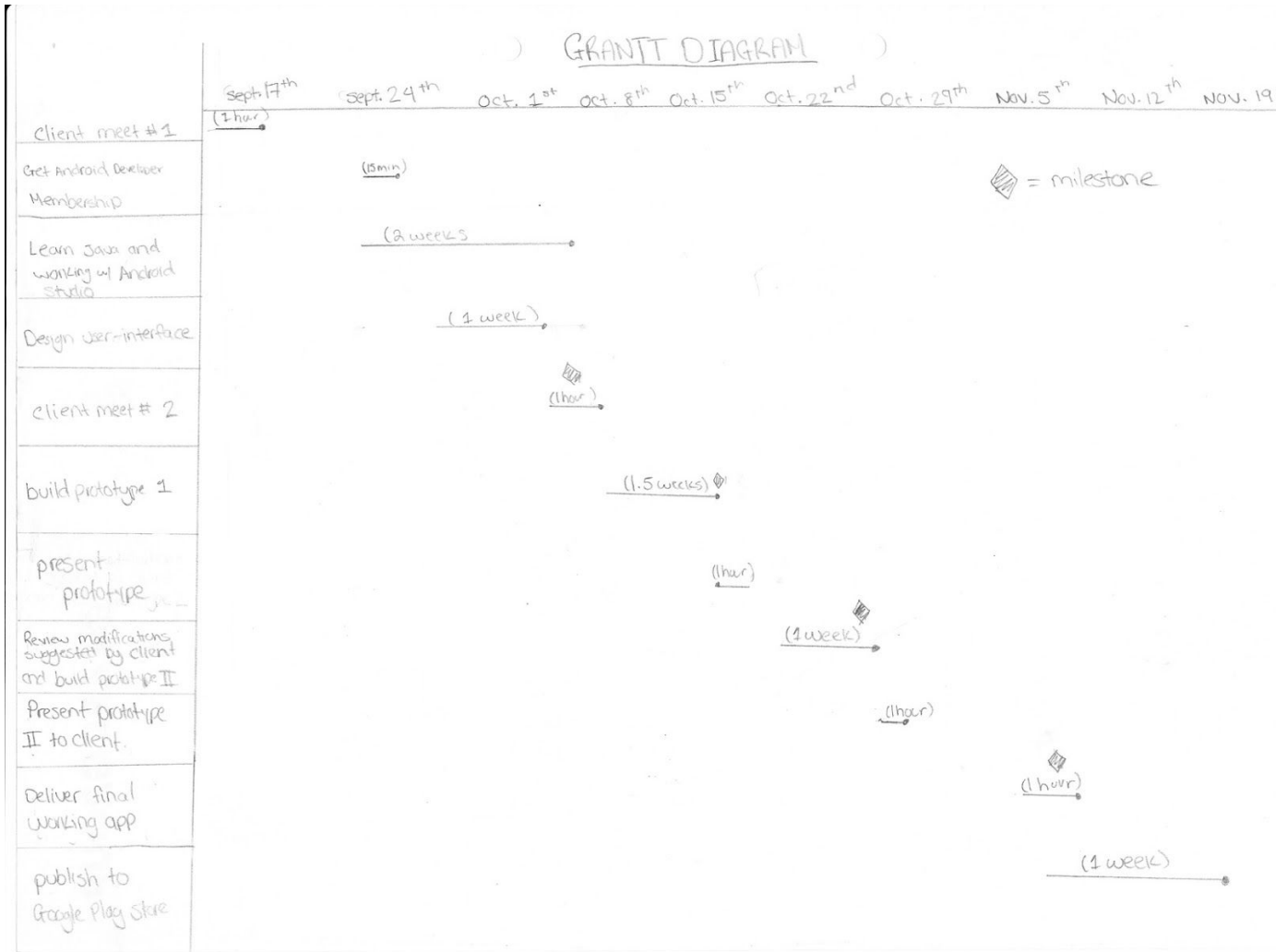


Figure 4: Gantt Diagram

Bill of materials:

<u>Expenditure</u>	<u>Cost</u>
Android Developer Membership	25 USD

Table 1: Bill of Materials

Justification of expenditures: The developer membership is required in order to publish the application and make it available to the thousands of people who could benefit from it.

Uncertainties and risks: If the app is not user friendly enough it may lead to confusion for the person with a disability. There is a certain amount of responsibility to be assumed when developing an application for people with disabilities.

