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The Actual Cost of Cell Phones

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Cell phones and smart phones have become a global phenomenon faster than any technology has before. Wherever you look today you can find people using cell phones no matter what part of the world you are in. The variety in the complexity of these devices will deviate from one place to another but mobile devices are used everywhere. The uses for them aren't the same everywhere you go and usually are based on the connectivity of the country. People all over the world use and consume and throw away phones without much thought into where they come from, what they are doing to them, or where they are going. These devices start as minerals mined in Africa leading to wars and harsh labor conditions. They then are produced in China under hard working conditions. While consumers use them they are subjecting themselves to the positive and negative sides to this technology. Finally people dispose of them where most end up in a technological dump. The social and physical costs of cell phones and smart phones is higher than most people realize and higher than many would be willing to pay.

History of Cell Phones

The majority of the world uses cell phones but not many know or are aware of how quickly they became a cultural norm. The history of this device goes back to less than 50 years ago. The first cell phone came about in 1973 but they didn't become commercially available until 1983.[1] The growth in the past 30 years has been tremendous. From 1990 to 2013 alone the number grew from 12.4 million to over 6 billion in use. In 2013, the number of cell phones in use was equal to 96% of the world's population.[2] The number of cell phones is expected to pass the

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[1] Teixeira, Tania. "Meet Marty Cooper." 23 April 2010. *BBC News.* Online. December 2014.
[2] "There Will be More Mobile Phones than People by 2014." 13 May 2013. *Deccan Herald.* Online.
    December 2014.

number of people in the world in the next year because many people have more than one cell phone that they use. Throughout the world the average is 89 phones per every 100 citizens in the developing countries and 128 phones per every 100 citizens.[3] According to a study in Egypt in 2001 while the internet had been introduced in 1994 and the mobile phone in 1998 the internet only had 400,000 users compared to the 2,000,000 cell phone users. The cell phones cost on average about five more dollars than the internet but the skill level required to operate a cell phone is much lower.[4] This showed that people were willing to pay a little more to use a phone over the internet because they believed it was more beneficial to them.

Uses of Cell Phones

The original use of a cell phone was to make and receive phone calls through a wireless connection over long ranges. Most cell phones also have the capability to send text messages from phone to phone. From these messages multimedia messages became popular to not only send text from one to another but to be able to add pictures, videos or sound clips. Today the use of smart phones is almost endless. For many people their smart phones works as their camera, video camera, gaming device, e-mail system, calendar, alarm clock, navigation, and largely for social networking. Most people who have more than one phone use one phone for personal use and the other one for business. There is an irony in this because while people are trying to keep their work and business lives separate through having multiple phones, the very presence of a work phone makes them available to bosses 24/7. People today bring the office home with them when they have their "work" cell phone on at all times. Many big companies will provide their employees with mobile phones so that they can be in contact with them at all hours whether they are at work or not. Another popular reason that people have more than one cell phone is to keep

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[3] "There Will be More Mobile Phones than People by 2014." 13 May 2013. *Deccan Herald.* Online. December 2014.
[4] Warschauer, M. (2003). *Technology and Social Inclusion.* Boston: MIT Press.

secrets on or use for affairs or illegal business.[5] They will use a secret number that only a few people can associate to the person using it. In theory, mobile phones were designed to help people become more connected and have access to more information. In many poor countries cell phones were meant to be the way the government would communicate with more people throughout their country. It was meant to increase the livelihood of the poorest countries by giving them access to information. Africa, for example, has seen an increase in phone usage for making or receiving payments and for people to do their banking on. [6]

Another thing cell phones have done is become helpful tools for other forms of media. With all the new technology developments on handheld phones, other types of media use cell phones to further push their media out to the public such as television and newspapers. Similar to the idea that how people use their cell phones depends on where they live there are also differences between how people use them based on their gender. Some have studied the uses between men and women. It was found that men use phones to get things accomplished; women will use them more to express themselves especially through the use of social networks. During a study in 1995 it was found that women use about 1 hour and 5 minutes a day connecting to people using their phone or in person which is higher than men who only spend about 48 minutes connecting to people.[7] An article from 2013, states that on average people check their phones 110 times per day. Other studies by Cuafield and Byers have found that the average could be as high as 150 times per day. Data has shown people can check their phones up to 900 times in one day which isn't a full 24 hours because this included time for sleeping. The most popular hours people use their phones is between 5pm and 8pm in which people will check their phones at least

[5] "UK | Millions keep secret mobile". BBC News. 16 October 2001.
[6] "Emerging Nations Embrace Internet, Mobile Technology." 13 February 2014. *PewResearch.* Online. December 2014.
[7] Curran, J., & Gurevitch, M. (2000). *Mass Media and Society.* London: Arnold.

