

# Mobile Technology Has Changed Our Culture

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## Abstract

Mobile technology usage has become a common part of every life. Smartphones have not only become a communication source for news, talking, texting, searching the web and more; but they have become a part of our culture. This study sought to determine how mobile phone acceptance and users' perceptions of socially acceptable styles of communication using mobile phones have changed. The researchers have conducted a study comparing results from 2010 to 2023. Results from 293 participants from the 2023 study were analyzed to show how mobile technology has changed our culture over time.

**Keywords:** mobile technology, smart phones, culture, communication

## 1. INTRODUCTION

Using mobile devices/smartphones has become an integral part of people's everyday lives. The way in which people communicate with the devices continues to change. In 2023 we are living in an "always-on" world where we are almost expected to be connected 24 hours per day, 7 days per week. Smartphones allow people to connect "anytime", "anywhere" to "anybody". It is hard to imagine living without them. Smartphones, along with keys and money are considered to be one of the three survival tools that most people always carry with them (Emanuel et al., 2015). The use of mobile devices has become part of our culture.

As smartphones are becoming a companion for most people in the United States, landlines are barely holding ground. Since 2004, 60% of people no longer have a landline and rely solely on using their mobile devices for communications (Centers for Disease Control and Prevention, 2022). According to a 2022 study of 1,591 respondents, 21% of smartphone users between the ages of 18-54 and 10% over the age of 55 spend on

average 40 or more hours per week on their devices (Statista, 2022). The majority of all users surveyed spent approximately 19 hours per week on their phones.

In 2010, the researchers conducted a study to determine if mobile technology is changing the way people communicate (Pinchot, et.al, 2011). At that time, there were 81.6 million cell phone users in the United States. As of December 2022, approximately 12 years after the original study was conducted there are now over 302 million cell phone users in the United States which shows a continued acceptance of the technology over time (Statista, 2022).

The number of unique mobile Internet users stood at 5 billion in 2022, indicating that over 60 percent of the global Internet population uses mobile devices to go online. In 2022, mobile Internet traffic accounted for almost 60 percent of total web traffic. There are currently 6.8 billion users worldwide (Statista, 2022). According to a Pew study on mobile phones, over 97% of all Americans own a cellular phone of some kind as of 2022. There has been a 50% increase in

smartphone ownership from 2011 until 2022. Additionally, 15% of American adults are smartphone-only Internet users – meaning they do not have broadband Internet in their homes (Pew Research Center, 2022).

This study seeks to determine how mobile phone acceptance and users' perceptions of socially acceptable styles of communication have changed from 2010 when the original study was conducted until 2023. In 2010, mobile phone use was in its infancy, only three years after the introduction of the iPhone as the first modern smartphone in 2007, followed by Android and App Stores for both platforms in 2008 (Eadicicco, 2017). Still, the results from that 2010 study showed that mobile technology was starting to change our culture. More than a decade has passed since the first study was conducted, and all indicators show that mobile phones have only become more ingrained in our daily lives, and integral to how we communicate both personally and professionally.

The researchers will compare results from the past study to the present study by exploring the following research question:

RQ1: In what ways has social acceptance of mobile phone use changed from 2010 to 2023?

## **2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT**

Smartphones are the most commonly used devices for communications and online activities. Smartphones are used for purposes such as email, texting, video calls and conferencing, banking, making travel arrangements, accessing educational content or social media, and surfing the Internet to name a few. In addition to the positive attributes of mobile devices, they have also been known to prevent individuals from engaging in their work or even to cause sleep deprivation due to the number of hours spent on the device. Additionally, mobile devices can lead to excessive dependence and use of the technology which is known as nomophobia (King et al., 2014; Yildirim & Coreia, 2015). Meluman and Pham (2020) note that, "no recent technological innovation has had a more transformative effect on consumers' lives than the virtually indispensable smartphone" (pp.231).

