Exploring the extent of Technophobia: a study conducted in the Maltese Public Service

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Management Summary/ Abstract

Do you pleasantly find yourself on a computer regularly and enjoy social networking sites such as Facebook, YouTube or Twitter? Do you regularly use the internet and your computer to the extent that when power goes out you find yourself going crazy? Would you start your day even if you forgot your mobile phone at home or would you go back for it, even risking of being late, as it is invaluable to you? Well whether you answered yes or no to the above questions, Technophobia affects you. Technophobia, according to vast researchers is the evidence of Anxiety, Negative global attitudes and specific negative cognitions found in people when using or even contemplating about using computers or related technology. With society today being more technological, with services more and more dependant on the internet and with governments encouraging business to move towards e-commerce, the impact that people suffering with Technophobia will feel by such initiatives will be huge, and so will the companies in return when their products or services are not consumed or used. This study, through over one hundred questionnaire respondents and some interviews, delved into understanding such phobia while seeing if it still lives on in 2011, who is suffering from it and whether this is a wide spread issue or not. The research used valid, reliable and already tested instruments such as CARS, CTS and GATCS used by Drs Rosen and Weil in many of their studies for measuring attitudes, cognitions, and anxieties. These instruments were administered to part of the Maltese Public Service, which included senior resources such as Director Generals, Directors and Chief Information Officers, all experts in their respective fields, to more specific segments such as Customer facing units, support staff and many more. Data was collected and analyzed through Charts and cross-tabulation reports and then contrasted with past studies.
that eventually provided the much needed results. Such showed that 58.6% of respondents suffered from Technophobia, amongst other results, and it was clear that the research managed to provide answers to questions such as “…. time is sometimes lost while we struggle with machines, yet do we know why for some of us, it is so painful to use such technology?” With Malta having a strong online presence in Public Services (e-gov) and an even stronger ICT national Strategy backing it, which achieved great results both in contrast with other European countries and also the World, knowing that people suffered from Technophobia may have just provided the answer to why such online services were being slowly adopted. This being the first study in such field in Malta and thus uncovering such phobia, it is now up to businesses and the Government alike to provide the right medicine to cure such phobia and thus reap the real benefits in ICT related investments.
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Chapter 1
Chapter 1 - Introduction

It’s the year 1995 and following quite a long wait, I just managed to get my hands on the new instalment of the game “Doom” a first person shooter video game that had won “Best Fantasy or Science Fiction Computer Game” (Anon, 1994) of the year, and to a technological-inclined adolescent those days, that video game was purely heaven.

Following a 5 sec whiz of the manual, I start installing/loading the game which felt like ages, and then it promptly ended to greet me by the Doom logo and I start going at it. Just after 20 minutes into it, the game halts, the computer crashes and I have just experienced my first real outburst to a computer screen (Lazar et al, 2006 pp.188), which mind you, was half my size and probably heavier then me at the time. Although in that same year we had just experienced the first release of Microsoft’s Internet Explorer and the first look and feel of www.yahoo.com, such fears and outbursts to similar situations still live on and maybe the only difference to today is that people have even found new and more creative ways to vent out their anger. Naming a few fears such as power cuts, modem/wireless router malfunction and the much adored blue screen of death will surely send a wriggling chill down someone’s spine. Whilst hoping to bring a smirk to your faces, fifteen years ago Newsweek (Stoll, 1995) wrote an article titled “The Internet? Bah!” portraying the main theme of how the Internet was a complete waste of time. This was the same year I was playing “Doom” which meant that just a few million people were connected to the Internet, Mark Zuckenberg, the founder of Facebook was not even a teenager, Google had not yet been conceived and we where still happy with the sound and performance of our dial-up modems (Ghio 2010, pp.3). The world has changed a lot in 15 years technological wise,
“Analog is dead, Google is King” (Ghio 2010, pp.3), Social networks are the norm and anyone who has no Facebook account is living on the moon.