9 times per hour. Other times of the day people check their phones about 4 times per hour.[8]

Studies done by the International Data Corporation found that 80% of people check their smart

phone within the first 15 minutes of waking up and 80% of those who do say it is the first thing

they do when they wake up. About 25% of people don't go an hour a day without their smart

phone in the same room as them, 63% have it 23 hours of the day and 79% have their smart

phone with them 22 hours of the day. On average, a smart phone user will have 7.4 social

applications on their phone and are likely to use them when they are in social settings in order to

connect with those around them.[9]

Diffusion of Innovations Theory

Cell Phones, like many other products, were introduced with hopes of becoming a highly

used product all over the world. However, unlike many other products, the popularity of cell

phones grew extremely quickly and hasn't slowed down. The growth of this technology can be

explained by the theory of diffusion of innovations. This theory states that the rate of adoption of

any new innovation will follow an S curve if it is to reach a point where it is sustaining itself as

the cell phone has done.[10] There are four elements to look at in order to try to predict if the

innovation will be able to reach this critical mass point. These elements are: the innovation itself,

the communication channels available, the timing, and the social system in place. The innovation

in order to be successful must convince users there is an advantage in adopting a new

technology. This assumes that most people are resistant to change and unless they are convinced

the new idea will be advantageous enough to take the time to learn it they will often stick to what

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[8] Woollaston, Victoria. "How Often Do You Check Your Phone?" 8 October 2013. *Mail Online.* Online. December 2014.

[9] Stadd, Allison. "79% of People Have Their Smartphones With Them 22 Hours a Day." 2 April 2013. *All Twitter.* December 2014.

[10] Fisher, J.C. (1971). "A simple substitution model of technological change". Technological Forecasting and Social Change 3: 75–88.

they know. It also depends on how compatible the innovation is with the system that people already in place. In terms of the cell phone, the desk phone was a popular commodity so people already knew the advantages of having a phone and this put their already useful tool on the go. The innovation also must be simple to understand or learn. The more complex the product is, the less advantage people will see in taking time to learn how to use it. The next factor is that the communication channels must be strong in order for numerous people to start using a product. It is ironic now because the cell phone has created this communication channel for so many other products that have come about. This new communication channel had to use old communication channels in order to be spread all over the world. The next element is that of time, every idea needs some time to become part of everyday life. Nothing is going to catch on overnight and the people selling and marketing the product must be able to get through the initial slow stages before their product can really become popular. Finally the social system must be in place to accept the new innovation. Internal and external factors on a person must create a desire for the new product.[11]

When a new innovation comes onto the market people will go through a five step process in order to adopt this innovation into their everyday life. The first step is for the consumer to become knowledgeable about the innovation. They become aware of the product but aren't convinced to try it out for themselves yet. The next stage is persuasion. In this stage the consumer becomes interested in the innovation and seeks more information. They then move into the decision stage where they weigh the advantages and disadvantages of purchasing the innovation and from these pros and cons they can accept or reject the innovation. If they accept the innovation they move into the implementation phase where they start using it in their lives

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[11] Rogers, Everett M. (1962). Diffusion of Innovations. Glencoe: Free Press.

and determine how useful it is to them personally. The final stage is confirmation where they use interpersonal and intrapersonal cues to decide if they will continue to use the innovation.[11]

There are five types of people who go through these stages at different times in the innovations life cycle. The first category of people is the innovators themselves who actually come up with the product. They must be near the scientists who can create the products. They must be willing to take risks and have high financial liquidity in order to take those risks on many products, some of which will fail. The next group of people is called early adapters. They once again have high financial liquidity in order to try new products. They have high social status, high levels of education and are opinion leaders in their communities. After a longer period of time the next group called the early majority will start to adopt the innovation. They have a relatively high social status are also considered opinion leaders. These people usually have connections to early adopters or other early majority members to hear about the innovation. The next group is considered the late majority who implement the innovation after a majority of people. They come to new innovations with a high level of skepticism about new products. They have little financial liquidity so they don't risk their money on products that may or may not be useful to them. The final small group is the laggards. They are the last to adapt to a product. They have low social status, low opinion leadership, and low financial liquidity. They are usually bias towards tradition and have an aversion to trying new things.[12] If a product can reach all five groups it is considered a success and has been diffused into 100% of the market. If not, the product is a failed innovation. In the past 31 years, cell phones have been able to work their way through all five groups of people and are seeing a steadily increasing usage rate. It has been one of the most successfully diffused innovations of the current generation.

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[12] Rogers, Everett M. (1962). Diffusion of Innovations. Glencoe: Free Press.

