The Impact of Technology on Gen X and Gen Z

Matthew Marino

Department of General Education, Kean University

GE-2024 07: Research and Technology

Professor Das-Iyer

December 4, 2022

Abstract

The research in the following study was important for supporting or contradicting information from previous studies, and revealed more information on how technology has impacted Generation X and Generation Z. The study was a quantitative approach, and it was conducted over 2 weeks. Voluntary participants from Generation X and Generation Z were given a 24-question survey. Three studies had similar results, and two studies had contrasting results when they were compared to this study. There were more participants from Generation X which made it hard to make exact comparisons. Both generations cared about risks, and they both thought that technology has made society lazier. Generation X and Generation Z also thought that technology made life easier and caused more stress/anxiety in society. This study resulted in disproving generational stereotypes related to technology, and revealed that both generations had more views in common than expected.

Introduction

Technology is constantly evolving and affecting the way people live their lives. Younger generations may have an easier time adapting to new technologies than the older generations. Technology has changed education, entertainment, banking, payment methods, and access to knowledge. Generation X consists of anyone born between 1965-1979, and Generation Z consists of anyone born between 1995-2010 (Agárdi & Alt, 2022). Generation X tends to distrust technology, and Generation Z has never known a day where it has not existed (Çoklar & Tatli, 2021). A study revealed that men and women in Generation X have different levels of being able to multitask, use graphics to express themselves, and yearning for instant gratification, but there was not a difference between men and women in Generation Z (Çoklar & Tatli, 2021). A different study on how those two generations perceive mobile payment options found that both generations did not see privacy as a risk, but Generation X was concerned about financial risks (Agárdi & Alt, 2022).

The present study was a quantitative research study that focused on the impact technology had on Generation X (Gen X) and Generation Z (Gen Z). The researcher mainly focused on how technology has impacted education, entertainment, banking, payment methods, access to knowledge, and how each generation thought technology has impacted society. The results of the study hoped to clarify the studies mentioned before, and assist future researchers who research the impact of technology on different generations. Data was collected by distributing a survey to members in Generation X and Generation Z. The survey included questions related to how technology has impacted education, entertainment, banking, payment methods, access to knowledge, and what each generation thought the impact of technology was on society.

Literature Review

The goal of the study was to discover the impact technology has had on the different aspects of the lives of Generation X and Generation Z. The areas that have been explored by researchers are education, smartphone usage, economy, and a comparison of digital natives and digital immigrants. People who have grown up with technology constantly in their lives are known as digital natives, and digital immigrants are people that did not grow up with a lot of technology (Çoklar & Tatli, 2021). The exact range that defines someone has part of a specific generation can vary. One study determined Generation X consists of anyone born between 1965-1979, and Generation Z consists of anyone born between 1995-2010 (Agárdi & Alt, 2022). A different study mentions Generation X is anyone born between 1965-1980, and Generation Z is anyone born in and after the year 2001 (Çoklar & Tatli, 2021).

Education

Information and Communication Technology (ICT). ICT has not only been used to help with general education, but also help students learn a second language. A study conducted in Mexico on fifth grade students using interviews and surveys had the goal of finding out what technology was used for L2 learning, and how students felt about using information and communication technology (ICT) to learn at home and what features they preferred (Ledesma & Izquierdo, 2020). The students used ICT out of school, and technology was mainly used to practice vocabulary, writing in English, watching videos, and listening to music (Ledesma & Izquierdo, 2020). The researchers revealed various ways students used technology to help better their learning, but failed to include how teachers implement or encourage ICT usage. Similarly, Gu, Zhu, and Guo (2013) conducted a study in Shanghai on K-12 students and teachers using surveys and interviews. The goal of the study was to see how students and teachers use

technology (Gu, Zhu & Guo, 2013). High school students used ICT in class the most, and primary school students used it the least. (Gu, Zhu & Guo, 2013). The researchers revealed that information and communication technology is used the most to help improve the education for high schoolers. ICT has been used more at home than in school by students, and teachers also used ICT (Gu, Zhu & Guo, 2013). The provided result demonstrated that ICT was not only used for learning, but used for teaching too. Ledesma and Izquierdo (2020); Gu, Zhu and Guo (2013) revealed that ICT can be used for multiple purposes in education, and that students used ICT more at home than they did at school. Ledesma and Izquierdo (2020) and Gu, Zhu and Guo (2013) both used surveys to collect data on students, but Gu, Zhu and Guo (2013) included teachers in their study. The provided data revealed a portion of the impact technology had on education.

Using Technology to Learn. Technology has allowed students to learn new languages. Ledesma and Izquierdo (2020) studied the impact technology had on Mexican students learning English. The researchers discovered that most students had access to the Internet outside of school, and ICT was used for more than 4 hours a day by 59% of the students (Ledesma & Izquierdo, 2020). The statistic proved that a majority of students used technology to help with their studies. The students were not afraid of using ICT and enjoyed it, but they only read instructions when necessary (Ledesma & Izquierdo, 2020). The students did not practice through social media, but they used technology for help with vocabulary and pronunciation (Ledesma & Izquierdo, 2020). The researchers discovered that the students preferred the textbook because technology can be distracting, but they enjoyed the challenge the technology provides as they advance (Ledesma & Izquierdo, 2020). Shockingly, students preferred to use old ways of learning, and did not rely on technology.