TELOS summary:

Technical: Our team has some experience writing code in Java, but we will make an effort to learn Java and this is part of the project timeline.

Economic: Since there is virtually no cost associated with the completion of our project this is a non-issue.

Legal: Since we are creating original code and developing our own application from scratch this is also a non-issue.

Operational: Time may be a limiting factor, but if we manage to satisfy each deadline and develop our app in a timely fashion we will be able to deliver the app on time.

Scheduling:

Our deadlines are reasonable and we have given ourselves enough time to learn how to use Java and learn about our client's needs. This ensures we would succeed with our project.

6 Prototyping, Testing and Customer Validation.

After some discussion with our client it was determined that we needed to review many of the components of the android application we were working on as a team. Much emphasis was placed on the parts of the application relating to the notification system for the user such as how he or she will be notified when the time limit for his current task is about to be reached and what options are available to him when this point is reached. The user must have the option to answer “yes” the task has been successfully completed or that “no” the task was failed or alternatively not completed in time. This will influence the outcome of the report that will be generated and sent by email to the respective coaches of each user in order to provide information in a simple manner about how the user is performing in his work

Our assumption is that a system consisting of three total options available to the user will be sufficient for our clients’ needs and will allow for a seamless user experience. The first option will consist of the user completing the task prior to the time limit reaching its limit thus the user will be passed on to the next available task once the beginning time of this next task is reached. The second and third options will be available once the timer end has been reached and they will be “yes” or “no” the task has been completed. If the user is happy with these options and the client has no oppositions to the use interface design this will be kept throughout further permutations of the application to be developed.

Upon presentation of our first prototype to the user and client consensus was reached and development of application was to be continued without any further modifications

7 Final Solution

The final solution generated is an Android smartphone application currently published and available for download on the Google Play Store. The application allows for planification of a daily schedule with set start and finish times for each task, customizable task naming and previously created task memory, different notification options such as vibration or audio, generation of a daily report email detailing the user’s performance. The app also allows for the customization of how long before the end of a task the user is to be notified that the time allotted for the task is about to expire.

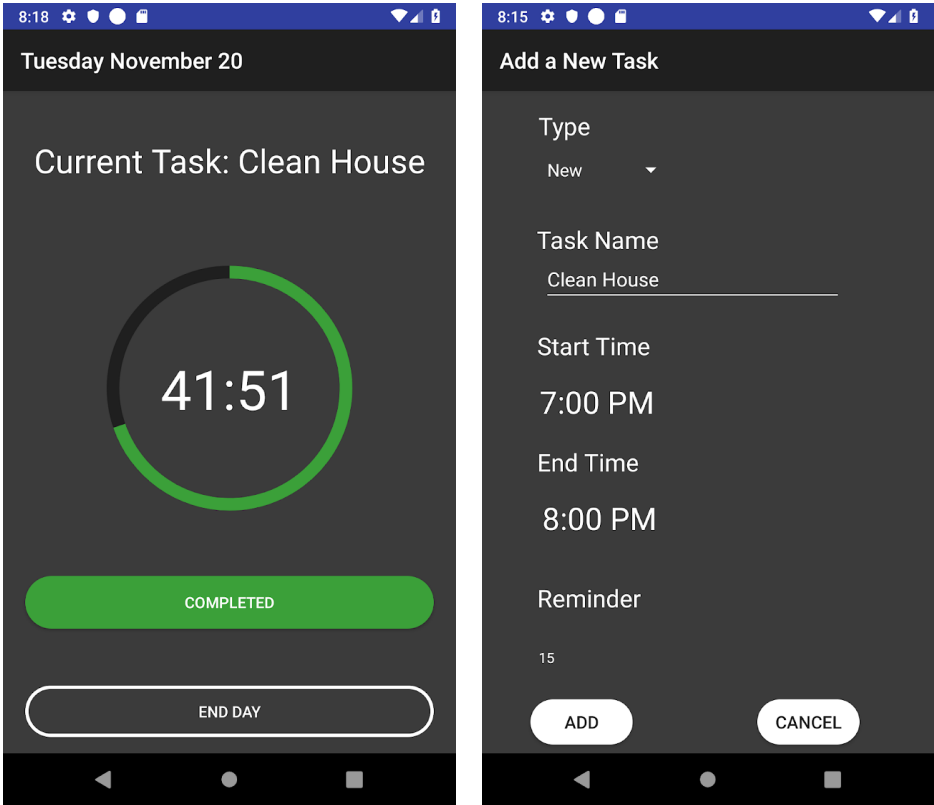


Figure 5: Final Solution within Android Smartphone

The application also features a simple and intuitive user interface with very easy to use buttons and voiceover compatibility.