Smart Phones

Today there are not only cell phones in the world but now smart phones have become very prevalent. More than half of people who use cell phones are reported to be using smart phones which combine their cell phone with the many other uses. Apple created their first version of the now popular iPhone in 2007 which was one of the first phones to feature an all touch screen without a stylus or keyboard. Samsung responded in 2008 with the HTC Dream using the Android operating system. These phones were the start to the smart phones people think of and see today. Of cell phone manufacturers Samsung and Apple hold the largest shares of the smart phone market by holding 23.8% and 12% respectively in the third quarter of 2014.[13] In August 2013 they together accumulated 90% of the profits for smartphones worldwide. Because of these high market shares, the way they produce cell phones is important to look at. 36% of people who are buying cell phones are buying from these companies and while it is hard to look at exactly where each company gets their minerals from it is easy to look at who is producing the phones.[14] Collectively all smart phone companies can be held responsible for the mining and disposing processes but individually they should be looking at their production conditions.

Conflict Minerals

The creation of cell phones begins with minerals that are mined in Africa. The main mineral being mined that is used in cell phones is columbite-tantalite, more commonly known as coltan. These minerals have been the reason for what people call the Congo Civil War. Thus far the war has caused about 5.5 million deaths as of 2008.[15] Children in the area are forced to work

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[13] Gupta, Shalene. "After Gobbling Up Motorola, Lenovo Becomes Third-Biggest Smartphone Maker." 30 October 2014. *Fortune.* December 2014
[14] "Galaxy phones power Samsung to record $5.2 billion profit". April 27, 2012.
[15] "Congo war-driven crisis kills 45,000 a month-study". Reuters. 22 January 2008.

in unsafe mines to be able to extract the minerals they need to make electronics. These minerals are referred to as conflict minerals which are minerals that are mined through armed conflict. The groups will force the people to work up to 48-hour shifts and will use rape and violence to control the workers.[16] It is a very similar process to what many people are much more familiar with which are "blood diamonds." Along with the coltan they must extract they also must use raw materials such as oil, copper, and plastic that when being mined can contaminate the soil and groundwater in surrounding areas. Another area of conflict comes from the process of extracting tin from the environment to use to repair and build phones. This process is destructive to the environment and has been recorded for putting children into dangerous working conditions to accumulate tin. The main area of the problem comes from Indonesian Islands and when asked about it all smartphone companies except for Apple admitted to using tin from this area. Even though Apple didn't say yes to the question, no answer is in turn the answer that the public doesn't want to hear.[17]

Production in China

After the minerals are mined from Africa and other parts of the world, they are sent to countries that will produce the phones. China is and has been the most popular producer of cell phones in the world. In 2007 they produced 600 million phones which was over half of the worldwide production.[18] While the exact conditions of these work environments are unknown, in 2010 people around the world were given reason to believe they were poor. In 2010 eighteen employees from China's company Foxconn attempted suicide with fourteen of them being successful. Foxconn produces products for Apple, Motorola and Nokia, some of the biggest cell

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[16] Polgreen, Lydia (November 15, 2008). "Congo's Riches, Looted by Renegade Troops". The New York Times (The New York Times Company). Archived from the original on December 16, 2010

[17] Simpson, Cam. "The Deadly Tin Inside Your Smartphone." 23 August 2012. *Bloomberg Business Week.* December 2014.

[18] Baidu Encyclopedia: China Mobile Communications Corporation's History

phone providers in the world. Previous to 2010 there were only two recorded suicides from the company which led people to believe that there may have been some external factors or group mentality behind the large number in 2010 alone.[19] Nevertheless, through university students' research they found that work conditions were a factor as well. The universities found that the company forced illegal overtime and didn't report accidents that happened in the work place. They also accused the management style at the company of being inhumane and abusive. In response to these reports the company did raise wages, put a net around the building to stop people from jumping out, and forced their employees to sign no-suicide pledges. While this helps the problem, people still believe that the working conditions there are not up to standards that most Americans agree with.[20] Foxconn's largest factory is located in Longhua, Shenzhen in Chine and covers 1.16 miles. They openly report that many of the employees work up to 12 hours per day for 6 days each week. Their main products are the Apple IPhone and IPad. Other news stories comment on the relations between the Chinese workers and the Taiwanese workers in the China factories of this company. Because it is a Taiwan based company the Chinese workers aren't treated with the fairest conditions. In addition, in 2012, the company admitted that they had hired 14 year old children to work for their facility even though the legal working age in China is 16. They tried to hide this process by saying the children were "interns" working through an "internship" program that was helpful for them. This company has continued to be a large victim of criticism from the American and Chinese media for their working conditions.[21]

Samsung who is Apple's largest competitor, and owns the largest market share of mobile phones, faced a similar conflict when reports stated they had children working long hours in their