However, digital learning does not only involve online courses. Persada, Miraja, and Nadlifatin (2019) conducted a study in Indonesia on 150 Generation Z university students. The researchers had the goal of discovering Gen Z's intentions on using digital learning through a two-part survey (Persada, Miraja & Nadlifatin, 2019). The researchers discovered that digital learning was not used a lot outside of school, and digital learning was the primary method of learning for 23.33% of the students (Persada, Miraja & Nadlifatin, 2019). The percentage of students that were required to use digital learning was 14.67%, and 15.33% used it to aid them with their regular learning (Persada, Miraja & Nadlifatin, 2019). The researchers concluded that digital learning was used for entertainment by 12.67% of the studied population (Persada, Miraja & Nadlifatin, 2019). The three most used medias are paid courses, university e-learning, and educational videos (Persada, Miraja & Nadlifatin, 2019). The researchers failed to discover how digital learning affected the use of storm days.

Furthermore, the technical savviness of each generation may vary. Wang et al. (2014) had the goal to see if students had more experience with technology than their teachers by using surveys and interviews. The study population was a total of 24 teachers from Utah and New York, 774 eighth grade Utah students, and 305 sixth to eighth grade New York students (Wang et al., 2014). The student to teacher ratio that was studied was unfair, and could have caused the data to be inaccurate because the number of students overpowered the number of teachers. The primary devices used by teachers and students were laptops, cell phones, and desktops (Wang et al., 2014). The provided data reveals that older and younger generations preferred the same technology. Students in school used search engines and Word, but outside of school they mainly used social media, YouTube, texting, and search engines (Wang et al., 2014). Teachers used the same applications as students except they used presentations and spreadsheets more (Wang et al.,

2014). The researchers discovered that the students were fast learners when learning new technology, and they were more engaged when technology was used (Wang et al., 2014). The discovery was major because if more technology was used in schools, then students would learn more from being more engaged. The study also revealed that teachers use technology more than students, but the students used more technology outside of school (Wang et al., 2014). There was not a major gap between teachers and students when it came to technological experience, and the teachers age did not affect their ability to use technology (Wang et al., 2014). The teachers also struggled to find ways on how to integrate technology into classrooms (Wang et al., 2014). In comparison, Gu, Zhu and Guo (2013) found that it was hard for teachers to incorporate ICT in the classroom. The younger the student the more they expected ICT to be used in class (Gu, Zhu & Guo, 2013).

Ledesma and Izquierdo (2020) and Persada, Miraja, and Nadlifatin (2019) discovered that technology was used as an aid, and that students preferred to use other methods for primary learning. Wang et al. (2014) and Gu, Zhu and Guo (2013) discovered that teachers struggled to implement technology in the classroom. All four studies used surveys to collect data. Ledesma and Izquierdo (2020) and Persada, Miraja, and Nadlifatin (2019) focused their study on students, but Wang et al. (2014) and Gu, Zhu and Guo (2013) included teachers in their research.

Smartphone Usage

Smartphones have changed the way items are paid for, caused addiction in some generations, and impacted the way people search for information. Agárdi and Alt (2022) conducted a study using a survey on how each generation used mobile payment methods, and it was conducted using a total of 708 Hungarian university students and their parents. The major results of the study were that Gen X only cared about financial risk and not privacy risks, but

Gen Z did not care about any of the risks (Agárdi & Alt, 2022). The data was important because it proved how much Gen Z trusts when compared to Gen X. Agárdi and Alt (2022) revealed that the enjoyment Gen X felt had a major impact, but the compatibility of using mobile payment options had a larger impact on Gen Z. However, a second study was conducted in Israel with an 80-question survey (Zhitomirsky-Geffet & Blau, 2016). The aim of the study was to find out differences between each generation and addictive smartphone use (Zhitomirsky-Geffet & Blau, 2016). The researchers studied 216 people, and they discovered Gen Y was the most addicted to their smartphones (Zhitomirsky-Geffet & Blau, 2016). Gen X was the least addicted, and Gen Z had the highest emotional and social environment factors for smartphone addiction (Zhitomirsky-Geffet & Blau, 2016). The two younger generations used social networks, and Gen X used more email, texting, and information apps (Zhitomirsky-Geffet & Blau, 2016). The data revealed that Gen X used smartphones to find information, and the younger generations used them to socialize. In addition to the previous study, Zhitomirsky-Geffet and Blau (2017) conducted a different study with the goal of figuring out what type of information each generation looked for on their smartphone. The study was conducted in Israel using 216 participants and a 66-question survey (Zhitomirsky-Geffet & Blau, 2017). The results of the study were that older generations looked for functional/cognitive information, and younger generations looked for social information (Zhitomirsky-Geffet & Blau, 2017). The data was important because it revealed that Gen X used smartphones as a tool to seek information, and Gen Z used phones more for social interactions. Gen X used texting and email the most, and social networks were used the most by Gen Z (Zhitomirsky-Geffet & Blau, 2017). Zhitomirsky-Geffet and Blau (2016); Zhitomirsky-Geffet and Blau (2017) revealed that bias may have been caused by self-reporting data.

Agárdi and Alt (2022) differed from the other two studies because their study took place in Hungary, and they studied smartphone usage in regards to mobile payment options. Zhitomirsky-Geffet and Blau (2016) and Zhitomirsky-Geffet and Blau (2017) both conducted studies in Israel. Zhitomirsky-Geffet and Blau (2016) and Zhitomirsky-Geffet and Blau (2017) both discovered that Gen X used texting and email the most, and social networks were used the most by Gen Z. Agárdi and Alt (2022), Zhitomirsky-Geffet and Blau (2016), and Zhitomirsky-Geffet and Blau (2017) used surveys to collect data, and used Generation X and Generation Z as a study population.

