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May 9, 2020

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Mr. Airhart,

I submit the following report, "Android vs. iPhone" in partial fulfillment of the requirements for the course Technical Report Writing. This topic is extremely relevant to college students as a smartphone is one of the most expensive consumable items college students regularly purchase. It is also relevant to my Associate's Degree of Applied Science in Computer Engineering as I seek to determine impartially which smartphone has the most value and why.

The most important takeaway from my findings is that historically, Android phones offer a better price point than iPhones for similar features. Conclusions, appendix, and statistics are all included. This report should be beneficial to those looking to make a more informed decision on which smartphone to purchase.

Thank you to the researchers who provided detailed statistics on this topic and to the websites that published detailed specifications on each smartphone.

Sincerely,

Nathan Beidle

Nathan Beidle

Enclosed: Formal Report

Android vs. iPhone

Nathan Beidle

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Technical Report Writing

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ABSTRACT

In recent years, smartphones have become a vital tool for many college students. Because of their price point, these phones are often payed off over time through payment plans. That being said, knowing which phones historically have the highest longevity and best value is essential for students. While Android and iPhone both offer similar features, Android phones may be better suited for college students because they have more accessible tech support, less intrusive system updates, and cheaper buying options.

INTRODUCTION

Background

Android and iPhone have both dominated the smartphone industry with their innovations to modern communication and technology. While an Android phone may come in several different brands, such as Samsung, OnePlus, and LG, iPhones have remained proprietary. This means if you enjoy the look and feel of an iPhone's user interface, you are limited exclusively to that brand. Android, on the other hand, is an open source operating system which means any company can use the Android Operating System on their phones. This is an important point in the context of this paper for several reasons. First, and most importantly, when referring to an "Android" in this paper, it refers to a phone that runs the Android Operating System, not necessarily an Android branded phone. Second, the open source nature of the Android Operating System allows much more competition in the Android market. This competition leads to lower prices and a larger variety of phones to choose from. Finally, to maintain access to the App Store and up-to-date security features, users must update an iPhone to the latest operating system version every time there is an update available. This will be discussed in detail later as it has caused complications and controversy among iPhone users.

Purpose

By contrasting the brands Android and iPhone, this paper seeks to inform college students about what may be the better investment for their communication needs. Details and specifications on different Android phones and iPhones will be presented in order to show the strengths and weaknesses of both brands. The focus of the analysis will mainly pertain to specifications that affect quality and durability, such as battery life, available technical support for the product, software features, etc.

Scope

This paper will focus mainly on current models of smartphones but will also consider trends from previous generations of smartphones. The phones mainly referenced in this paper will be the iPhone 11, Samsung Galaxy S10+, and the OnePlus 7T. There are many other current models from both brands, but the models presented in this paper are both extremely popular and offer many similar features. There will also be information provided on the more economic phones offered by both companies.

ANDROID VS IPHONE

The Rise in Smartphones and Prices

Prior to 2007, the cell phone industry was a bit of a wild west. Cell phones were beginning to be able to connect to the internet, send emails, and download applications. Even though these features were groundbreaking at the time, they were often slow and poorly implemented. On top of terrible network speeds and minimal processing power, most cell phones at the time had either no keyboard, or a reduced keyboard, making typing for long periods of time impractical. All these issues were resolved, however, with a brand new type of cell phone, a smartphone called the iPhone.

The iPhone may not have been the first phone to refer to itself as a smartphone, but it set the most precedents for what we consider today to be a smartphone. It had a glass touch screen, minimal buttons, a straightforward rectangular design, Bluetooth, a high pixel density camera, a powerful processor, and so on (Jones, 2020). It would be years until any company could compete with Apple's new phone.

Once competition did catch up, prices started going up. With cheap and easy to make flip phones being an item of the past, new and more powerful smartphones became the rising trend. The first iPhone was available for purchase at the price of $499 on its release date. There were also subsequent models with reduced prices. These versions retailed for $199 and $299. The lowest available price for the most recently released iPhone, an iPhone 11, is $699, an increase of $400 or 133% more than the original iPhone (See Figure 1).