- The Real Invasion of the World – Technology

The reality of this is that computers are wired to nearly all aspects of our lives, and we are living in the so called “information age”. Information Technology (I.T.) has become a part of our everyday life and people tend to experience and use technology at work, at home at the beach, practically everywhere including in the most mundane of activities. “Most people do not even realise just how deeply our lives are interconnected via miles and miles of cables or by the invisible arm of wireless communications” (Agius 2010, pp.5), that we sometimes give the laptop a symbolic pat on the back when it comes back to life following a serious of errors yet we curse (Lazar et al 2006, pp.190) (Brosnan 1998, pp.1-2) our mobile phones when they beep to inform us of a low battery. Similarly I’ve heard a lot of people shouting at their TV as there was nothing to watch, while on the other hand we give a little whoopee of joy at finding a wi-fi signal when we are waiting for our gate to open at the airport (Agius 2010, pp.5). In all of these cases our outbursts of joy or rage all lead to show just how much technology is part of our lives.

- The Human Experience of the Invasion

Of course individuals’ reliance on computers differ – while some are permanently connected, others do not check their mobile phone for days on end, much to the anger of those attempting to get in touch with them. Emotions differ from one person to another vis-
à-vis technology and while one person might use constantly technology to get by his/her daily life, another might just avoid it, others again might just get anxious, nervous or stressed when they are faced with technology and use words not found in the dictionary when this fails them. Having said so, who wouldn’t be irritated when possibly a website or internet downtime occurs or when one uses his personal computer for Internet Banking but gets lost in the menu? These are all added factors that technology brings with it, sometimes referred to as “baggage”, as without it, like for the internet banking example, we would have been serviced face to face with no technological related problems. So what are we saying here? Is there something underneath or hidden in I.T. that creates us stress, irritation or plainly anger? Could it be that these systems are not adopted for a reason? What’s the human experience of it? What’s for sure is that this is a very serious phenomenon that can have consequences spread as a ripple effect on today’s society, governments and businesses alike as if technology is offered but not adopted by people, citizens and employees this simply minimizes the ability to reap the rich rewards of technology. One term comes to mind, could it be …… TECHNOPHOBIA?

**Are you an Allie or a Foe to the Invasion?**

Fear or dislike of computers and related technology, is called Technophobia and it is an issue that affects many people, many of whom don’t even know it (Rosen & Weil 1992, pp.7). This may sound out of place in a world where technology overdose is considered normal and healthy, yet it is real, and although we are just beginning to comprehend the effects of such phobia, history shows us that man-kind has always reacted to technology, whether in a positive manner via adoption and use, or in negative ways such as anxiety,
avoidance, incompetence, fear, stress, negative attitudes and cognitions and so on so forth (Brosnan 1998, pp.11). Questions start to arise like, do people want technology or is it imposed on them in some way or another? Do people want technology to be part of their lives and believe that if this was so it would improve it or are we mistakenly assuming that just because people use technology, in some form or another? How many of us suffer from technophobia, is this widespread? What are Governments doing vis-à-vis Technology, are they promoting it or are they against it and how will this decision affect us? All these questions revolve around 2 items, mainly Technology and the human experience around it. Technology is briefly described by diverse online dictionaries as the usage of tools, systems and techniques to serve a purpose or assist in solving an issue. This definition can be simplified as “the modern handling of information by electronic means” (Ugwo et al 2000, pp.711). Examples of technology are Personal Computer (PC), Alarm clock, the Internet, e-mail, videogames, automated office equipment software and much more. The Human Experience can be defined as when people interact with other people, an object or a situation that can happen at any point in time. This experience becomes even more colourful as this research will focus on how people experience usage or avoidance of computers and related technologies which should provide us with some fireworks.

**Research Aim and Objectives**

Governments all around the globe (Dutta & Mia, 2009) are promoting more and more the use of the Internet to reach and offer their citizens general services. Malta’s online services, referred to as electronic government services, offer from Birth and Death Certificates to Driving licenses to General Customer Service with the intention to further reach citizens spread all over the world in a more fast, focused and efficient way. These
days’, people are subject to technology usage everyday due to how the work environment has evolved to be. Public Service employees in Malta have been trained in technology in the past years so that they can meet today’s challenges and provide a faster, more reliable service to the public. Besides the normal word processing and email software, employees are also being trained to use bespoke solution (tailor made) software referred to as electronic government (e-gov) systems to interact with the public that allows amongst others for quicker means of communications that helps to reduce queues and thus offer efficient service. Public Service employees can thus be regarded as super users since they will be facing technology from the back-end as a Government employee to offer a service and advice/help to the public and from the front-end as a Maltese citizen, to receive a service for example while using online Government websites.