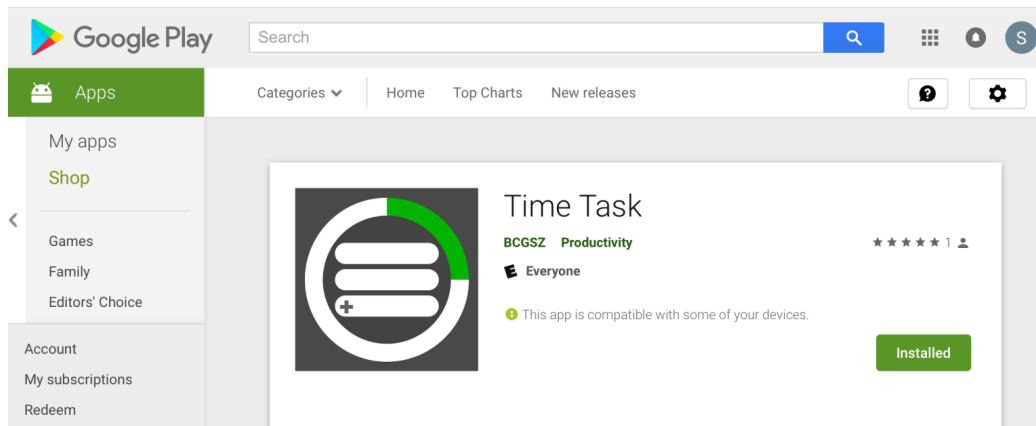


Figure 6: Time Task in Google Play Store

8 Business model

We used a Freemium business model. Since our client asked for an open source and totally free app to be used by any disabled person who may need it in Ontario we focused on keeping the app free of subscriptions, advertisement, upgrades or add-ons. We will consider adding in a donation button allowing any user who greatly appreciates the app to thank us for our work.

How: The only partner needed is the client who manages and communicates with many disabled people who are employees in Ontario. This will allow the distribution and widespread use of our application by all the people who can benefit from it. Our key resource is the software we are developing. Our key activity is running, building and developing an application for our users. We will update the app as needed. It will also include taking feedback from our client into account and implementing desired changes as required.

What: The problem being addressed by the making of this app was an increased level of self-fulfillment in the lives of disabled people. People who want to have an increased level of self-fulfillment in their lives will certainly benefit from the making of this application. Business people with a difficult time managing their time in a busy environment can also benefit from this application. People with imposed time management restrictions by their employer could potentially make use of this app. This project could utilize a business to business model or alternatively a business to customer model.

Who: Our customer relation model was to be mostly through receiving complaints or tips on how to improve the app. This information will be conveyed to us through the client who will make comments about common issues encountered through the use of the application. Our product has been delivered through the Google play store which is the official way of delivering any application for all android phones. Value will be created for disabled people who need assistance in their daily lives. The most important people are those who have severe disabilities such as ADD and partial or total blindness.

How much: No ads will be used to avoid complicating the lives of people who already have disabilities and trouble making it through a normal day. Donations will be accepted from any user, but no costs will be imposed on any of the users. No other costs will be associated with the usage of the application, unless it is to be used in a business/commercial environment at which point the business model for the application may be reviewed.

Core assumptions:

- We assumed the user would make use of the application every day.
- We assumed the application would make an important impact in the everyday lives of the users.
- Our riskiest assumption was that the user would make use of the application every day.

This theory was discussed during one of the client meets and we were informed to expect most users of the application to make constant use of the application on a daily basis. Each user normally has a coach who follows them and helps them throughout their work week. The coach will make sure everything is set up correctly in the app and will also potentially have access to the automatically generated reports on a daily basis informing them of the performance of the user on that given day.

Thus, our assumption was validated.

9 Economic Analysis

A mock income statement was generated since we are using a freemium business model with no foreseeable revenue and/or costs of any kind whatsoever.

