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Designing for People

Design determines use. Without thoughtful design, even the most ingenious products cannot succeed. The first successful consumer "smartphone" was the Apple iPhone, released in 2007. It was unique because it had a usable, responsive touchscreen and a well-designed user interface. Soon after Apple's release, touchscreen phones slowly gained popularity as other companies released their own competitors to the iPhone. Tablets also gained popularity a few years later for their larger screens but compatibility with touch-enabled applications and games. Microsoft has tried to take the touchscreen to an established device and integrate touchscreens with laptops using Windows 8. This has not been as successful as the company hoped, but why? The success of touchscreen mobile devices is due to well-designed user interface and variety of specific applications that were created with the touchscreen in mind. The smartphone and the touchscreen phone were born together, but laptops and touchscreens were not. In laptops, touchscreens seem more like an afterthought that was tacked on in an attempt to rejuvenate existing technology. If computer software and hardware was updated and redesigned for use with touchscreens, would touch laptops might become as widely used as smart phones instead of being

considered unnecessary? Would touchscreens be as effective on powerful computing

machines as they are on simpler hand-held devices?

There was incentive to create for the new smartphone market when the iPhone

appeared. Apple released the AppStore in 2008, right before the second generation update

of the iPhone. Even before then, dedicated iPhone applications were available via iTunes.

However, with the release of the App Store, there became thousands (and eventually

millions) of applications dedicated for use with Apple's touchscreen interface. Applications

like Words with Friends, Draw Something, Angry Birds, and Instagram were created with

the iPhone in mind. Twitter, Facebook, and YouTube created application versions of their

websites optimized to work on the iPhone. Because of the successful new platform and

potential market, there was incentive for both independent developers and established

companies to create applications that would be available to every person that owned an

iPhone, iPod Touch, and eventually the iPad. People wanted to create software for these

devices because base user interface for these devices was extremely well-designed. The

touchscreen was fast, sensitive, and responsive. It was the first successful capacitive

touchscreen device on the market, although the LG Prada was the first (Webdesigner

Depot). This meant that the screen's response was due to a change in the amount of

electrical charge at the point of contact instead of relying on pressure, like resistive

touchscreens (Wilson). Resistive touch screens were slower, less sensitive, and did not

allow for multi-touch. With the new technology and user interface design, users could

zoom with a pinch and scroll with a swipe. The addition of the touchscreen actually made

using the device more enjoyable. It was, and still is, good design. It encouraged good

software design. Good design led to happy consumers, and happy consumers led to a successful product line and trust in Apple.

It took nearly three years for Google's Android platform to catch up to Apple's design. Their success was different because Google made the operating system while companies such as Samsung, Motorola and HTC created the hardware. By November 2011, Android had more than 50% of the smartphone market (Reed). Although it took longer for Google and its hardware partners to create something that could compete with Apple, they became successful for the same reasons. Google created an easy to use and customizable operating system. Google Play provided the same incentive to developers as the AppStore. The companies making the physical devices succeeded in incorporating advanced hardware features that made these devices competitive. Although Apple succeeded first, Google was able to jump into the market by providing an alternative for consumers looking for a different user experience, lower cost, or specific features. For example, one MIT Android user cites the synchronization of Google services as his reason for choosing Android (Kerrie Interview 1). This proved that consumers were not necessarily drawn to the newest technology, but depended on reliable and easy to use products.

Like the smartphone, Apple was also largely responsible for the growth in popularity of tablets. When the iPad was released in 2010, it was met with a bit of ridicule over the name and skepticism about its purpose (Boston.com). However, the device was able to develop a niche in the market and its popularity grew. It was almost as if consumers did not know they needed this product until Apple released it. The product made sense. It allowed users to use the same well-designed applications (and even new iPad-only ones)

on a larger screen. Developers created applications to edit photos, take notes, sketch, etc.

The lightweight form factor and large screen area allowed for a wide range of possible uses

for the device. Soon, people were adding keyboards and styluses to their tablets and

leaving their laptops idle. For most daily tasks including checking email, browsing the web,

and scanning social media, a tablet was more than enough. One MIT undergraduate

studying computer science explained, "I use my iPad when I'm not really working. It's more

like a relaxation thing" (Wen Interview 1). Computers, for users that had both, were

reserved for heavy computing and gaming.