US PHONE PRICES FROM 2016-2019

	2016 (starting price)	2017 (starting price)	2018 (starting price)	2019 (starting price)	% change of highest price from 2016 to current model
Galaxy S10 E	N/A	N/A	N/A	Galaxy S10E: $750	N/A
Samsung Galaxy	Galaxy S7: $650-695	Galaxy S8: $720-$750	Galaxy S9: $720-$800	Galaxy S10: $900	29.5%
Samsung Galaxy Plus	S7 Edge: $750-795	Galaxy S8 Plus: $785-$850	Galaxy S9 Plus: $840-$930	Galaxy S10 Plus: $1,000	25.8%
Samsung Galaxy Note	Note 7: $834-880	Note 8: $930-960	Note 9: $1,000	Expected Aug 2019	13.6%
Motorola Moto G	Moto G4: $199	Moto G5 Plus (no Moto G5 in the US): $229	Moto G6: $249	Moto G7: $299	50%
LG G series	LG G5: $576-689	LG G6: $600-720	LG G7: $750-790	LG G8: $820-$850	19%
LG V series	LG V20: $672-829	LG V30: $800-912	LG V40: $900-$980	LG V50: TBD	18.2%
iPhone (cheapest)	iPhone 7: $649	iPhone 8: $699	iPhone XR: $749	Expected Sept 2019	15.4%
iPhone X	N/A	iPhone X: $999	iPhone XS: $999	Expected Sept 2019	0%
iPhone Plus/Max	iPhone 7 Plus: $769	iPhone 8 Plus: $799	iPhone XS Max: $1,099	Expected Sept 2019	42.9%
OnePlus	OnePlus 3: $399	OnePlus 5: $479 / OnePlus 5T: $499	OnePlus 6: $529 / OnePlus 6T: $549	OnePlus 7 Pro: $670 (128GB/6GB RAM model)	67.9%

Figure 1 Rise in Prices, "Even more proof that your iPhone and Android are more expensive in 2019," (Dolcourt, 2019).

When it became apparent that prices for iPhones were beginning to rise by substantial amounts, Android software began to come into the picture. As companies struggled to compete with the software and hardware powerhouse that is Apple, they began to look outwards for new options. The Android Operating System provided this solution by allowing manufacturers to focus on phone production and design rather than software design. Suddenly, more brands such as LG, Google, HTC, and Nokia all had their own smartphone to compete with the new iPhone. While this competition did allow for the price of Android phones to stay relatively low, it had did not have a visible influence on iPhone prices.

Comparing Android and iPhone

Battery Life

Battery life is a more complex topic than one might think. It involves not only how long a phone will stay charged for, but also how long it takes to charge and the overall lifespan of the battery. In terms of battery life for day-to-day use, the iPhone is the clear winner. Simon's article on the topic explains, "If battery life is your deciding factor for any phone, go with the iPhone 11," (Simon, 2020).

However, a major downside for iPhone users is charge time. In the same article, Simon (2020) points out that the iPhone is still using an archaic five-volt charger, which is much less powerful than the Android's warp charging. It is also important to consider that smartphone batteries often wear out over time. While Android and iPhone both have software built into the operating system to help extend battery life, Apple's software is much more in-depth, allowing users to view statistics on their battery's health over time (see Fig. 2). Due to Apple's proprietary nature, this software is also highly optimized, allowing users to download and run more applications without adverse effects (Apple Inc., 2020).

One downside to the iPhone in this comparison is that the battery is non-removable, meaning users must seek official Apple Support services if they wish to replace the battery. Most Android phones however have easy to remove and easy to replace batteries in case the original battery wears down over time, or in case the user wishes to keep a spare emergency battery on hand. This issue is made worse by Apple's software updates that often drain resources, but more on that to come later.

Figure 2 Apple Battery Screen, (Apple Inc., nd).

Durability

As mentioned before, iPhone users enjoy better software for battery support, as well as

the latest technology in screen durability and overall phone durability. However, in the event that

something does happen to an iPhone such as a broken screen, water damage or the system

freezes completely, the expense is often hefty and out of pocket. Due to Apple not allowing

third-party support for their devices, all iPhone repairs must go through Apple. Android users

however have the luxury of turning to any support service they trust in order to fix different

issues.