Economy

Technology has impacted the economy through the way products are purchased and the way items are purchased in stores. Panjaitan et al. (2019) used a survey to conduct a study on how Generation X viewed their experience and acceptance towards using e-commerce sites. The participants had to have made at least two online purchases to qualify for the study, and 89 out of the 95 surveys were used for analysis (Panjaitan et al., 2019). The researchers discovered that Generation X used laptops the most in order to reach e-commerce sites, and members of that generation had an above average level when it comes to using e-commerce sites even though they did not grow up with the Internet (Panjaitan et al., 2019). Generation X felt that the sites were not only easy to use, but also easy to learn how to use them (Panjaitan et al., 2019). Panjaitan et al. (2019) revealed that Gen X mostly strongly agrees that shopping online made them feel insecure, were concerned about products arriving damaged, and thought it was difficult to find the right product. Generation X also feared certain risks which were the product quality, payment system, cost, and products not arriving on time (Panjaitan et al., 2019). The researchers failed to look at other generations to see how they felt about using e-commerce sites. Similarly,

Agárdi and Alt (2022) concluded that how easy it was for Generation X to use mobile payment options determined how useful they were. Mobile payment options brought up concerns regarding financial risk, but not privacy risk (Agárdi & Alt, 2022). Panjaitan et al. (2019) and Agárdi and Alt (2022) revealed that ease of use was a major factor for if Gen X uses a service, and they thought more about the risks that could occur by using a service. Agárdi and Alt (2022) studied Generation Z as well as Generation X, and Panjaitan et al. (2019) only studied Generation X.

Digital Native VS Digital Immigrant

Technology has impacted digital natives and digital immigrants differently in their levels of digital nativity, and the way they have perceived technology. Çoklar and Tatli (2021) conducted a study in Turkey by using a survey in order to figure out what the digital nativity levels of each generation were. People born between 1965-2010 were used as the study population (Çoklar & Tatli, 2021). Generation X viewed themselves less digitally native than generations Y and Z, and men in generations X and Y viewed themselves more digitally native than females (Çoklar & Tatli, 2021). Çoklar and Tatli (2021) discovered that there was not a gender difference in Gen Z regarding digital nativity. Owning a computer affected digital nativity in Gen X the most (Çoklar & Tatli, 2021). Owning a computer affected Gen Y but not as much as Gen X, and Gen Z was not majorly affected (Çoklar & Tatli, 2021). Çoklar and Tatli (2021) found out that increased self-efficiency, computer usage and Internet usage would increase digital nativity for Gen X. Women in Gen Z had more access to technology throughout their lives than any other generation (Çoklar & Tatli, 2021).

By comparison, Filho, Gammarano, and Barreto (2021) performed a study to see how the multimedia system in cars influenced digital immigrants and digital natives. The researchers

used interviews and netnography to collect data (Filho, Gammarano & Barreto, 2021). Netnography is a data collection technique where researchers look at discussion forums on the Internet about a certain subject (Filho, Gammarano & Barreto, 2021). The digital natives preferred functionality of the system and digital immigrants preferred operation (Filho, Gammarano & Barreto, 2021). The digital natives had an easier time adapting to changes, and the digital immigrants were concerned about safety (Filho, Gammarano & Barreto, 2021). Digital immigrants cared about how using the system made them feel, and worried about the responsibility of using the system (Filho, Gammarano & Barreto, 2021). Filho, Gammarano, and Barreto (2021) discovered that digital natives did not care about responsibility. A flaw in the study was that it was hard to identify who was a part of each generation during the netnography portion of data collection (Filho, Gammarano & Barreto, 2021).

Çoklar and Tatli (2021) and Filho, Gammarano, and Barreto (2021) both compared digital natives to digital immigrants. Çoklar and Tatli (2021) used a survey to collect data and Çoklar and Tatli (2021) used netnography and interviews to collect data. The two studies revealed that digital natives were the exact opposite of digital immigrants. Digital immigrants cared about the responsibility of using the multimedia system and the digital natives did not (Filho, Gammarano & Barreto, 2021). Computer ownership had a major impact on digital nativity for digital immigrants, but not for digital natives (Çoklar & Tatli, 2021). Çoklar and Tatli (2021) studied an overview of differences, and Filho, Gammarano, and Barreto (2021) studied the differences on a specific topic.

Therefore, all the studies used a similar methodology which was distributing surveys, but Filho, Gammarano, and Barreto (2021) used netnography and interviews instead of a survey. The impact of technology on Generation Z was mostly studied in education and smartphone usage.

Generation Z had not been studied a lot when it came to economic topics, and Generation X was not studied as much when it came to education. Ledesma and Izquierdo (2020) and Gu, Zhu and Guo (2013) revealed that ICT can be used for multiple purposes in education, and that students used ICT more at home than they did at school. Ledesma and Izquierdo (2020) and Persada, Miraja, and Nadlifatin (2019) discovered that technology was used as an aid, and that students preferred to use other methods for primary learning. Wang et al. (2014) and Gu, Zhu and Guo (2013) discovered that teachers struggled to implement technology in the classroom. Zhitomirsky-Geffet and Blau (2016) and Zhitomirsky-Geffet and Blau (2017) both discovered that Gen X used texting and email the most, and social networks were used the most by Gen Z. Panjaitan et al. (2019) and Agárdi and Alt (2022) revealed that ease of use was a major factor for if Gen X used a service, and they thought more about the risks that could occur by using a service. Computer ownership had a major impact on digital nativity for digital immigrants, but not for digital natives (Çoklar & Tatli, 2021).