The remainder of this literature review focuses on mobile phone usage habits and cultural changes that have been noted in the literature in the past decade in regard to how people interact with their mobile devices.

### **The Adult "Pacifier"**

Meluman and Pham (2020) describe smartphones as an "adult pacifier" because people have their phone with them at all times and tend to be less inhibited when they use it compared to a desktop or laptop. The devices are so important that employers supply employees with phones so that they can stay connected. This has blurred the lines as to when work starts and ends each day, creating challenges for a work-life balance. Consumers of smartphones also derive emotional benefits such as comfort and a way to relieve stress. This comfort arises due to the portability of the device, being able to touch and move things on the device, and a sense of privacy since each individual usually owns their own device. In moments of stress, consumers tend to seek out their smartphones to use as a stress reliever.

### **Work-Life Balance**

Due to the COVID-19 pandemic starting in 2020, people were forced to work from home. In 2023, working in a hybrid format or working from home has become part of what is considered the "new normal". With this benefit comes the non-stop connectivity to work. Since the pandemic, 32% of workers have to be available to their employers in their free time as compared to 18% prior to the pandemic. Additionally, 28% of employees work outside their regular hours without pay as compared to 13% prior to the pandemic. Lastly, close to 50% of workers have shorter breaks while working from home as compared to 29% prior to the pandemic (Schmucker, 2022). In order to stay healthy, workers need to be able to detach from work matters in their personal time. However, almost half of all employees working from home cannot detach. They take calls at night, while on vacation, out to dinner with friends and during family time.

It has been noted that work-life balance has become a problem with the continued use of mobile devices. Employees often blur lines associated with work by using social media during work hours. When a person's social media use includes co-workers as well as friends and family, it can also become increasingly difficult to keep personal life separate from work life (Pinchot, et.al, 2011). There have been instances where employees were even fired for taking a sick day and then posting their activities for the day on social media or were fired for posting comments about the employer (Matyszczyk, 2009; Sondergaard, 2009).

### **Phone Numbers as Identity**

It is important to note that phone numbers now refer to people instead of places. Meaning that

just because your area code is from New York for example, does not mean that you actually live in New York. The phone number itself is almost a form of identity. In 2023, we are living in a time where area codes are irrelevant to a person's location. Our cell numbers follow us instead of us following a number (Pinchot, et.al, 2011).

### **High Usage Levels by Generation Z**

The number of mobile phone users continues to grow exponentially across all economic and age sectors. However, university students have been identified as one of the largest and most important target markets and the most active users of smartphones (Al-Barashdi, et al. 2015). Generation Z, those born in the late 1990's and early 2000's, use their smartphones more than other generations (Ozkan & Solmaz, 2015).

A 2021 qualitative study on smartphone usage of 29 university students revealed that students on average use their smartphones for 317 minutes per day which is approximately 5-1/2 hours. Students spent an average of 1 hour and 20 minutes per day on messaging applications, 1 hour and 10 minutes on social networks and 1 hour and 7 minutes watching videos (Kaysi et al, 2021).

A 2021 study on smartphone usage among university students revealed that there are a number of factors that have been identified to be associated with students spending long hours on their smartphones. The findings show that 61% of students used their smartphones based on their mood followed by 58% who use their phones based on how much time they had available during the day. Additionally, almost 42% of students use their mobile devices whether they are alone or with others (Fook et al., 2021). Not surprisingly, the study also revealed that 98% of students use their smartphones to surf the Internet as their number one use. Over 92% of students use their smartphones to update information on social media and close to 91% are using apps. Students in this study on average spent 25% of their day on their mobile device (Fook et al., 2021).

### **Mobile Phone Addiction**

The use of smart phones has led people to become addicted to the technology. A study conducted by Tosell et al. (2015) discussed that e-mail, text messaging, social media, and Internet use all assisted in addiction to smart phones. However, Beranuey et al. (2009) determined that the mobile phone is not the source of the addiction, but rather the content

that is accessed through the device that causes addiction.