It should also be mentioned Apple's forced slow down of older models of iPhones. This

year Apple agreed to pay $500 million to iPhone customers after being sued over software

updates. According to the lawsuit, these updates were targeted at slowing down older generations

of iPhones in order to encourage the purchase of new generations (CNBC, 2020). While Android

does also release regular updates that often require more system resources, part of Android's

customizability is being able to choose what version of the operating system to run. If an older

version of Android runs better, users can maintain that version without issue. This allows more

flexibility when purchasing an Android as consumers can look at dated Android models that still

run well on older operating systems. Consumers can also be assured that if they buy a modern

Android, it will not be rendered obsolete due to system updates.

Other Features

Some important features not related to overall product longevity must be mentioned when

contrasting Android and iPhone, such as camera quality. Camera quality is a major concern

among many smartphone users. The most recent release of the iPhone 11 has provided

consumers with more options when it comes to the camera quality. The powerful camera is

backed by software that allows multiple different editing tools, photo options, and video

recording options (Android vs. iPhone, 2012). All of this software is developed in-house by

Apple, so it is extremely well optimized and of exceptional quality. While Android does have

applications that have similar options when it comes to cameras, they are mostly by third-party

application developers. This means users may have to pay for some features, deal with

advertisements, or put up with a piece of software that is of lower quality than Apple's.

Android, however, boasts more applications, has higher levels of customizability, and has

the ability to "root" the phone. Rooting a device allows users to have full administrative control

over the phone. While this may not be an important feature for many, some use this feature to

run third-party applications on their phones that are not available in the Google Play Store (Hill,

2020). For those not interested in rooting their phones, Android still offers much more in the

realm of customization than Apple. With more advanced organization methods, tools to add

widgets to navigation screens, and tools to build custom navigation screens, Android software is truly a sandbox of opportunities.

Both Android and Apple offer wonderful documentation to anyone looking to develop mobile applications. With in-depth guides and video tutorials, both brands have developed their own integrated development environments (IDEs) to assist in the software making process. These IDEs offer modern IntelliSense assistance to give developers freedom and flexibility when developing their code. Experienced programmers will also enjoy the variety of languages available to program in for either platform.

It is also important to note that both phones have a specific "look-and-feel". The look-and-feel of software is a broad term that describes how a user will navigate, interact, and use a specific piece of software. While both Android and iPhone may have overlapping features, how one interacts and uses these features is different for each platform. This is largely where brand loyalty comes in. If a consumer is comfortable with how one phone navigates, and they have spent a long time using the same software, they are likely to continue to align with products from that brand, regardless of pricing or other features. This shows that look-and-feel is one of the most important qualities of modern smartphones.

Price Point

As mentioned before, the price off all smartphones has gone up notably in the last few years. This makes the buying decision more difficult and more important. As of May 9, 2020, an iPhone 11 runs $699, a OnePlus runs $600, and a Samsung Galaxy runs $1,000. The clear winner here is the OnePlus for several reasons. The OnePlus has faster charge times than the iPhone, nearly the same battery life as both Galaxy and iPhone, and it does not sacrifice on any build

quality. However, if someone's priority is a longer battery life over quick charging and quick

restarting, then an iPhone is still the way to go (Simon, 2020).

There is one other critical factor when it comes to the price differences between Android

and Apple. There are several small Android brands that produce lower powered smartphones

meant for budget consumers. While Apple does run an SE line of phones that is meant to be

more affordable, the most budget model on this line still runs $400. In addition, there are many

older generations of Android phones that run just as well currently as they did when they were

released.

Conclusion

With mind blowing advancements in communication technology, choosing a smartphone in 2020 can be rather difficult. This difficulty is increased when consumers are parting with $600 or more depending on the decision made. While all smartphones may simply look the same with their universal black-brick shape, what is going on behind the scenes is what is important and where the differences can be seen. Factors including battery quality, lifespan of the phone, operating systems and camera quality are all important features of smartphones that need to be considered in order to select the smartphone that is going to be most beneficial to the user.

Recommendations

Before buying any smartphone, it is important to research the different brands ahead of time. Think of what would be considered the most important features of a phone and look for the brand that executes those features the best. It may not be the best option to simply buy the newest model of the old phone, instead look to see who has the best camera, start up time, battery life, and overall longevity. Every generation of phone has brand new features, and a new generation comes out nearly every year. Therefore, it is imperative conduct research prior to purchasing a new smartphone.

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