Methodology

The study aimed to discover how Generation X and Generation Z have been impacted by technology. The study was a quantitative research study in which surveys were used to collect data. The survey questions were created by the researcher, and came from previous studies. Zhitomirsky-Geffet and Blau (2016) have conducted a study on Generation X, Generation Y, and Generation Z to research smartphone addiction levels in each generation. The researchers used an 80-question survey to collect data in Israel (Zhitomirsky-Geffet & Blau, 2016). The current study conducted research on Generation X and Generation Z, but not Generation Y. The current study also used a survey to collect data, but with fewer questions and in New Jersey.

The study was conducted on members of Generation X and Generation Z. Generation X members were from the researcher's family, neighborhood, and Kean University. Generation Z participants were from family, friends, and Kean University students. The surveys were sent out via email and texting. The data was collected over a span of 2 weeks. The study aimed to view how different types of technology have impacted different generations. The independent variable was technology and the dependent variable was the different generations. The researcher was not able to control when the participants took the survey, or how they felt when the survey was taken. The researcher also was not able to control recent experiences with technology.

Confidentiality was maintained through the use of anonymous surveys, and personal information was not asked for. An informed consent form was attached to the survey, so the participants knew what the purpose of the study was. The informed consent forms made the participants volunteers, and they were not forced to take the survey. If a participant was under the age of 18, a parent or guardian would have to sign for them. Time and the number of participants were limitations of the study. Due to time, there were slightly more participants from Generation X than Generation Z. The number of questions that were asked on the survey was also limited. Another limitation was Generation Y and Baby Boomers were not used to collect data due to time.

Results

The study had the objective of discovering how technology has impacted Generation X and Generation Z. The participants were asked 24 questions that are related to a couple different topics.

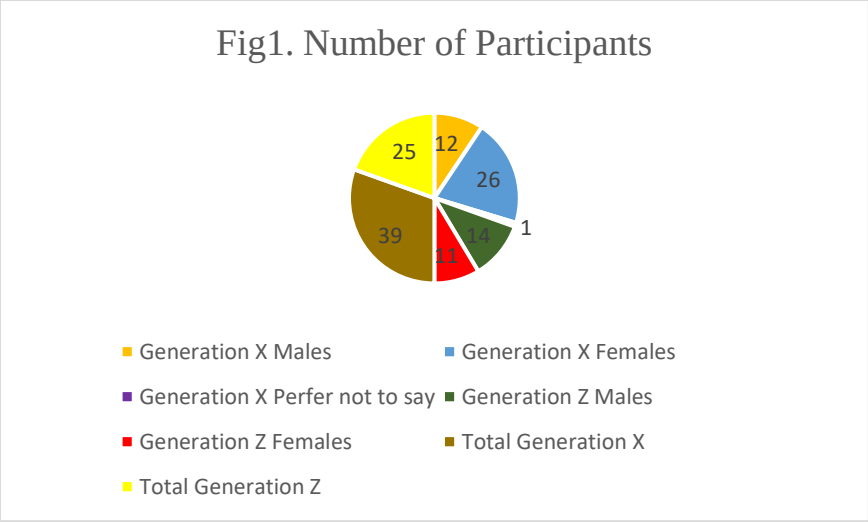

Figure1 depicts the demographics of the participants. Out of the 64 participants, there were 39 from Generation X and 25 from Generation Z. The participants from Generation X were 12 males, 26 females, and 1 preferred not to say. The Generation Z participants were 14 males and 11 females.

Table 1

Time Spent using Technology	Number of Participants in Gen X	Number of Participants in Gen Z
4-6 hours a day	11	7
7-12 hours a day	22	17
12 + hours a day	6	1

Table 2

Type of Device used	Number of Participants in Gen X	Number of Participants in Gen Z
iPad	1	0
Laptop	22	4
Desktop	5	0
Smartphone	11	21

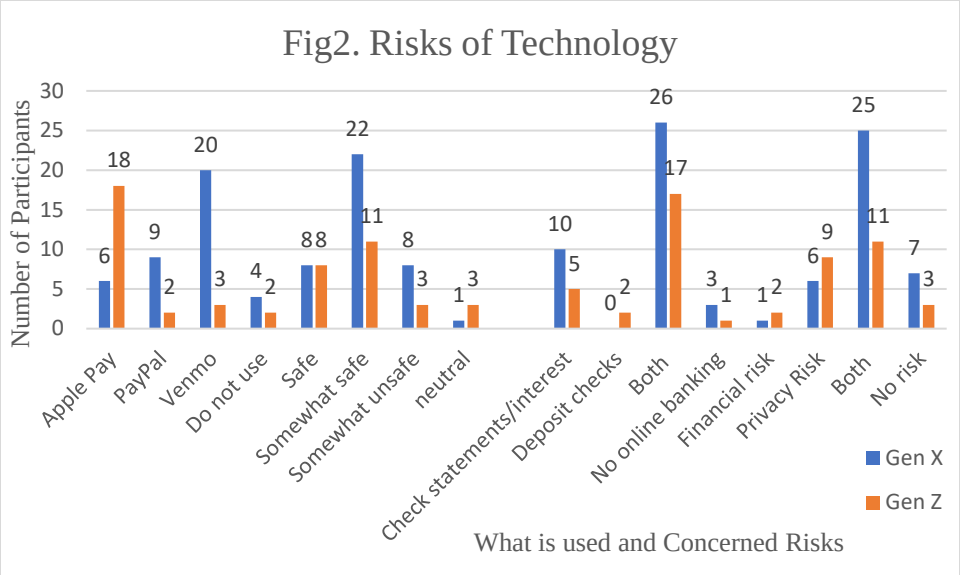

Figure2 depicts the mobile payment options preferred by each generation, and how safe they deemed them to be. Figure 2 also represents the main reason why online banking was used and its perceived risks.