Literature continues to support the relationship that people seem to develop with their smartphone (Alter 2017; Fullwood et al., 2017; Melumad et al., 2019; Wilmer et al., 2017). The most common description of a person's relationship with their mobile phone found in the literature is that it resembles behavioral addiction leading to a desire to engage in risks of social, physical, or financial harm (Albrecht et al., 2007). Prior work shows that users report problematic behaviors such as a loss of productivity (e.g., using the phone during work), degradation of interpersonal interactions (e.g., using the phone while at dinner with friends or family) or being unsafe (e.g., texting while driving) (Bianchi & Phillips, 2005; Pinchot et al., 2011; Vahedi & Saiphoo, 2017; Yen et al., 2009).

Rozgonjuk et al. (2019) conducted research that shows that college students are addicted to their mobile devices because they have a fear of missing out. The findings revealed that daily life disruptions are led by students constantly checking their phones for updated content and actions that they believe require immediate responses. This frequency of checking the mobile device has correlated with detrimental effects on academic work.

The researchers note that there has been a major shift in literature from the original study in 2010 until today 2023. The literature in 2010 focused on the ways people were using their smartphones as compared to 2023 when a vast majority of the literature has shifted to dependency and addiction to the device. This change shows an acceptance of the technology but also a growing dependency on mobile devices to fulfill normal functions of our everyday lives.

## **3. METHODOLOGY**

This study used an electronic survey (n=293) to survey smartphone users. The survey consisted of 30 quantitative questions: 20 that were taken from the authors' previous study (Pinchot, et.al, 2011) and 10 that were added for additional insight for this comparison study based on the review of the literature. Two of the 20 repeated questions were focused on demographics (age and gender), and 18 of the repeated questions were focused on understanding the mobile phone habits of participants.

These questions asked about scenarios such as whether the participant had ever answered a

mobile phone at a funeral, in a place of worship, or while at lunch or dinner with friends. In addition, questions were asked about phone communication preferences, such as whether the participant preferred voice calls or text messages, and how the participant received the majority of their phone communications – landline, mobile phone via voice call, or text messaging. Further, they asked whether the participant found it rude if someone took a phone call while they were speaking or meeting with the participant.

The authors’ original study was conducted in 2010 when mobile phone usage was still relatively new. (Pinchot, et.al, 2011). The iPhone was released in 2007, with Android following in 2008. App stores were only released for both platforms in 2008 as well, so mobile phone usage was still new in many ways. The 10 additional survey questions added focused on updating the survey to include similar questions on phone communication preferences over a decade later, in 2023. For instance, a question in the original survey that asked whether the participant had ever used a phone while driving was revised into four questions that distinguished between using a phone in hand vs. hands-free while driving, or texting in hand vs. hands-free while driving. Other updated behavioral questions were also added including whether the participant ever talks on speakerphone while in public or finds it rude if others have the speaker on while talking on the phone in public. More direct questions were also asked such as whether the participant believes it is socially acceptable to use a mobile phone in public and if the participant could make it through the day without using or checking their phone.

The sample (n=293) for the study included adults aged 18 and older who have used a mobile phone. A total of 319 people started the survey, but 293 (92%) participants completed usable surveys.

The survey used in this study was created in Question Pro and posted on Amazon Mechanical Turk (MTurk) for data collection in July 2023, with approval from the university Institutional Review Board. MTurk is a crowdsourcing tool that has been widely used by academic researchers for survey research (Lovett, 2018; Redmiles et al., 2019).

#### 4. RESULTS

Of the participants who completed the survey (n=293), 55% (160) identified their gender as male, 45% (131) female, and .3% (1) non-binary. Of the 293 participants, 161 were

between the ages of 30-39, 53 were 18-29, 45 were 40-49, 20 were 50-59, and 14 were 60 or over. The age breakdown is illustrated in Table 1.