[19] Lau, Mimi (15 December 2010). "Struggle for Foxconn girl who wanted to die". South China Morning Post
[20] "Inside Apple's iPod Factories". Macorld UK. 2006-06-12.
[21] Blodget, Henry. "Your IPhone was Built, In Part, By 13 Year-Olds Working 16 Hours a Day for 70 Cents an Hour." 15 January 2012. *Business Insider.* December 2014.

factory for less than reasonable compensation. They have recently discussed moving its factory from China to Vietnam due to the rising costs of manufacturing in China. Cell phones are one of numerous electronic devices that China is seeing a dropping market share in production. At the same time the export rate of such items from countries like Vietnam have risen in the past few years. These companies are constantly looking to find the cheapest way to produce their products in order to generate the most profit. As one of Apple's largest suppliers and the world's largest phone producer this trend could inspire lower wages in China or other companies to follow their lead.[22]

Social Costs of Cell Phones

Mobile phones are being consumed worldwide today and while they are helpful to most people there are also many risks that people are taking when using them. Some of these risks are to a person's physical health while others are to their mental or social health. One of the most recent studies on cell phones that made people start to question cell phones was the finding that cell phones could send radiation to the brain through the ear canal. One problem it can cause is dielectric heating which can cause the body temperature to rise by fractions of degrees. In most recent studies they have found that cell phone radiation cannot be linked to cancer or brain tumors like many thought in the beginning.[23]

Cell phones have created a feeling, especially in westernized countries, of the feeling and need to be constantly busy. New technology that is meant to keep us more connected keeps us busier than ever before. The more we busy ourselves the busier we want to continue to make ourselves. "A great many of these busy-making activities are completely our own doing. We

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[22] "Samsung May Move Phone Manufacturing to Vietnam." 14 May 2014. *Want China Times.* December 2014.
[23] Luria, Roy; Eliyahu, Ilan; Hareuveny, Ronen; Margaliot, Menachem; Meiran, Nachshon (2009). "Cognitive effects of radiation emitted by cellular phones: The influence of exposure side and time". Bioelectromagnetics 30 (3): 198–204

don't just choose them, we pursue them."[24] As much as people want to say that they are busy because their phone is always bugging them, at the end of the day people create these distractions and nagging through their uses of their phones. Powers discusses that the philosophy we have been living by is that "connecting via screens is good and the more you connect, the better."[23] However this causes people in general to not be able to stop checking their phone every few minutes and humans struggle more to slow down their thoughts. "The goal is no longer to be 'in touch' but to erase the possibility of ever being out of touch."[23] The feeling of being connected helps people to feel like they always have someone around them or they are never alone. Throughout life many teachers have posed the question "why do you carry your cell phone everywhere you go?" From personal experience, students more often than anything answer that they take it because they feel safer knowing that someone is always just a click away. People are afraid to feel like they are absolutely alone despite the fact that people got around just fine without this luxury until 1983.

> "Someone who cannot tolerate aloneness is someone who doesn't know he's grown up. It takes courage to let go of that fantasy of childhood safety. The world may never seem so certain again, but what fresh air we breathe when we take possession of our own separateness, our own integrity! That's when our adult life really begins."
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> Mildred Newman and Bernard Berkowitz[25]

That moment when people are able to be liberated from the feeling like they need to be connected every moment of the day will be the moment people will be able to stop checking their screen.

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[24] Powers, W. (2010). *Hamlet's Blackberry.* New York: HarperCollins Publishers.
[25] Newman, M., & Berkowitz, B. (1971). *How to Be Your Own Best Friend.*

Cell Phones have also taken over social situations and hurt people's ability to relate to one another on a personal level or face-to-face. Almost everyone has been in a conversation that was interrupted by someone having to answer a phone call or text message that causes the conversation happening to cease. No one likes to have it done to them but most people would do the same thing given the same circumstances. Similarly people's ability to hold face to face conversations has gone down tremendously. This affects people ability in many aspects of their lives including business transactions, first impressions, dating, and interviews.

