**Design Project - Final Report**

**Google Pixel Watch 1**

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**Introduction:**

This design project focuses on improving the Google Pixel Watch 1, a smartwatch released in 2022 by Google. It has a circular display and comes with a rubber (detachable) watch band. With the Pixel watch being about three years old, a new one will cost around $100 - $200 now. It can do all the basic things that most modern smart watches can do like checking the time, making calls, notifying the user of their schedule, listening to music, and much more. The Google Pixel Watch is of course created by Google and is meant to go hand in hand with their Google Pixel phones. The Pixel Watch was Google’s first entry in the smart watch realm. The Pixel Watch faces strong competition from other smartwatches, including the Apple Watch, Samsung Galaxy Watch, and certain Fitbit models. That being said, Fitbit being a competitor is questionable because Google owns them and has incorporated Fitbit health tracking in the Pixel Watch. You can use the Fitbit software in the Pixel Watch to track steps, flights of stairs traveled, calories burned, heart rate, and even sleep data all for free with the watch. The Pixel Watch also comes with a very good battery life sitting at approximately 24 hours until you will need to charge again. Overall, it is a quality Smart Watch, but it does have areas where it could be better.

This paper will be split into three parts, the front-end analysis, errors and solutions, and potential drawbacks. The front-end analysis section will explain potential users, environments the watch might be used in and a deeper dive into what functions the watch has. The errors and solutions section will explain the major or bothersome errors the watch includes. And finally, the potential drawbacks section will point out potential drawbacks that would come with the proposed solutions in the errors and solutions section.

**Front-End Analysis:**

This design project aims to improve the Google Pixel Watch 1. Although the device is already very well made and completely functional, there are some things that can make it better and give the users better experience using the device.

The Pixel Watch has a broad range of users from different ages to different backgrounds. Most users of the Google Pixel Watch are likely between 18 and 35 years old, although the watch can accommodate a wide range of ages. Older individuals may be less likely to use the Pixel Watch due to its small screen, which may be difficult to read. It is also unlikely that children under the age of 14 will use the Pixel Watch, as parents may be hesitant to trust them with an expensive device.

The education level would also be very broad due to the broad age range. But it is safe to say that the majority of users would have at least some sort of high school education. Users will also have a large range of education/career backgrounds ranging from people with tech careers to people with artistic careers.

The Pixel Watch can accommodate a broad variety of disabilities as well. A person who is deaf can use the pixel watch because the watch has a vibrating function that allows the user to feel a vibration when the watch is trying to send a notification. People who are colorblind can change the color scale to accommodate their color blindness. For people that are blind or can’t read there is a text to speech feature that can read out the text on the screen. Although someone may be blind, with the google assistant, almost everything is accessible just using your voice, so vision is not necessary for use.

Overall, the user range is very large and can include people of all ages and different backgrounds so the watch must be very accommodating to be able to be used by the broad range of different users.

Due to the wearability of the watch, there will also be a broad range of environmental conditions the watch may go through. Here is a look at the classical environmental conditions and the range of conditions the watch may encounter:

|  |  |
| --- | --- |
| Environmental Condition | Google Pixel Watch |
| Light Level | Could be anything from outside in the bright sun to inside a dark room |
| Noise | Could be anything from a quiet room to a loud party/concert |
| Temperature | Could be anywhere from a hot 100-degree day to a below zero day |
| Movement | It could be used stationary or could be on the move, jogging, running or other exercise. |
| Space | Need at least a half arm’s length of room to see the watch |

The Pixel Watch has a large variety of functions and an ever-expanding library of functions due to the ability to download additional apps from the Play Store. But here are some of the main system functions:

* Classic watch function (keeping time) – the classic ability to check the time on a watch, with bonus features like a stopwatch and timer.
* Health/fitness tracking – The watch keeps track of heart rate, steps, flights of stairs, sleep schedule, and more.
* Check messages and make phone calls – You can see texts and even type messages as well as us the watch as a phone and talk directly into it like a phone.
* Music – Ability to stream music from the watch itself. The phone can be elsewhere, and the music can stream straight to the headphones from the watch.
* Google Wallet – you can tap your watch like a phone to pay using google pay.
* Google Assistant (ask questions) – Just like an android phone, you can say “Ok, google.” to activate the google assistant and ask it any question.