Age Range	No. of Participants	Percentage
18-29	53	18.1%
30-39	161	54.9%
40-49	45	15.4%
50-59	20	6.8%
60 +	14	4.8%

**Table 1: Participants by age**

The research question for this study was:

RQ1: In what ways has social acceptance of mobile phone use changed from 2010 to 2023?

The following results compare the findings from the 2010 study to the current study. The first set of questions asked participants whether they had answered their mobile phone in several different social situations. The results from this set of questions are shown in Table 2.

Have you answered your mobile phone:	2010	2023	% Change
In a store	99%	94%	-%5
In a meeting	42%	56%	+14%
In a classroom	33%	48%	+15%
At a sporting event	86%	67%	-19%
At a meal with friends	91%	86%	-5%
In a movie theatre	18%	72%	+54%
In a place of worship	11%	46%	+35%
At a funeral	11%	60%	+49%

**Table 2: Comparison of participants’ use of mobile phones in various social situations**

The authors chose these questions to represent social situations where it would be questionable as to whether it is socially acceptable to answer a mobile phone. Several social situations decreased, including in a store, sporting event, and having a meal with friends. But the majority of categories saw an increase in usage of mobile phones in these social situations, including in a meeting and in a classroom. Major increases in percentage were seen for some of the most controversial social situations, including in a

movie theatre, in a place of worship, and at a funeral.

The next set of questions asked about behaviors when using mobile phones, and the results are shown in Table 3. First, participants were asked if they talked regularly on their mobile phones in public places. In 2010, 73% of participants indicated that they did, and in 2023, this percentage has increased by 22%. This indicates a clear majority participating in this behavior, with 95% of participants in the current study noting that they talk on the phone regularly in public places. In the current study, participants were also asked whether they believe it is socially acceptable to talk on their mobile phone in public. The majority, 87%, answered yes, while only 13% answered no. These results point to a cultural shift where it is now socially acceptable to talk on mobile phones in public places.

Behaviors and Opinions	2010	2023	% Change
Talk on mobile phone regularly in public places	73%	95%	+22%
Believe it is socially acceptable to talk on your mobile phone in public	-	87%	-
Taken a work call while on vacation	73%	89%	+16%
Use texting as a form of communication	93%	88%	-5%
Prefer texting to making a phone call	53%	92%	+39%

**Table 3: Comparison of participants' mobile phone behaviors or opinions**

Further, a majority of participants in both studies have taken a work call while on vacation, 73% in 2010 and 89% in 2023. This increase in willingness to take work-related calls while on vacation serves as evidence that there are blurred lines between work and private life, and could indicate potential problems with work-life balance.

Finally, in this section, participants were also asked if they use text messaging as a form of communication and if they prefer texting to making a phone call. There was a slight decrease (-5%) from 2010 to 2023 in participants who noted that they use text messaging. While this result is a bit surprising, there could be other

reasons that this response decreased. For instance, many people use social media apps for text or video communication in 2023 and may not consider these communication methods as text messaging. Further, there was a large increase in responses between the studies (+39%) when participants were asked whether they preferred texting to making a phone call. In 2010, 53% preferred texting and in 2023, 92% preferred texting. With this increase, it is clear that text messaging is a preferred method of communication in 2023.

The next set of questions probed deeper into how participants communicate using their mobile phones by asking whether they receive the majority of their phone communications via voice calls on a mobile phone, text messages, or on a landline. The majority of participants indicated that they receive most communications via voice calls on a mobile phone (75% in 2010 and 71% in 2023), while a fair number of participants indicated they receive most communications via text messaging (16% in 2010 and 21% in 2023), and a consistently low number indicated their majority of communications are received via landlines (9% in 2010 and 7% in 2023). Table 4 shows the differences in responses between the two studies.

