ADOPTION CATEGORIES IN COMMUNICATION TECHNOLOGIES: FACTORS THAT INFLUENCE A PERSON TO BE A LATE OR EARLY ADOPTER OF NEW COMMUNICATION TECHNOLOGIES

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ABSTRACT

ADOPTION CATEGORIES IN COMMUNICATION TECHNOLOGIES: FACTORS THAT INFLUENCE A PERSON TO BE A LATE OR EARLY ADOPTER OF NEW COMMUNICATION TECHNOLOGIES

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This study explored people's attitudes and feelings towards communication technologies across different ages and cultures using a Grounded Theory (GT) approach. It examines how their history of communication technology adoption affected their current attitude towards new technologies. The study categorised participants by their adoption level of communications technology, following a diffusion of innovation approach. It also determined the factors that affect participants' adoption or non-adoption of the new communication technologies.

A questionnaire was designed and distributed to 67 participants in Britain and Egypt. Based on the data type, quantitative and qualitative approaches have been used to analyse the data. The results showed that there is a significant correlation between a participant's Internet adopter category and the email adopter category they are placed in. In addition, the majority of laggards chose not to adopt communication technologies because they considered them complicated, or they had concerns over privacy. The Internet adopter category does not influence using the Internet as a source of information at all. Although all the young participants were university student, there were no innovators at all between them in the Internet and email. All the Internet adopter categories used the Internet as the main source for local and world news. A Grounded Theory approach was adopted to analyze the open-ended questions in the questionnaire. A percentile approach was used to define new adopter technologies. Discriminate analysis showed that the quantitative data did not correlate with the new adopter categories. The questionnaire analyses showed that shortening the questionnaire would have produced better results, and hence brevity must be prioritised in future research.

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CHAPTER I: INTRODUCTION

Traditional approaches to communicate and exchange information have been replaced and challenged by new innovations. The tremendous development of information and communication technologies has divided the societies to two groups: adopters and non adopters. Some technologies become so important and widely used that anyone who does not want to use them or cannot is at a disadvantage. Overall, there are five broad areas of technology: 1) telecommunication technologies; 2) medical technologies; 3) environmental interface technologies; 4) personal technologies; and 5) assistive technologies [**1**]. This study examined people's attitude and adoption rate to communication technologies, in particular letters, landline phones, TV, Mobile phone, Internet, and email. It measured people's adoption rate using "Diffusion of Innovations" theory by Rogers [**2**]. Specifically, it examined the similarities in and differences between feelings and attitudes towards communication technologies in peoples of different cultures, age range, and adoption categories.

1.1 Background of the Study

In the early 21st century, technology became more popular, more complicated and more diverse. This was caused by rapid development in all technologies. These changes prompted researchers to study the relationship between technology and societies. Borgmann [**3**] argued that technology can be defined as an activity that forms or changes cultures. Morgan [**4**] also noted that the social evolution of society can be dictated by its technological evolution. More specifically, researchers such as Lenksi and Toffler focussed on level of information and history of communication as a way of measuring culture evolution.

Previously, studies focussed on how technology shaped the social structure of the society. They described technological change as a phenomenon that follows its own logic, which we are unable to control. However, MacKenzie and Wajcman [**5**,**6**] challenged these assertions in their model, entitled Social Shaping of Technology (SST). They demonstrated that technology is affected by the social context in which it develops. SST was the opposing theory to British Government ideology in the late 1970s, which suggested that specific paths of technological changes were investable [**7**].

More researchers began to study the relationship between society and technology and how society can feedback on the forms of technology adopted. For instance, Daamen [**8**] highlighted that public acceptance of a proposed technology is an essential influence on technological development in society. However, societies differ from one another and because of that variance in cultures, different philosophies and attitude towards technologies arise. Norman [**9**] pointed out that some people think that technology makes them smarter, while on the contrary, other people feel that it makes them stupid. For an example, Monsma [**10**] explained that "Technicism" sees technology as the solution to all the problems. On the other hand, "Luddism" is inherently hostile to technology because it threatens jobs [**11**].

Studying people's attitude towards technologies across different cultures became a very important field for both research and business reasons. With the technological advancement of the 20th century, telecommunication became a very important subject for everyone. In 2009, worldwide telecommunication revenues topped 3.7 Trillion US$ [**12**]. Via advertising, Communication technologies targeted consumers' emotions by stressing the importance to stay connected [**13**]. In few years, the development of communication technologies has changed the way people talk, meet, and take decisions [**14**].

This development has changed people's attitudes and attachment to communication technologies. In 2006, 59% of the Americans depended on TV as their main source of news [**15**]. Now, nearly half of all American adults (47%) reported that they get at least some local news on their tablets and Mobile phones [**16**]. As explained before, it is the society that shape the technology used. Social and cultural factors shape the direction as well as the rate of innovation [**7**].

Society influences technological innovation by adopting or non adopting new technologies. It is a fact that no matter how useful the technology is; it is no good if no one has used it. That is why technologies evolve and improve with time. While some technologies might not get adopted smoothly, others may be adopted very fast. As an example, Google+ only took 16 days to reach 10,000,000 users after its launch date [**17**] and

one month to reach 25 million users [**18**]. The adoption rate of societies was described by Rogers [**2**] in "Diffusion of Innovations" theory.

The diffusion of innovation theory seeks to explain at what rate new technologies are adopted among individuals and organizations. Rogers [**19**] defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system". As a result from his theory, an individual will have to follow one out of five adopter categories: 1) innovators: the first 2.5%, 2) early adopters: the next 13.5%, 3) early majority: next 34%, 4) late majority: next 34%, and 5) laggards: the last 16%. In addition, he pointed out that these categories are not symmetrical, as each one has different characteristics to the others [**20**]. He claimed that while early adopters were sociable and intelligent, laggards were more isolated and less intelligent [**20**].

Selwyn [**21**] found that laggards do not adopt new technologies for many reasons, such as: limitations in cognition, knowledge, personal beliefs, being afraid from using a technology, or not having enough money to make the purchase. In addition, Brown [**22**] and Klein [**23**] argued that the significant and rapid development in technology adversely affected their faith in their own skills, and they simply they chose not to adopt.

Klein [**23**] pointed out that Rogers's approach does not consider why laggards of certain technology might be early adopters of another technology. In addition, he pointed out that laggards should be divided into different categories and not a homogonous group, as in Roger [**20**].

Older people are an example of demographics that frequently do not adopt new technologies (e.g. the Internet). In 2011 in UK, the numbers of Internet non adopters were only 69,000 people between 16 and 24 and 3,363,000 for people older than 75 years [**24**]. According to Roger's theory, older people are isolated and less intelligent. However, Goodman et al. [**25**] argued that older people are motivated by technologies, such as computers, for practical purposes. With advancements in communication technology, older people themselves on the wrong side on digital divide. Singh [**26**] pointed out that older people fear new technologies and they sense that their experience is useless when

compared to the younger generation, who are able to communicate and perform tasks much faster.

Technology should offer a variety of tariffs to all levels of the society. However, a non-adopter might be the victim of a "commercial calculus and design processes of suppliers." [**23**]. This gap or the 'digital divide' is seen to two different ways; Pippa Norris [**27**] argued that, following an S curve, the gap will close in the end. On the other hand, Sassi [**28**] argued that the development of technologies will only create new social gaps and strengthened the old ones.

In order to find more about the reasons for these gaps researchers have studied people's attitude towards technologies. For instance Williams and Mills studied how people's attitude towards a technology may influence the "public acceptance of new technologies" in twelve countries [**29**]. Other researchers have done more specific studies about example technologies, such as computers [**30**,**31**]. There is a wide literature on people's attitude towards technology and there has been substantial debate on the subject (Chapter 2).

Ultimately, a small number of factors were found to be the key influences on attitudes towards technology, such as: ability to adapt to new technology [**32**]; its perceived usefulness [**33**,**34**,**35**]; and gender [**34**,**36**]. Davis [**37**] was one of the early researchers who developed an acceptance testing methodology, which he called it Technology Acceptance Model (TAM). He has pointed out that people's attitude towards technology is directly influenced by its perceived usefulness and ease of use [**38**]. In addition, he argued that if the person finds a technology easy to use, he or she will directly find it useful.

Although TAM and TAM2, which was introduced by Venkatesh and Davis [**39**], were popular methods, several notable limitations have been noted [**40**]. Not accounting for cultural influences was identified as a crucial limitation by many researchers [**41**,**42**,**43**,**44**]. Luborsky [**45**] argued that that culture influences technology acceptance rates in many ways, through social, ethical, and age differences.

1.2 Statement of the Problem

Several studies have followed the approach of Rogers (1995) in categorising people according to their adoption rates of specific technology. However, Klein [**23**] pointed out that Roger's approach does not address the issue of why early adopters of one technology might be or should be an early adopter of another technology. In addition, Klein [**23**] and Mahajan et al. [**46**] pointed out that adoption categories do not need to be divided into five categories. Klein (2004) suggested that laggards are not a homogonous group while Mahajan combined innovators and early adopters into one category. There is a lack of information about the characteristics of people in the adoption category. In addition, although cultural influences were identified as a crucial limitation by many researchers [**41**,**42**,**43**,**44**], research that contrasts adoption rates between cultures is limited.

This explorative study used the diffusion of innovation approach to categorise the participants using the adopter categories. A questionnaire has been designed to determine more details about people's backgrounds and attitudes towards technology. It will focus on gender (male/female); age (young/old); cultures (Britain, Egyptian, and others); and the adoption categories. In the Grounded Theory approach, there is no predefined hypothesis to follow. The questionnaire has enabled a substantial amount of data to be accumulated, to answer the following research questions:

1.3 Research Questions

The study addressed the following research questions:

1- What are people's adoption categories to communication technologies: letters, landline phones, Mobile phones, televisions, Internet, and email?

2- For each individual, are there any differences in their respective adoption categories across different technologies?

3- Does adoption category or attitude towards technology vary with gender, age, or culture?

4- Has the participant's usage of existing technology affected their usage of new technologies?

1.4 Significance of the Problem

The rapid development of communication technologies has helped people's ability to communicate and plan. Although, this has excluded some people who are described as laggards. The development of technologies will only create new social gaps and a new generation of laggards [**28**].

Technologies should come with different tariffs to suit everyone. The results of this study may be useful in identifying the characteristics and attitude of technology adopters and non adopters. It might also establish the reasons why have they chosen to adopt or not a certain technology. It will show how technologies influence people's decision to adopt new technologies. Finally, differences in technology use across genders, age, and cultures will be determined that might be useful for future technological developments that would not exclude people and avoid a new 'digital gap'.

If we are able to find the factors that influenced people's decisions to adopt or not adopt new technologies, then we will be able to know what type of people might have an adoption problem before it exists.

1.5 Research Design

The study aimed at exploring the data rather than testing any pre-defined hypothesis. The participants were randomly sampled from different countries. 67 participants overall have answered the questionnaire, 44 from Egypt, 13 from Britain, and 10 from other different countries. Participants were mainly young people. They were divided into two groups: young people <=25 (45 participants), and older people >25 (22 participants). 39 participants were males and 28 were females.

A questionnaire was designed to collect as much data as possible about the participants' history of using communication technologies, and their feelings and attitude towards technology in general. The questionnaire was divided into two parts. Part 1 asked participants about the six communication technologies mentioned before. Part 1 was 33 questions, 21 of which were open ended questions (repeated in the six sections), such as: 'What do you like least about using X?' Or 'Can you remember what encouraged you to get X?' The other 12 questions collected quantitative data, such as: 'Have you ever used X

before?' Or 'approximately, when did you first start to use X?' The questionnaire has been reproduced in the Appendix (Appendix 1).

All Egyptian participants have received the questionnaire through the Internet, specifically via Skype and Facebook. Participants from other cultures were recruited personally in face to face discussions. These participants received the questionnaire by email and filled it in at their convenience, except one British participant who did not have an email and was interviewed in person. All participants were aware that their information is confidential and that they had the right to quite anytime.

As the questionnaire was a mix of quantitative and qualitative data, two different approaches to data analysis were used. For the quantitative data, results were analysed one question at a time, with SPSS data analysis software employed to obtain the frequency and percentage information required to pick out trends. Following a Grounded Theory approach, both quantitative and qualitative methods were used mainly to explore people's responses, and not to test any pre-defined theory.

1.6 Limitations

The age of participants was biased towards younger people more than older people, with mean age of ~30 years. In addition, 65.67% of the sample population were from Egypt. Hence the sample might not represent the full diversity of cultures. Also, the questionnaire was so long that many participants refused to participate. Finally, the study had multiple objectives: attitudes towards technology, feelings towards communication technologies, adoption categories, perceived usefulness and perceived ease of use, and participants' history of using communication technologies. This broad scope meant that the study was limited with respect to depth on any single question.

Participants' answers were limited to important question like the time of first TV used. Most of the participants could not remember the date of TV, Letter, and Landline phone first use. The study had only investigated the effect of email, the Internet, and Mobiles.

1.7 Roadmap

Chapter 1 provided a brief summary of attitudes towards communications technology and the degree to which adoption rate varies with culture and age. It has highlighted the underlying research to the study, the statement and significant of the problem, the research questions, the research design, and its limitations. Chapter 2 is a review of the literature on technology, people's attitude towards technology, common methods and approaches to measure people's attitude, and the diffusion of innovation theory. Chapter 3 discusses the research approach, participants, pilot study, and the research instruments used to collect and analyse the data. Chapter 4 represents a summary of questionnaire results. In Chapter 5, the results are brought together and discussed. Finally, the major findings and future recommendations of this study are presented in Chapter 6, the conclusion.

CHAPTER II: LITERATURE REVIEW

2.1 Technology

Before the 20th century, technology usually referred to the study of useful arts, especially those that are mechanical [**47**]. Among social scientists, Read Bain introduced a new definition for technology that included cultural elements. Writing in American Sociological Review [**48**], he claimed that: "Technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them" [**48**]. Over time, more definitions of technology emerged in different fields; the different characteristics and structure of technology have been strongly influenced by social constructionism, as many definitions were equally prominent in different fields [**49**] as cited in [**50**]. In the early 21st century, technology became a very broad word as it became more complicated and diverse. There are five broad areas of technology: 1) telecommunication technologies; 2) medical technologies; 3) environmental interface technologies; 4) personal technologies; and 5) assistive technologies [**1**]. Telecommunication technologies like telephone, television, radio and computers were listed in the top ten technological developments in the 20th century [**51**].

2.1.1 Technology and culture

In 1989, Franklin defined technologies as a formalized practice to do things [**52**]; seeing technology as formalized practice links it directly to culture as it consists of socially accepted practices and values [**53**]. Albert Borgmann, in The Canadian Journal of Sociology, argues that technology can be defined as an activity that forms or changes cultures [**3**]. For an example, the development of communication technologies, such as computers and the Internet, vastly improved social interaction, creating a new term called 'Cyber Culture' [**54**].

Many scholars wrote about the relationship between technology and cultural evolution [**55**,**56**,**57**,**4**,**58**]. Morgan's concept of social evolution is defined by its technological evolution. In his research, social evolution has been divided into three areas: savagery, barbarism, and civilization [**4**]. A handful of researchers, such as Gerhard Lenksi and Alvin Toffler, focused on information as a way of measuring culture evolution. According to Lenksi, society advancement and human development depends on their

history of technology development, communication, and the level of information and knowledge they have [**59**]. However, all the previous researchers saw technological changes as a phenomenon that follows its own logic, which we are unable to control; some people welcome it while others do not accept it. In addition, they have argued that societies are shaped and categorized by the level of technologies they have.

2.1.2 Social Shaping of Technology

In 1985, a model presented by MacKenzie and Wajcman challenged these assertions, that the authors claimed only addressed the outcomes or 'impacts' of technological change on societies. In their model Social Shaping of Technology (SST), they demonstrated that technology is affected by the social context in which it develops [**5**,**6**]. The SST model shows that it is not the inner technical know-how that develop the technology, but instead the social factor and conditions of its creation and use. SST has helped to broaden technology policy agendas as societies might disagree on nuclear energy, but, on the other hand, they will accept communication technologies like Mobile phones. SST was opposing the British government ideology in the late 1970s, which suggested that specific paths of technological changes were investable [**7**]. Therefore, public acceptance is an important factor that can influence technological development in societies [**8**].

2.1.3 Technicism and Luddism

Because people's life experiences are different, different philosophies, or attitudes towards technologies, emerged within the same culture and cross different cultures [**60**,**61**]. In his book "Things That Make Us Smart", Norman [**9**] pointed out that some people think that technology makes them smarter, while on the contrary, others feel that it makes them stupid. In addition, according to Social Construction of Technology theory (SCOT), the researchers who seek an answer for acceptance or rejection of technology should look to the social world. SCOT argues that it is not technology that influences people actions, but rather, it is people actions and environment (e.g. work) that shape the technology [**62**]. For instance, 'technicism' describes the fact that some people have great confidence in technology, believing that it is the solution for all their problems. Monsma in his book "Responsible Technology: A Christian Perspective" wrote: "Technicism reduces all things to the technological; it sees technology as the solution to all human problems and needs.

Technology is a saviour, the means to make progress and gain mastery over modern, secularized cultural desires." [**10**]

On the other hand, Luddism, a movement emerged against technology which they believed it was threatening their jobs [**11**]. It was named after Ned Ludd who refused to work and smashed his knitting machine [**63**]. As well, Martin Heidegger argues in his book "The Question Concerning Technology" that technology is the supreme danger to a man because it prevents us from having a good understanding of our fundamental nature and of ourselves [**64**,**65**]. In addition, Nikolas Kompridis and Francis Fukuyama wrote about the dangers of new technologies like biotechnology [**66**,**67**].

2.2 Telecommunication Technologies

With the technological advancement of the 20th century, telecommunication became a very important subject for everyone. In addition, the ability to send and receive information over great distance grew significantly. Examples include visual communication technologies like TV, oral communication technologies like radio; Mobile phone; and telephone, and written communication technologies like letters, short messaging services (SMS) by Mobile and e-mails. The worldwide telecommunication industry has a direct impact on economy as well. In 2009, worldwide telecommunication revenues topped 3.7 Trillion US$ [**12**]. In addition, it has influenced social relationships. In 1988, Claude S. Fischer wrote about how telephone promotions and campaigns were targeted to consumers' emotions by stressing its importance to stay connected with friends and families [**13**].