TimeTask

Income Statement

For the Years Ending [Dec 31, 2019, Dec 31, 2020 and Dec 31, 2021]

discount rate 10%

Revenue	2019	2020	2021	Total	NPV 2020	NPV 2021	NPV 2020 total	NPV 2021 total
Number of user	3 000	22 000	25 000					
Number of donation	300	2 200	2 500					
Average donation value	10,00 \$	10,00 \$	10,00 \$					
Donation revenue	3 000,00 \$	22 000,00 \$	25 000,00 \$	50 000,00 \$	20 000,00 \$	22 727,27 \$	23 000,00 \$	45 727,27 \$
Sales Revenue	- \$	- \$	- \$	- \$				
Operations Revenue	3 000,00 \$	22 000,00 \$	25 000,00 \$	50 000,00 \$	20 000,00 \$	22 727,27 \$	23 000,00 \$	45 727,27 \$
Expenses								
Fixed								
1 Android developer membership	33,75 \$						33,75 \$	33,75 \$
2 Web hosting and domains	12,00 \$	96,00 \$	96,00 \$	204,00 \$	87,27 \$	87,27 \$	99,27 \$	186,55 \$
3 Banking fee	60,00 \$	60,00 \$	60,00 \$	180,00 \$	54,55 \$	54,55 \$	114,55 \$	169,09 \$
4 NPO declaration of registration	34,00 \$	- \$	- \$	34,00 \$			34,00 \$	34,00 \$
5 NPO annual registration fee	88,00 \$	88,00 \$	88,00 \$	264,00 \$	80,00 \$	80,00 \$	168,00 \$	248,00 \$
6 Software	35,00 \$			35,00 \$	0,00 \$	0,00 \$	35,00 \$	35,00 \$
7 Accounting consultant	500,00 \$	500,00 \$	500,00 \$	1 500,00 \$	454,55 \$	454,55 \$	954,55 \$	1 409,09 \$
8 Salaries and wages (accounting)	960,00 \$	960,00 \$	960,00 \$	2 880,00 \$	872,73 \$	872,73 \$	1 832,73 \$	2 705,45 \$
9 Apple developer fee		133,65 \$	133,65 \$	267,30 \$	121,50 \$	121,50 \$	121,50 \$	243,00 \$
Variable								
10 Salaries and wages (tech support and maintenance)	1 440,00 \$	10 560,00 \$	12 000,00 \$	24 000,00 \$	9 600,00 \$	10 909,09 \$	11 040,00 \$	21 949,09 \$
11 Salaries and wages (accounting)		3 660,00 \$	4 160,00 \$	7 820,00 \$	3 327,27 \$	3 781,82 \$	3 327,27 \$	7 109,09 \$
12 PayPal donation fee	177,00 \$	1 298,00 \$	1 475,00 \$	2 950,00 \$	1 180,00 \$	1 340,91 \$	1 357,00 \$	2 697,91 \$
Direct								
* Salaries and wages (TimeTask App Development)	6 000,00 \$	2 000,00 \$	1 865,70 \$	9 865,70 \$	1 818,18 \$	1 696,09 \$	7 818,18 \$	9 514,27 \$
Cost of good sold	6 000,00 \$	2 000,00 \$	1 865,70 \$	9 865,70 \$	1 818,18 \$	1 696,09 \$	7 818,18 \$	9 514,27 \$
					0,00 \$	0,00 \$	- \$	- \$
Operating Expenses	3 339,75 \$	17 355,65 \$	19 472,65 \$	40 134,30 \$	15 777,86 \$	17 702,41 \$	19 117,61 \$	36 820,02 \$
Gross Profit	(6 000,00) \$	(2 000,00) \$	(1 865,70) \$	(9 865,70) \$	(1 818,18 \$)	(1 696,09 \$)	(7 818,18) \$	(9 514,27) \$
Operating Income	(6 339,75) \$	2 644,35 \$	3 661,65 \$	- \$	2 403,95 \$	3 328,77 \$	(3 935,80) \$	(607,02) \$

Note

Table 2: Income Statement

* cost of making the app

Using a net present value analysis, we can see that our break-even point would occur after the third year because our net present value operating income in 2021 is in a deficit of 607,02\$. In reality, this break-even point could be displaced earlier if we limit the funding going back into the development of the app.

