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## **Productify Final Paper**

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## Abstract

ADHD (attention deficit hyperactivity disorder) and ASD (autism spectrum disorder) are among the world's most common disabilities, affecting an estimated 3% of the newborns in 2018 [1][2]. While the two disorders do have immense effects on one's life, there are tricks and tools that can get one to focus on their goals and be productive. According to a research study published by the National Library of Medicine, college students who suffer from disorders such as ADHD/ASD report being more productive when using certain tricks and tools such as having a planned schedule, a list of things to do, and more [3][2]. Because of this, as well as other problems such as lack of apps that work on all devices, or even synchronizes, a much better solution would be to have an app that fulfills all these criteria. To address this, we developed Productify, a user-friendly application that enables users to track their goals, synchronize their data across all devices, and leverage features such as note-taking, reminders, and a pomodoro timer. Our app is built using the cross-platform framework React Native, written in Javascript, and uses Firebase for data storage and synchronization. We also conducted 44 consumer interviews to gather feedback and ensure our app is accessible and user-friendly, adhering to guidelines such as the Web Accessibility Initiative. Our ultimate goal is to provide individuals, particularly those with ADHD or ASD, with a tool that can help them achieve their goals and increase productivity.

## Background

Attention deficit hyperactivity disorder, or ADHD, is one of the most common psychiatric disorders, affecting more than 3 million people in the United States and 3% to 4% of adults worldwide newborns in 2018 [1][2]. The condition has shown that while treatment can help decrease symptoms, the condition is incurable. Similarly, autism spectrum disorder, or ASD, has shown similar characteristics as ADHD and scientists even believe there is a correlation between the two [4]. This condition often starts in childhood and lasts well into adulthood. And it has been proven to hurt self-esteem, make relationships harder, make school and work harder, and lead to feelings of inadequacy, shame, and low self-worth.

People with ADHD and/or autism often experience difficulties performing tasks effectively due to feeling overloaded physically and mentally, as they react very actively to stimuli [3]. This can cause them to miss important deadlines, struggle with long-term planning, and have difficulty executing tasks. Socially, they may seem very interested in certain topics but have difficulty maintaining attention on other tasks. Additionally, these conditions can lead to forgetfulness and difficulty finding employment.

According to the article "14 Most Common Symptoms of ADHD" [5], some of the key symptoms of ADHD include a short attention span, difficulty following instructions, poor memory, distractibility, poor short-term memory, and resistance towards tasks that require concentration. Other symptoms to consider are disorganization and poor time management. Restlessness, impatience, emotional dysregulation, hyperactivity, and impulsivity are also commonly present in people with ADHD. This can lead to them missing important deadlines, putting their tasks

behind until they need their immediate attention, and significantly affects their ability to plan tasks in the long term, as well as executing tasks in the present day. This can also affect their social lives as well, as they may seem to be extremely interested in certain topics, and struggle to maintain attention to other tasks. Sometimes because of this stress it is extremely easy for them to forget what they had to do or what was next in their schedule. All these pose challenges in their employment and in their chances of finding one.

Restlessness, impatience, emotional dysregulation, hyperactivity, and impulsivity are also commonly present in people with ADHD. Adults with this condition are also associated with a wide range of psychosocial impairments, including lower educational attainment and poorer workplace performance, as well as difficulties establishing and sustaining close personal relationships. Overall, people with ADHD or Autism require medication or tools to help them stay on track on a day to day basis.

## Statement of the Problem

People with ADHD/ASD face a wide array of problems due to their symptoms. One of the problems is their short attention span. Because of the short attention span, it is sometimes hard and challenging for them to sustain their attention on the same thing or task. in their workplace. It is quite common for them to lose interest quickly and rarely persevere in what they are working on.

ADHD/ASD makes it difficult for people with this condition to organize tasks or make plans because they cannot get all the way through without losing track of their thoughts. Because it is extremely easy for them to get lost when the information they are handling is too much, they easily forget all the things they need to keep in mind when making complex decisions and planning future activities [3]. Consequently, often they prefer to switch tasks and very rarely do they complete anything successfully.

In addition, the disabilities affect people's ability to concentrate and persevere in a mental task, as a result, this is what makes people with ADHD/ASD forget this easily. Also counting that it is quite easy for people with ADHD/ASD to get distracted [5]. Distractibility is also a very troublesome symptom these people experience. In this case, people with such conditions are easily distracted, which makes it exceedingly difficult for them to complete a task or focus on something for an extended period of time.

Having explored and studied all these conditions and symptoms, people with ADHD/ASD suffer from, we hope that our idea, to develop a note taking app combining time management features, can help users keep track of their lives and schedules more effectively.