These developments in communication technologies have changed the way people talk, meet, and take decisions [**14**]. In 2000, 81% of 15-24 year old Mobile phone users sent Mobile text messages to coordinate social arrangements and 42% used them to flirt [**68**]. Even people's access to local and world news has been significantly influenced by it. In 2010, 30.1 million adults in the UK have accessed the Internet almost every day, which is double the estimate in 2006 [**69**]. In May 2011, the office for national statistics showed that only 8.71 million adults (17.5%) have never used the Internet [**24**]. In addition, people's attitude towards the Internet has changed dramatically in the USA. During 2006, Internet was the main news source for many home broadband users; table 1 below shows the result of the

Pew Internet Project Survey in America to determine "where people get news from". However, only four years after the date of that survey, nearly half of all American adults (47%) reported that they get at least some local news on their tablets and Mobile phones [**16**]. It is obvious that people have become attached to telecommunication technologies. However, according to Social Shaping of Technology (SST), societal practices and use of technology shape the development process. It is the social and cultural factor that shapes the direction as well as the rate of innovation [**7**].

Local TV	National TV	Radio	Local paper	Internet	National paper
59%	47%	44%	38%	23%	12%

Table 1 where people get news from? Source: Pew Internet Project [**15**].

2.3 Technology Adoption Rate

One an important factor of culture influence is their adoption rate of new technologies. One example of this is the case of cable and satellite uptake in Germany and Britain in 1999 [**70**]. While cable was relatively old in Germany compared to satellite, in Britain, the opposite was the case. The rate of adoption is the speed with which an innovation is adopted by members of a social system [**71**]. No matter how useful the technology is; it is no good if no one has used it. New technologies evolve and improve with time. Some take a long time to be adopted (e.g. 3D TV) while other fail to rise and shine (e.g. Concorde). On the other hand, there are some telecommunication technologies that were adopted rapidly. For instance, Google+ only took 16 days to reach 10,000,000 users after the lunch day [**17**]. In addition, Apple's iPad sold three million units in the first 80 days, the fastest adoption rate ever [**72**]. In 1962, Everett Rogers, a communication scholar and sociologist, published a new theory called "Diffusion of Innovations" [**2**]. The theory seeks to explain why, how and at what rate new ideas and technologies are adopted among individuals and organizations. He has defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" [**19**]. In addition, he proposed that there are four elements that help in spreading the new technologies: the innovation, communication channels, time, and the social system.

2.4 Diffusion of Innovations

Firstly, when a new technology is introduced, any individual goes through 5 decision making stages. Then, if the new technology or idea is adopted it spreads by communication channels. Communication channels are the means individuals use to get messages from one to another in order to reach common understanding [**19**]. Thirdly, over time the number of people adopting a new technology defines its rate of adoption. Finally, it is the social system that defines the characteristics of the new technology (i.e. innovation consequences).

To answer questions like: 'why do some innovations spread more than others?' Rogers has proposed five characteristics that establish the adoption rate of an innovation: relative advantage (usefulness), compatibility, complexity (ease of use), trialability, and observability to those people within the social system. In addition, he explained that the time dimension is involved in the innovation diffusion in three ways. Firstly, the innovation-decision process (the decision making process), involving the mental process through learning about the technology, and evaluating it after usage. It is consisted of five steps:

1. Knowledge: the user is aware about the knowledge and its features.
2. Persuasion: attitude becomes to be formed whether with or against.
3. Decision: the user adopts or rejects the innovation.
4. Implementation: the user starts to use the new technology.
5. Confirmation: evaluation stage.

Secondly, the innovativeness of an individual: the degree to which the user is early or late in adopting the technology compared with other members of the social system around [**19**]. Rogers suggests that there are five categories for society members' adoption rate [**2**]. Figure 1 below explains the relationship between number of people adopting the innovation, innovation status, and distribution. The five adopter categories of members of the social system are: 1) innovators: the first 2.5%, 2) early adopters: the next 13.5%, 3) early majority: next 34%, 4) late majority: next 34%, and 5) laggards: the last 16%. The third way in which the time is influencing the diffusion of the technology is the rate of adoption. It is measured by the number of people who adopted the innovation over a time period.

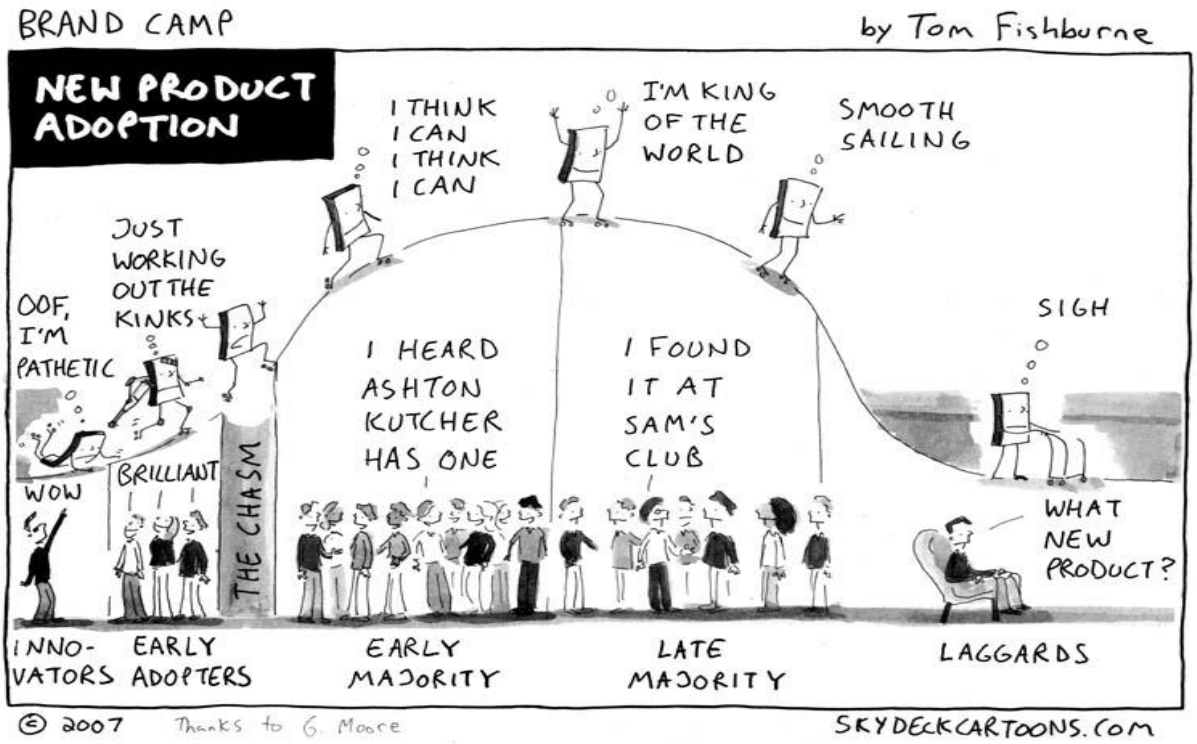


Figure 1 the five adopter categories [**73**].

2.4.1 Adopter Categories

Rogers [**71**,**20**] described the process of innovation adoption as a normal bell shaped distribution. He has characterized the early majority and late majority as being one standard deviation away from the mean in the positive and negative. Early adopter and laggards are two standard deviations away, and innovators are three standard deviation away on the positive side from the mean [**74**]. Originally, Rogers proposed that identification of the relevant adopter category can shed light on the characteristics that are common to all the individuals in that category. These characteristics can be used in the future development of the technology to match it to the attitudes of target audiences. Despite little empirical support for this theory, there has been a trend to use these categories as predictor variables to the adoption behaviour [**75**]. The decision making process explained above in the time element is influenced by many factors; these factors are categorized as: geographical settings, societal culture, political conditions, and globalization and uniformity country [**76**]. All these factors influence the adoption of new technologies for both individual and organization, except that geographical location can also influence individual adopters.

Each group in the five adopter categories has its own personality and attitude towards particular innovated technologies. Roger wrote on his book commenting on the adopter classification:

"This adopter classification is not symmetric in that there are three adopter categories to the left of the mean and only two to the right. One solution would be to break laggards into two categories, such as early and late laggards, but laggards seem to form a fairly homogenous category. Similarly, innovators and early adopters could be combined into a single category to achieve symmetry, but their quite different characteristics suggest that they are two distinct adopter categories." [**20**]

Innovators are the first to adopt an innovation. They are willing to take risks, young in age, have the highest social class, and have great financial resources. Innovators play a great role in introducing new ideas to the system [**20**]. Early adopters, the next 13.5% to adopt a technology, are more integrated into the local system and have the greatest influence on the following adopting categories. Early adopters tend to be more economically successful, like to be seen leaders, and love getting advantages over their peers [**77**]. The next category is the early majority, adopting new technologies slightly faster than average. Early majorities are pragmatists open to wild ideas, but will not adopt them without proof of their benefits. They have below average social status and little financial support. Rogers said that "their innovation-decision period is relatively longer than that of the innovators and early adopters". Fourthly, late majority who hate risks and often influenced by the fears and opinions of laggards [**77**]. Their adoption is sometimes the result of increasing network pressure from peers. Finally, laggards represent the last 16% of individuals in the adopter categories. The point that laggards choose to accept or reject technologies is defined by their past, as their decision is made in terms of their previous experiences [**20**].

2.4.1.1 Limitations

Although technology adoption has been discussed extensively, technology non adoption has received less attention. The diffusion of innovation model has been criticised by Latour [**78**] because innovators and early adopters are seen as society's first class, but

laggards are failing to adopt the new technologies despite their benefits. The non adoption of technology by laggards is seen as their fault, but perhaps the technology was built without them in the mind [**23**]. In 2004, TV viewers who did not switch to digital TV were described as "a hardcore of refuseniks" and "a minority" by government minister Tessa Jowell [**79**]. However, another UK Government minister, Patricia Hewitt, explained that the government "must continue to bridge the digital divide" and described them as "groups most at risk of digital exclusion" [**80**].

With the rapid take-up of innovations in social and business life, the universal adoption of new technologies is allowing old technologies to be withdrawn. In the case of the digital divide, non adopters are seen as victims who are being bypassed by the progressive new technologies offered [**23**]. As described above in the diffusion on innovation theory, Rogers described innovators and early adopter as sociable and intelligent where laggards were more isolated and less intelligent [**20**]. He does however stress that they should not be seen as a negative part. Overall, relatively little work has been done to better understand the characteristics and attitude of laggards, and even less critical research. Research by Selwyn [**21**] pointed out why laggards do not adopt new technologies. He cites limitations in cognition, knowledge (not having the understanding to use the technology), personal ideology (as an act of opposition), personality (being fearful about using a technology), and financial resources (not having enough finance to get it). With the great technological advance, it is becoming too hard for consumers to choose what and when to buy a new technology. The consumer phrase of the day is becoming "Fear of Obsolescence" [**81**]. Brown [**22**], wrote an article that discusses the challenges facing the PC industry along with the non-adopters. It proved that late majority and laggards fear that their skills are obsolete, and that is why with the technological advancement, they choose not to adopt anymore [**22**].

Rogers's view about laggards offers no explanation for why laggards of certain technology might be early adopter of another technology. In addition, he assumed that laggards form a homogonous group [**20**], while Klein [**23**] proved that laggards do not conform to a homogonous group. In Klein's research, early digital television (DTV) equipments were expensive and difficult to use where only very few people were able to

use it (innovators). It became cheaper and easier to use after 2 years, and that is when the technology progressed from elite to universal (early adopter and early majority) and then to democratic form (laggards). Klein points out that if DTV was not designed to those who have no desire for more channels (i.e. laggards), then: "why is there still a tendency to blame them for non adoption?" In addition, he explains that the digital exclusion for laggards is just a result of "commercial calculus and design processes of suppliers." [**23**]

2.5 Example of laggards: older people

A perfect example of non adopters to popular technologies (e.g. Internet) is senior citizens. In 2011, the UK Office for National Statistics discovered that 8.71 million adults had never used the Internet, and 3.36 million were senior citizens above the age of 75 [**24**]. In addition, Table 2 presents the age demographic of Internet non adopters in the first quarter of year 2011 in UK according to the survey estimate. Only 69,000 adults, between 16 and 24, had never used the Internet. The interesting part about this data is that the older the citizen gets, the more likely he/she is to not use the Internet. In addition, Goodman et al. [**25**] found that the decline in use of computers with age was highly significant.

Older people have found themselves on the wrong side on digital divide for many reasons. Their conventional fear of new technologies and the sense of uselessness against the younger generation who is able to communicate and perform much faster, have both helped to foster this digital divide [**26**]. Older people in Goodman et al. [**25**] showed that they are motivated to use computer for practical purposes as their most common application was word-processing. In addition, many commented positively on their usefulness. As for problems and difficulties, it was mainly about jargon that was difficult to understand; lack of support; choices that were too complicated; and a large amount of information to digest, even if the task was simple. All previous results show how the older people are willing to use computers if they have been given the right environment.

Age Group	Numbers	Number (Percentage)
16-24	69,000	0.9
25-34	171,000	2.1
35-44	377,000	4.4
45-54	870,000	10.2
55-64	1,512,000	21.0
65-74	2,260,000	42.8

75+	3,363,000	76.1

Table 2 Internet non-adopters in Q1 2011, UK.

In general, the term 'digital divide' can be seen as a multidimensional concept with global and social dimensions [**28**]. The global dimension will make sure that the innovation is available between industrialized and developing countries, while the social dimension covers the gap between rich and poor; young and old; and male and female [**28**]. Technology should offer a variety of tariffs to all levels of the social dimension. For instance, BT, one of the main providers of ICT services in UK, offered in Feb 2002 a new programme of price reductions for broadband services [**82**]. The development of communication technologies and the gap between adopters and non adopters can been seen in two different views. Firstly, the normalization model: this view was represented by Pippa Norris [**27**] when she argued that differences in the digital divide will remain to a certain extent; however, following an S curve, this temporary gap will close in the end. On the other hand, the development of the information society will create new social gaps and strength the old ones [**28**].

2.6 People's attitude towards technologies

Many researchers have attempted to study people's attitude towards technologies. For example, Withey [**83**] studied how the public reacted to the presentation of science; Pardo & Calvo [**84**] investigated attitudes toward science among the European public; there have been many others [**29**,**85**]. For example, in Williams and Mills book [**29**], they argued about the Public Acceptance of New technologies over twelve countries. In addition, there have been other studies that measured people opinions about specific areas of technologies such as Porte & Metlay [**86**]. Other researchers ask about beliefs and attitudes towards one or few applications in technology, such as computers [**30**,**31**]. In general, an individual's attitude towards technology is influenced by many factors. Starting with an individual's personal experience [**87**] to background [**88**]; time of adapting technology [**32**]; perceived usefulness [**33**,**34**,**35**]; gender [**34**,**36**]; cognitive ability [**89**]; and mechanical abilities [**90**]. However, there have been very few studies discussing the non adopters' attitude towards technology across cultures.

2.6.1 Technology Acceptance Model (TAM)

One of the early attempts to understand how people accept and use technology was by Fred D. Davis in his doctorial thesis in 1985. The goal of his research was to develop a practical user and acceptance testing methodology which he called it Technology Acceptance Model (TAM) [**37**]. He explained, as in Figure 2, that the attitude towards new systems can be predicted by user's motivation which is influenced by the system features and capabilities [**37**].

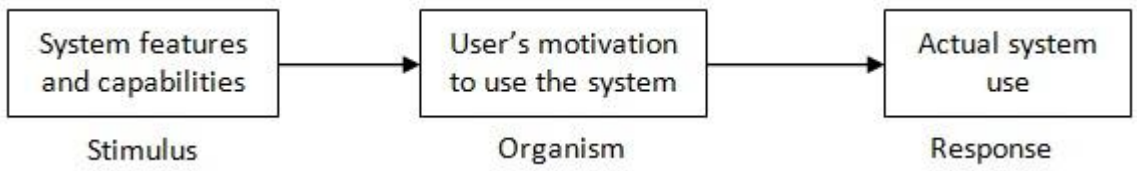


Figure 2: Conceptual Framework of Technology Acceptance [**37**].

The first TAM suggested that when people are introduced to new technology, their user motivation to use it is divided into three parts: attitude towards the technology, perceived usefulness and perceived ease of use. The user's attitude towards the technology is influenced by the last two factors:

1- Perceived usefulness: "the degree to which a person believes that using a particular system would enhance his or her job performance" [**38**].
2- Perceived ease-of-use: "the degree to which a person believes that using a particular system would be free from effort" [**38**].

According to Davis, as in Figure 3 below, perceived usefulness of a technology is directly influenced by its perceived ease of use. Andrew Dillon and Michael G. Morris support this theory, stating that users will find the easiest system more useful even if it had the same features [**91**]. In 1975, few studies found that perceived usefulness provided a reliable prediction and high correlation between perceived usefulness and system usage [**92**,**93**], as cited in [**40**]. TAM has been adapted and extended in different fields. Several studies [**94**,**95**,**96**] consolidated all the results obtained by TAM. Most of the studies found that there is a high correlation between perceived ease of use and usefulness and system usage. However, TAM could not go further than this to measure the reasons behind the ease of use and usefulness [**40**].

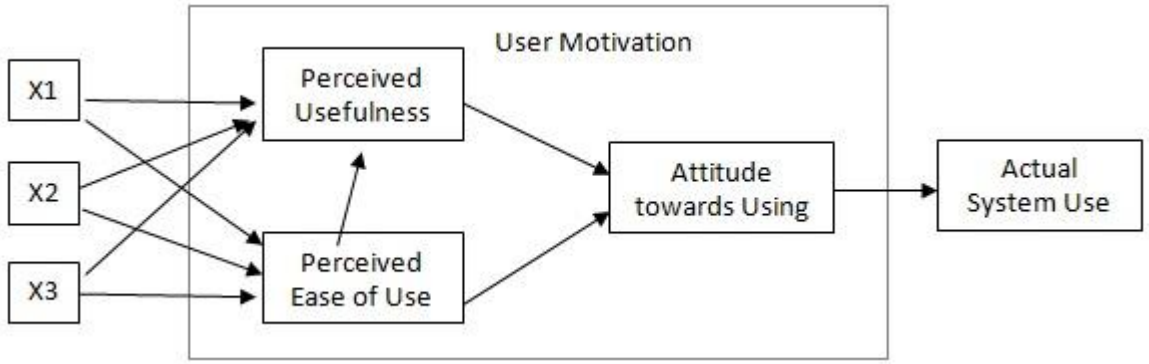


Figure 3: First TAM [**37**].