Assumptions made:

1. We are following a non-profit business model. this mean our profit made will always be reinvested into the development of the app
2. The app is free to download, free of subscription, ads and paid upgrades
our revenue comes from donations made through PayPal that will be part of operating revenue
3. We assume that one in ten users will donate
4. Assume that the average donation is 10\$
5. The first year is when the android version of the app will be launch
6. The second year is when the iOS version is launched
7. The third year is when the app is further improved on both platforms
8. We are assuming that our user base will be around 3000 in the first year, it will then greatly expand to around 22000 in the second year because of our cross-platform app. The prediction of growth of the app will be of around 3000 for the following years

Expense descriptions:

1. Price to post our app on google play store
2. Oneandone web hosting to have a web page to post resources.
3. Banking fee from TD enterprise account
4. NPO declaration of registration based on Qc. tariff
5. NPO annual registration fee based on Qc. tariff
6. Quicken accounting software.
7. To take care of provincial and federal tax reports
8. Administrator labour pay, 4 hrs/month @ 20\$/hr
9. Price to be on apple store.
10. To take care of support of app and website, 20hrs/10000 users every month @ 20\$/hr
11. Input donations to quicken for accounting. 12inputs of donation/hrs @ 20\$/hr
12. Fee that PayPal charges for using their donation platform. 30 cents plus a 2.95% fee per transaction

10 Conclusions and Recommendations for Future Work

In conclusion we all learned a great deal about many topics. One area of expertise where tremendous learning was needed was programming with Java.

At the beginning of the project all team members only had some fundamental knowledge about how to use Java and its intricacies. Throughout the course of the semester we had no choice but to quickly learn and use Java creatively since the application was entirely coded with Java. Many difficult problems were encountered and creative solutions were needed to overcome them. Notable examples are the use of a system that follows the time of the day reliably without making use of a timer system dedicated to the application itself. Many issues were also encountered when trying to piece together the customizable nature of the application ensuring that no errors were to occur and that under all circumstances the user would be able to go through a work day without any problems arising from a technical perspective in the app. It was also important to ensure reliability of the notification system since the intended users were to depend on it for their livelihood.

Another area where much progress was made was in web-based hosting services. Our team continually made use of GitHub to consolidate our efforts throughout the course of the semester allowing us to work independently on a single common project and make sure continuity was maintained in all the work produced. It was inherently necessary to use a web based hosting service since each member was responsible for coding separate components of the app on an individual level and this allowed to make sure every piece of the app functioned with the other pieces as intended.

It was also interesting to actually interact with a real client. This was an interesting diverging point when considering other traditional engineering courses where scenarios are limited to simulations. Even more interesting was to learn to work with a client who had a severely debilitating physical disability.

We had to come up with ideas simply to communicate with our client and make sure he understood what we were presenting him and what he wanted from us. Interpretation of his comments based on what we were capable of sharing with him was one of the finer points of the entire project as we wanted to make sure the client was satisfied with the outcome of the project in the end.

We learned a great deal about how to communicate our thoughts and how to listen to someone and decipher what it is they need or want. It was challenging to put ourselves in the shoes of someone of a disability we truly knew very little about. We had to learn to understand why the potential users of our application could benefit from it in the first place and this influenced how we designed many of the visual aspects and customization features of the application.

In the future we plan on creating an iOS equivalent of the app if possible and improving the compatibility of the application with more as many devices as possible on the Android platform making the user experience as seamless as possible.

APPENDICES

APPENDIX I: User Manual

Installation: To install the application simply go to the following link from your android device and click the “Install” button:

<https://play.google.com/store/apps/details?id=com.gng.bcgysz.timetask>

Use of the application is fairly intuitive:

1. From the main screen press the “+” button to add a new task to your day
2. Next, set the name of the task within the “Task Name” field
3. Set the start and end times in the respective fields
4. Set the reminder time, this is the time allowed before the user is reminded his task time is about to expire (for example, a reminder time of 15 minutes will notify the user his 14:00 deadline is approaching at 13:45)
5. Click the “Add” button to add this task to your day or “Cancel” to exit back to the main menu without adding the task
6. Once the user is ready to start the day press the “Start day” button

Settings that are configurable include the email address to send the generated report to and notification options.

APPENDIX II: Design Files

Our project was uploaded to Maker Repo and is available at the following link:

<https://makerepo.com/santosgagbegnon/gng2101time-task>