Task Analysis

* Charge the watch
* Power on the watch by holding down the crown button
* Unlock the watch
  + This can be via pin number, dot pattern or no passcode
* The main screen is displayed
  + The time is shown along with 4 small widgets
  + The widgets can include things like the temperature, the date, steps, a shortcut to another app, etc.
* Connect the watch to the phone
  + Download the pixel watch app on your phone
  + Connect your phone to the watch via Bluetooth
* Swipe through the tiles
  + Swipe left or right on the middle of the screen to transition to different tiles
  + Tiles can be customized and chosen
  + Tiles are widgets for different apps you have including:
    - A long selection of different Fitbit options
    - Calendar widgets
    - Weather app widgets
    - Etc.
* Swipe down to open the quick settings
  + This menu includes a bunch of important options including:
    - A shortcut to the main settings
    - Do not disturb
    - Flashlight
    - Airplane mode & more
* Swipe up to see all notifications
* Press the crown on the side to open a list of apps
  + You can either turn the crown to scroll or you can just swipe up like a regular phone to scroll through the list of apps
* Press the button next to the crown to open a list of recently used apps
* Use the play store app to install more apps
  + The Play store is harder to navigate on a smaller screen, so they made sure that the big categories are on the main page
  + Click on the app you want to install, and you see the install button and you can scroll down further to see pictures, reviews, and descriptions just like the normal Play store
* Connect the Fitbit app to the watch
  + When you click on any Fitbit widget or the app it will direct you back to your phone to download/sign into the Fitbit app
    - You do need to have an account, but it is free
    - The premium is completely optional, and the free version has all the important features
  + Once it’s connected you will have access to all your fitness data
  + You can customize which widgets you want on tiles or on the main watch face using the Pixel Watch app
* Power down the Watch
  + Hold down the crown and four options pop up (like a normal phone)
    - Power off
    - Restart
    - Emergency SOS
    - Emergency info
  + Of course, select power off to completely shut down the watch

**Errors and Solutions:**

The Google Pixel Watch 1 is very well made and doesn’t have any real device breaking errors. That being said, I have identified 6 errors that don’t suspend the user from using the device, but 6 errors that can be an annoyance to a user and even make that user consider buying from a competitor company instead.

The first error I identified is the screen’s small touch targets. This is an error that relates to the perception stage of information processing and can affect anyone who might not have perfect vision or anyone who has larger hands/fingers. This is a problem because the small touch targets may lead to increased user frustration and input errors and some people would like the ability to use the typing feature on the watch in a different way. Although the watch does have an option for speech to text, talking is not always an option for the user so the watch should have features to adapt to that situation in which case it doesn’t. A solution for this problem could be to increase the key sizes on the onscreen keyboard even if it means redesigning the way the keyboard looks. An example could be large text characters that you can either click on or swipe to the next one character.

The second error is the lack of programmable physical buttons. This applies to the action stage of information processing and applies to all users of the watch. You can use the crown on the watch as a button to open the list of downloaded apps. The watch includes one other button right beside the crown that opens a list of your recent apps. Although this is minor, it is annoying that the only two physical buttons on the watch have a very similar function. This would be acceptable as a default, but the inability to change button functions is problematic. An easy solution is to make a setting that allows for even just one of the buttons to be remapped to whatever the user chooses. For example, if a user uses the watch to check the weather a lot, they could go to the settings and make the button open the weather app when clicked instead of opening a list of recently used apps. It is a very doable change that google can for sure add. This aligns with Nielsen’s (1995) principle of user control and freedom, which emphasizes giving users the ability to customize their interface for greater satisfaction.

The third error is the relatively short battery life for what the watch offers. This applies to the cognition stage of information processing and applies to all users. Specifically, the ones that want to use the watch for extensive periods of time. The battery life on the Pixel Watch 1 sits at a good 24 hours. While this seems like a sufficient duration, users who want to track both daytime health statistics and sleep may struggle to find time to charge their watch. One solution is to create an on-wrist charger that users can use while sleeping. The default watch charger charges from the bottom of the watch are where the wrist would be when the watch is being worn. So, the add on could be placed on top and charge from the top so the user can where the watch while sleeping and it can still track the users sleep data.