In 2000, Venkatesh and Davis introduced TAM2 with additional variables that added as antecedents to the perceived usefulness [**39**]. Using TAM2 they were able to provide more details about why users find the system useful. To sum up, the technology acceptance model is a very popular model to predict system usage, but there are a few notable limitations shared among researchers regarding the model [**40**].

2.6.1.1 Limitations

In 2010, Qi-Ying and Qi-Fang Su identified one of the limitations of the Technology Acceptance Model. According to this research, TAM's limitation is that it does not include cultural influences. Many researchers discussed the importance of emerging culture as one vital factor that influences technology adoption [**41**,**42**,**43**,**44**]. Luborsky [**45**] pointed out that culture and personal biography shape the course of technology acceptance. In addition, he stressed the importance of understanding social, ethics, and cultural differences, as well as age differences, in understanding technology usage. Non adopting new technology includes limitations in the development and installation of the new technology. These limitations sometime make it hard to accept the new technology [**44**].

2.6.2 Pupils' Attitude Towards Technology (PATT)

In 1984, another famous instrument was introduced in The Netherlands to find out about Pupils' Attitude Towards Technology (PATT). In the May 1988, a new PATT instrument was introduced for USA students. PATT-USA consists of four parts. Firstly, students are asked to write a short description of what they think technology is. Secondly, respondents fill in demographic details; this part consists of 11 questions. Thirdly, the students should response with five-part Likert scale to 58 statements to assess their attitude towards

technology [**97**]. The 58 statements were subcategorized into five scales: 1) General interest in technology. 2) Attitude towards technology. 3) Technology as an activity for boys and girls. 4) Consequences of technology. 5) Technology is difficult. Finally, in the last section, 30 items made up the concept factor of the PATT method. It was written in three-part Likert scale and organized into four parts that discussed technology with society, science, skills, and pillars [**97**]. Soon after, the PATT was used in 1999 in Africa as validated in USA. In addition, it has been used in developing countries Like: Botswana [**98**], South Africa [**99**], and India [**100**].

2.7 Summary

To sum up, technology has evolved significantly after the industrial revolution, and telecommunication technologies have become a major field. Research has sought to show how these technologies have shaped societies and cultures and vice versa. The SST and SCOT models emphasise that it is people who decide the technology adoption and development. While some people accept technologies like in Technicism, others reject it, as in Luddism. The adoption rate is determined by the number of people adopting the technology over a period of time. Some technology got adopted by the whole society, which in a way has viewed the non adopter (e.g. older people, disabilities, rural areas) as isolated, of low class and intelligence, and of limited economic means. However, it is fair to say while some of these factors might be true; a non adopter might be a victim of "commercial calculus and design processes of suppliers." [**23**]. In addition, cultural factors influence technology adoption considerably. In order to understand why people adopt or do not adopt technology, researchers have tried to study peoples' attitude towards technology. This research is trying to highlight some of the characteristics common between adopters and non adopters in Egypt and the UK. In addition, it points out some reasons of communication technology acceptance or rejection.

CHAPTER III: METHODOLOGY

3.1 Objective of the Study

This study aims to understand the similarities and differences between adopters and non adopters of communications technology across different cultures. Until now research on attitudes towards technology and diffusion of innovation has been largely investigated. However, with the rapid development of technology, the reasons why or how people choose to adopt or not adopt are not clear, especially for older people.

This study has focussed on users of communication technology users and their attitude towards technology. In addition, using diffusion of innovation theory, all participants were categorized according to their adoption level. In particular, I have aimed to explore the attitudes of adopters and non adopters, and the reasons for variable uptake in communication technologies across different cultures. A mix of quantitative and qualitative approaches has been used in order to allow participants to express their feelings and opinions more freely.

This study is not trying to prove or disprove any theory as it is following a Grounded Theory approach. All quantitative data will be presented in the aim of exploring the relationship between participants and not confirming any hypotheses.

3.2 Research Approach

The study used a qualitative approach to gather data about people's attitude towards communication technologies. Qualitative methods of data gathering and analysis have gained popularity over the years especially in social science fields because it allows participants to contribute more information freely. The term 'qualitative research' refers to any type of research that produces findings based on researcher's observations and not any statistical method [**101**]. In addition, qualitative methods can be used to discover details about participants' feelings and emotions which are difficult to get through normal research methods [**101**].

There are many different ways of doing qualitative research like [**102**,**103**,**104**,**105**]. In this study, a questionnaire was designed by the author and then sent to participants in

three different ways: via face to face interview, electronic interview using Skype, and via email questionnaire. Grounded Theory (GT) was applied to analyse the data, which was introduced by Glaser and Strauss [**106**]. Some of these data have been quantified using frequencies and percentage methods in SPSS.

Grounded theory is "the systematic generating of theory from data, that itself is systematically obtained from social research" [**107**]. There are seven steps involved in conducting research via Grounded Theory: 1) Collect data. 2) Open code. 3) Write memos throughout the entire process. 4) Conduct selective coding and theoretical sampling. 5) Sort your memos and find the Theoretical Code(s). 6) Read the literature. 7) Write up your theory. These are summarised graphically below (Figure 4):

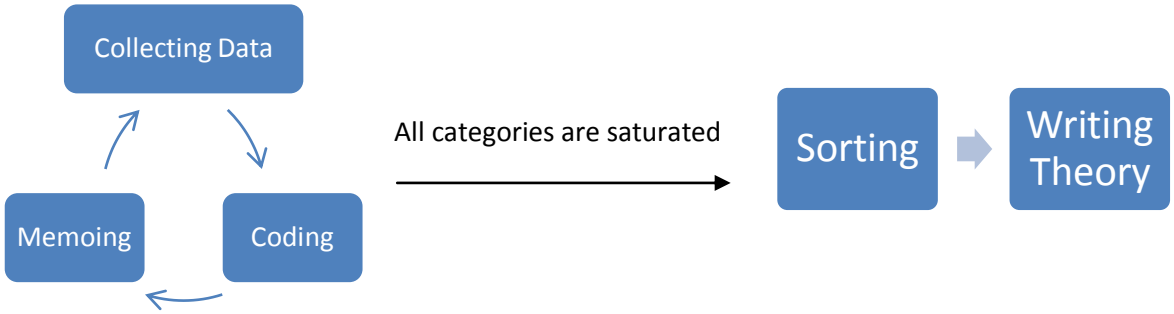


Figure 4: The basic steps of Grounded Theory.

Since their original publication, Glaser and Strauss have disagreed on how Grounded Theory should be conducted. Strauss published a book about his view of Grounded Theory in 1987 and with Corbin in 1990 about his view of Grounded Theory [**108**,**109**]. Glaser [**110**] claimed that what Corbin and Strauss critiqued was not Grounded Theory in its intended form. Following this division, researchers were able to create and edit new Grounded Theory methodologies. Morse et al. [**111**] suggested that the most popular grounded theories are:

1- Glaser: [**107**,**110**,**112**]
2- Strauss and Corbin: [**101**] or Corbin and Strauss [**113**]
3- Charmaz: [**114**,**115**]

Glaser [**116**] argued about Charmaz's constructive Grounded Theory. He highlighted that "constructivist Grounded Theory is a misnomer" and he claimed that it is more like a

Qualitative Data Analysis (QDA) than a Grounded Theory. Glaser and Strauss separated paths led to what we know now as the 'Glaserian' and 'Straussian' versions of Grounded Theory method [**117**]. Given space constraints, a discussion of the differences between Glaserian and Straussian approaches would be inappropriate here. However, it is important to note that Glaser's approach emphasised the obtaining of theory by data conceptualisation, whereas Strauss added a more structured approach to analysis using constant comparative technique. For more details of the contrasting approaches see Onions [**118**].

Despite which version of Grounded Theory one ascribes to, there are two fundamental pillars of the approach: 1) that there should be no theoretical ideas when starting to prove or disprove; and 2) concepts are developed through constant comparison. The first point does not imply that the researcher should be empty minded, rather that they should have open mind, and do not commence the work with a theory to prove or disprove. With the Grounded Theory method, the researcher records any idea as text whilst continuing to observe the data and analyse texts. Through constant comparison, the data will eventually generate a theory [**107**,**106**].

This constant comparative method is the core of the developing GT, without which it cannot be developed [**112**]. It can be used to produce either conceptualisations (Glaserian) or rich descriptive accounts (Straussian): this being the main point of contention between the approaches. This study follows the Grounded Theory concept; however if there is any conflict in any step, it will follow Glaserian approach, for the following reasons:

1- The Glaserian approach, as explained before, is interested in the conceptualisation more than the full descriptions of Strauss and Corbin.
2- The Straussian approach is aimed more towards the study of individuals, rather than studies of organisational and technical issues [**119**].
3- The Straussian approach suffers from coding problems [**120**,**121**].

3.3 A mixed Research approach

According to Glaser, Grounded Theory may use qualitative data, quantitative data, or a mixture of the two [**122**]. When quantitative and qualitative approaches are combined,

they are often applied in a sequential order. Data observed by qualitative approaches might be examined using statistical strategies to explore a theory. Quantification of phenomena can be done to get an overview and better understanding of the qualitative material [**123**]. In addition, Strauss and Corbin [**101**] pointed out that qualitative data can be quantified. However, researchers need to code the data in a way that allows them to be statistically analyzed.

Mixing approaches is more time consuming, but it has its advantages. Social researchers employ a process named "*triangulation*". It means that a researcher will be able to learn more about an object by observing multiple perspectives, rather than just one perspective [**124**]. There are different types of triangulation available, this research focussed on "*triangulation of method*". This type combines both qualitative and quantitative approaches/data, either sequentially or in parallel [**125**]. Table 3 illustrates three important features that separate qualitative and quantitative measurements.

Feature	Qualitative	Quantitative
Timing	Measured while in data collection phase.	Separation between data gathering and data analysis.
Data	Sometimes the data come as a number, but mostly in spoken words.	Produces data in the form of numbers, which is more standard.
Data-Concept	Concepts are developed and refined through the data gathering.	Concepts and data gathering techniques are identified from before.

Table 3 Qualitative and quantitative measurement features [**125**].

3.4 Pilot Study

For my research pilot study, hard copy questionnaires were given to six students to test my approach. All participants stated that the questionnaire was interesting, but it was so long. However, a substantial amount of data was obtained from each participant.

The pilot questionnaire, as in Appendix 1, was divided into two parts, totalling 46 questions. Part 1 examined people's history of using communication technologies. This part had six sections; each section discussed a particular type of communication technology. Questions like: Have you ever sent X before? Or can you remember what encouraged you? Were asked consistently in part one. Part 2 explored the participant's feelings, perceived usefulness of the six communications technologies in question, and their perceived ease of use. All questions in Part 1 were open-ended (e.g. Can you remember what prompted you

to have this technology?). Part 2 depended on the Likert scale which captures the intensity of the participant's feelings [**126**].

Each participant, on average, needed around 35 minutes to finish the questionnaire. Overall, there was no significant difference in their answers, despite the respondents being from different cultures. Some participants answered questions with one or two words, while others gave more details. I concluded that the questionnaire is quite long to be filled in one session, and should be shortened in the future.

To sum up, the pilot provided large amount of qualitative data about participants' experience and attitude towards communication technologies.

3.5 Main study: participants

Sixty-seven participants were involved in this study, 39 males and 28 females. The age range was from 19 to 68 years with a mean age of 30 years (Figure 5). The study had people from 10 different countries, with participants were mainly from Egypt and Britain, although 10 from other countries (Figure 6).

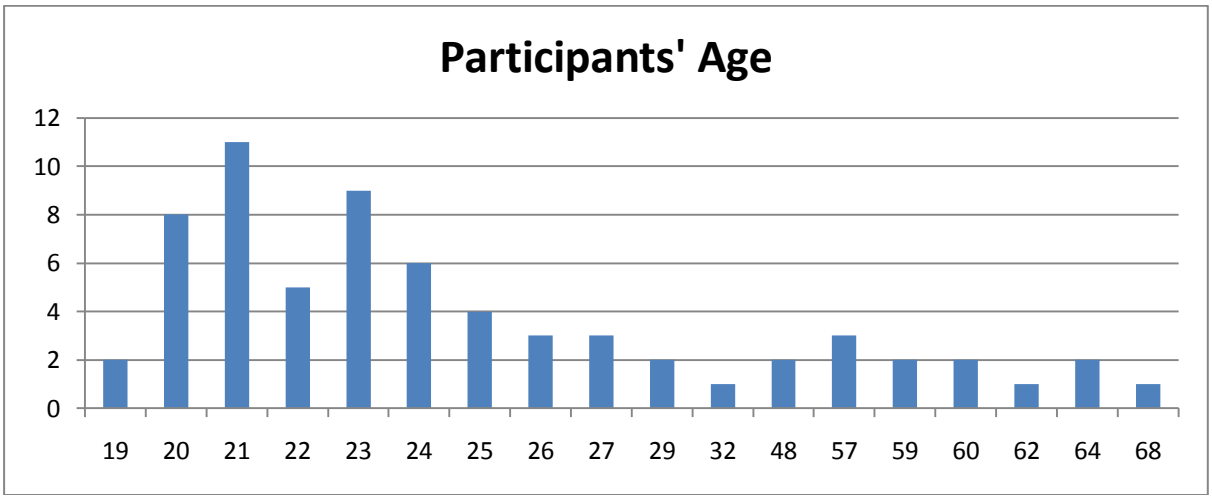


Figure 5: The age range of participants.

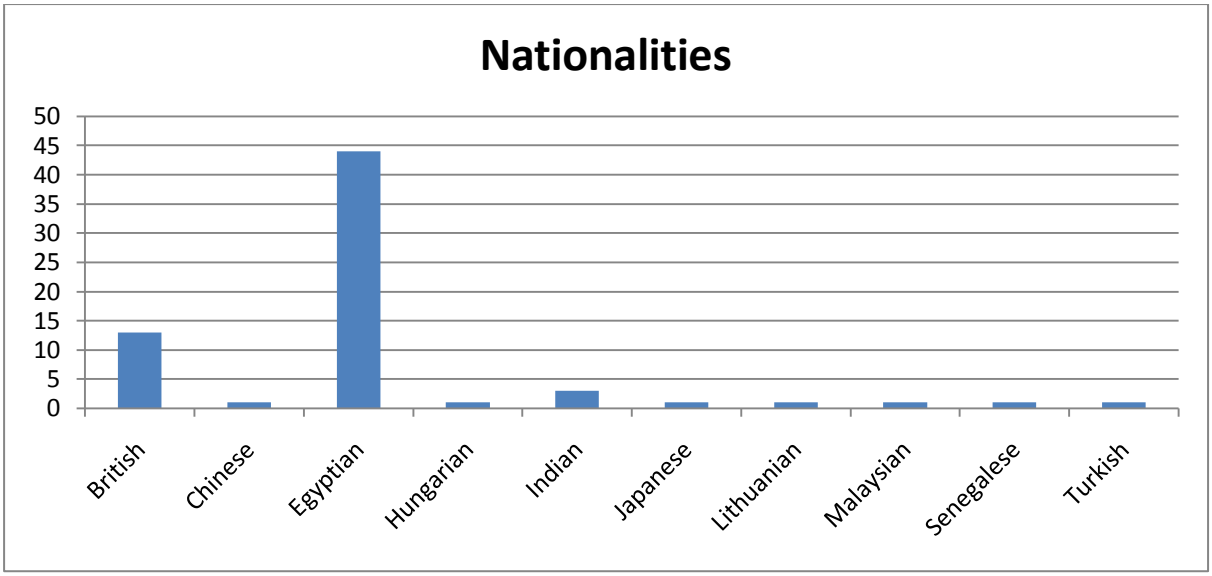


Figure 6: The nationalities of participants.

3.6 The research instrumentation

Questionnaires that ask both open and closed questions are the simplest way of combining qualitative and quantitative measurements [**127**]. The findings from open ended questions are longer, more detailed and difficult to analyse because the responses are neither standard nor systematic [**127**]. However, such findings help the researcher understand the participant's point of view in their own terms. Patton (2002) highlights that items in a structured questionnaire require a deductive approach; however, in practice, some items may be determined deductively while others are left open for inductive analysis.

It is important to highlight that few authors have analyzed the effect of questionnaire length on data quality. Bogen [**128**] explained that there is no negative relation between questionnaire length and response rate. However, it will significantly influence the data accuracy. Although the respondent continues to answer questions, they may provide a poor quality answer just to finish it and this cannot be controlled for [**129**].

The study questionnaire was 12 pages long and took 30-45 minutes to complete. Most feedback, especially from older people, suggested that the questionnaire was too long. Although it is hard to determine an 'optimal' length for an interview, there is a general agreement that it should take no longer than 45 to 60 minutes and should not exceed 14 pages [**130**].

The questionnaire consisted of a personal details section and two parts for questions. The personal details page collected background information like which countries that participants had lived in and the previous jobs they had. Questions in Part 1 were divided into six sections, and Part 2 was five questions. Part 1 was specifically designed to gather information about participants' experience and their usage history of communications technologies. These were namely: letters, TV, land-line telephones, Mobile phones, Internet, and email.

Part 2 consisted of five questions (Questions 34 to 38), each question being used to measure how the individual felt or thought about technology. Question 34 asked participants to describe the way they feel towards the six communication technologies with respect to eleven different feelings. Feelings suggested in the study varied between positive, negative and ambiguous. Participants were asked to express their feelings whether they felt like that while using the technology, it was neutral, or they did not feel like that. The feelings suggested were found to be the most cited by other participants in similar studies [**131**,**132**,**133**,**134**]. Question 35 discerned the primary source of local news and world news from. Questions 36 and 37 determined the participant's perceived usefulness and perceived ease of use of the communication technologies.

The Likert scale was used to analyse Part 2. Participants were asked whether they agree on disagree with a statement. In the last question, they were asked to express their opinion on 59 statements. These statements were used in two previous studies. Firstly, Pupils' Attitude Towards Technology (PATT) and Taviss [**135**]. The statements were categorised into five subfields: 1) General interest in technology. 2) People's attitude towards technology. 3) Contribution of Technology. 4) Consequences of technology. 5) Technology is difficult.