This was key, and thus it was decided that the Public Service Employees in Malta will be asked to participate in a questionnaire and interview to help answer some of the questions surrounding Technophobia with the main aim to identify:

**Research Question 1 (RQ1):**

- Does Technophobia (fear or dislike of Computers and related technology) exist in the Maltese Public Service?

**Research Question 2 (RQ2):**

- How vast is Technophobia spread within the Maltese Public Service?
Research Question 3 (RQ3):

- Who is being affected by Technophobia?

Due to the broad nature of the Public Service in Malta, it was decided to focus this research on the Public Service employees working within the Courts of Justice and the Permanent Secretariat of the Ministry for Justice and Home Affairs and the Permanent Secretariat of the Ministry of Foreign Affairs. The main functions of the Ministry of Justice and Home Affairs are the preservation of peace, order and security in the country; the administration of justice; the provision of legal services to the Administration; the management of immigration and asylum-related issues and civil protection. The Ministry of Foreign Affairs on the other hand serves as a window to the world. Malta’s foreign policy is based on solid core belief in integrity, prosperity, peace and stability. By establishing bilateral and multilateral relations with all regions of the world Malta fulfills its commitment to world order, economic growth and social well-being for all the people of the world. This policy has enhanced positive relations with all countries and has reinforced Malta’s efforts to co-operate with other countries to restore stability in war-torn regions, eradicate poverty and provide humanitarian assistance in a spirit of brotherhood, friendship and constructive co-operation. For both Ministries, the Permanent Secretariat is responsible for the overall coordination of the activities of the respective line departments, agencies and entities that together execute the aforementioned functions and contribute to the effective fulfillment of the Ministry’s and Government’s objectives in this regard. More detail can be obtained from [http://www.mjha.gov.mt/](http://www.mjha.gov.mt/) and [www.mfa.gov.mt](http://www.mfa.gov.mt).
Technophobia is perceived to be one of the most challenging issues in Information Systems Research today (Sami & Pangannaiah 2006, pp.430) and being that no such similar study has been made in the Maltese Public Service, it is hoped that this would bring fresh new results and insights for interested parties to analyse and possibly also to keep in mind when building tomorrow’s strategies. It is important to stress out that the purpose is not to halt technology or technology innovation, to the contrary, these are needed. The issue is to understand whether Technophobia might be playing an important part in the adoption of technology, while hoping that such results can show us what reality really is like (at least in the Maltese Public Sector) while providing the possibility of adjusting the current measures should these not be aligned with user needs.
Chapter 2
Chapter 2 – Literature Review

Throughout history, it is easily visible how much technological change affected the ways in which we live our lives (Robinson-Staveley & Cooper 1990, pp.168). Doing the simplest and normal things in the morning in the year 2000 will probably constitute a wake up alarm from your mobile phone or using an electric kettle or microwave oven for breakfast, does it sound familiar? By the time we leave our houses we would have used a good number of technologies seamlessly. Back a few years and you will find that many people still used their wrist watch as an alarm clock instead of today’s mobile phones or a normal steel kettle to make coffee. Technological progress has and still is constantly changing the way we live our lives. This makes people rewire their lives accordingly. We never used to carry around a phone with us back in the days, people used to call during office hours at work or after at home, yet today people feel panicked if they forget their mobile phones at home during their trip to work and most probably will prefer turning their day around instead of staying a whole day without it. Another example is the way banks have pushed over the years for people to start using Automated Teller Machines (ATMs) (Rumberger 1984, pp.6). Many service providers have implemented a diverse range of technologies to allow customers to produce and consume services electronically that in turn helps the provider to improve operations and increase efficiencies (Gilbert, Lee-Kelley, Barton 2003, pp.899), but what about the customers? Are they pleased with this change in service and will they use it? Do they feel confident using it? Many argue that ultimately, adoption of technology becomes “imposed” due to the technology becoming an integral part of society (Rosen & Weil 1992, pp.4) but how much are many? And what about the rest or the technophobic, shouldn’t this service be for everyone? Some might still be hesitant of those machines that replaced their
face to face communications, and haven’t gotten comfortable with for example an ATM (Meuter, Ostrom, Bitner, Roundtree 2003, p.899). But let’s take a question at a time

