



Assignment 2

Comparing the complexities of tablets and desktop computers

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Introduction

We have chosen to examine the complexity of the tablet compared to that of the desktop computer since we believe tablets to be the future of personal computing. We are interested in the tablets because we think they represent a paradigm shift on the horizon, one where the average consumer brings his digital presence with him wherever he goes. We understand that the power of a desktop computer cannot be replaced in regard to the requirements of an IT professional, and as such will not be made obsolete, but we believe it will grow into more of a niche technology with the tablets or other portable computers representing the ubiquity of personal computing. In the context of this assignment we consider a tablet to be a portable computer consisting mainly of a display with touch functionality, while we consider the desktop computer to be a stationary and modular powerhouse.

The analysis will be conducted by comparing the different levels of complexity between the tablet and the desktop computer. To do this, we will examine both artifacts using the ideas of internal, external, interaction, and mediated complexities from the point of view of an average user.

Analysis

Tablet

External complexity

The tablet real estate is occupied almost solely by a touch screen. There are a few buttons on it, but none of them are very pronounced, and they control only very basic things such as locking and unlocking the touch screen and the alignment of the interface. On the back of the artifact there is nothing to interact with. Our verdict is that the external complexity of a tablet is rather low.

Internal complexity

If you break a tablet open, you will find a circuit board, some wiring, and power units (or batteries). There is no readily apparent way to open the tablet casing, and as such we can deduce that the internal hardware is not meant to be tampered with by the user. The internal complexity is very high.

Interaction complexity

The interface of the tablet is controlled by the touch screen in combination with an accelerometer. Tapping icons and making gestures on the screen is the main mode of interaction with the hardware through which you control the software. There is an onscreen keyboard for text input, but a lot of the software can recognize handwriting as well. The accelerometer lets the user control some applications with motion, and also decides the alignment of the display. The immediacy and tactility of the interaction makes the complexity low.

Mediated complexity

As we are using our fingers to navigate the touch screen, there is no disconnect between what we are seeing, what we are doing, and what is happening as we do it. The tablet uses an icon paradigm in which an action is bound to a graphical representation of that same action, for example tapping a photo album with your finger will immediately bring up the photo album software. It seems intuitive enough, but we also need to consider the experience we have with other icon-based interfaces and how the expectations translate from those interactions to the ones we are performing with the tablet. Touch typing on the onscreen keyboard isn't easy, but there are handwriting solutions available. The physical movement controls enabled by the accelerometer is also very intuitive. In general, the mediated complexity seems to be low, but it may be a bit more difficult for people without the mentioned experience.

Design space

The tablet is generally a small, lightweight digital artifact that is meant to be taken with you as a portable alternative to a desktop computer. Its size and weight is roughly equal to that of a book, which means that you can use it in almost any situation. It is, however, an electronical device covered in a pane of glass, a design that affords the artifact an air of fragility which makes it obvious that you aren't supposed to use it in

moist or physically volatile situations. Because of size implications, the portability of the tablet is always going to be a higher priority than its relative computing power.

Desktop computer

External complexity

The desktop computer normally consists of a screen, a chassis, a keyboard, and a mouse. To be able to use the desktop computer you also need to connect it to a power source and run cables between most of the devices to have them detect each other. For example, in a normal setup, you need a power cord from both the chassis and the screen as well as a cable between the chassis and the screen to transmit image data. There are wireless options for mouse and keyboard but commonly they are also connected to the chassis by cords. Besides the mandatory devices listed above, there are also a number of peripheral devices you need to make full use of the computer, such as, but not limited to, a speaker system, a webcam, and a microphone. With all these different devices, the external complexity is rather high.

Internal complexity

Most desktop computers are modular in the sense that they are meant to be able to be opened and upgraded by an advanced user. This does not, however, mean that the internal complexity is low. If you open the chassis, you will find a circuit board, or a motherboard, filled with different components. If you know your way around computers, exchanging a piece of hardware for another is not harder than finding a place where it fits and putting it in, but you still couldn't possibly modify or build your own components. Unless you are a specialized engineer, you can't begin to understand how the inner workings of a circuit board or a central processing unit works. With this in mind, the internal complexity of a desktop computer is very high.

Interaction complexity

The user controls the computer both by operating the mouse on a horizontal plane to move a cursor on the screen as well as typing on the keyboard to input text and other symbols. Due to the multiple input devices and the unintuitive translation of the horizontal movement of the physical mouse to the vertical movement of the cursor, we think that the desktop computer has a medium-level interaction complexity.

Mediated complexity

While it is not hard to learn how to interact with a keyboard and a mouse, it's still a discrepancy between the way you move your hand and the way that movement translates to the cursor. It is, in short, not very intuitive. The same problem applies to writing on the keyboard, where the things you write appear on a very different plane compared from where you're actually doing the input. Touch typing in this manner is an acquired skill and it takes a long time to downgrade the activity into muscle memory, and it has very little in common with writing by hand. The icon-based system is in many ways equal to that of the tablet. All in all, the mediated complexity is medium to high.

Design space

The design space of the desktop computer depend on its physical size and the lack of portability that size implies. The system is meant to be used locally in such a profound way that it shapes its surroundings, creating a "computer room" wherever it is placed. Since it is the main focus of its physical location, there is no real spatial constraint for the hardware, which makes computing power a higher priority than portability. With the inherent modularity of the desktop computer, we have an endless amount of options to customize the periphery. While the desktop computer by default claims an entire desk, or even room, there is the possibility to extend its design space by adding further technology to it, for example remotely controlling it as a media machine.

Comparison

Since the tablet is a portable evolution of the computer, a lot of things had to change with the attributes of the design. The world of peripherals associated with the desktop computer doesn't really have a place in the mobile design space of the tablet. This fact necessitated a very big change in the interactions between the user and the interface - having to carry around a mouse and a keyboard would counteract the idea of a

portable machine. This problem was solved by adding a touch screen as the main mode of interaction, a solution which also served to lower both the interaction and mediated complexities because of the intuitive ways of letting the user manually manipulate the interface with their hands. The internal complexities of both devices are very high since they are basically two sides of the same coin - they are both computers, and as such need the same internal parts to run. The difference is in the difficulty of opening them, where the case of a desktop computer is normally very easy to get into compared to the tablet which requires tools specific to the official service technicians. While the desktop computer isn't openly affording the idea of exploring the insides of the case to the user, one could argue that it still does so in a greater capacity than the tablet, if only because the user is more likely to have access to the tools required to open a computer case than the tools required to open the tablet.

Reflections

After observing the different complexities of the artifacts our prediction of the future of personal computing hasn't changed. While the point of a tablet is to bring your digital information with you wherever you go, there are a number of interesting ways to connect it to other devices in the future. For example, it could serve as the users personal "identification device" towards intelligent surfaces or connect wirelessly to projectors and screens. In the less immediate future the face of mobile computing might even be something completely different, such as a centralized interaction with intelligent surfaces, omitting the requirement of a physical device altogether. We do not see the desktop computer becoming extinct, but it will probably be more of a specialized artifact for creative digital professionals.

The system of metaphorical icons has, due to the ubiquity of computer systems, taken a life of its own, and most contemporary users would think of the folder as "that thing on the computer with files inside" rather than "a storage device meant to organize documents", which is an interesting thing to consider. Another notion we came across was the fact that a desktop computer transformed the physical space around it into something with preconceived meaning, a place where the artifact usage is prioritized and natural, while the tablet instead blended into the physical space, becoming a part of the activity in which it was placed.