For the last question in Part 2, the initial plan was to convert the Likert scale to into an index. The index gives a score to people's answer which gives a more precise quantitative measure. For example, 'agree', 'tend to agree', 'tend to disagree', 'disagree' would be converted to 10, 20, 30, and 40. The lower the overall participant score, the more they

agree with the sentences [**125**]. However, this study will analyse each sentence individually, and will not use the same subfields and technique used in PATT for three reasons:

1- PATT was used for young students, which is not suitable for this study.
2- PATT was originally designed more than 20 years ago in 1988. People's opinion might have changed.
3- Taviss's statements are assessed in a different way to PATT statements.

Part 1 was a mixture of open ended questions and Likert scale questions. At the start of each section, the participant was asked if they have used the relevant communication technology. If yes, they will continue answering questions related to that technology. If no, then they will skip the whole section. In the Likert system, all answers are arranged into numbers, which are readable for statistical analysis software like SPSS or Excel. For the qualitative research, concepts are refined or developed based on the data. This process is called conceptualisation [**125**].

3.7 Procedure

The questionnaire was long in people's opinion, and this could potentially be why many refused to take a part in it. To look for more participants, I modified my Facebook Status to ask for volunteers. Around 10 people from Egypt and 1 person from Britain were interested in participating. Then I asked my friends on Facebook using Facebook Chat to participate in my study. I corresponded with more than 110 friends, 77 agreed to help; around 45 people from Egypt and 23 people from different countries. Each participant was informed about the study and questionnaire using Skype, and they were given a copy of the questionnaire. 57 participants completed the questionnaire; 37 from Egypt and 10 from other countries excluding Britain (but see below).

As my data was biased towards young Egyptian people, I asked participants to pass the questionnaire to an older person in their environment (e.g. father). As a result, I received seven more completed questionnaires from older Egyptians, which raised the number to 44. It was difficult to follow the same technique for British participants. In order to find more participants, a compensation of people's time was offered (a prize draw for

three £10 Marks and Spencer vouchers) to all British participants. A mailshot was sent via the Computer Science department email system, but no reply was received.

I subsequently used all the facilities available in campus such as the restaurants, colleges, sports centre and asked people to participate in the questionnaire in person, which was subsequently sent via email to be completed when they are free. They were informed about the compensation and the time it would take. 15 people received the questionnaire, and 9 people sent it back completed. In total, I received 13 filled questionnaires from British people, 1 replied to my Facebook Status and voluntarily passed the questionnaire to two more people, 9 people who were selected randomly from the university sent it back by email, and the last British participant was an older person with no email, whom I interviewed in his work place.

3.8 Data Processing and Analysis

Overall, 67 questionnaires were analysed. In qualitative research, a Grounded Theory develops during the data collection process, basing the theory on the data in a flexible approach [**125**]. This theory is built by making comparisons. For example, if young people were more interested in email rather than Mobile texting, is it the same for older people? Then we might search for the reasons behind contrasting trends.

The first phase is the data collection phase. Glaser [**136**] indicates that everything that the researcher encounters when carrying out research is data (e.g. documents or the environment) and not only the participants' answers. The second phase is the data analysis phase or data coding. It is the first examination of the data, assigning it into categories [**125**]. The data collection phase and the open coding phase occur simultaneously until the core category is selected.

The first questionnaire is analysed and for each answer given by the first participant a category is used to represent his answer for each word, sentence, or paragraph. In the second interview, the participant's replies are constantly compared to the first to determine if they fit into the categories of the first or if they need another category. After several comparisons, one or more categories will be found common to all participants, connected to many different categories, which is known as the core category.

During the data coding phase, memos were written for any ideas, findings, or connections between the categories, tracking the progress of the constant comparisons. Phase three (sorting) comes after analysing the participants' answers and memoing all the findings available in data. This phase structures the memos in a way that provides the basis for writing the theory, which is the last phase.

Quantitative data taken from the questionnaire will be analysed using SPSS software to test theories statistically. All Likert scale replies will be converted to numbers and analysed by SPSS software. SPSS software determines the statistical significance of trends in the data at the 95% confidence level. Non-significant trends will not be used in this study's findings.

3.9 Ethical Considerations

This research does not have any legal requirements. According to the ESRC Framework for Research Ethics [**137**], there are six key principles:

1- Research should be designed, reviewed and undertaken to ensure integrity and quality.

The proposed research questions were designed to explore an existing knowledge about factors that influence people's decision while adopting new technologies. The questionnaire approach is appropriate to answer all the research questions as it can give both quantitative and qualitative data. It has been highlighted that the results of this study will help us to understand why some people choose not to adopt new technologies, which may help to design a technology suitable for them.

2- Research staff and subjects must be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved.

All participants were provided with a brief description of the background and purpose of the research. In addition, they were given a brief description of the basic research question/issue, the design and procedure of the research, and data confidentiality. In order to save participants' time the questionnaire has been sent via email and they have been asked to send it back except a participant from British who did not have an email address. This is the only participant that was interviewed face-to-face.

3- The confidentiality of information supplied by research subjects and the anonymity of respondents must be respected.

All participants' names have been replaced with a number. This number represents the order of received questionnaire. Participant 1 means he/she is the first completed questionnaire and so on. Completed questionnaires are in a file on my personal computer which is accessed only by me. Nothing in the study can be connected to a particular participant and they have been informed about that.

4- Research participants must participate in a voluntary way, free from any coercion.

All participants knew that they were free to withdraw at anytime, whatever the reason. This study used a small monetary reimbursement for the time volunteered by British participants. They were asked to fill out the questionnaire and return it in order to be eligible for the draw to win one of three £10 Marks & Spencer's vouchers.

5- Harm to research participants must be avoided.

There was no harm by any means physically or emotionally on the participants. The questions were designed in a way that does not tackle any personal or embarrassing topics at all. The information listed by participants in the study did not reveal their identity. Finally, all participants filled out the questionnaire in their own time, and were given the space to do so.

6- The independence of research must be clear, and any conflicts of interest or partiality must be explicit.

The research design enabled me as a researcher to remain independent throughout the entire process. In addition, there were no conflicts of interests.

CHAPTER IV: FINDINGS

There are two types of questions: open-ended (qualitative) and quantitative. All quantitative data were accumulated via Likert scale questions in the questionnaire, and analysed using IBM Statistical Packages for Social Sciences (SPSS) Version 19. All open ended questions were analysed through a categorisation method, as in Grounded Theory. Frequencies and percentages were calculated for the quantitative data. Chi-square testing was used to determine statistical significance. The Independent Samples T Tests were used to compare two independent groups (e.g. gender) on a given variable or different variables. Another statistical approach was used like discriminate analysis to find if the data can predict the participant group according to his/her answers. Open-ended questions analysed on a question by questions basis. Question answers were compared across the sixty seven participants in order to find any similarities between their answers.

This study examined people's attitude and feelings towards six communication technologies. A questionnaire was distributed among participants electronically, and in one case, face-to-face. The aim of the study was to explore the factors that affect the attitude and decisions of adopters and non adopters'. Finally, the study followed a Grounded Theory approach, in which there is no predefined theory to prove or disprove. This was in order to explore theories that are grounded on the data.

The results are presented below. Technologies will be referred to as X because some questions are repeated in the six categories. Some questions in Part 1 and Part 2 will be presented individually.

4.1 Part 1

Note that although Part 1 questions were repeated over the six technologies, they will be addressed for all technologies at once.

4.1.1 Usage, questions number 1, 7, 12, 17, 23, and 29

The first quantitative question in each section was "Have you ever used X before?" Participants were asked to tick the appropriate option whether it is 1) yes or 2) no. If no, the participant is asked to move to the next section. For each question the frequencies and percentages are presented in Table 4 below.

Answer	Letters	TV	Telephone	Mobile	Internet	Email
Yes	42, 62.7%	67, 100%	67, 100%	66, 97. 9%	63, 94%	62, 92.5%
No	25, 37.3%	0, 0%	0, 0%	1, 2.1%	4, 6%	5, 7.5%
Total	67, 100%	67, 100%	67, 100%	67, 100%	67, 100%	67, 100%

Table 4: Frequencies and percentages for usage questions.

Table 4 showed that there was a large difference in letters usage, while all the participants have used TV and land line telephones. Table 5 below shows more details about the letter usage question.

Answer			
	Female	Male	Total
No	**7**	**18**	**25**
Younger than 26	7	15	22
Older than or equal 26		3	3
Yes	**21**	**21**	**42**
Younger than 26	12	11	23
Older than or equal 26	9	10	19
Total	**28**	**39**	**67**

Table 5: Letter usage, by gender and age.

4.1.2 First time of use, question numbers 2, 8, 13, 18, 24, and 30

The second question in each section was about the first date they used the technology. For the TV, only 15 participants remembered when they used the TV for the first time. Only 23 participants could remember this for Landline phones. Mostly all participants highlighted that it was already installed by their parents. Table 6 below shows more details about the frequencies.

Technology	Responses	Mean (year)
Letters	41 – 61.2%	1988
Landline Phone	23 – 34.3%	1986
TV	15 – 22.4%	1973
Mobile	66 – 98.5%	2003
Internet	61 – 91%	2002
Email	59 – 88.1%	2003

Table 6: Time of first use of particular communications technologies.

4.1.3 Primary means of previous communications, question number 3

The question was “What was your main way of communicating with people at distance rather than letters?” This question was only asked once in the letters section, as it should be the oldest communication method available among the six. This was an open-

ended question, and all participants' answers were compared. Each participant could mention more than one technology. 39 (58.2%) participants answered this question. Table 7 shows the results.

Means of communication	Responses
Landline Phone	26
Mobile	7
Internet (including Facebook and Chat Messengers)	7
Email	7
Telegram – Telegraph	2
Face to Face	2

Table 7: Primary means of communication in the time of letters.

4.1.4 Reasons of usage, questions numbers 4, 9, 13, 19, 25, and 31

The question was "Can you remember what encouraged you to use/have X?" 41 (61.2%) participants answered the letter question. Contacting family abroad was the main reason for 15 participants to send letters. Other reasons were mentioned, like: school, local customs, and personal motivations. Table 8 shows the highest three reasons.

Reason	Responses
Contact family	15
Contact close friends	8
Send thank you letters	7

Table 8: Reasons for sending a letter.

Participants' answers for the landline phone question were much more direct. Only 17 participants answered this question. 12 participants installed it to communicate better with family and friends. 3 participants said that landline phone was mainly for emergencies. Only 13 participants answered the TV question. The reasons for using TV were almost the same: either to watch news, entertainment programs, discover new technology, or because of social pressure. 57 (85.1%) participants answered the question on Mobiles. Here, there were other reasons, like for work or for a gift. Table 9 below describes the main reasons for getting a Mobile phone.

Reason	Responses
Better way of communication (Including price and mobility)	17
Parents – Children Supervision	20
Social pressure	9

Table 9: Reasons cited for using/having a Mobile.

Fifty-two (77.6%) Participants answered the Internet question. 19 Participants chose education as the main reason they began to use the Internet. Other reasons were for work or entertainment. Table 10 below shows the most mentioned reasons.

Reason	Responses
To study	19
To chat with friends and family online	14
Interest in a new technology	9

Table 10: Reasons cited for using the Internet.

The last question examined reasons for using email. 53 (79.1%) participants answered this question. The most important reasons were to chat (32 participants) and because everyone else had email (7 participants). Few responses cited work or websites' registration.

4.1.5 Frequency of use and adoption, question numbers 5, 10, 15, 20, 26, and 32

This question was divided into four parts. Part 1 was a statement, asking if the participant believed that the way X is used has changed over time. Part 2 asked if the participant is using X more frequently of late. Part 3 asked if the participant was the first one to use X in their peer group. The aim of part 3 was to know more about in which adopter category the participant thinks they belong to. The first three parts were statements and participants were asked to answer using Likert scale. They had 6 options: agree, tend to agree, neutral, tend to disagree, disagree, and not using it anymore. Tables 11, 12, and 13 show the responses. At the end, participants were asked to explain their answers. The part 1 statement was: "The way I use X has changed over time." The part 2 statement was "I am using X more frequently." The part 3 statement was "I was the first one to use X between my friends and connections."

Technology	Not using it anymore	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree
Letters	28	23	7	5	2	2
Landline Phone	1	44	9	8	2	3
TV	3	44	5	8	3	4
Mobile Phone	1	46	4	6	3	7
Internet	6	49	4	4	1	3
Email	7	36	6	10	4	4

Table 11: Responses to the statement: "The way I use X has changed over time."

Technology	Not using it anymore	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree
Letters	41	2	1	3	4	16
Landline Phone	6	10	4	16	10	21
TV	7	17	7	12	11	13
Mobile Phone	1	47	5	8	1	5
Internet	6	51	4	3	1	2
Email	7	38	8	7	4	3

Table 12: Responses to the statement: "I am using X more frequently."

Technology	Not using it anymore	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree
Letters	24	3	1	14	4	21
Landline Phone	2	3	2	19	10	31
TV	6	3	0	20	11	27
Mobile Phone	1	6	10	13	9	28
Internet	7	9	8	6	13	24
Email	7	5	8	17	8	22

Table 13: Responses to the statement: "I was the first one to use X between my friends and connections."

4.1.5.1 Reasons for change over time

Thirty-three people described how their attitude towards letters has changed through time. The evolution of new technologies has made communication with letters slower and less efficient. Participant number 51 mentioned that advances in technology have made the Post Office negligent about personal letters. She said: "the Post Office used to be much stronger than it is now, both in terms of services and speed; because before they knew that it was very crucial for everyone that used it. Now because there are many other ways to communicate their efficiency has lessened." 17 people mentioned that new technologies have replaced letters because they are faster, cheaper, and more reliable.

Forty-four participants provided more details about this question. 26 participants clearly believed that Mobile phones are much better for communication than Landline phones. However, they pointed out that cost is an important part of the change. Some people prefer Mobiles because of the contract, while others prefer the landline phone because their broadband tariff gives them free calls. All females mentioned that they prefer to use the landline phone for long conversations.

Forty-three people added more information about why their attitude has changed towards TV. 25 people answered from Egypt, where TV is very popular. 21 people now watch TV online as they claim it saves time. They also mentioned that they can control what to watch and when. Generally they used the TV more when there were big events or sports matches.

Mobiles have become the most popular way to communicate recently. 41 participants identified some of the reasons for this. All British people agreed that they used text messaging more than calling. Two participants (aged 60 and 48) from Egypt said that having a Mobile is the only way to receive calls from their children and to contact them. Overall, most thought that Mobiles were either: better than the Landline phone, important, or offered everything that they wanted. Participant number 27 (aged 23, Egyptian, female) said “in the past, Mobiles were just for fun: sending messages, ringing my friends, playing games, setting alarms, but now it is like air and water for me.”

Email was considered a vital element of people’s life. 30 participants explained why they changed their email use over time. The main reason was that some websites and social networks required an email address to join. Most users cited Facebook as such a site. In addition, chatting with friends was another reason to have email. Very few mentioned that they used email to communicate with their friends. However, almost all participants said that although the use of email was firstly to join websites, it had become useful for job offers and business uses.

Email was considered a vital element in participants’ life. 30 participants explained why there has been a changed in email usage overtime. The main reason was the evolution happened in websites and social networks that required having an email in order to join. The most mentioned website was Facebook. In addition, chatting with friends was always a reason to have email. Very few mentioned that they use email as a way to communicate with their friends. However, almost all participants said that although the use of email was in the first to join websites and chatting, now it is for jobs offer and business uses.

4.1.6 What do you like least? Question numbers 6, 11, 16, 21, 28, 33

Participants were asked “What do you like least about using X?”. In the letters section, 36 participants mentioned: time, post offices, hand writing and uncertainty. They believed that they are wasting too much time in writing and sending the letter, and waiting for a reply. Some participants pointed out that they hated that they do not know if the second user received the letter or not.

People did not like Landline phones mainly because they have a fixed location. There was a contradiction between the 53 participants who answered this question. Some people liked them because they were cheap, while others did not like them because they were expensive. The two primary reasons people did not like landline phones were because they are immobile and they are indirect. Also, several participants mentioned that, when receiving a call, you do not know who is talking to you until you pick it up, and you never know who will pick up the phone if you are calling.

A total of 57 participants answered this question for TV. Overall, British participants were quite critical of this technology, citing drawbacks that included: poor programme quality, limited channels if there is no paid service, and it being a waste of time. Overall, the majority of Egyptian participants like to watch TV. However, they hate the advertisements, and that they are unable to choose a certain programme to watch. Younger participants mentioned that they prefer online TV because they can watch whatever they want, whenever they like.

The majority of people loved to use their Mobile. Participant stated that they are aware of the potential health implications (i.e. headaches), but they continue using the technology heavily, regardless. The availability was seen as both good and bad thing. Participant 21, a young Egyptian female said “Sometimes I hate the fact that it’s that easy to reach me. And switching the phone off doesn’t make it better because I’d be dying to switch it on to see if somebody called” Overall, people love to be connected and available to their peers all the time. 11 people hated the situation when their battery dies. Only 1 young British female loved her Mobile, while the rest of the British mentioned that they either hate the battery issue or think it is expensive.

The general attitude towards the Internet was positive amongst all participants. Almost half of the participants stated that there is nothing wrong at all with the Internet and they just love it. Participant number 20, who is a young Egyptian male, said “I can't describe why I like using the Internet, but at least I can get what I want through it anywhere & anytime.” Overall, people hated the Internet when it is slow and they were afraid of its security issues. They also hate the advertisements, with many stating that they are afraid of addiction.

Finally, for email, the primary cause for complaint was spam emails. They did acknowledge that email is the best way to send and receive attachments, but they were afraid of being hacked. Some of the reasons were similar to the same question on personal letters: such as uncertainty over if the recipient has checked the letter or not. Only 3 young participants from different cultures stated that the more modern emails are impersonal, as you cannot describe your feelings, like you could before with a letter.

4.1.7 How often do you change your Mobile phone? Question number 22

This question sought the reasons why people get new Mobiles and how often do they get new one. The question was “How often do you change your Mobile phone and why?” 61 participants answered this question. 13 people said that they changed it every 2 years, 4 every year, and 6 people varied between 3-5 years. The rest did not specifically mention the time. 25 participants pointed out that they changed their Mobile to keep up with the latest technologies. Three British people and one Turkish person said that they only change their Mobile at the end of their contract. None of the Egyptian people mentioned anything about contracts as the practice is not common there. The majority, 28 participants, claimed that they do not care about changing their Mobile because it satisfies their basic requirements of making calls, having SMS text messaging, and having an alarm. All participants above 50 years said that it is not important to change it at all. However, in order to keep up with technology, some said that they might change it every five years.