With more and more touchscreen devices becoming popular, the next logical step

was to bring touchscreens to existing devices. This time, Microsoft would be the first. In

October 2012, the Windows 8 operating system was released. It was an attempt to

synchronize the operating system of Windows phones, tablets, and computers, and its user

interface was intended for use with a touchscreen. It had a Windows Store for dedicated

Windows 8 applications. Although the idea seemed reasonable and millions of existing

Windows users upgraded to Windows 8, the operating system was not considered

extremely successful. It was revealed in a series of interviews with MIT undergraduate

students that touchscreen laptops were mostly considered "unnecessary" and "excessive."

Why is that? Why are slightly larger versions of Apple devices considered groundbreaking,

while an updated laptop computer is considered excessive?

The answer is in design. Laptops were not designed to be used with a touchscreen

as smartphones and tablets were. Laptops were designed for the efficient use of a touchpad

and keyboard. The clamshell design protects the screen during travel and also allows for

various viewing angles for user comfort. The design made sense for a non-interactive screen, just as a touchscreen on a smaller, hand-held design makes sense. The extended use of vertically positioned touchscreens has been linked to shoulder problems (Eadicicco). This is because the arm has to hang in the air in what is known as gorilla arm -- "the arm begins to feel sore, cramped and oversized — the operator looks like a gorilla while using the touchscreen and feels like one afterwards" (New Hacker's Dictionary). Apple's Steve Jobs said in 2010 that "Touch surfaces don't want to be vertical. It gives great demo, but after a short period of time you start to fatigue, and after an extended period of time, your arm wants to fall off" (Carmody). This is the reason Apple has focused on multi-touch touch pads, but not incorporated a touchscreen in to any of their laptop devices. They believe that the design would not work.

However, just because the laptop clamshell design was not designed with touchscreens in mind, that does not mean they cannot be redesigned for touchscreen integration. This would include rethinking both hardware and software. Screens would have to be able to be placed in an ergonomically friendly position, and ideally, a keyboard would still be able to be easily accessed since the tactile response of a physical keyboard cannot be replaced with a touchscreen. The Lenovo Yoga 2 makes a notable attempt in addressing the design flaws that make traditional laptops unsuited for touchscreens. In CNET's review, they say "With its 360-degree flip-and-fold body, you get the look and feel of a regular thin-and-light laptop, but with the added flexibility to use it as a tablet just by folding the screen back. You can also tent it, which is nice for playing games, or use the keyboard as a stand, so the screen is better positioned for watching movies or having video chats" (CNET). Microsoft also takes a stab at the transformer laptop with the Microsoft

Surface Pro. These hardware updates are headed in the right direction for more successful

touchscreen laptop devices, but even with these devices on the market, touchscreen

laptops are still considered a novelty, not a necessity.

Software is also a significant barrier. Windows 8 sold 60 million licenses, but it was

still criticized for its unintuitive, confusing interface (Reed). Windows users made the jump

from Windows 7 because it was the logical step, but many users regretted the decision

when they were forced to re-learn the interface (Spector). The first step needed in the path

to success for touchscreen laptops is a usable and intuitive operating system, like what

Apple created with their iPhone and iPad operating systems. However, Apple has no plan to

jump into the touchscreen laptop race (Tibken). Although Apple might be the ideal

candidate to create a successful touchscreen friendly laptop operating system due to its

brand loyalty and successful design team, any company can achieve this. Once a reliable

user-interface is created, software developers will have more incentive to create programs

for these devices since more users will be exposed to them. This has already begun to

happen as Microsoft seeks to improve Windows 8 with Windows 8.1 and future updates.