Table 3

Main use of Technology	Number of Participants in Gen X	Number of Participants in Gen Z
School	0	12
Work	32	0
Entertainment	7	13

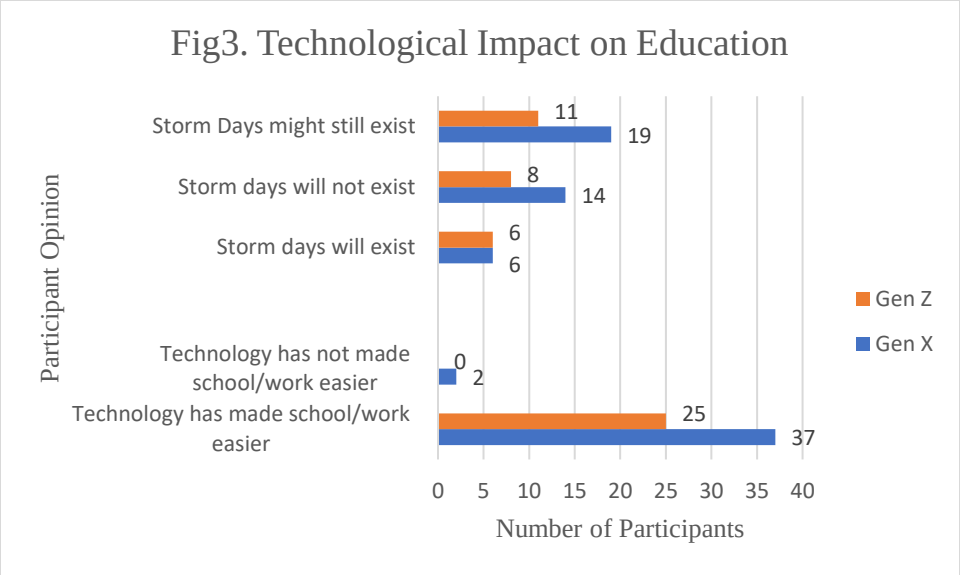

Figure3 depicts how each generation felt about if storm days will still exist because of technology, and how technology has affected school/work.

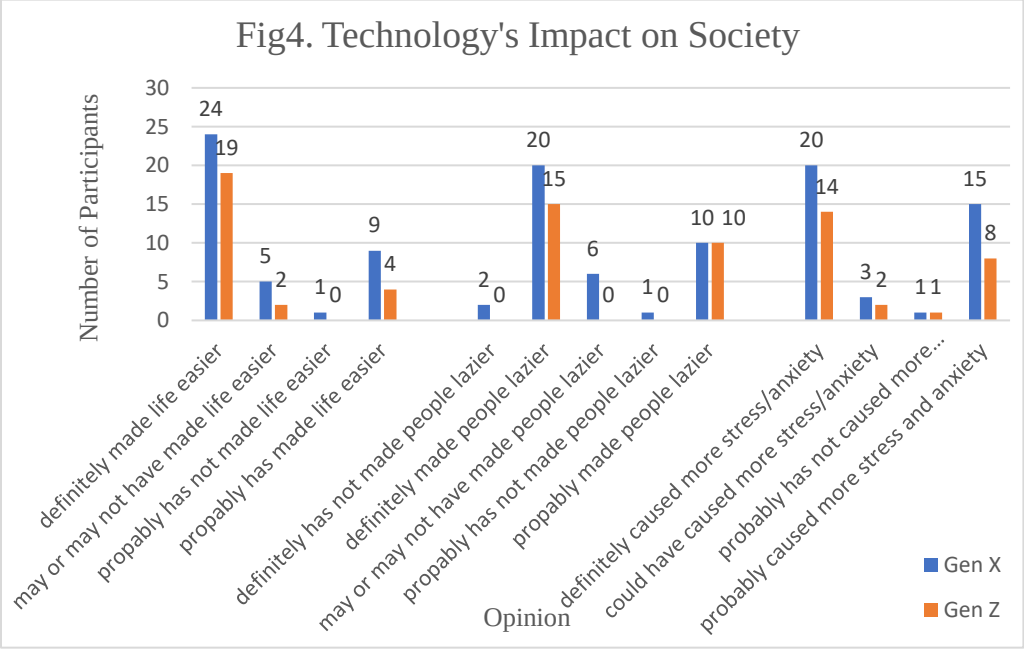

Figure4 depicts the opinion each generation had on how society had been impacted by technology. The covered areas were made life easier, made people lazier, and caused more stress/anxiety.