4.1.8 How did you learn to use the Internet? Question number 27

Question number 27 was “How did you learn to use the Internet?” It was designed to find out, for those people that have decided to learn a relatively new technology like the

Internet, how they will learn it. 57 participants answered this question. 9 people said they have been taught by a family member, such as a brother, daughter, son, or their parents. School was a popular answer from participants, especially from Britain. Only two people from Egypt pointed out that they learnt the Internet at school.

4.2 Part 2

4.2.1 Feelings, question 34

This question aimed to find out how people feel towards communication technologies. The question was “Please describe the way you feel right now towards the communication technologies listed below.” The participants could answer by choosing one out of three options: (√) yes I feel this way, (X) no I do not feel this way, and (—) neutral. The feelings were of three types: positive, negative, and ambiguous. If most participants responded ‘yes’ to a positive feeling, it got +1 point; else it got -1 point and 0 if it was ambiguous. The positive feelings offered were: ‘enjoyable’, ‘satisfying’, ‘easy to use’, and ‘trustful’. The negative feelings offered were: ‘stressful’, ‘complicated’, and ‘expensive’. Ambiguous feelings were: ‘apprehensive’, ’necessary’, ‘personal’, and ‘luxury’.

Email got the highest score between the six communication technologies (Table 14). For email questions, the participants responded yes to all positive feelings and no to all negative feelings. Drawbacks were cited as follows: Mobiles were expensive, participants did not trust information on the TV or the Internet, Landline phone was not enjoyable to use, and letters were not enjoyable or satisfying.

People found that Internet is the most ‘enjoyable’ technology with 53 participants agreeing. The least ‘stressful’ was Mobiles with only 35 participants agreeing. In addition, Mobiles were chosen as the most ‘satisfying’ communication technology with 44 participants. Landline phone was chosen as the most trustful source of information by 34 people. Figure 7 also shows each technology and the feelings associated with it.

Choice	Letter	TV	Landline Phone	Mobile	Internet	Email
Enjoyable	Neutral	Yes	Neutral	Yes	Yes	Yes
Stressful	No	No	No	No	No	No
Satisfying	No	Yes	Yes	Yes	Yes	Yes
Apprehensive	Neutral	No	No	No	No	No
Easy to Use	Yes	Yes	Yes	Yes	Yes	Yes
Trustful	Yes	neutral	Yes	Yes	No	Yes
Necessary	No	Yes	Yes	Yes	Yes	Yes
Personal	Yes	No	Yes	Yes	Yes	Yes
Luxury	No	No	No	No	No	No
Complicated	No	No	No	No	No	No
Expensive	No	No	No	Yes	No	No

Total	4	6	6	6	6	7

Table 14: How the majority of participants felt towards communication technologies.

'Yes', 'No' or 'Neutral' in the previous table indicates the most popular response as to whether they agreed with the feelings in the choice column.

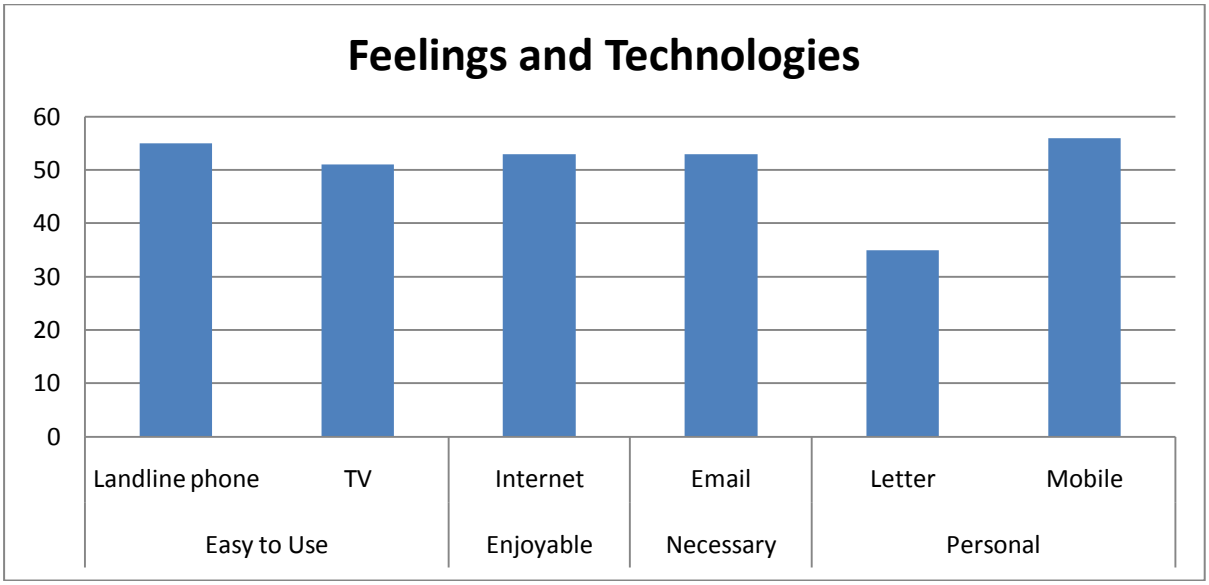


Figure 7: Feelings most associated with each communication technology.

4.2.2 Source of news, question 35

The participants were asked about their main source of local news and world news. They were given five options to choose from: TV, newspapers, radio, talking to people, and the Internet. Participants could choose more than one. 67 participants answered this question. Internet was selected as the number one news source for both world and local news with 44 responses (Figure 8). TV was second with 26 responses, with the majority of people using it for both world and local news. 39 participants stated that they did not use the radio as a source for news at all. However, this technology was number one for local news, with 18 responses.

	Internet		Talking to people		Radio		Any news paper		Television	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
NA	10	14.9	25	37.3	39	58.2	28	41.8	23	34.3
Local	3	4.5	16	23.9	18	26.9	15	22.4	10	14.9
World	10	14.9	5	7.5	2	3	5	7.5	8	11.9
Both	44	65.7	21	31.3	8	11.9	19	28.4	26	38.8
Total	67	100	67	100	67	100	67	100	67	100

Table 15: Frequencies and percentages for source of information question.

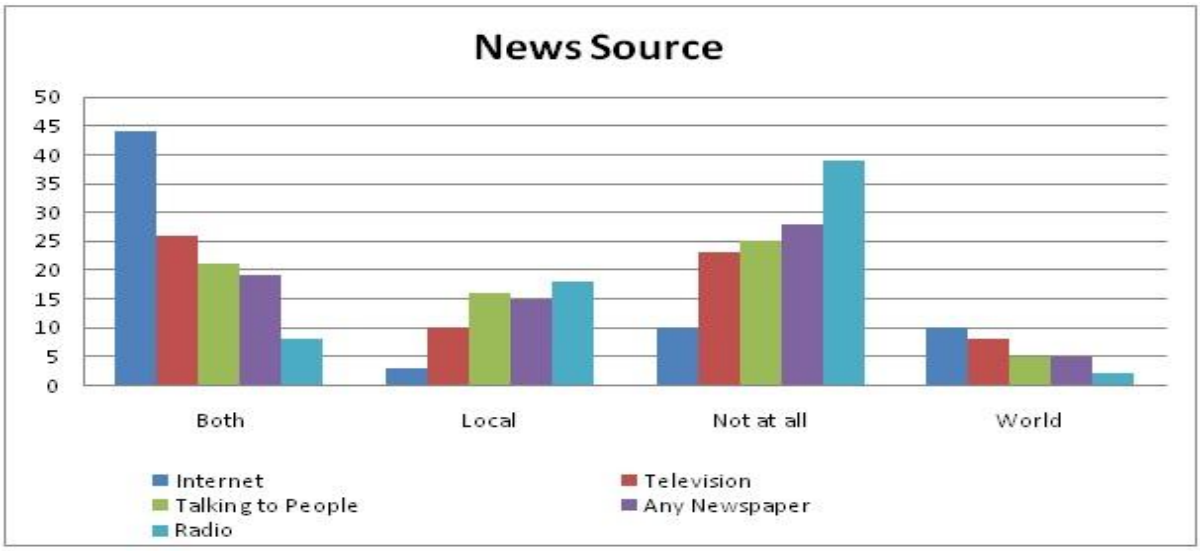


Figure 8: The communications technologies that participants get their news from.

4.2.3 Perceived ease of use, question 36

This question asked to what extent did participants agree or disagree with the following statement: "It is very easy for me to use the following communication technology". Participants had 5 options: 'agree', 'tend to agree', 'neutral', 'tend to disagree', 'disagree'. Mobiles were the most frequently selected technology (Table 16). Among the six communication technologies, 15 participants disagreed that letters were easy to use.

Easy to use	**TV**	**Letters**	**Landline Phone**	**Mobile**	**Internet**	**Email**
Answer	Agree	Agree	Agree	Agree	Agree	Agree
Responses	58	19	50	63	53	58

Table 16: Number of participants that considered a particular technology easy to use.

4.2.4 Perceived usefulness, question 37

Participants were asked: "To what extent do you agree or disagree with the statement: "The following communication technology is very useful" Again, the Likert scale was employed, with five options: 'agree', 'tend to agree', 'neutral', 'tend to disagree', 'disagree'. Overall, people agreed that the six communication technologies are useful, except for letters (Table 17). Mobiles were selected as the most useful technology where letters were the least.

Useful	**TV**	**Letters**	**Landline Phone**	**Mobile**	**Internet**	**Email**
Answer	Agree	Disagree	Agree	Agree	Agree	Agree
Responses	37	19	24	59	55	58

Table 17: Number of participants that considered a particular technology useful.

4.2.5 Attitude towards technology, question number 38

This question was adapted from an original design that measured people's attitude towards technology in the PATT-USA study. However, as explained in the literature review, this section will highlight people's answers and will not use PATT-USA index method. 59 statements were given to the participants, and they were asked to express their opinion using a Likert scale of 5 options: 'agree', 'tend to agree', 'neutral', 'tend to disagree', 'disagree'. Table 18 below shows the number of missing responses, what the majority answered, and how many chose this answer for each statement. To check the statements, see Appendix 2.

Statements	Missing responses	Majority's answer	Frequency	Percentage
1	1	Agree	32	47.8%
2	0	Agree	47	70.1%
3	0	Agree	48	71.6%
4	0	Tend to Disagree	24	35.8%
5	1	Agree	36	53.7%
6	2	Agree	26	38.8%
7	1	Agree	34	50.7%
8	0	Agree	27	40.3%
9	1	Agree	26	38.8%
10	0	Neutral	18	26.9%
11	3	Disagree	25	37.3%
12	1	Disagree	18	26.9%
13	1	Agree	42	62.7%
14	1	Disagree	29	43.3%
15	1	Agree	24	35.8%
16	4	Agree	21	31.3%
17	2	Agree	22	32.8%
18	2	Agree	42	62.7%
19	0	Agree	33	49.3%
20	2	Disagree	19	28.4%
21	3	Agree	32	47.8%
22	1	Neutral	17	25.4%
23	1	Neutral	27	40.3%
24	0	Agree	30	44.8%
25	3	Disagree	19	28.4%
26	4	Agree	25	37.3%
27	2	Agree	27	40.3%
28	1	Disagree	19	28.4%
29	2	Agree	25	37.3%
30	1	Agree	27	40.3%
31	1	Neutral	20	29.9%
32	1	Agree	37	55.2%

33	2	Agree	22	32.8%
34	1	Disagree	34	50.7%
35	3	Agree	29	43.3%
36	2	Agree	31	46.3%
37	3	Neutral	21	31.3%
38	1	Agree	35	52.2%
39	1	Tend to Disagree	24	35.8%
40	1	Agree	25	37.3%
41	3	Agree	23	34.3%
42	1	Tend to Disagree	16	23.9%
43	2	Neutral	19	28.4%
44	3	Agree	32	47.8%
45	3	Tend to Agree	21	31.3%
46	2	Tend to Agree	26	38.8%
47	4	Neutral	27	40.3%
48	6	Tend to Agree & Neutral	21	31.3%
49	2	Tend to Agree	19	28.4%
50	1	Tend to Disagree	23	34.3%
51	2	Agree	36	53.7%
52	1	Agree	33	49.3%
53	1	Agree	31	46.3%
54	4	Neutral	19	28.4%
55	2	Agree	34	50.7%
56	2	Tend to Agree	16	23.9%
57	2	Neutral	18	26.9%
58	2	Agree	20	29.9%
59	2	Agree	19	28.4%

Table 18: Agreement with the 59 statements of the PATT-USA study.

The following are the statements that participants have answered with more than 60% agreement on the same answer:

1- Statement 2: “Machines have made life easier.” 47 Participants (70.1%) agree with this statement.
2- Statement 3: “Technology is good for the future of this country.” 48 Participants (71.6%) agree with this statement.
3- Statement 13: “Technology is very important in life.” 42 Participants (62.7%) agree with this statement.
4- Statement 18: “Computers make business and government more efficient.” 42 Participants (62.7%) agree with this statement.

4.3 Summary

This chapter presented the results from a questionnaire distributed to 67 participants examining people's attitude and feelings towards six communication technologies. Quantitative data were computed using SPSS. Qualitative data were analysed using a Grounded Theory approach where all participants' answers to the open ended questions were compared.

Not many participants used letters: younger people in particular avoided them, principally for the time taken to write and send them. Mobiles are considered to be the most 'personal' communication technology. Landline phones were praised for their ease of use. The Internet was found to be the main source of both local and world news. Some participants mentioned that radio is a good way of obtaining local news.

In the next chapter, all participants will be divided into their adoption category. For each question the study examined differences between members of the same category. The focus of the coming chapter is on laggards and non adopters, to find out if there are commonalities between them. The major findings are represented, as is the conclusion of the study, and the recommendations for further research.

CHAPTER V: DISCUSSION

This study investigated the characteristics of people in adoption categories, and the factors that might influence their decision to adopt or not adopt new technologies. 67 participants answered qualitative and quantitative questions via a questionnaire. Qualitative answers were compared and summarized, while SPSS was used to analyse the quantitative data. The study findings are discussed and analysed in this chapter. Participants were assigned to their adoption category. The adoption categories were subsequently presented and discussed for each question in the questionnaire. The study tried to elucidate differences in adoption category with gender, age, or culture. Due to the small number of suitable participants' responses, the study was unable to determine the effect of letters, TVs, or landline phones on new technologies. This was however possible for the new technologies: Mobiles, email and the Internet.

This chapter discussed the data in order to answer the following research questions:

1- What are people's adoption categories to communication technologies: letters, landline phones, Mobile phones, televisions, Internet, and email?
2- For each individual, are there any differences in their respective adoption categories across different technologies?
3- Does adoption category or attitude towards technology vary with gender, age, or culture?
4- Has the participant's usage of existing technology affected their usage of new technologies?

Firstly, the adopter categories of Mobiles, email and the Internet are calculated and discussed separately across gender, age, and culture. Secondly, the data from each technology is compared to find the characteristics and commonalities of each adopter category. Finally, statistical analysis approaches have been used, including Chi-square analysis, discriminate analyses, and Spearman correlations to test for relationships in the responses.

All participants were divided into two age groups. Group 1: participants who are younger than 26 years (45 participants). Group 2: Participants who are older than or equal

to 26 years (22 participants). Nationality was divided into three categories: British (13 participants), Egyptian (44 participants), other (10 participants).

5.1 Adopter Categories

The most widely accepted method to identify adaptation categories is introduced by Rogers [**2**]. There are five categories, following the form of a bell-shaped curve. In order to determine the adopter category, the study needed the mean time of technology adoption (t) and its standard deviation (σ).

Adopter Category	Adopter Percentage	Area covered under bell curve
Innovators	2.5	Less than t – 2σ
Early Adopters	13.5	Between t - σ and t - 2σ
Early Majority	34.0	Between t and t - σ
Late Majority	34.0	Between t and t + σ
Laggards	16.0	More than t + σ

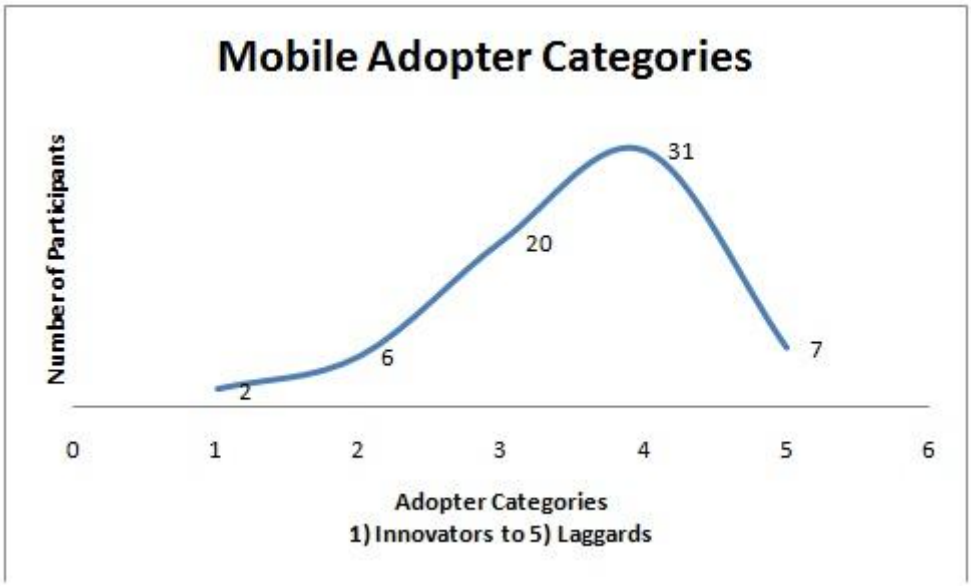
Table 19: Distribution of adopter categories.

5.1.1 Mobiles

Sixty-six participants answered question 18: "Approximately, when did you have your first Mobile phone?". The mean year was 2003. Table 20 and Graph 9 explain the adopter categories in more detail. In Graph 9 the adopter categories are represented in the X axis by the numbers 1 to 5, where 1 represents innovators and 5 represents the laggards. The Y axis is the number of participants.