**The Maternity of Technology**

To understand technophobia, we must first understand the invasion of technology into our personal and professional lives. Way back in the 18th century technological change occurred when the first machinery was brought to help craftsmen do their jobs. The Luddites, a group of craftsmen in the British Textile industries of Lancashire, Yorkshire and the Midlands organized themselves to oppose the introduction of power machinery into their trades because they feared that technology will force them out of a job (Rumberger, Levin, 1985, pp.400) (Haddad, 1996 pp.147). Luddites attempted to halt the Industrial Revolution by smashing the new machinery (Brosnan 1998, pp.155). New technology has been having a widespread and visible impact on work since then, that led to the transformation of the work place affecting most workers and industries by the introduction of more machinery and most notably, the proliferation of computers in their jobs (Heinssen Jr, Glass, Knight 1987, pp.49). A specific difference between industrial machinery and computers exist due to the pace of their introduction into society. While advancements in heavy industrial machinery took place at a steady and understandable pace, most common technology such as computers, the Internet, wireless technologies and mobile communications took over the scene from one day to the next (Wang, Shu, Tu 2008, pp. 3003). Statistics collected in 2005 shows that the vast majority (87%) of teens (12-17) in the United States use the internet. This statistic has gone up by 14% since it was last measured in the year 2000 (Lenhart, Madden, Hitlin, pp.1), similarly Wireless Internet usage grew from 16% in 2001 to 56.8% in 2007. Perhaps the best statistics though, would
be coming from the Public sector as Government services are used by everyone (Pieterson, Ebbers, van Dijk, 2007, pp.149), unlike businesses who can just ignore less-valued customers. Most people in fact at some point in their lives go to public school, claim benefits or pensions, visit the Public Hospital, posts letters and use public transport, consume power and water supplies, rely on local authority services from education to waste disposal and benefits from police protection. For example in the case for Public Schools a few years back, 1983, Tucker (1985 cited by Rosen & Weil 1995, pp.10) shows us that in 1 year, the number of computers have more then doubled to amount to 50,000. By 1988, this had increased to 2 million computers in public schools (Martinez & Mead 1988 cited in Rosen & Weil 1995, pp.10). By 1990, Becker (1991, cited by Rosen & Weil 1995, pp.10) suggested that the increase from 1983 was around 300,000 to 400,000 new computers per year… now that is fast! Although technology and in this particular example computers where the “tool of the day” such rapid introduction could be overwhelming for some people whom might be accustomed to certain manual processes. In 1983 the National Commission of Excellence in Education instructed schools to treat computing as the fourth basic skill along with reading, writing and arithmetic (Rosen, Weil 1992, pp.6) with Selwyn (2003, pp.100) describing it as “the indispensable grammar of modern life” that further sustains the notion that technology has become a prerequisite to living and working in today’s “information age”. This changed society as we knew it forever and with this formal acceptance of Governments all over the world, technology brought with it an estimation of $98 billion investment on 57 million personal computers during the 1980s only in corporate America (McCarroll cited in Roberts & Henderson 2000 pp. 427) with no signs of slowing down. To the contrary, growth in heavy machinery and automobiles and planes took time that in turn has helped people adjust and learn the new technology. Such growth can be compared to a new born who takes 9 months to arrive thus giving the parents time to
prepare and adjust to the change accordingly. With technology, like computers and the Internet, this was not so and just when people started to adjust, a new technology or upgrade came in and then another and then another, all within a small span of time which left them with a “baby” per month. This can be quite overwhelming and people are suffering from being surrounded by these rapidly changing technologies (Wang, Shu, Tu 2008, pp.3003). Lazar et al (2006, pp.202) argue that using a computer is not as relaxing and pleasurable experience as some suppliers suggest in their advertising and infact Murrell and Sprinkle (1993 pp.60) in their survey at a real estate office confirmed this notion by showing that one third of the office felt incompetent in their ability to use computers with 21% saying they avoided using computers altogether. Lu and Su (2009, pp.447) mentioned that sometimes even with mobile phones people avoid use due to worries about pressing the wrong buttons or due to the constant changing and complicated application systems that have been placed in such tiny devices. This is further supported by statistics (Lenhart, Madden, Hitlin 2005, pp.iii) showing that the landline telephone remains the most dominant communication with teens with results as high as 51%, trashing the 12% usage for mobile phones. One would expect that new technology, in whatever size or form, although is renewing itself at a fast pace, would still be used, especially in the Public Sector. However a report by Educational Testing Services (1988 Martinez & Mead cited in Rosen & Weil 1995, pp.10) shows that this is not true. Becker (1991, cited in Rosen & Weil 1995, pp.10) supports this notion and states that “only a minority of teachers and students can be said to be major computer users”. Whilst the provision of ICT facilities in public sites such as colleges, libraries and museums mean that people have the potential access to technology, such access is meaningless unless people actually feel able or want to use it (Selwyn 2003, pp.100). North and Noyes (2002, pp.135) state that in 1998 half of the UK population would own a computer by the year 2000, the same survey though shows
that almost half of the same population fears that they are being left behind by technology and are unconvinced by new technologies. These statistics imply that certain factors can prevent individuals whether interested or not, from utilizing technology.