Table 4

Easiness of Learning New Technology	Number of Participants in Gen X	Number of Participants in Gen Z
Extremely Easy	8	10
Somewhat Easy	15	13
Neither Easy nor Difficult	9	1
Somewhat Difficult	7	1

Table 5

Type of Information Searched for on Technology	Number of Participants in Gen X	Number of Participants in Gen Z
Functional/Cognitive	22	3
Social	17	22

Table 6

Main Applications used	Number of Participants in Gen X	Number of Participants in Gen Z
Games	1	5
Search Engines	10	8
Social Media	7	10
Word, Excel, PowerPoint	21	2

Table 7

Technological use for Entertainment	Number of Participants in Gen X	Number of Participants in Gen Z
Social Media	17	5
Listen to Music	8	6
Play Games	6	4
Watch Videos	8	10

Table 8

When Notification is Received	Number of Participants in Gen X	Number of Participants in Gen Z
Wait to Check it	23	14
Instantly Check it	16	11

Table 9

Likeliness of Taking Online Courses	Number of Participants in Gen X	Number of Participants in Gen Z
Highly Likely	5	10
Somewhat Likely	11	5
Neutral	10	4
Somewhat Unlikely	10	2
Highly Unlikely	3	4

Table 10

Perceived Easiness of Online Courses	Number of Participants in Gen X	Number of Participants in Gen Z
Online is Easier than in Person	7	4
Online might be Easier than in Person	10	8
Online is Harder than in Person	22	13

Table 11

Influences use of Technology	Number of Participants in Gen X	Number of Participants in Gen Z
Personal Interest	34	16
Society	5	2
Enjoyment Felt using it	0	7

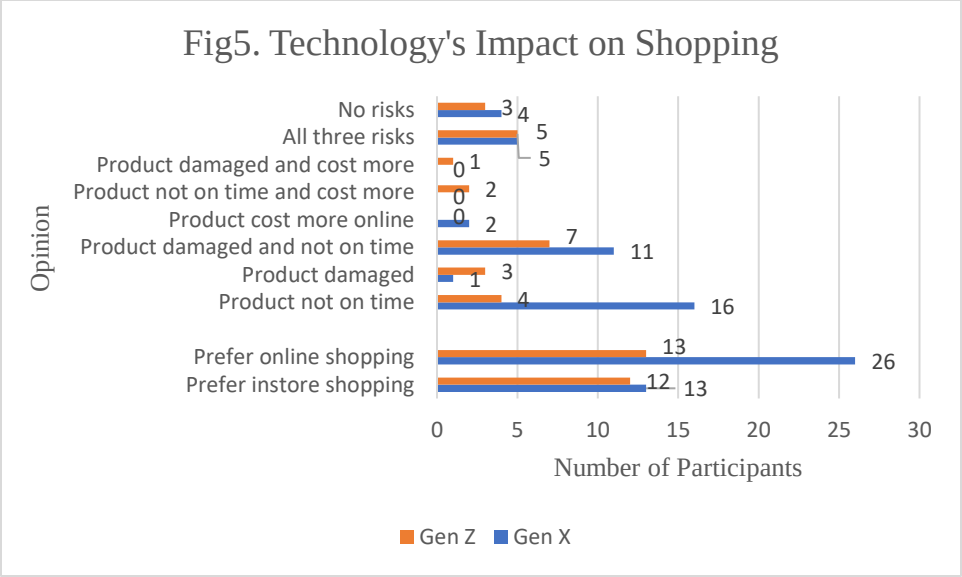

Figure5 depicts the risks each generation felt when shopping online and how they preferred to shop.

Discussion and Conclusion

The purpose of the qualitative study was to determine how Gen X and Gen Z have been impacted by technology. Figure1 depicted that most of the participants in Gen Z were male and most of the participants in Gen X were female. Table 1 demonstrated that a majority of the people in both generations used technology for 7-12 hours a day. The result was important because it revealed that Generation Z did not use technology more than Generation X did. Table 2 revealed smartphones were used the most by Gen Z, and laptops were used the most by Gen X. Panjaitan et al. (2019) discovered that Generation X used laptops the most to access e-commerce sites. The results from this study were similar to their results, and helped clarify what device was used the most by Gen Z.

Figure2 revealed Apple Pay was used the most by Gen Z, and Gen X used Venmo the most. Both generations felt that mobile payment options were somewhat safe. Figure2 also

revealed most people in both generations used online banking to deposit checks, and check statements/interest. Most people from both generations felt that online banking had privacy and financial risks. The second highest for Gen Z was privacy risks, and the second highest by one person for Gen X was that there were not any risks. This was shocking because previous studies revealed that Generation X tended to care more about risks than other generations. This study revealed both generations felt that there were risks. Even though the number of people in Gen X that felt both risks existed was higher than that of Gen Z, most of the Gen Z participants still chose that option. Agárdi and Alt (2022) were contradicted because they discovered that Gen Z did not care about risks, and that Gen X only cared about financial risks. They were contradicted because Gen Z did care about risks, and Gen X cared about both types of risks.

Table 3 demonstrated that Generation Z primarily used technology for entertainment, but by one participant. The second-place answer was school for Gen Z. Generation X mainly used technology for work. The Gen Z result was shocking because most people would think that Gen Z would mainly use technology to aid them in school before using technology for entertainment. All the Gen Z participants were enrolled at a college at the time of the study. The Gen X result was not shocking because most people in that generation tend to still be working. Figure3 depicted that both generations thought that storm days may still exist for schools, and that technology has made school and work easier. The thought that storm days might still exist was important because with zoom and google meets classes could still be held virtually. It was surprising to see that most people did not think storm days would cease to exist because of technology. It was not surprising to see that most people thought technology has made school and work easier, but two people in Gen X felt the opposite. It was interesting to find that people thought school or work became harder because of technology.