When trying to be productive, it is also difficult for one to open all their productivity apps to be productive at once. For example, one can use Google Calendar to keep track of their schedule, open Google Keep to find what they need to get done for the day and open a Pomodoro timer app to make sure they stay on track. Most of these applications are not disability inclusive, having too many unnecessary features that most people do not use. In addition to this, all these apps synchronize all the settings on other devices or even work on certain operating systems, resulting in either repetitive work or trying to find and move to an alternative tool. Because of all the wasted time and frustration this causes, we believe there should be a better alternative where all the tools are in one application, works on all devices and operating systems, as well as synchronizes all data under one account.

## Rationale of Solutions

Although there are many note-taking apps available, the market is highly fragmented across different devices. While some prominent cross-platform apps exist, they tend to be complicated to use, which creates a high barrier to entry and leads to low adoption rates in the long term [6]. During our site visit to the Day Services of Goodwill NYNJ, we heard from participants with ASD/ADHD that they would like an easy way to jot down their tasks. Similarly, at CCNY, we observed that many computer science students who use multiple operating systems struggle to find note-taking solutions that can transfer to their Linux counterparts. This problem is also prevalent in workplaces, especially now that working from home has become more common.

According to the research paper "Strategies for Coping with Time-Related and Productivity Challenges of Young People with Learning Disabilities and Attention-Deficit/Hyperactivity Disorder" by Consuelo M. Kreider, Sharon Medina, and Mackenzi R. Slamka, college students with conditions such as ADHD or ASD reported higher productivity from adopting certain routines in their day [2]. These routines included having a structured schedule, planning systems, reminder systems, planning activity breaks, and others. However, maintaining these structures can be challenging. This is where Productify comes in, providing users with the necessary tools to organize and structure their day-to-day effectively without rigid, difficult-to-adapt structures like calendars. It also serves as a reminder to assist users who experience memory loss and attention deficits. Modules integrated into the application include note-taking, reminders, a Pomodoro timer to delegate time between productivity and breaks, and a calendar. Throughout the project, we continuously gathered feedback from users to ensure that the



features we implemented were helpful to them. Based on our 45 interviews, we found that after multiple iterations and changes, users were quite satisfied with our application, describing it as intuitive, simple to use, and having a friendly user interface. We referred to many research papers during the development process, the most important of which was the Web Accessibility Initiative guidelines created by the World Wide Web Consortium to make websites and online applications more user-friendly for people with disabilities. Thanks to this and the feedback from our interviews, we were able to create an application that was simple and easy to use.

As a business, Productify strives to be accessible to everyone without requiring users to pay a premium to use the app. Users may not be interested in a productivity app that requires payment, so we considered many free business models, such as an advertisement-based model and freemium. Initially, we considered using an advertisement-based model, but we found that it would be detrimental to the user experience. Imagine using the Productify app to organize your thoughts, and suddenly an advertisement pops up, disrupting your train of thought. This would be even more problematic for people with ADHD or Autism, whose thoughts tend to wander when they are distracted. Although it initially seemed like the most sustainable form of revenue, it was not ideal for our target audience.

After careful consideration, we have adopted a freemium model for both our business to consumer (B2C) and business to business (B2B) strategies. Our application can be downloaded for free by consumers, with files stored locally on their devices. However, users who wish to access additional features such as synchronization or quick commands will be required to pay a monthly fee of \$5. This fee is necessary to offset the costs we incur when using Firebase.

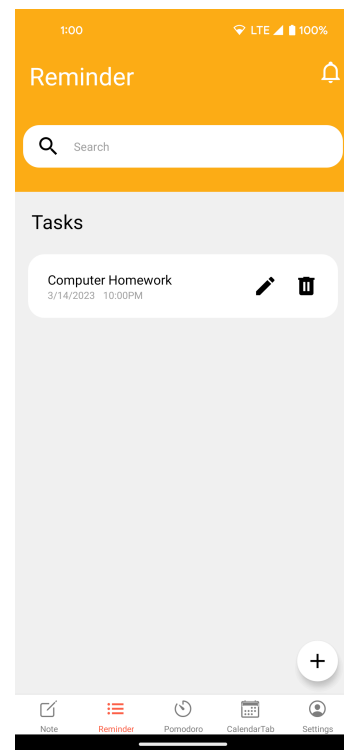
For our B2B model, we have formed partnerships with institutions such as Goodwill, which provides support to people with ASD for their social skills and job search. We will offer our application to B2B clients at a discounted rate, which is less than our standard pricing. Goodwill has expressed interest in incorporating our application into their curriculum, and we hope to form additional partnerships in the future to further enhance user productivity.