Dating has become more and more from technology and through applications phones have become a new beginning to relationships. Applications for phones such as Tinder have given people a new way to meet new people besides just going out and starting conversations in public. The fear of being rejected is much easier to handle when you are behind a phone screen and didn't really put yourself out there for others to see. After only two years since being released, Tinder sees more than a billion swipes per day. They match about 12 million people per day. The company has stated that they have as many users as other social networking sites in a short period of time, approaching about 50 million users. Similar dating sites that were around before Tinder missed the mark by saying that love could be calculated by some formula. People didn't buy into this concept as easily and so their applications never quite met the numbers that Tinder sees. Tinder uses the full capabilities of a smart phone to engage people in meeting a match. They use pictures of people, make it quick and easy to use when convenient and put it in mobile form so people have it with them at all times.[26] In 2013 about 10% of Americans were

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[26] Bilton, Nick. "Tinder, the Fast-Growing Dating App, an Age-Old Truth." 29 October 2014. *The New York Times.* December 2014.

using online dating sites or apps. Of those 10%, the number of people who had gone on a date with someone who they met online went to 66%.[27]

Similarly job interviews are becoming harder for people to handle because people don't communicate face to face as often anymore so it is no longer a leisurely event for people. Because of this it becomes even harder to communicate in stressful situations such as a job interview. Many people of the working generation will complain that people from the younger generation no longer know how to hold conversations with adults. They know how to speak in text lingo with short sentences and incomplete thoughts and one word responses. The way people communicate should be different between texting and in person but it isn't for all people.

Powers discusses how it also affects family relationships in something he calls "the Vanishing Family Trick." When families are all together watching a movie one will get up to do a mundane task such as use the restroom or get a glass of water but they never come back because they get stuck to a screen. Slowly one by one the rest will do the same until only one remains, realizes they are alone for good, and go forth in finding their screen to connect to. Similarly e-mails have replaced letters but have taken most of the sentimental value out of them. Most e-mails are short, sweet and to the point without all the extra conversational points. In many work places e-mails have replaced people going to a neighboring office to talk to a colleague about something. It eliminates the need for face-to-face contact in the workplace which helps people because they believe they can be more efficient without wasting time walking from one place to the next.[28]

People have been forced to be able to become better at multitasking, or at least pretending to multitask, in response to the introduction of cell phones. With so many tasks available at the

[27] Shu, Catherine. "Tech Crunch." 21 October 2013. *38% of People Who are "Single and Looking" Have Used a Dating Site or App.* December 2014.
[28] Powers, W. (2010). *Hamlet's Blackberry.* New York: HarperCollins Publishers.

touch of a button, people's minds jump from one application to the next with very little time to change. People think they can read a book, drink coffee, text and listen to music but the human mind can only actually focus on one thing at a time. One will become the forethought and the rest will fade to the background. As soon as a new distraction comes into play all the old tasks get pushed aside even though they are still happening. As well your mind needs time to switch between all the tasks so while people think they are saving time by being able to do everything at once they are losing time as well. "It's estimated that unnecessary interruptions and consequent recovery time now eat up an average of 28 percent of the working day."[27] When Basex looked at this in 2009 they estimated that due to people wasting over a fourth of their day on distractions and technology issues they lost 900 billion dollars in one year. Although this is an extreme case it stands true for many other companies that they have lost profit as well due to wasted time.[29]

One of the largest negative effects of cell phones has been their presence while people are driving and leading to many accidents. Distracted driving is the number one cause of car accidents in America. Studies have shown that people who use a hand held device while driving are 4 times more likely to get in an accident. Drivers, who are texting, are 23 times more likely to get in an accident.[30] There have been numerous studies done to examine the effects of using a phone while driving and they assume that the data underrepresents the true number because there is no way to know for sure if someone was on their phone when the accident happened. In a study done by Strayer, Drews and Crouch, they found that people who drove while talking on a cell phone were at a bigger risk for accidents than those driving while legally intoxicated. People on their cell phones had slower reaction times and followed cars in front of them more closely.[31]

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[29] "Workplace Interruptions Cost US Economy $588 Billion a Year." 9 January 2006. *Basex*. December 2014.

[30] Pines, Michael. "Top 3 Causes of Car Accidents in America." 19 February 2013. *Drivers*. December 2014.

[31] Strayer, David, Frank Drews and Dennis Crouch. "Fatal Distraction? A Comparison of the Cell Phone Driver and the Drunk Driver." *Human Factors* (2006): 1-5.

In 2014, the National Security Council found that cell phones accounted for 26% of car crashes in 2013.[32]

In a talk about cell phones at University of Legon in Ghana, we were informed that cell phones have become the new cigarette to our society. They are addictive, a disturbance, occupy an oral fixation, have a certain look about them, and by putting them into the hands of the youth they are almost guaranteeing a customer for life. The speaker, Read Schuchardt, then went on to discuss how the smart phone has five basic uses: a telephone, a mirror, assist in prayer, a rosary, and most importantly your new friend. In this talk it was also discussed that Smart Phones have become the new God to people. As technology has gotten improved over time religiousness has gone down. It is ironic because people now have more ways than ever to be able to access the Bible but the number of readers goes down each year. The people who have downloaded the Bible App on their phone have made it so accessible that it is no longer a scarce object. Scholars will say that value and scarcity are indirectly related. The time when the most people wanted to read the Bible was when it wasn't being printed and only the wealthy and educated could access it. Now that it is no longer a scarcity being that it is the highest sold book ever, the value of it has gone down.[33]

Benefits of Cell Phones

While there are many negative effects that can be seen by the use of cell phones they are not all bad for our society. At their true basic point they do allow people to connect especially over long distances.