Receive the majority of phone communications by:	2010	2023	% Change
Mobile phone via voice	75%	71%	-4%
Text message	16%	21%	+5%
Landline	9%	7%	-2%

**Table 4: Comparison of participants' primary phone communication methods**

Another set of questions delved into the usage of mobile phones while driving. Talking on the phone and texting while driving can be extremely dangerous and are illegal in most U.S. states without the use of hands-free technology. Hands-free technology was not prevalent in use in 2010, and only the current study asked participants if they used this technology while driving.

Based on the responses, shown in Table 5, there has been a dramatic decrease (-40%) in talking on the phone while driving from 2010 to 2023 (without hands-free technology). However, 51% is still an alarmingly high percentage for

participants to indicate they participate in this dangerous behavior. Similarly, there was very little change for texting on a mobile phone while driving from 2010 to 2023 (+1%). This result (50% in 2010 and 51% in 2023) also indicates that more than half of the participants text while driving, which is concerning because studies have shown that driving while texting may be more dangerous than driving under the influence of alcohol (Madden & Lenhart, 2009).

<b>While Driving:</b>	<b>2010</b>	<b>2023</b>	<b>% Change</b>
Talk on phone	91%	51%	-40%
Talk on phone (hands-free)	-	58%	-
Text on phone	50%	51%	+1%
Text on phone (hands-free)	-	51%	-

**Table 5: Comparison of participants' mobile phone use habits while driving**

The 2010 study asked participants whether they thought it was rude if someone took a phone call while meeting or speaking with them. This question was repeated in the current study and the results were very close, with 63% responding that they think it's rude in 2010 and 67% responding that they believe it's rude in 2023, a difference of only 4%. Two additional questions in this same area were added for the 2023 study. Participants were asked if they talked on speaker phone while in public. Of the respondents, 67% indicated that they do use speaker phone in public. Further, they were asked if they think it's rude if someone talks on speaker phone in public and 62% indicated that they find it rude. This is an interesting result that seems to indicate that while the majority of people find it rude when someone talks on speaker phone in public, they still participate in this activity.

Another new question asked in the current study focused on whether the participant had ever been out to a meal with friends where everyone at the table was on their mobile phone. In 2023, 79% of participants said they had experienced this situation, while only 21% had not. The final new question in the current study asked if the participant could make it through the day without using or checking their mobile phone. The majority of participants, 65%, responded yes, while 35% answered no.

In the 2010 study, there were several statistically significant relationships found between age and

various behaviors and opinions about mobile phones. For instance, significance was found between age and each of the following: (1) preferring text over voice calls, (2) number of texts sent on average each day, (3) taking a work-related phone call while on vacation, and (4) whether or not the participant felt that it was rude to be interrupted by a phone call when meeting with someone. In the current study, there were no significant relationships found between age and any of the various behaviors and opinions about mobile phones.

## 5. DISCUSSION

This study sought to determine how mobile phone acceptance and users' perceptions of socially acceptable styles of communication using mobile phones have changed from 2010 to 2023. In their original study, the authors found that standards of behavior in regard to use of mobile phones in various social settings were changing. Prior to the rise of mobile phone usage, there were different cultural standards that allowed for less interruption in places like meetings, movie theatres, places of worship, funerals, or even just meals with friends. In 2010, those cultural norms were changing as more and more people started to use their mobile phones for calls and texts while in those primary social situations (Pinchot, et.al, 2011).

Additionally, in the original study, a number of significant relationships were found between age and mobile phone usage behaviors and opinions. It was clear in that study that younger people were more likely to send more text messages on average per day and to prefer texting over voice calls. They were also more likely to take work-related phone calls while on vacation. Interestingly, younger people were also more likely to find it rude for someone to take a phone call when meeting with someone (Pinchot, et.al, 2011).

In the current study, the participants showed no significant difference in how age groups use mobile phones in social situations. This shows a clear difference from 2010 when younger people were more likely to use mobile phones and prefer text messaging. In 2023, people of all age groups use mobile phones regularly, and the majority of participants in this study prefer texting over voice calls even though they still receive the majority of their phone communication via voice calls on their mobile device.