Figure4 depicted that most people thought that life has definitely become easier due to technology. It also depicted that both generations leaned towards technology having caused more stress and anxiety in people as well as made them lazier. It was significant to see that Generation X and Generation Z were on the same page when it came to how technology has impacted society. A correlation could be made that the easier life becomes the lazier people become. Since Gen Z grew up with technology, it was surprising to see that they leaned towards technology making people lazier. Since life with technology was all they know, it could have been suspected that they may have felt the opposite because it was what they perceive as normal.

Table 4 revealed that Generation X and Generation Z both leaned towards that it was easy for them to learn new technology. Filho, Gammarano, and Barreto (2021) are contradicted by this result because they discovered that digital natives had an easier time learning new technology, but in this study most of the digital immigrants said it was easy for them to learn new technology. Table 5 revealed Zhitomirsky-Geffet and Blau (2017) had similar results because most of the Gen X participants looked for functional/cognitive information, and most of the Gen Z participants looked for social information. Table 6 demonstrated that social media and search engines were the two most used applications by Gen Z, and Word, PowerPoint, and Excel were the most used applications by Gen X. Wang et al. (2014) had similar results because the results from this study matched their study. The teachers who were digital immigrants used Word, Excel, and PowerPoint more than the digital natives, and the digital natives used more social media than the digital immigrants.

Table 7 revealed that Gen X tended to go on social media., and Gen Z tended to either watch videos or listen to music. The results were a little shocking because social media would have been thought to have been the most popular with Gen Z, and watching video or playing

games would have been thought to have been the highest for Gen X. Table 8 showed that both generations said they tended to wait to check notifications when they received them. This was shocking because Gen Z was typically seen as always on a device and having the need to check their phone when they received a notification. The Gen X result was as expected, but a contradiction came when the survey was sent out. The Gen X population tended to complete the survey sooner than the Gen Z population.

Table 9 revealed that Generation Z was more likely to take online courses, and Generation X was split between somewhat likely and somewhat unlikely. Most of Generation X thought online classes would be harder than in person. Table 10 demonstrated that half of Gen Z thought that online courses would be harder and the other half thought they might be easier or easier than in person classes. The correlation between both tables revealed that Gen X probably would not want to take online courses because they thought they would be harder, but even though Gen Z thought they would be harder they were still inclined to take them. Table 11 depicted that personal interest was what both generations said influenced them to use technology. Agárdi and Alt (2022) determined in their study that Generation X was majorly influenced by the enjoyment they felt when the multimedia system was used, but this study demonstrated that both generations were influenced by personal interest.

Figure5 depicted that Generation X preferred to shop online, and Generation Z was split between online and instore shopping. Only one more person in Gen Z said they preferred online shopping. It was expected that Gen Z would prefer to shop online, but the study showed that it was almost an even split. Gen X was expected to want to shop instore, but the study demonstrated the opposite. The product not arriving on time was the biggest risk felt by Gen X when shopping online. The second biggest risk was a combination of the product not arriving on

time and being damaged. Gen Z felt that the biggest risk when shopping online was the product being damaged and not arriving on time. The second biggest risk was a combination of the product not arriving on time, being damaged, and costing more online. Generation Z had a bigger variety of combinations when compared to Generation X which could indicate that most members in Gen X worried about the same risks. Panjaitan et al. (2019) had similar results because their study resulted in Gen X worrying about the products not arriving on time and being damaged. The current study clarified their results, and it gave insight to the opinions of a generation they did not study.

In the end, the current study had the goal of discovering how technology has impacted different aspects of the lives of Gen X and Gen Z. The studies by Panjaitan et al. (2019), Zhitomirsky-Geffet and Blau (2017), and Wang et al. (2014) had similar results to this study. The studies by Agárdi and Alt (2022) and Filho, Gammarano, and Barreto (2021) had contrasting results to this study. The study was limited by time which meant all the generations could not be included. There were also more participants in Generation X which meant the results could not be analyzed with a 1 to 1 ratio. If the study was conducted again, other generations should be included and more questions should be included that are related to education. The results from this study gave insight to how Generation Z feels, that both generations do not always fit into their stereotypes, and that Generation X and Generation Z have more common views than expected.

References

Agárdi, I., & Alt, M. A. (2022). Do digital natives use mobile payment differently than digital immigrants? A comparative study between generation X and Z. *Electronic Commerce Research*, 1–28. https://doi-org.kean.idm.oclc.org/10.1007/s10660-022-09537-9.

Çoklar, A. N., & Tatli, A. (2021). Examining the digital nativity levels of digital generations: From Generation X to Generation Z. *Shanlax International Journal of Education*, *9*(4), 433–444. https://eric.ed.gov/?id=EJ1309727.

Filho, E. J. M. A., Gammarano, I. de J. L. P., & Barreto, I. A. (2021). Technology-driven consumption: Digital natives and immigrants in the context of multifunctional convergence. *Journal of Strategic Marketing*, *29*(3), 181–205. https://doi-org.kean.idm.oclc.org/10.1080/0965254X.2019.1656278.

Gu, X., Zhu, Y., & Guo, X. (2013). Meeting the "Digital Natives": Understanding the acceptance of technology in classrooms. *Journal of Educational Technology & Society*, 16(1), 392–402. http://www.jstor.org/st able/jeductechsoci.16. 1.392.