"We use them to nurture relationships, to feed our emotional, social, and spiritual hungers, to think creatively and express ourselves. It's no exaggeration to say that, at

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[32] Kratsas, Gabrielle. "Cell Phone Use Causes Over 1 in 4 Car Accidents." 28 March 2014. *USA Today.* December 2014.
[33] Schuchardt, R. (2013, October 18). Cell Phone is God. Accra, Ghana

their best, they produce the kinds of moments that make life rewarding and worth living.

If you've ever written an e-mail straight from the heart, watched a video that you couldn't

stop thinking about, or read an online essay that changed how you think about the world,

you know this is true."

William Powers[34]

Cell phones have helped people be able to reach out to people for special events, in times of

need, or when information needed to be passed along. When someone loses a friend or relative

they can talk to the people they love most to feel comforted and supported in their time of

trouble. When something exciting happens people can call those close to them or part of it to

share their joy together. Cell Phones have helped people become more aware of the world around

them and be able to support causes that are bigger than themselves. When Hurricane Sandy hit

New Jersey MTV started a text message form of raising money. People who were watching the

television saw a number that they could text to donate money to the people suffering from the

hurricane and to put towards rebuilding the area. Campaigns like this wouldn't be possible or

successful without MTV being able to assume that the majority of its consumers had cell phones

that made them capable of donating. Also cell phones and smart phones especially can also help

supplement education for students. Applications such as translators and textbook supplements

can help students be productive as well as most colleges having applications that students can

check grades on.

Social Information Processing Theory

Many scholars have previously criticized the effectiveness of communication between

people via text messaging and other computer mediated forms. One theory, the social presence

theory, discusses that different mediums are required for different levels of involvement of a

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[34] Powers, W. (2010). *Hamlet's Blackberry.* New York: HarperCollins Publishers.

conversation. Face to face is the strongest medium and text-based is the weakest medium. This is because of the lack of awareness of the other person. This creates a discussion but not a connection like face to face communication does. Because of this, we still feel lonely even when we are communicating with people. This can cause our conversation to feel impersonal, individualistic, and task-oriented. Similarly, the media richness theory also discusses that rich conversations cannot develop over computer mediated communication. Finally, many scholars have explored the problem of having a lack of social context cues over computer mediated communication. People can't read others body language or nonverbal cues so there communication is less filtered. This tries to explain the extreme negativity in messages that are sent in online messages that people often don't experience face to face.[35] Overall, most theorists agreed that the lack of nonverbal cues and social awareness caused an environment not healthy to grow relationships in.

However, Joseph Walther came up with the social information processing theory that states that people can adapt to these limitations and actually grow significant relationships through computer mediated communication. He states that relationships will grow to the extent that the parties originally gain information about each other and use that to form impressions. Walther says that the nonverbal cues that are lacking from computer mediated communication can be replaced by verbal cues.[34] Similarly, while people are communicating via technology they are more likely to ask questions and disclose information about themselves and this can actually improve their face to face interactions. Walther's theory discusses that if you give a little extra time to computer mediated communication it can become equal with face to face

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[35] Griffin, Em. "Social Information Processing Theory of Joseph Walther". A First Look at Communication Theory 8th Ed. McGraw Hill. Retrieved 3 April 2012.

communication.[36] There are two components of computer mediated communication that make it work: Verbal cues and extended time. The verbal cues of computer mediated messages are a large and almost the only part of text messages. Because of this, all impressions are formed based on the words themselves as opposed to the words along with all other cues. The other part is that these messages are sent back and forth much slower than a face to face interaction but the speed isn't necessarily important, as long as all the content is taken in it doesn't matter how quickly it is sent and received. However, people do use time as the one nonverbal cue they can gather through computer mediated communication. People will react to the amount of time that it takes for the receiver to respond and use that as a cue of their interest in the conversation.[34]

The Social Information Processing Theory states that more intimate relationships can be made via computer mediated communication than face to face using the ideas of the hyper personal model. The hyper personal model explores the ideas of selective self-presentation of the sender, over attribution of similarity of the receiver, an asynchronous channel and the self-fulfilling feedback prophecy. Selective self-presentation of the sender refers to the idea that when people meet online they are making whatever presentation of themselves that they wish to. When they talk to people they decide what information they want to share and are able to hide things about themselves that they couldn't in real life such as a stutter or a lisp. The receiver of messages in computer mediated communication experiences over attribution of similarity. Because they do not have an actual person in front of them they are more like to find similarities in the words expressed in conversation. Through finding all these similarities they are likely to create an exaggerated version of the sender in their minds. Between the two parties there is an asynchronous channel. This means that messages do not have to be sent simultaneously and