Phone habits while driving have also changed over the past decade. In the original study, 91%

of the participants said they talked on the phone while driving, holding the device. In the current study, this percentage has dropped to 51%, though this number is still alarmingly high for such a dangerous activity. Likewise, texting while driving, holding the device, was at 50% in 2010 and has held steady at 51% in 2023. The participants in the current study also noted that they use hands-free technology to both talk on the phone while driving (58%) and text while driving (51%). While this is generally regarded to be safer behavior, studies have also shown that any kind of mobile phone use, whether hands-free or not, can impact safety due to driver distraction (Lipovac et al., 2017).

This study sought to answer the research question: In what ways has social acceptance of mobile phone use changed from 2010 to 2023? The answer to that question seems clear. All social situations appear to be fair game for use of mobile phones, including settings such as places of worship or funerals which used to be places where most people would refrain from using their devices. Even though the current study shows that people still find it rude when others take a call while speaking to them or talk on their speaker phone while in public, they do find using mobile phones in public to be socially acceptable. The majority even engage in some of those rude behaviors themselves.

The literature provides support for the idea that mobile phones have become a necessary utility for people in their daily lives, akin to their wallets and keys (Emanuel et al., 2015). Given more time, the mobile phone may even surpass the wallet and keys in importance and become the one daily utility that people need. Phones can already use apps to serve as a key for a digital lock on cars (Wardlaw, 2020) and hotel rooms (Dans, 2019), and they can also serve as a wallet for contactless mobile payments (Seiber, 2021).

It would be remiss not to mention the impact of the COVID-19 pandemic on the role of mobile devices over the past decade, as this study looks at the time period between 2010 to 2023, which includes the pandemic which started in 2020. For instance, there was a significant leap forward in the adoption of contactless mobile payments between 2020 and 2023, with 69% of retailers noting that they saw an increase during the pandemic (Seiber, 2021). The appeal of the contactless nature of the transaction was likely the driving factor in this increase in adoption.

Further, mobile devices became a primary source of support, comfort, and communication for

people during the COVID-19 pandemic, when most people spent a significant amount of time quarantined in their homes (de Souza e Silva & Xiong-Gum, 2023). Many adults now use their mobile phones to help pass the time or relieve stress in situations where they would not have been used before, what Meluman and Pham (2020) call an "adult pacifier."

Due to the ubiquity of smartphones, the increased adoption of mobile phone use for more tasks and types of communication during the pandemic, and the shift in cultural acceptability of mobile phone use in various social settings as described by this study, it is clear that our culture has accepted the mobile phone as a daily utility.

## 6. LIMITATIONS

This research sought to compare the results of a survey on mobile phone communication behaviors and user perceptions about mobile phone usage in a comparison study between responses obtained in 2010 and then again in 2023. In the 2010 study, the sample was much smaller (n=88), and was obtained through convenience sampling of university students. In the current study, the sample was larger (n=293), but was obtained via Amazon MTurk. The respondents from MTurk were not limited to university students, which could limit the comparison.

## 7. CONCLUSIONS

Mobile phones have clearly provided modern conveniences, not the least of which is being the ability to stay in touch with family, friends, and work colleagues from anywhere around the globe. With the ubiquity of mobile phones and the continued growing usage of mobile apps, contactless mobile payments, and other mobile device technology, it would arguably be difficult in modern society to survive without a mobile phone. However, with the great power of mobile phone technology comes great responsibility. While many enjoy the benefits of mobile phones, there is a growing concern in regard to mobile phone dependence and addiction (Melumad et al., 2019; Rozgoniuk et al., 2019; Alter, 2017; Fullwood et al., 2017; Wilmer et al., 2017) and a continued impact on work-life balance (Arokiasamy & Fadzil, 2022; Schmucker, 2022).

Given the many potential social and mental health problems that could be caused by overuse of mobile phones, more study is needed to determine the best path forward for responsible and healthy use of mobile phones.

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