	Innovators	Early Adopter	Early Majority	Late Majority	Laggards	Total
Participants	2	6	20	31	7	66
Percentage	3.03%	9.09%	30.30%	46.97%	10.61%	
Years	<1995	1995-1999	1999-2003	2003-2007	>2007	
Age mean	61	61	48	23	20	

Table 20: Mobile adopter categories and their frequency.

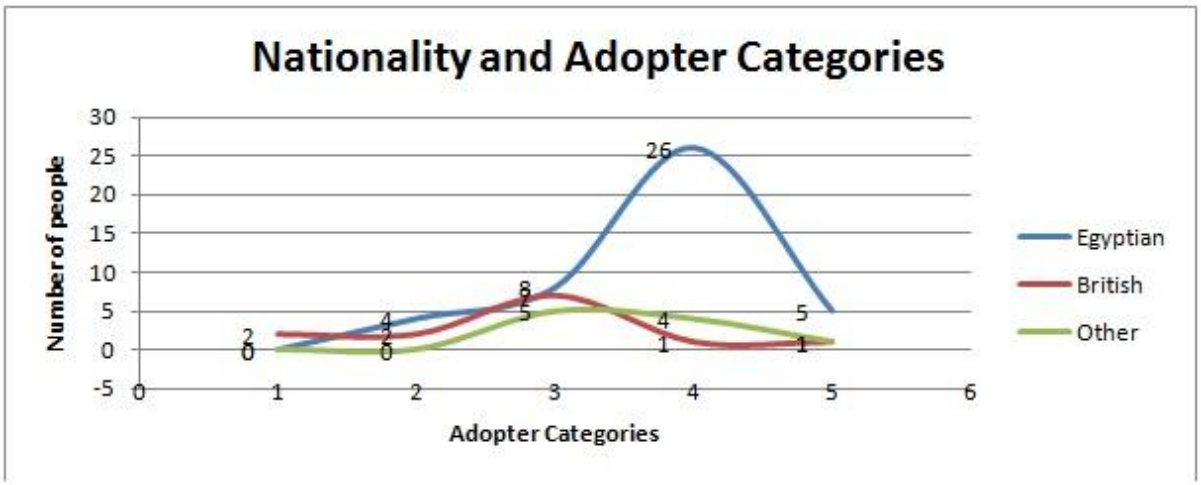


Graph 9: The distribution of Mobile adopter categories.

In each adopter category, gender, age, and culture factors were compared. Table 21 below shows the distribution of these factors across the Mobile adopter categories.

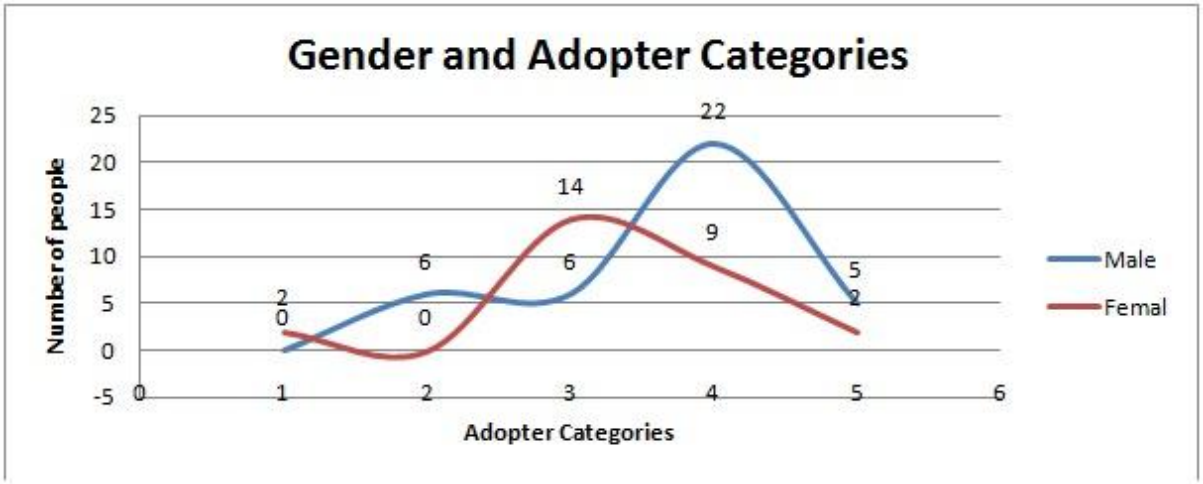
Information		Innovator	Early adopter	Early majority	Late Majority	Laggards
Gender	Male	0	6	6	22	5
	Female	2	0	14	9	2
Nationality	Egyptian	0	4	8	26	5
	British	2	2	7	1	1
	Other	0	0	5	4	1
Age group	Young	0	2	13	24	6
	Old	2	4	7	7	1

Table 21: Gender, nationality, and age across the Mobile adopter categories.



Graph 10: The distribution of nationalities across the Mobile adopter categories.

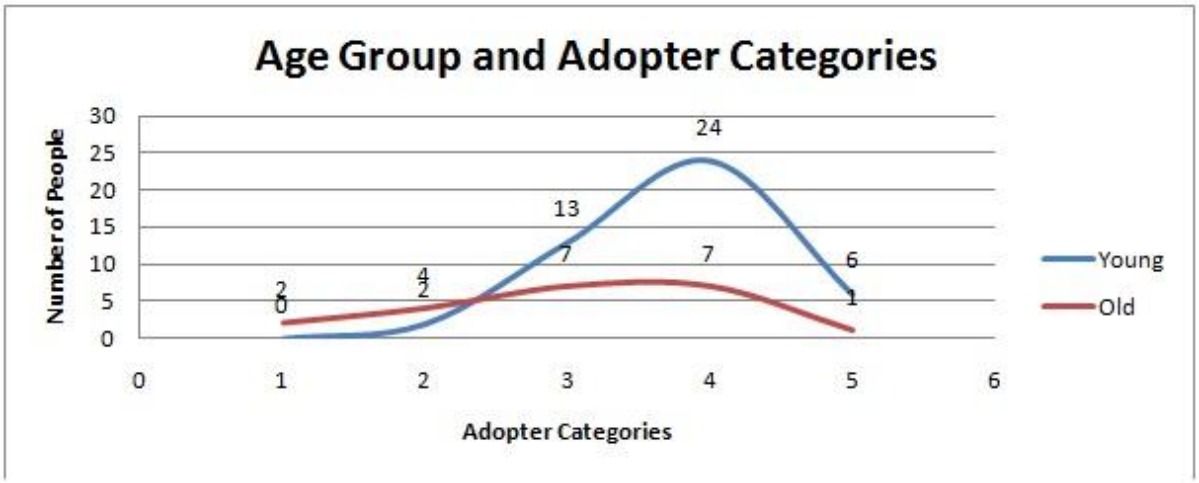
As shown in Graph 10, Egyptians were considered as late majority in adopting Mobile technology (26 participants). British participants were mainly in the early majority (7 participants). Other nationalities were either an early majority (5 participants) or late majority (4 participants).



Graph 11: The distribution of gender across the Mobile adopter categories.

Graph 11 above shows the gender distribution across the five adoption categories. Males were mostly late majority (22 participants). On the other hand, females were categorized as early majority (14 participants).

The relationship between Mobile adopter categories and age is represented below in Graph 12. Participants less than 26 years were classified as younger (group 1), with those older than or equal to 26 classified as older (group 2). The majority of young people were in late majority category (24 participants). Older people were equally in early majority and late majority categories (7 participants each).



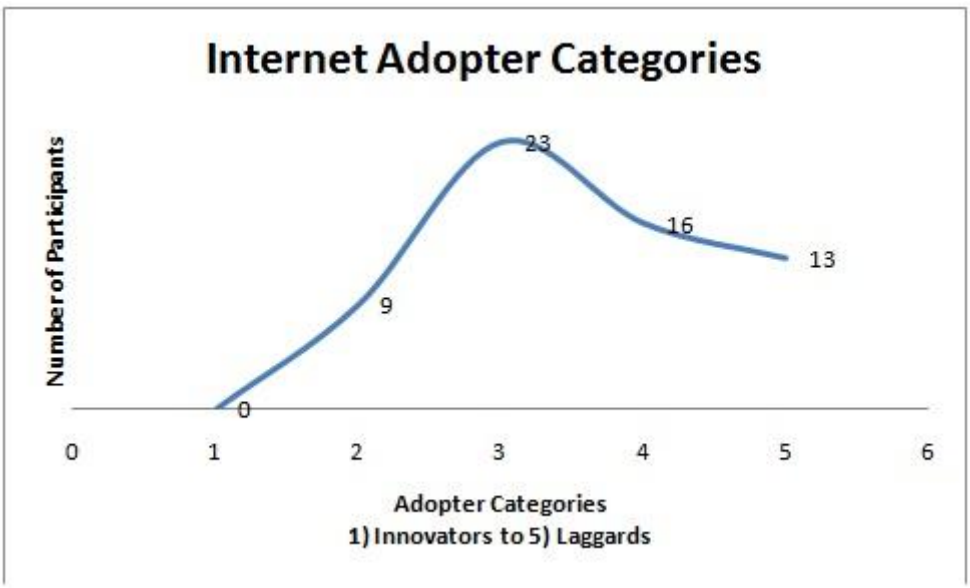
Graph 12: The distribution of age groups across the Mobile adopter categories.

5.1.2 The Internet

Sixty-one participants answered question 24: "Approximately, when did you when did you start to use the Internet?" The mean year was 2002.

	Innovators	Early Adopter	Early Majority	Late Majority	Laggards	Total
Participants	0	9	23	16	13	61
Percentage	0.00%	14.75%	37.70%	26.23%	21.31%	
Years	<1997	1997-2000	2000-2003	2003-2009	>2009	
Age mean	0	33	28	28	26	

Table 22: Internet adopter categories and their frequency.

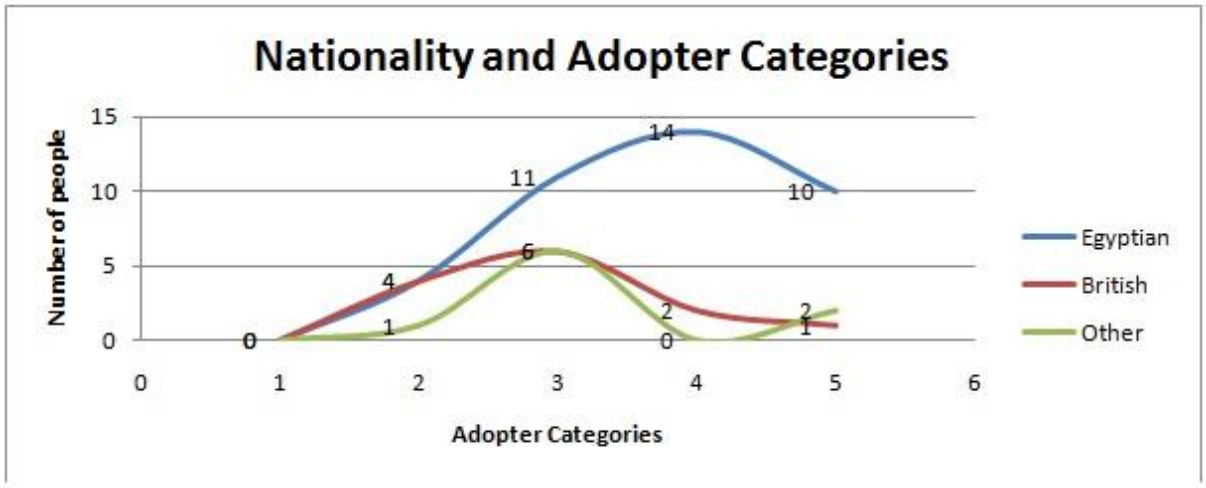


Graph 13: The distribution of Internet adopter categories.

Table 23 below shows the distribution of the age, gender and nationality factors across the Internet adopter categories.

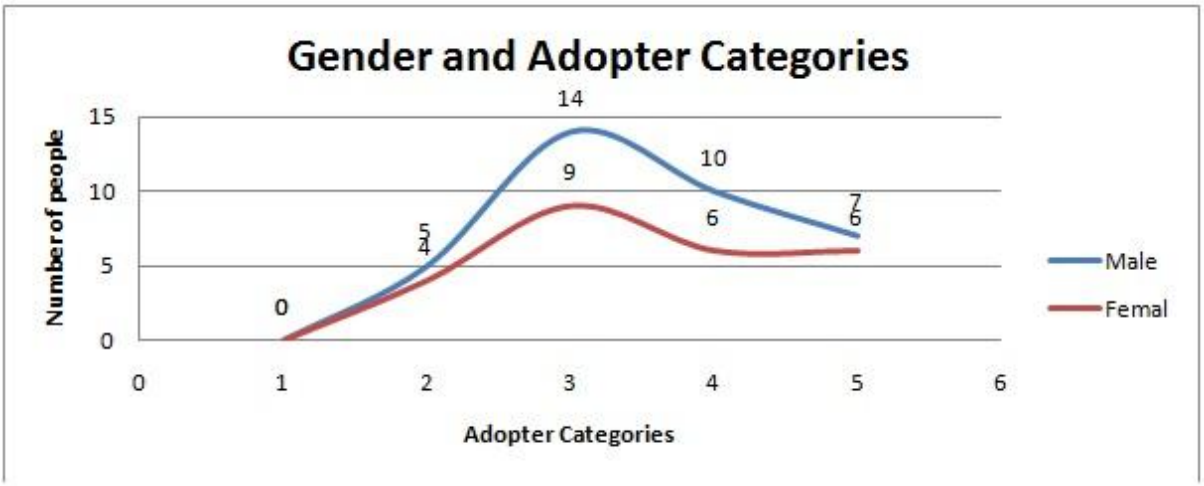
Information		Innovator	Early adopter	Early majority	Late Majority	Laggards
Gender	Male	0	5	14	10	7
	Female	0	4	9	6	6
Nationality	Egyptian	0	4	11	14	10
	British	0	4	6	2	1
	Other	0	1	6	0	2
Age group	Young	0	4	17	11	11
	Old	0	5	6	5	2

Table 23: Gender, nationality, and age across the Internet adopter categories.



Graph 14: The distribution of nationalities across the Internet adopter categories.

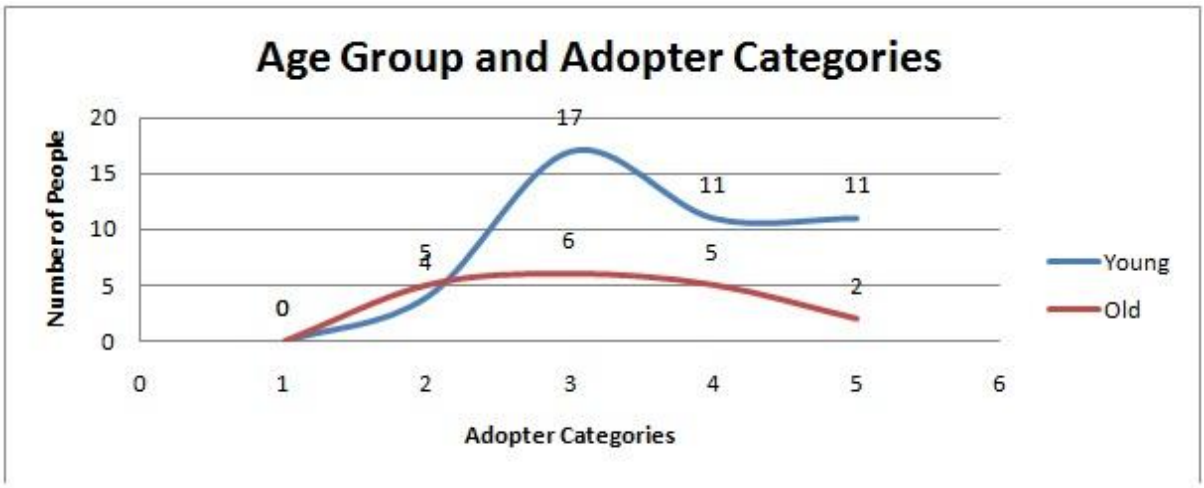
As shown in Graph 14 above, and similar to the Mobile results, Egyptians were considered as late majority in adopting Internet technology (14 participants). British participants were concentrated in the early majority (6 participants) and early adopter (4 participants). Other nationalities were mainly an early majority (6 participants).



Graph 15: The distribution of gender across the Internet adopter categories.

The gender distribution across the five adoption categories is shown in Graph 15 above. The common gender category for both sexes was the early majority. Both males and females formed the early majority group, who first used the Internet between 1999 and 2002.

Graph 16 below represents the relationship between Internet adopter categories and age groups. The majority of younger people were in early majority category. Older people were distributed among the categories, but were mainly in early majority (6 participants) and late majority categories (5 participants).



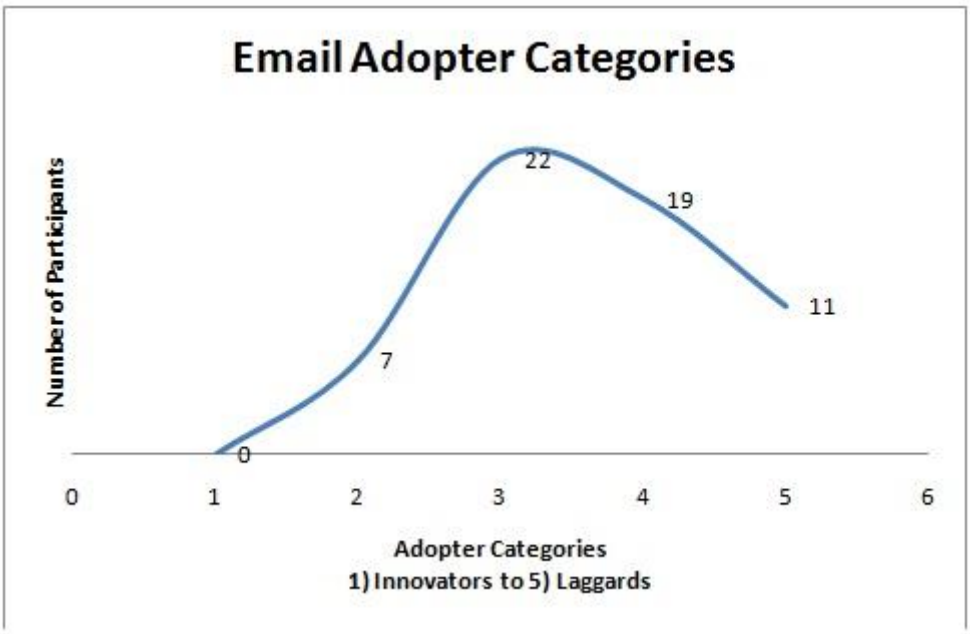
Graph 16: The distribution of age group across the Internet adopter categories.