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[36] Farrer, James, and Jeff Gavin. "Online Dating in Japan: A Test of Social Information Processing Theory." CyberPsychology & Behavior 12.4 (2009): 407-08. EBSCO Host. Web. 25 Nov. 2011.

because of this, messages are sent to be read at a convenient time, not always immediately. This also gives the sender more time to edit messages and have a complete filter over what they say. An asynchronous channel helps especially people in different geographic regions. They don't have to both be available at the same time in order to communicate like they did before computer mediated messages, but they can still communicate rather quickly compared to things such as letters. Also when people do want to communicate they don't have to put down all their other work, they can multitask and get work done while communicating with people. Finally, the hyper personal model states that people in general will form more favorable impressions through a screen. When the people do then meet in person they will want to continue this belief according to the self-fulfilling prophecy.[37]

Disposing of Cell Phones

The average lifespan of a cell phone in our world today is 11-18 months.[38] After these months most people throw their phone away and never think about where it is going after that. Very few will give their phone to a company to recycle for them despite not really knowing where the company is taking it or what they are going to do with it. Unfortunately many of these electronic products will get sent over to developing countries to be thrown in a big pile in the middle of a town. This can be dangerous because many of these electronics contain minerals that are hazardous to the people and environment around where they are sitting. The old products are sent over supposedly as hand-me-downs that people can still use but often times many of the products that have been sent are much past their usable stage. Depending on whom you hear the statistics from will determine what information you are given. In the Ghana E-waste Country Assessment they "found that of 215,000 tons of electronics imported to Ghana, 30% were brand

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[37] Griffin, Em. "Social Information Processing Theory of Joseph Walther". A First Look at
    Communication Theory 8th Ed. McGraw Hill. Retrieved 3 April 2012.
[38] "E-waste research group, Facts and figures". Griffith University.

new and 70% were used. Of the used product, the study concluded that 15% was not reused and was scrapped or discarded."[39] Other sources will tell you that upwards of 80% of the electronics sent to Ghana were discarded. When the phones are sent to these countries the chemicals they contain can become part of run-off and further contaminate water that is already not very healthy to begin with. The largest dump site as of March 2014 is at Agbogbloshie in Ghana where they burn and disassemble the electronics with no safety or environmental concerns.[40] Another large electronic waste processing area is in Guiyu, Shantou in China.[41] Some people call it the e-waste capital of the world. Over 150,000 people work there for 16 hours a day to disassemble electronics to try to get the parts that they can reuse or sell again. Not many investigations have looked into the health effects of this environment but there have been a few. One researcher tested 165 children from the area to look at lead concentrations in their blood. 82% of the children had blood/lead levels above the "safe" amount according to international health experts of 100. The average reading found was 149.[42] Another study looked at the environmental effects in this area and found that there were 100 times the levels of airborne dioxins than when previously measured. The levels of carcinogens in duck ponds and rice paddies exceeded international standards for agricultural areas. Rice paddies also contained levels of cadmium, copper, nickel and lead higher than international standards. They also found heavy metals in road dust with up to 300 times the amount of lead and 100 times the amount of copper than normal.[43]

Electronic companies along with many other types of companies help to create this problem using planned obsolescence. They purposefully create products with a limited useful life

[39] "Ghana e-Waste Country Assessmen". Ghana e-Waste Country Assessment. SBC e-Waste Africa Project.
[40] "Agbogbloshie: the world's largest e-waste dump – in pictures" The Guardian. Web. 01 Mar. 2014.
[41] Basel Action Network and Silicon Valley Toxics Coalition (2002-02-25). "Exporting Harm: The High-Tech Trashing of Asia" (PDF). Seattle and San Jose.
[42] "Toxic Tea Party". Greenpeace.org.
[43] Sthiannopkao, S. &. (2012). Handling e-waste in developed and developing countries: Inititatives, practices and consequences. Science of the Total Environment

either in the way that it stops functioning or it becomes out of fashion.[44] Through this they are able to make the consumers replace their product every few years as opposed to having a product that lasts forever. This idea causes a surplus in the number of electronics in the world because people are going through them more and more quickly so more need to be produced. The companies aren't fazed by what this process is doing to the environment because what they see is that the more phones they sell the more money they will make.