One MIT undergraduate revealed her reasons for not wanting a touch screen--"I mean,

there aren't really that many programs that are set up for the use of a touch screen. So I

mean I guess it would be cool to have it, but I don't know what I'd use it for" (Marisa

Interview 2). The lack of dedicated software is also a barrier to purchase, but this might

change soon. Adobe announced a partnership with Microsoft to improve touch-screen

compatibility with Creative Cloud products (Kastrenakes). *The Verge* also notes, "...more

important for the long run, Adobe is working on some interface changes that'll make the

app *designed* for use with touch, rather than having touch support grafted onto it." This is

important, because even existing programs will have to be completely rethought for efficiency with a touchscreen. There is very little similarity between a mouse and touchpad versus multi-touch and dragging capabilities presented with a touchscreen, and designers will have to use these allowances and take full advantage of the hardware. At the Adobe/Microsoft event, "the companies also demonstrated various tablet-enabled features, including touch gestures to edit curves and drop shadows, moving a tablet around to change the perspective in a 3D room view, swipe gestures to move the limbs on a sketched model, and smartphone shakes at a tablet for Jackson Pollock-style painting" (Kastrenake). These are exactly the types of features that would transform a device from novelty to necessity.

At a technical university like MIT, students often rely on their computers to run coding software and 3D modeling software. Students may also use their computers to edit videos for projects or photographs of their college experience. While the general American population may not require high computing power for their daily Reddit surf or YouTube binge, students, particularly engineering students, do. Solidworks, a 3D modeling program commonly used among mechanical engineers, requires are least 8GB of RAM to run smoothly (Solidworks). The iPad Air 2 has 2GB of RAM, and most other tablets have similar specs (Detwiler). However, most student laptops have enough power to run these programs, but lack the touchscreen. 3D modeling, like Adobe Photoshop and Illustrator, has a lot of potential with touch gestures and shifting perspective. The Microsoft Surface Pro 3 has actually been somewhat successful in providing enough computing power for these programs while still having a usable touchscreen. In a blog review by a mechanical engineer running Solidworks on a Surface with Core i5 and 8GB of RAM , he wrote, "Don't

expect to [be able to] turn on every feature to maximize image quality but it runs very smoothly" (Henry). However, the same review also cited some usability issues regarding screen size and the size of icons on the program. These issues, while seemingly minor, can have a huge impact on the user experience. If buttons that are easily toggled between on a laptop or desktop using a mouse and difficult to access with a touchscreen, users will be more compelled to use the non-touch device for a faster workflow. This is an example of programs that are compatible with touchscreens, but are still not optimized and redesigned for touchscreens. Once companies that create programs like Solidworks, Blender, AutoCAD, and Rhino reconsider their design decisions and create modified versions of their existing programs for touchscreens, they can be used on higher powered touch-enabled devices and could make 3D modeling more efficient and intuitive. However, there does not seem to be much interest in adapting these programs yet, perhaps because these devices are not yet as popular as they could be.

Beyond the usability of products, cost is another factor that directly influences consumer purchasing decisions. In a series of interviews with MIT students, one student mentioned not being able to afford a touchscreen laptop (Lisa Interview 1). However, Macbooks are significantly more expensive than the leading Windows competitors of similar technical specifications, but college students are still willing to pay for them. Why? Consumers pay for well-designed products. They are willing to pay for reliability and ease of use. The issue with touchscreen laptops is not the higher cost. Once again, the main issue comes back to design. If there was a well-designed touch screen laptop that supported a wide variety of specifically designed programs that were reliable and sped up workflow, consumers would be willing to pay a premium price.

Thomas J. Watson, founder of IBM, once said "Design must reflect the practical and aesthetic in business but above all... good design must primarily serve people." How a product is designed ultimately determines what people will use the product for. It is unreasonable to label an entire group of products as unnecessary simply because the current iterations were not thoughtfully designed. Smartphones and tablets succeeded not because these products are inherently useful, but because people contributed to various aspects of their design to make the product easy to use and useful in different ways. Although touchscreen laptops are not currently considered necessary, this can be changed with software and hardware design updates. This process will involve third-party software developers, user interface and user experience engineers, industrial designers, and many others. While it might take some time for the market to change, touchscreen laptops should not be ruled out as an unnecessary feature yet. They have not really been given a fair chance.

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