5.1.3 Email

Fifty-nine participants answered question 30: “Approximately, when did you get your first email account?” The mean year was 2003.

	Innovators	Early Adopter	Early Majority	Late Majority	Laggards	Total
Participants	0	7	22	19	11	59
Percentage	0.00%	11.86%	37.29%	32.20%	18.64%	
Years	<1996	1999	2002	2005	2008	
Age mean	0	31	27	29	24	

Table 24: Email adopter categories and their frequencies.



Graph 17: The distribution of email adopter categories.

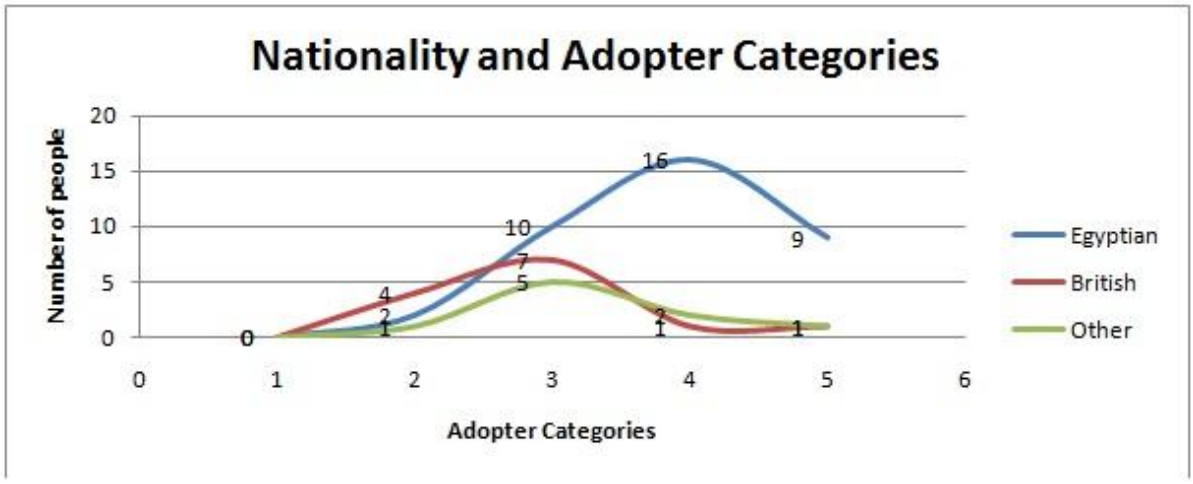
In each adopter category, gender, age, and cultural factors were compared. Same as Internet's results, there were no participants in the Innovation category. Table 25 shows the distribution of these factors across the email adopter categories.

Information		Innovator	Early adopter	Early majority	Late Majority	Laggards
Gender	Male	0	5	11	13	6
	Female	0	2	11	6	5
Nationality	Egyptian	0	2	10	16	9
	British	0	4	7	1	1
	Other	0	1	5	2	1
Age group	Young	0	4	16	13	10
	Old	0	3	6	6	1

Table 25: Gender, nationality, and age across the email adopter categories.

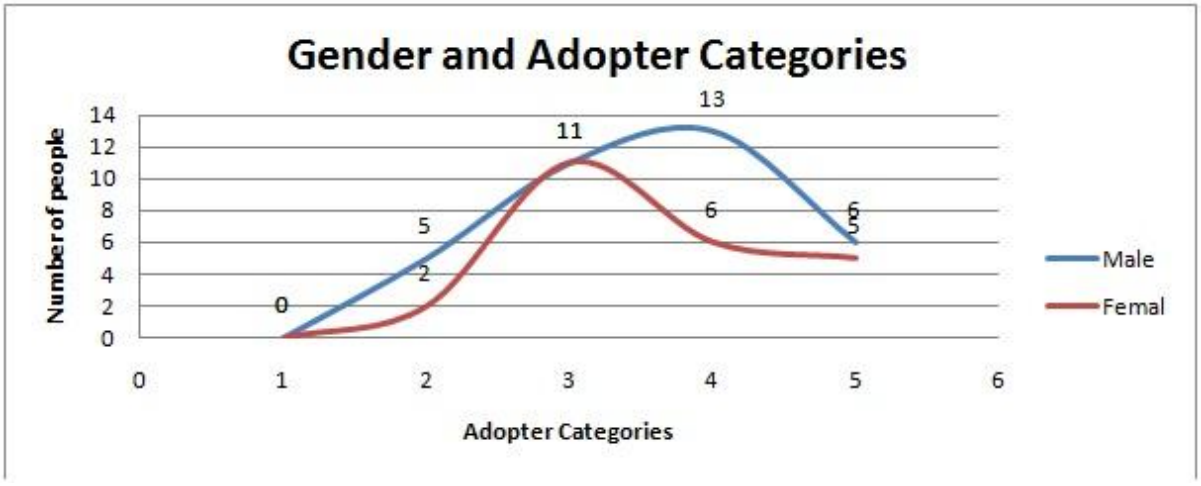
Graph 18 below shows that Egyptians were mostly in the late majority category (16 participants). British participants were mainly in the early majority (7 participants) and early

adopter (4 participants). Other nationalities were mostly in the early majority (5 participants).



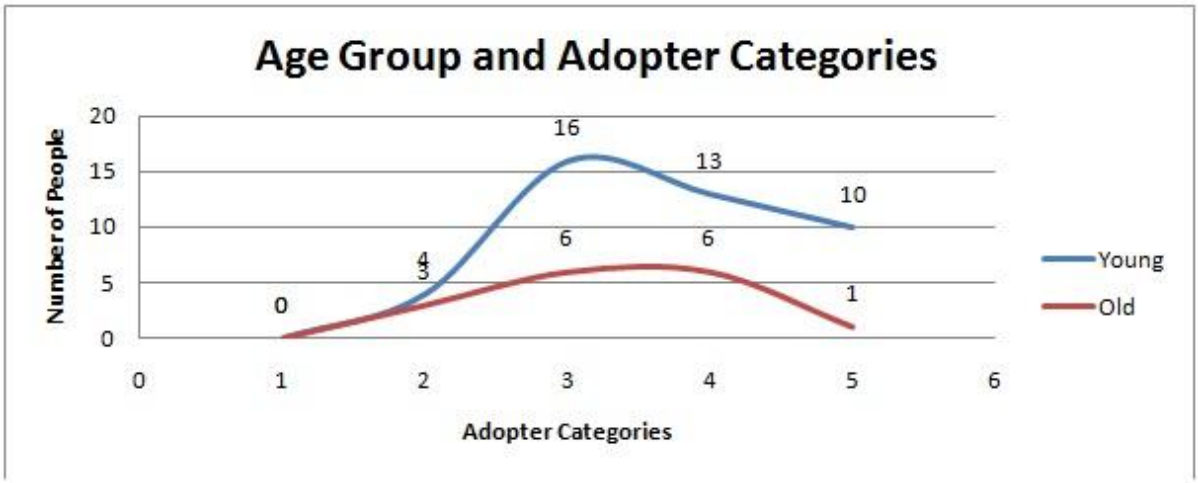
Graph 18: The distribution of nationalities across the email adopter categories.

The following graph (Graph 19) shows the gender distribution across the five adoption categories. The common male classification was late majority (13 participants), while female were mainly categorized as early majority (11 participants).



Graph 19: The distribution of gender across the email adopter categories.

Finally, the relationship between email adopter categories and age is represented below in Graph 20. The majority of the younger people were in early majority category (16 participants). Older people were equally distributed mostly in early majority and late majority categories (6 participants each).



Graph 20: The distribution of age group across the email adopter categories.

To sum up, for each technology each participant has been into one out of five categories according to the time of he/she has started to use the technology. Table 26 summarises the adopter categories by gender, nationality and age in percentage terms.

This study was unable to find factors common to those in the innovator category as there were no participants assigned to this category, except in the Mobile technology. The innovators in Mobile technology were two older British participants. Most males were assigned to the late majority category. On the other hand, females were more likely to be early majority. Egyptian people were more likely to be in late majority category: 42% of Egyptians were assigned to this group. British people's answers were mostly (52%) in the early majority. Age did not seem to have any effect in this study as both younger and older people were almost equally distributed between the early majority and late majority categories.

Information		Total Innovator	Total Early adopter	Total Early majority	Total Late Majority	Total Laggards
Gender	Male		14%	26%	38%	15%
	Female	2%	7%	40%	25%	15%
Nationality	Egyptian		8%	22%	42%	18%
	British	5%	26%	51%	10%	8%
	Other		7%	53%	20%	13%
Age group	Young		7%	34%	36%	20%
	Old	3%	18%	29%	27%	6%

Table 26: The distribution of adopter categories with gender, nationality, and age.

5.2 News and Internet adopter categories

Participants were also asked about their main source of local and world news. The Internet was one of the most popular means of getting news. This section will determine if the Internet adoption category of the participant affected the source of news they preferred. 61 participants are represented in Table 27 below. The majority of all participants across all adoption categories depend on the Internet for both local and world news. However, there is a suggestion that those in the early majority category are more interested in the Internet as a news source more that other categories, because 91% (21) of its members use the Internet as their main source of information. We can conclude however that Internet adoption category does not affect a participant's use of the Internet as source of information.

	Innovators	Early Adopter	Early Majority	Late Majority	Laggards
Do not use it	0	2	1	1	2
Local	0	2	0	0	1
World	0	2	1	3	3
Both	0	3	21	12	7
Total participants	0	9	23	16	13

Table 27: Differing use of the Internet for news across the Internet adoption categories.

5.3 Adopter categories and frequency of use

This section examines if the adopter category of Mobiles, email or the Internet influence the frequency of use of that technology. For example, Table 28 below represents responses to question 20 across the Mobile adopter categories. Results were similar for the Internet adopter categories and email adopter categories. Overall, the majority of people in all categories, even laggards, believe that they are using all three technologies more frequently. Hence adopter category of a technology does not influence the frequency of use.

	No answer	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Total
Innovators	0	2	0	0	0	0	2
Early Adopter	1	5	0	0	0	0	6
Early Majority	0	16	0	2	1	1	20
Late Majority	1	25	4	0	0	1	31
Laggards	3	3	0	1	0	0	7
Total Participants	5	51	4	3	1	2	66

Table 28: Responses to question 20 across Mobile adopter categories.

5.4 Adopter categories and feelings

This section analyses the relationship between technology adopter category and feeling. Table 29 shows the participants' feelings towards Mobiles across the Mobile adopter categories. All categories thought that Mobiles are enjoyable and easy to use.

Feelings	**Innovators**	**Early Adopter**	**Early Majority**	**Late Majority**	**Laggards**
Enjoyable	Agree	Agree	Agree	Agree	Agree
Stressful	Agree	Neutral	Disagree	Disagree	Disagree
Satisfying	No answer	Agree	Agree	Agree	Agree
Apprehensive	Disagree	Neutral	Disagree	Disagree	Agree
Easy to Use	Neutral	Agree	Agree	Agree	Agree
Trustful	Neutral	Neutral	Agree	Agree	Disagree
Necessary	Neutral	Neutral	Agree	Agree	Agree
Personal	Neutral	Neutral	Agree	Agree	Agree
Luxury	Neutral	Neutral	Agree	Disagree	Disagree
Complicated	Neutral	Neutral	Disagree	Disagree	Disagree
Expensive	No answer	No answer	Agree	No answer	Agree

Table 29: Mobile adopter categories and feelings.

Internet and email were analysed in the same way. Laggards did not feel that they can trust the information found on the Internet. Participant 43 said that it is "it is easy to

share rumours." with this technology. In addition, they were the only group who feel that it is complicated. The majority of laggards pointed out that they find the Internet stressful. Overall, there is a general agreement that these technologies are easy to use, necessary, and enjoyable.

5.5 Perceived ease of use (EOU) and perceived usefulness (USEF)

Questions 36 and 37 asked participants about their perceived ease of use and perceived usefulness. Overall, people agreed that the six communication technologies are useful except the letters. Mobiles were selected as the most useful technology, while letters were the least. In addition, Mobiles were selected as the easiest technology to use, and 15 participants disagreed that letters were easy to use. This section is to find if there is any correlation between the responses to these two questions. A Spearman correlation using SPSS was performed (Table 30). Generally, people who thought these technologies were easy to use also thought they were useful. The exception to this was Landline phones. This supports the findings of Davis [**38**], who argued that if the person finds a technology easy to use, he or she will directly find it useful.

Technology	p-value (significance)
TV EOU and USEF	0.001
Letters EOU and USEF	0.000
Landline Phone EOU and USEF	0.975
Mobile EOU and USEF	0.000
Internet EOU and USEF	0.000
Email EOU and USEF	0.000

Table 30: Association between ease of use and perceived usefulness.

5.6 Adopter categories' correlation

Using Spearman correlation in SPSS, this section determines if there is any correlation between assigned adopter categories for Mobiles, email and the Internet. Table 31 below shows that there is high correlation between the Internet adopter categories and the email adopter categories. It means that early adopters of the Internet are more likely to be early adopters of email. The correlation between Internet and Mobile adopter categories was not significant; perhaps to be expected as there is less overlap between the technologies. Finally, there is a correlation between Mobile adopter categories and email adopter categories.

			Internet	Mobile	Email
Spearman's rho	Internet Adopter Categories	Correlation Coefficient	1.000	.217	.772**
		Sig. (2-tailed)	.	.078	.000
		N	67	67	67
	Mobile Adopter Categories	Correlation Coefficient	.217	1.000	.270*
		Sig. (2-tailed)	.078	.	.027
		N	67	67	67
	Email Adopter Categories	Correlation Coefficient	.772**	.270*	1.000
		Sig. (2-tailed)	.000	.027	.
		N	67	67	67

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 31 correlation between the adopter categories.

5.7 Adopter categories: an alternative approach

All participants were asked to what extent they agree or disagree about the following statement "I was the first one to use X between my friends and connections." They answered using the Likert scale, with a number from 1 to 5 where 1 is "agree" and 5 is "disagree". Letters were excluded from this approach several people had never sent a letter.

Average score across the technologies determined a participant's overall adopter category. For an example, if participant 1 agrees that he/she was a leader in all technologies, the result will be: (1+1+1+1+1)/5=1. Table 32 below represents the results of the participants' answers. This approach defined only 4 adopter categories 1) Innovator/early adopter, 2) early majority, 3) late majority, and 4) laggards, in the style of Vijay [**46**]. The minimum mean value was 1 and the maximum was 5 who have disagreed on all the statements. Using cumulative percentages, the means were distributed into the four categories. Table 33 shows the number of participants in each category. This approach gleaned more balanced categories than Rogers's diffusion of innovation theory which has the bell shaped distribution [**2**].

		Frequency	Valid Percentage	Cumulative Percentage
Mean	1.0000000	1	1.5	1.5
	2.0000000	3	4.5	6.0
	2.2000000	2	3.0	9.0
	2.3333333	1	1.5	10.4
	2.4000000	2	3.0	13.4
	2.6000000	2	3.0	16.4

	2.8000000	2	3.0	19.4
	3.0000000	7	10.4	29.9
	3.2000000	3	4.5	34.3
	3.4000000	1	1.5	35.8
	3.6000000	5	7.5	43.3
	3.8000000	2	3.0	46.3
	4.0000000	5	7.5	53.7
	4.2000000	5	7.5	61.2
	4.3333335	1	1.5	62.7
	4.4000000	8	11.9	74.6
	4.6000000	3	4.5	79.1
	4.8000000	2	3.0	82.1
	5.0000000	12	17.9	100.0
	Total	67	100.0	

Table 32: The distribution of first use scores.

		Frequency	Valid Percentage	Cumulative Percentage
Adopter Category	Innovator/Early Adopter	13	19.4	19.4
	Early Majority	18	26.9	46.3
	Late Majority	19	28.4	74.6
	Laggards	17	25.4	100.0
	Total	67	100.0	

Table 33: Adopter categories according to mean score.

5.7.1 Nationality, age, and gender

Chi-Square tests were used to find out if there is any significant relationship between nationality, age, and gender and the adopter categories. Table 34 highlights that there is no relationship at all.

Coefficients[a]						
Model		Unstandardised Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.997	.542		3.687	.000
	Nationality	.047	.181	.033	.259	.797
	Age	.012	.009	.161	1.290	.202
	Gender	.126	.271	.058	.464	.644
a. Dependent Variable: Adopter Category						

Table 34: The relationship of nationality, age or gender with adopter category.

5.7.2 Frequency of use

Participants were asked using the likert scale about their opinion on the following two statements: Statement 1 “The way I use e-mail has changed over time”, and Statement

2 “I am using email more frequently.” Table 35 below shows that there is no relationship between the responses and the adopter categories of the participants.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.021	.498		4.060	.000
	St1_ Landline Phone	.108	.144	.112	.749	.457
	St1_TV	.082	.114	.096	.720	.474
	St1_Mobile	.019	.126	.025	.151	.880
	St1_Internet	.035	.158	.035	.224	.824
	St1_Email	-.115	.133	-.144	-.862	.392
	St2_Landline Phone	-.049	.099	-.077	-.495	.622
	St2_TV	.063	.097	.099	.648	.520
	St2_Mobile	.159	.154	.182	1.033	.306
	St2_Internet	.207	.189	.184	1.095	.278
	St2_Email	-.092	.132	-.107	-.694	.491
a. Dependent Variable: Adopter Categories						

Table 35: Frequency of use relationship to adopter category.

5.7.3 Attitude towards technology

Participants were given 59 statements in order to examine their attitude towards technology. Only three statements had a probability less than 10%. Table 36 below show the three statements that might be used in future research to understand the people’s attitude in the adopter categories. However, these data might be a false positive data as this study did not do Bonferroni correction test.

Coefficients[a]						
Model		Unstandardised Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Statements	S14	1.785	0.812	0.983	2.197	0.07
	S39	-2.34	1.148	-3.02	-2.039	0.088
	S56	0.965	0.425	1.082	2.272	0.063

Table 36 Significant relationships between attitude towards technology and adopter categories.