Solutions

Powers says that the answer is easy, "the essential idea is simple: to lead happy, productive lives in a connected world, we need to master the art of disconnecting."[45] The struggle in many people's lives is learning how to balance themselves between the new technology and the more traditional values. While the idea and action of spending quality family time playing board games sounds like an ideal situation many people will choose to engage in media instead or throughout. The solution to the cost of these cell phones will need to come from the companies producing them, the consumers using them, and the general consensus of the population to stand together on these issues.

The solution to the social causes that come from consuming a cell phone aren't as clear cut without the absolute extreme of eliminating the use of cell phones all together. Some workplaces have tried to help reverse the negative effects of e-mail by saying that on Fridays there is no e-mail. Above all, this forces people to walk to other people in the building and have face-to-face connections instead of being able to hide behind a computer for a full workday. Many people of older generations have lost hope on trying to help the younger generation figure out life not connected to the screen. However it is important to continue to fight the habits that

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[44] "An Economic Theory of Planned Obsolescence". Quarterly Journal of Economics. 1986.
[45] Powers, W. (2010). *Hamlet's Blackberry.* New York: HarperCollins Publishers.

children are developing that causes addiction to phones as they grow up. Cell phone companies have realized that their best marketing strategies are to get cell phones into the hands of young people and they will be addicted for life. The best way to fight this trend is to start with the young generation and continue to encourage traditional ways of having fun or learning. People have to individually commit to not allowing the screen to be their driving force throughout the day. Many people have come to believe that they can't go through the day without their phone from the minute they wake up to the minute they go to bed. While convenience is a factor in this feeling it is possible to live without a phone or at least there is no need to check it as often as people do. The three largest components that take a phone from being an every once in a while thing to an all the time thing is texting, social networking and games. These are not bad things when in private but most people have allowed these applications to take over social settings as well. While it can be hard for people to break these habits, they can take the phone from being seen as deterrence from social life and personal connections back to a positive technological advancement.

Throughout a person's day they find themselves using a phone for almost everything they need. While this is convenient it can be helpful to have separate products as to not be distracted by everything on one's phone. Most people use their phone as an alarm clock. This makes it so people reach for their smart phone first thing in the morning. With this comes all the hassle of being on a phone and people feel the need to answer any messages they received while asleep or check their e-mail first thing. Another important change that people should push to make is to turn their phone off when they get in the car. Most people can't resist the distraction that it brings and so the only way to rid of this distraction is to turn the phone off. There are other navigation systems out there that can be used if that is the problem people face but similar to an alarm clock

as soon as someone looks at their phone they are more likely to get distracted by everything else that is on it.

The companies who produce the phones should try their best to become a bigger part of the solution as opposed to just accepting that they are the problem. Companies need to commit to not buying products that have gone through unsafe or unfair conditions to be produced. (See Appendix 1 for companies who are trying to fix the problem) While this will either decrease profits or increase prices the cost isn't worth the lives it has risked. In terms of recycling companies should keep the extremely dangerous toxins out of their products so that if they do end up in the environment they aren't as harmful to the location they are placed in.

Cell phones continue to be one of the most highly used technological advancements around the world today. The number of cell phone users has grown substantially and rapidly since its introduction to the commercial world in 1983. They can be seen all around the world today no matter where you are travelling to. Unfortunately most of the users of these handheld devices don't see or imagine the effect they are having on the environment around them. Many of the problems are in countries that don't consume the product as much. The problems that come from mining the minerals and raw materials in the phone, the problems that come from the production process, the problems that come from using the phones, and the problems that come from throwing the phones away are all things people should be but aren't aware of. They look at the cell phone they are buying and think it only costs a few hundred dollars but many people don't see the numerous social costs they are incurring by picking up that phone.

Appendix 1

There are numerous companies trying to help different parts of this long supply chain of phones. One company that is raising awareness of the conflict minerals is FairPhone. They aim to produce a smart phone that goes through "fair" conditions from the mining to the product delivered to the customer. Their website states that their mission is to "bring a fair smartphone to the market- one designed and produced with minimal harm to people and planet." As of November 13, 2013 they were able to sell 25,000 of their initially produced phone. While it is not 100% "fair" because that is not quite possible they hope that their initial product can at least bring about awareness and help the conditions become better. While this Dutch-based group is working to help the production side of the smartphones a group in Canada called "Recycle my Cell" is working to dispose of them properly. They began in 2008 and they help Canadians dispose of their cell phones. They collect the phones and see if they are reusable anywhere. If they are salvageable they will be resold. If they are no longer capable of functioning the group disposes them based on the regulations of trans boundary movement of hazardous waste. America has also tried to help take a stand. America has tried to take action against the dangerous mining of coltan by mandating that companies disclose where their materials originate from the Democratic Republic of Congo as well as the nine countries that surround this country. This will help because hopefully Americans will see that some companies use coltan and try to avoid buying from those companies until they change their practices.

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