The fourth error is the failure of the “raise to wake” gesture of the watch. This applies to the perception stage of information processing and applies to all users of the watch. The “raise to wake” gesture is where you lift your wrist to look at your watch and the watch turns on to show the user the screen. Otherwise, while the wrist is down the watch screen turns off to save battery. This is problematic because users expect the watch to respond when they lift their wrist, but it does not always function as intended. A solution is to add better or more motion sensors to the watch so that this gesture fails less often. This solution will help the watch support the principle of timely feedback and system responsiveness (Norman, 2013).

The fifth error is watching vibrations being too quick or not strong enough. This also applies to the perception stage of information processing and applies to older users or users that are in motion (working out or even just walking). People might miss the watch vibration due to its quick duration and low strength. It can be easily missed by someone who is doing something active or even an older person, whose physical detection is not as strong as it used to be. This is a problem because it can cause users to miss important notifications. A solution to this problem could be to add more vibration customization options. If you go in the settings currently you can toggle on and off vibrations but there is no option to extend vibration duration or increase or decrease vibration strength. Allowing your user to have options like those can make for a better user experience because their personal preferences are being met. According to WCAG 2.1 (W3C, 2018), ensuring content is perceivable for all users is a fundamental principle. This can be achieved by offering customizable feedback options, such as adjustable vibration strength and duration, which accommodate users with varying sensory needs.

The sixth error is the watch lags or performs slowly when first used. This applies to the cognition stage of information processing and applies to all users. This is a problem because when you first turn on the watch or use it for the first time in a while the watch acts very slowly because it tries to process so many things in the background, and this is very annoying for users who are trying to check the watch. A good solution would be to optimize performance by performing the tasks like updating and background processing while the watch is on the charger or off wrist. This reduces processing delays and improves perceived responsiveness while the watch is in use (Norman, 2013; Nielsen, 1995).

**Potential Drawbacks:**

With the solutions for the errors comes potential drawbacks. I will explain the possible drawbacks and say if the pros outweigh the cons or not.

For error number one, increasing the keyboard size/layout could reduce the screen space that is available. This can make other app interfaces harder to navigate and view. The watch display could look too cramped for the user. It might also make the user type slower, but the user should still have the option available to them in case they need it. The optimum button size for a touch screen is 1 cm2 (Montgomery, 2025) and with that solution you can meet that minimum even if it hurts typing speed. So that being said, I think the pros outweigh the cons because the layout would be completely optional and wouldn’t affect the average users’ experience negatively because they might not even need that option.

For error number two, the only real drawback for allowing the user to change the physical button functions would be an increase in cost but that might not be the case depending on how it was made internally. The problem might be solved with some software development and an update to everyone’s watch. Of course, the pros outweigh the cons here and this would make for such a useful option for all users.

For error number three, adding an on-wrist charger for night charging could lead to the user’s discomfort or even some skin irritation. It would also be an add on so it would cost extra money for the user to buy. The cons outweigh the pros, so users would need to find an appropriate time to remove the watch for charging.

For error number four, add more/better motion sensors to improve the “raise to wake” gesture could cause the watch to consume power at a higher rate. It would also cost Google more to make and therefore cost the user more to purchase the watch. Unless they can figure out a solution using the software, the cons outweigh the pros here and it would not be worth implementing this solution.

For error number five, allowing for users to increase vibration intensity or duration could cause battery to drain faster. The strength of the vibration could also become annoying to the user but with this solution the pros definitely outweigh the cons because it would all be customizable for the user. They could set the vibrations to the settings that work best for them and therefore the only drawback would be the possibility of a faster battery drain.

For error number six, doing most of the background processing and updating while off wrist actually doesn’t have any significant drawbacks. This solution optimizes performance without disrupting real-time functionality. The only drawback would be that it uses up power off wrist if the watch is not on a charger. So obviously, the pros outweigh the cons with this solution because it’s able to give the user a better experience without any significant issues unless you don’t put the watch on its charger.

**Conclusion:**

In conclusion, this design project identified key usability issues with the Google Pixel Watch 1, proposed solutions for these issues, and analyzed potential drawbacks of the proposed changes. The difficulty in identifying significant errors suggests that the Google Pixel Watch 1 is a well-designed device with strong core functionality. That being said, the errors and the possible solutions that I was able to propose would make the Pixel Watch more reliable and user-friendly. These improvements have the potential to significantly enhance the Pixel Watch’s functionality and user satisfaction while minimizing potential drawbacks.

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