## Design and Development of Systems

Part of our MVP plan is to create a cross-platform app to address shortcomings in the productivity system. We found that most applications were either too complicated to use and/or were not cross-platform compatible. As such, we had in mind a programming language that would compile across many different operating systems to allow us to have a write-once-run-many codebase to maximize our target while minimizing code maintenance.

The programming language we ultimately chose was JavaScript using the Expo framework. Expo is a toolkit based on top of React Native, a full-stack JavaScript framework, which provides an easy-to-use UI design language, suitable for production apps as well as for rapid prototyping. We found that this was a good match as React Native was used by companies, such as Facebook, in designing mass-market applications such as their website and their mobile applications. The design of their framework suited our goal of a write-once-run-many programming system.

Another core feature of our application is to synchronize data between different operating systems. To perform this, however, we need a backend storage solution which acts as both the repository for stored data and as a relay for synchronization. We chose Firebase as it



integrated with Google Cloud and their APIs. We also chose the Google Oauth system as Google accounts are relatively ubiquitous and would be a good starting point in our target audience.

## Evaluation with Users & Partners

Over the course of the semester, we conducted interviews with potential main target consumers, specifically people with ADHD or Autism. While our app can be used by anyone and everyone, we recognize that these particular consumers have unique needs due to their symptoms.

From February to March, we reached out to communities from other schools such as SUNY Stony Brook, SUNY Albany, and the CUNY campus at large, and conducted 15 interviews. We documented our observations and their struggles in a rainbow spreadsheet as shown in Figure 2. In the second month, we were able to collaborate with Goodwill, an organization that helps people on the higher end of the autism spectrum, and conducted another 15 interviews. These interviews were particularly important as people on the higher end of the autism spectrum are the most difficult to help in our consumer base. We received valuable feedback about how we can make the app easier and more user-friendly for that demographic. Finally, we conducted 15 more interviews to showcase our minimum viable product and make final adjustments to see if users were satisfied with it.

Overall, the general feedback has been positive, with many people liking the simplicity and intuitiveness of our project. However, we identified some features that are still desired. For example, through our interviews, we discovered that people with ASD prefer visual cues rather than words, so we will implement a drawing feature to the notes section. We will also add a feature that we call "quick commands" which will allow users to type or use voice assistants to create a calendar event or reminder without the need to do it the regular way in case the user is

in a rush. Although this feature is partially done, we will continue working on it to make it more comprehensive. Finally, we plan to implement more features based on our users' needs.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Top-Level Theme	Observation	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
2																	
3		Tries to be proactive then tapers off															
4	Hand-written	Hand Written Notes because it is easier for them															
5	Phone distracts	Phone is a big source of distraction															
6	Phone distracts	Biggest culprit of distraction is social media/entertainment apps (Discord, Youtube, Reddit, etc)															
7	Productivity options fail	No productivity tools/does not stick with productivity tools															
8	Workaround	Tries to have fixed plans to prepare of them															
9	Forgetting	Forgets about things alot															
10	Structured Schedule	Does specifically structure day outside of school/work															
11	Quantized Schedule	Tries to break down tasks to make it smaller															
12	Free-form jotting	If takes notes on an app, does not look for any particular feature															
13	Workaround	Have other people hold them accountable															
14	Overall distraction	Hard to get to the work I need to do															
15	Overall distraction	Loses track of time															
16	Overall distraction	Generally takes longer for me to finish work than others															
17	Schedule Reminders	Uses manual alarm on the top of the hour saying do xyz (constant reminders)															
18	Workaround	Accommodations for work/class															
19	Checklists	Use checklists and check them often															
20	Block scheduling	Does not like planning to the dot															
21	Block scheduling	Performs tasks in terms of blocks and more general planning															

Figure 2: subset of data gathered from interviews

## Discussion of Potential Markets & Future Work

While our application is specialized for those with disabilities, Productify has potential to reach a wide audience with our image of improving productivity for all. To prevent us from marginalizing our target audience though, we want to focus on them and optimize the application best for their use.

As such, we plan on starting small. We believe our Served Available Market (SAM) includes college students with disabilities who may have trouble focusing and managing their time. We plan on reaching out to this audience through direct marketing such as social media, partnerships with organizations such as college accessibility centers, as our application is mostly designed under this paradigm. In addition, rehabilitation centers are a secondary target within our SAM, as they may also have a direct need for an application for their audience. New York City is known to be fast, and so the environment here makes it ideal as a market area. We plan on initially limiting our target audience to those who live in the New York City Metropolitan Area.