5.7.4 Discriminate analyses

Discriminate analyses were used within SPSS to determine if it can predict the gender, age, or nationality of the participants based on their answers. The TV frequency statement “I am using TV more frequently” and statements number 15, 19, 20, and 30 can discriminate between young and old people.

	Wilks' Lambda							
	Statistic	df1	df2	df3	Exact F			
					Statistic	df1	df2	Sig.
TV	.610	1	1	13.000	8.298	1	13.000	.013
S15	.852	1	1	64.000	11.093	1	64.000	.001
S19	.736	2	1	64.000	11.272	2	63.000	.000
S20	.679	3	1	64.000	9.774	3	62.000	.000
S30	.632	4	1	64.000	8.862	4	61.000	.000

Table 37: Statements that can discriminate participants by age.

Using the same technique, nationality can be discriminated by Statement number 45, 53, and 65 (Table 38) and statements 13, 23, 56, and 60 can be used to predict the gender of the participant (Table 39).

	Wilks' Lambda							
	Statistic	df1	df2	df3	Exact F			
					Statistic	df1	df2	Sig.
S45	.814	1	1	51.000	11.676	1	51.000	.001
S53	.717	2	1	51.000	9.882	2	50.000	.000
S65	.651	3	1	51.000	8.755	3	49.000	.000

Table 38: Statements that can discriminate participants by nationality.

	Wilks' Lambda							
	Statistic	df1	df2	df3	Exact F			
					Statistic	df1	df2	Sig.
S13	.771	1	1	64.000	18.993	1	64.000	.000
S23	.684	2	1	64.000	14.526	2	63.000	.000
S56	.595	3	1	64.000	14.047	3	62.000	.000
*S60	.542	4	1	64.000	12.881	4	61.000	.000

Table 39: Statements that can discriminate participants by gender.

CHAPTER VI: CONCLUSION

This study defined the distribution of participants across adopter categories for Mobile, email, and Internet. Using Rogers's diffusion of innovation approach, the distribution shape was similar to a bell-shaped curve. However, there was a lack of innovators amongst the participants. This study concluded that there is a high probability (38%) that a male is going to be in the late majority category. In addition, Egyptian participants are most likely to be in the late majority category (42%). On the other hand, the early majority category is more likely to have British people (51%) and females (40%).

This study concludes that for the Internet and email the level of education did not really influence the innovator category. Although all the young participants were highly educated, no one was an innovator in the Internet and email. However, the only innovators in this study were two old British participants. The price of the mobile services and internet services seems to be a problem for almost all the British participants. Therefore, it seems to be that the Internet and Mobile technologies were introduced in Britain before Egypt.

Using the Internet as a news source is not affected by a person's Internet adopter category. The study found that both early Internet adopters and laggards use Internet to get both local and world news. This is justified because the majority of the participants admit that Internet is necessary. In addition, both young and old people dislike the advertisements on the TV. Therefore, the Internet was the best replacement for TV. Further studies might want to explore more what type of format is suitable for the young and old people (e.g. text, picture, or videos) and why. The study has shown that there is a correlation between participants' answers to the perceived ease of use and perceived usefulness. This means that there is a high probability that if the technology was easy to use it will be useful as well. This conclusion is supported by many studies [**92**,**93**].

The study found that there is no relation between adopter category and frequency of use. Once old people understood the importance of the technology they seem to adopt themselves to use it. The study has shown that older people do not have any trouble adopting technologies, but they need to be convinced why it is important to them. This conclusion is grounded on the data, as the majority of old people mentioned practical

reasons to adopt technologies like TV, Mobile, and the Internet. For an example, they have used Internet for work and mobile to communicate with their kids. On the other hand, the majority of young people mentioned that they adopt new technologies to explore the possibilities available. For an example, they get new mobile to use wireless feature or do video calls.

Feelings towards the technologies differed between adopter categories. Laggards did not trust information found on the Internet, and there was constant fear of spam and hackers. In addition, laggards felt that Internet use was very complicated, being afraid that one wrong click would bombard them with information they do not need. Overall, all categories felt that Mobiles, email, and the Internet are easy to use, enjoyable and a necessity. The findings above help us answer Questions 1 and 3 in the research questions.

In order to answer Research Question 2, a Spearman correlation analysis was made across three technologies to find if there are, for each individual, any differences in their respective adoption categories across different technologies. The study found out that there is a significant relationship between the Internet and email. This is justified because most of the participants have used the email to chat or register on Internet websites, such as Facebook. There was also a relationship between email and Mobiles. This might be because many participants found email a good replacement for Mobile text messaging and voice chat. However, there was no correlation between the adopter categories of the Internet and Mobile. Hence, an early adopter of the Internet is not necessarily an early adopter of Mobiles.

The study employed an alternative approach to categorise the participants into adopter categories. In this approach, only four adopter categories were defined. Comparing the questionnaire data to these adopter categories found that there are very few questions that can be used to determine the adopter categories. The study did however define the statements that can be used to predict the gender, nationality, and age of future participants.

On research question 4, analysis of how a participant's use of existing technologies affected their usage of new technologies proved inconclusive. The relatively young age of

participants prevented suitable responses for older technologies like TV, Letters, and Landline phones.

6.1 Limitation of the study

Participants' age was one of the limitations found in the study, as younger people could not reply to some questions on the older technologies, such as TV, letters, and landline phones. This lack of response prevented adopter category analysis for these technologies.

Another limitation is the broad scope of the study. This study has tried to answer many questions about the adopter categories and contrasted the varying attitudes and adopter categories of participants. Reasons for not adopting new technologies or late adoption were sought. Finally, it examined the probability that technology adopter categories of a participant influence each other. The study may have revealed more in depth information if it had concentrated on one topic.

The questionnaire provided plenty of information on the adopter categories and the participants. However, if the questionnaires were provided by post, with a follow-up interview to explain their answers in more detail, then more depth on people's answers could have been obtained. For example, we do know that a majority of laggards thought that Internet was complicated, but we do not know why they think this way.

6.2 Suggestions for Further Research

The study used PATT instruments to measure people's attitude towards technology. This was suitable for many reasons. Thus, further research should choose a method that measure people's attitude towards communication technologies specifically, and not technology in general, because the method was devised not only for communication technologies, but also for surveys about computers, nuclear technologies and medical technologies.

Post interviews should be carried out with a selected, representative sample from the population. These interviews would clarify many things in people's answers that might have two meanings, and may add more detail to responses, such as feelings and stories.

The study aim was to examine six communication technologies: TV, letters, Landline phones, Mobiles, email, and the Internet. There was a lack of responses to the first three technologies. Overall, younger participants mentioned many different modern technologies that are used extensively, such as messengers (e.g. MSN) and Facebook, to communicate, or for entertainment (e.g. online TV). Further research might look into the attitude and preference of younger people towards these new technologies as a means of communication, compared to letters and Landline phones.

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APPENDIX 1

Briefing

This questionnaire is consisted of two parts in order investigate different people's attitudes to communication technologies. We want to find out about your history of using different communication 'technologies' and your current attitude, namely:

- Landline phones (telephones)
- Televisions
- Written letters
- E-mail
- Mobile phones
- Internet

Depending on which age group you belong to, some questions might be odd. However, please answer it as best you can. Firstly, the questions will be mainly about your history with the mentioned communication technologies. Please remember this is not a 'test'; there are no 'right' or 'wrong' answers; we are interested in your experience. Since we are interested in history in the first part, we will be asking you to think back and to remember dates and past events as approximate as possible. The second part is to figure out about your current attitude and feelings towards the mentioned communication technologies.

Please, there is no need to worry if you cannot remember exactly; just give us your best approximate answer, and remember that you can always withdraw from the questionnaire at anytime. According to data protection law, all information collected will be stored anonymously and securely. It will be published in a student project report and may be published more widely. Personal details will be edited and you will never be identifiable at any of the publications.

Personal details

First Name: Last Name:

Email (if you have):

Nationality:

Please draw a circle around your gender: Male. Female.

How old are you? Age (in years)

If you have ever lived in another country for more than 6 months, state below the country and time in years:

Country: .Time (i.e. from 1986 to 2003):

Country: .Time (i.e. from 1986 to 2003):

What is your current occupation, and if you are retired, what was your main occupation prior to retirement? I will be thankful if you can provide me with your career history:

Occupation: Time:

Occupation: Time:

What is your highest educational qualification? Choose only one.

- None
- School Certificate
- Higher School Certificate
- O-Levels
- GCSEs
- A-Levels, - please list the subjects

- Further Education (e.g. HNC, HND), - please list the subjects
- NVQ – please give the subject

- Bachelor's Degree, - please list the subject

- Master's Degree, - please list the subject

- PhD please give your thesis title

- Other (please give details)

Part 1

Letters

1. Have you ever sent a letter before?
    a. Yes.
    b. No (go to the next section).

2. Approximately, when did you send your first letter?

3. What was your main way of communicating with people at distance rather than letters?

4. Can you remember what encouraged you to send a letter?

5. To what extent do you agree or disagree about the following statements. Please give reasons for your choice.

	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Not using it any more
The way I use letters has changed over time.						
I am using letters more frequently.						
I was the first one to use letters between my friends and connections.						

Give reasons for the above choices:

6. What do you like least about sending letters?

Landline Phones (telephone)

This section is about what we will call 'landline phones'. That is to distinguish them from Mobile phones. In other words, we are talking about the fixed phone that you may have wired into your home.

7. Have you ever had a landline phone installed in your home?
    a. Yes.
    b. No (go to the next section).

8. When did you first have a landline phone installed in your home? (If it was installed since you were born, please go to question number 10.)

9. Can you remember what prompted you to have a telephone installed?

10. To what extent do you agree or disagree about the following statements. Please give reasons for your choice.

	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Not using it any more
The way I use telephone has changed over time.						
I am using telephone more frequently.						
I was the first one to use telephone between my friends and connections.						

Give reasons for the above choices:

11. What do you like the least about using landline phone?

Television (TV)

In this section we want to try to find out about your experience from watching television not using it.

12. Have you ever had a TV installed in your home?
    a. Yes.
    b. No (go to the next section).

13. Approximately when did you first have a TV installed at home? (If it was installed since you were born, please go to question number 15.)

14. Can you remember what prompted you to have a TV installed?

15. To what extent do you agree or disagree about the following statement. Please give reasons for your choice.

	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Not using it any more
The way I use TV has changed over time.						
I am using TV more frequently.						
I was the first one to use TV between my friends and connections.						

Give reasons for the above choices:

16. What do you like least about using TV?

Mobile

17. Have you ever used Mobile phones before?
    a. Yes.
    b. No (go to the next section).

18. Approximately, when did you have your first Mobile phone?

19. Can you remember what prompted you to have a Mobile phone?

20. To what extent do you agree or disagree about the following statements. Please give reasons for your choice.

	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Not using it any more
The way I use Mobile has changed over time.						
I am using Mobile more frequently.						
I was the first one to use Mobile phone between my friends and connections.						

Give reasons for the above choices:

21. What do you like least about using Mobile phones?

22. How often do you change your Mobile phone and why?

Internet

23. Do you, yourself, personally use the Internet at home, work, school, college or elsewhere or have you used the Internet anywhere in the past?
    a. Yes, current user;
    b. Never used the Internet (go to the next section)

24. Approximately, when did you start to use the Internet?

25. Can you remember what prompted you to use it?

26. To what extent do you agree or disagree about the following statements. Please give reasons for your choice.

	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Not using it any more
The way I use Internet has changed over time.						
I am using Internet more frequently.						
I was the first one to use Internet between my friends and connections.						

Give reasons for the above choices:

27. How did you learn to use the Internet?

28. What do you like least about using the Internet?

E-mail

29. Have you ever used e-mail before?
    a. Yes.
    b. No (go to part 2).

30. Approximately, when did you get your first e-mail account?

31. Can you remember what encouraged you to get an e-mail account?

32. To what extent do you agree or disagree about the following statement. Please give reasons for your choice.

	Agree	Tend to Agree	Neutral	Tend to Disagree	Disagree	Not using it any more
The way I use e-mail has changed over time.						
I am using e-mail more frequently.						
I was the first one to use e-mail between my friends and connections.						

Give reasons for the above choices:

33. What do you like least about using e-mail?

Part 2

34. Please describe the way you feel right now towards the communication technologies listed below.
    You can use three different marks: (√) Yes I fell this way. (X) No I do not feel this way. (—) It is neutral.

	Enjoyable	Stressful	Satisfying	Apprehensive	Easy to use	Trustful	Necessary	Personal	Luxury	Complicated	Expensive
TV											
Letters											
Landline Phones											
Mobile Phones											
Email											
Internet											

Please add any additional comments here:

35. Can you tell me your main source of news about what is going on in your own local area and in the world today?

	Local news	World news
Television	☐	☐
Any newspaper	☐	☐
Radio	☐	☐
Talking to people	☐	☐
Internet	☐	☐

If other, please give us more details:

In the following part we are interested in your opinion technology; this is not a test. Therefore, there are no right or wrong answers. Please do not take too much time for one statement. Please indicate to what extent you agree or disagree with the statements given.

36. It is very easy for me to use the following communication technology:

	Agree (A)	Tend to Agree (TA)	Neutral (N)	Tend to disagree (TD)	Disagree (D)
Television					
Letters					
Landline Phones					
Mobile Phones					
Email					
Internet					

37. The following communication technology is very useful:

	Agree (A)	Tend to Agree (TA)	Neutral (N)	Tend to disagree (TD)	Disagree (D)
Television					
Letters					
Landline Phones					
Mobile Phones					

Email					
Internet					

38. Please indicate how far do you agree or disagree about the following statements:
Agree (A) - Tend to Agree (TA) - Neutral (N) - Tend to disagree (TD) - Disagree (D)

	A	TA	N	TD	D
When something new is discovered I want to know more about it immediately					
Machines have made life easier					
Technology is good for the future of this country					
To understand something of technology you have to take a difficult training course					
You hear a lot about technology					
I will probably choose job in technology					
I would like to know more about computers					
Television makes people more aware of what's happening					
Technology makes everything work better					
You have to be smart to study technology					
I would not like to learn more about technology					
I like to read technological magazines					
Technology is very important in life					
Technology Is only for smart people					
Technology lessons are important					
I will not consider a job In technology					
There should be less TV and radio programs about technology					
Computers make business and government more efficient					
Everyone needs technology					

I would rather not have technology lessons					
I do not understand why anybody would want a job In technology					
If there was a club about technology I would certainly join it					
Supermarkets are a great advance over the corner store					
Technology has brought more good things than bad					
You have to be strong for most technological jobs					

Agree (A) - Tend to Agree (TA) - Neutral (N) - Tend to disagree (TD) - Disagree (D)

	A	TA	N	TD	D
Technology at home is something should be taught					
I would enjoy job in technology					
I think visiting a factory is boring					
Technology does more good than harm					
The world would be a better place without technology					
To study technology you have to be talented					
People should be able to take technology as a subject in schools					
I would like a career in technology later on					
I am not interested in technology					
Technology can solve pollution problems					
Using technology makes it country less prosperous					
You can study technology only when you are good in both mathematics and Science					
There should be more education about technology					
Working in technology would be boring					
I enjoy repairing things at home					
Automation creates better working conditions					

Technology causes large unemployment					
Technology does not need a lot of mathematics					
Technology as a subject should be taken by all pupils					
Most jobs in technology are boring					
I think machines are boring					
In the long run, discoveries made in our space program will have a big payoff for the average person					
The dangers of modern drugs are outweighed by their beneficial uses					
Because technology causes pollution. we should use less of it					
Everybody can study technology					

Agree (A) - Tend to Agree (TA) - Neutral (N) - Tend to disagree (TD) - Disagree (D)

	A	TA	N	TD	D
Technology lessons help to train you for a good job					
Working in technology would be interesting					
A technological hobby would be interesting					
The potential dangers of nuclear energy are outweighed by its potential benefits					
Technology is the subject of the future					
Everybody can have a technological job					
Not everyone needs technology lessons					
With a technological job your future is promised					
Technological advances will eventually solve the overpopulation problem					

I highly appreciate your participation in this survey, and thank you for your time.

APPENDIX 2

In this appendix, the 59 statements are presented:

1. When something new is discovered I want to know more about it immediately
2. Machines have made life easier
3. Technology is good for the future of this country
4. To understand something of technology you have to take a difficult training course
5. You hear a lot about technology
6. I will probably choose job in technology
7. I would like to know more about computers
8. Television makes people more aware of what's happening
9. Technology makes everything work better
10. You have to be smart to study technology
11. I would not like to learn more about technology
12. I like to reed technological magazines
13. Technology is very important in life
14. Technology Is only for smart people
15. Technology lessons are important
16. I will not consider a job In technology
17. There should be less TV and radio programs about technology
18. Computers make business and government more efficient
19. Everyone needs technology
20. I would rather not have technology lessons
21. I do not understand why anybody would want a job In technology
22. If there was a club about technology I would certainly join it
23. Supermarkets are a great advance over the corner store
24. Technology has brought more good things than bad
25. You have to be strong for most technological jobs
26. Technology at home is something should be taught
27. I would enjoy job in technology
28. I think visiting a factory is boring
29. Technology does more good than harm
30. The world would be a better place without technology

31. To study technology you have to be talented

32. People should be able to take technology as a subject in schools

33. I would like a career in technology later on

34. I am not interested in technology

35. Technology can solve pollution problems

36. Using technology makes it country less prosperous

37. You can study technology only when you are good in both mathematics and Science

38. There should be more education about technology

39. Working in technology would be boring

40. I enjoy repairing things at home

41. Automation creates better working conditions

42. Technology causes large unemployment

43. Technology does not need a lot of mathematics

44. Technology as a subject should be taken by all pupils

45. Most jobs in technology are boring

46. I think machines are boring

47. In the long run, discoveries made in our space program will have a big payoff for the average person

48. The dangers of modern drugs are outweighed by their beneficial uses

49. Because technology causes pollution. we should use less of it

50. Everybody can study technology

51. Technology lessons help to train you for a good job

52. Working in technology would be interesting

53. A technological hobby would be interesting

54. The potential dangers of nuclear energy are outweighed by its potential benefits

55. Technology is the subject of the future

56. Everybody can have a technological job

57. Not everyone needs technology lessons

58. With a technological job your future is promised

59. Technological advances will eventually solve the overpopulation problem