Ledesma, L. D., & Izquierdo, J. (2020). Digital natives and technology for L2 learning outside of the classroom. *Apertura: Revista de Innovación Educativa*, *12*(1), 1–19. https://doi-org.kean.idm.oclc.org/10.32870/Ap.v12n1.1801.

Panjaitan, M., Winarto, Napitupulu, J., Maslan, J., & Normi, S. (2019). Examining Generation X experiences on using e-commerce: Integrating the technology acceptance model and perceived risks. *Journal of Physics: Conference Series*, *1361*(1), 012029. https://doi.org/10.1088/1742-6596/1361/1/012029.

Persada, S. F., Miraja, B. A., & Nadlifatin, R. (2019). Understanding the Generation Z behavior on d-learning: A unified theory of acceptance and use of technology (UTAUT) approach. *International Journal of Emerging Technologies in Learning*, *14*(5), 20–33. https://doi-org.kean.idm.oclc.org/10.3991/ijet.v14i05.9993.

Wang, S.-K., Hsu, H.-Y., Campbell, T., Coster, D. C., & Longhurst, M. (2014). An investigation of middle school science teachers and students use of technology inside and outside of classrooms: Considering whether digital natives are more technology savvy than their teachers. *Educational Technology Research and Development, 62(6), 637–662.* https://kean.idm.oclc.org/login?url=https://www.jstor.org/stable/24546606.

Zhitomirsky-Geffet, M., & Blau, M. (2016). Cross-generational analysis of predictive factors of addictive behavior in smartphone usage. *Computers in Human Behavior*, *64*, 682–693. https://doi-org.kean.idm.oclc.org/10.1016/j.chb.2016.07.061.

Zhitomirsky-Geffet, M., & Blau, M. (2017). Cross-generational analysis of information seeking behavior of smartphone users. *Aslib Journal of Information Management, 69(6), 721-739.* https://doi-org.kean.idm.oclc.org/10.1108/AJIM-04-2017-0083.

Appendix

1.

Title of Project: The Impact of Technology on Generation X and Generation Z

Researcher: Matthew Marino

Department: Information Technology

Contact Information: Email marinom4@kean.edu

Faculty Advisor: Prof Sharmistha Das-iyer

Department: School of General Studies

Contact Information: Email sdas@kean.edu

Invitation to Participate:

You have been invited to participate in a research study. The study hopes to reveal how technology has impacted different aspects of the lives of Generation X and Generation Z.

Purpose of Study:

The purpose of the study is to see how technology has impacted Generation X and Generation Z. The following areas will be explored: education/ work environment, entertainment, banking, payment methods, access to knowledge, and views about the impact of technology on society.

Participation:

Participation in the study is voluntary, and if you do not want to continue at any point you may exit the survey.

Confidentiality:

The survey is anonymous, and the data collected in the survey will be used for educational purposes only.

Primary investigator/Under Graduate student: marinom4@kean.edu

Agreement to Participate: (Participant must be at least 18 years old at this time)

Please select yes if you agree to participate in the study. Selecting yes means you have read and understand the above information, and you wish to participate in the study. If you have any questions or concerns regarding the study, please contact the primary investigator or faculty advisor at their provided email address.

2. What generation are you a part of?

Generation X (1965-1979)

Generation Y (1980-1994)

Generation Z (1995-2010)

3. What gender do you identify with?

Male

Female

Prefer not to say

4. How much time do you spend using technology each day?

Less than 4 hours a day

4-6 hours a day

7-12 hours a day

More than 12 hours a day

5. What device do you use the most?

Smartphone

iPad

Laptop

Desktop

6. What is the main reason you use technology?

School

Work

Entertainment

7. What mobile payment option do you use the most?

Apple Pay

Venmo

PayPal

I do not use mobile payment options

8. Please rate how you feel about the following question.

How safe do you think mobile payment options are?

Scale of 1-5

9. What do you use online banking for?

Checking statements/interest

Depositing checks

Both

I do not use online banking

10. What type of risks do you think come from using online banking?

Privacy

Financial

Both

No risks

11. Do you think technology has made school/work easier?

Yes

No

12. Do you think storm days will no longer exist because of technology?

Yes, they will no longer exist

Maybe they will maybe they will not

No, they will still exist

13. Do you think technology has made life easier?

Yes to No range

14. Do you think technology has made people lazier?

Yes to No range

15. Do you think technology has caused more stress and anxiety?

Yes to No range

16. Please rate how you feel about the following question.

How easy is it for you to learn new technology?

Scale 1-5

17. What type of information do you use technology to find the most?

Social (social networks, texting)

Functional/cognitive (news, problem solving)

18. What are the main applications you use?

Word, PowerPoint, Excel

Games

Search engines

Social media

19. When used for entertainment, what do you do the most?

Play games

Watch videos

Listen to music

Go on social media

20. What do you do when you get a notification?

Instantly check it

Wait to check it

21. Please rate how you feel about the following question.

How likely are you to take online courses if the option was available?

Scale 1-5

22. Would you find online courses easier than in person?

Yes

No

23. How do you prefer to shop?

Online

Instore

24. What types of risks are there when shopping online?

Product is damaged

Product does not arrive on time

Product may cost more than at the store

Product is damaged and does not arrive on time

Product is damaged and costs more than at the store

Product does not arrive on time and cost more than at the store

Product is damaged, costs more than at the store, and does not arrive on time

There are no risks

25. What influences the way you use technology?

Personal interest

Society

The enjoyment felt using it