Growing further, we believe that our Total Available Market (TAM) will involve all students in the United States. With over 80% of Americans with a smartphone [7], we believe every city is an available market for us to expand to. Time management principles remain the same across different areas. Thus we find it appropriate to market our application outside New York City as part of expanding our outreach. In addition, our audience can widen to any other company who is interested in productivity and data resource management. Many companies use many task management services (Slack, To-Do, Sticky Notes, etc.) and our application can fit in as an integrator of all different note-taking systems.

Ultimately, we hope we will be able to target everyone who is digitally connected in the United States. Productivity styles are not confined to a certain culture, company, or mindset. Everyone has agendas to produce and execute, so everyone can potentially benefit from an application like this. While we are targeting a very large market which can potentially lead to feature creep, we will still focus and tailor the application to those with disabilities, as they are our core audience and need this feature most.

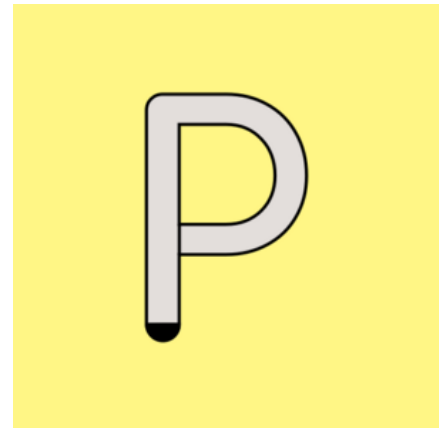


## Branding

Since the main purpose of this application is to provide individuals with ADHD/ASD a tool to help them stay on track on a day-to-day basis, and ultimately assist them in achieving their goals and increasing productivity, we have chosen to name our application "Productify." The name itself is self-explanatory, making it easy for users to infer that the application is focused on enhancing productivity. While it may not be immediately clear that it is specifically designed for people with ADHD/ASD, we address this by including a concise one-sentence description of the application's purpose.

In terms of the logo development for our application, in line with our branding strategy, we have created our initial logo, which can be seen in Figure 3. We aimed to reflect the brand's emphasis on simplicity and ease of use through the logo design. Our intention was to create a visually appealing and minimalistic logo. Additionally, we carefully considered the use of colors to create a noticeable contrast. The choice of a soft yellow as the background color stems from our research, as yellow represents positive feelings, curiosity, and even stimulates learning.

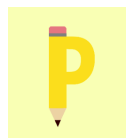
The logo comprises a gray letter "P," which represents "Productify," and is intentionally shaped to resemble a pencil. To reinforce this association with a pencil, we purposely made the bottom tip of the "P" black. The concept of the "P" resembling a pencil aligns with our branding



**Figure 3 - First Productify Logo**

signify education, discipline, and taking action—fundamental aspects of our application's purpose. This is why we specifically chose this design as it effectively communicates our intentions.

For our second and current logo iteration, we retained the same concept while making significant improvements as seen in Figure 4. We opted for an even softer shade of yellow for the background color to create a more welcoming and aesthetically pleasing appearance. The edges of the logo were also rounded to enhance the overall softness and visual appeal. We further refined the gray letter "P" to closely resemble a pencil, ensuring that all the necessary elements were incorporated for a more accurate depiction. Additionally, we applied a darker shade of yellow to the "P" to achieve the necessary contrast with the background.



# Productify

Figure 5 - Productify Letter mark

Since we are also developing a web version of our application, we have begun working on our letter mark logo, which is depicted in Figure 5. The logo features our current logo on the left side, accompanied by the application name on the right.



## Member Contributions

### Benjamin Trinh

He was responsible for coding the pomodoro timer module in the application, as well as designing the framework for the application. On Zahn, he contributed to most assignments and conducted about 10 interviews. Overall, he is an equal contributor to the project.

### Andy Zhou

As the POC, he was responsible for leading the team and being the spokesperson through meetings. He also worked on conflict resolution and as a mediator, as well as guiding the team through the Zahn Startup Process. He conducted the most interviews for our application and gave us insights to design the app based on feedback he received from interviews. He also worked on the Calendar aspect of the application. Overall, he is an equal contributor to the project.

### Diego Perez

He had the most experience with Javascript, so he coded most of the application. He was responsible for designing the calendar, notes, and Firebase systems that the application used. He also provided input on logo design, and conducted 10 interviews for the application. Overall, he is an equal contributor to the project.

## References Cited & Acknowledgements

**Faculty Advisors:** Dr. Zhigang Zhu (CCNY)

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**The work in this project is our own.**

**Any outside sources have been properly cited.**

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