- **Technology effects work**

Imagine a world without voice mails, e-mails, pagers and mobile phones. For workers over 40 years this is not hard and can recall a day when the soft ringing of the telephone was deemed as the only interruption. In the office environment these days, virtually every work function has been affected by technology as companies have introduced PCs, PC software and applications such as Operating systems (Windows) or Word Processing (MSWord), electronic information storage and retrieval systems (Oracle), Management Information and support Systems as well as email (MSOutlook) and web conferencing technologies (WebEx). These products are not static, to the contrary software versions are changing so fast that by the time users get used to one version, the next gets released and this creates stress (Sami & Pangannaiah 2006, pp.430). In many companies it is common practice that the ratio of penetration of computers is one is to one and with new technologies that improve teleworking facilities, this ratio might even be exceeded (Roberts & Henderson 2000, pp.428). This applies directly to the Maltese Public Sector where each government employee has a computer and an email account with software commonly installed such as Windows Operating system (XP), MSOffice 2003 for office related software and Internet Explorer as the main internet browser. Also some exceptions exist for extra computers or laptop for teleworking circumstances.

Technology provides answers to the needs of societies in education, health care, library services and access to online databases among others. Even in Human Resources (HR), a
department that most, if not all, companies have, technology has taken the table and turned it upside down by automating most HR functions from job analysis to recruitment with software applications rapidly becoming the vehicle by which HR collect and organize personnel-related data (Cronin et al 2006 pp.416). On-line recruitment is embedded within websites and is now commonplace with advantages that include reduction in time for HR staff performing administrative tasks that in turn helps personnel spend more time on other important HR functions (Cronin et al 2006, pp. 419). The Government of Malta has also automated it’s HR functions (www.recruitment.gov.mt), mainly due to the problematic large manual data collection procedures from various Departments spread all over the country (Government of Malta, 1996). Alleviating such conditions has in turn helped reduce the time it takes to make decisions. Banking has also been impacted by new technologies with the advent of electronic point of sales (Shops accept most of our cards), smart card, home banking and Electronic funds transfers that have also been incorporated in Government electronic services websites. Although these systems amongst others have reduced human errors, enhanced management decisions and have improved the speed of service (Ugwo et al 2000, pp. 714), we have to realize, that with the proliferation of such technologies along with social networks, apps and gadgets, promising us easier and more comfortable living, life as we knew it, has been altered to the point of no return. Who in the 1980’s (when the first computers were introduced in schools) would have imagined that we could have come to a situation where during work we are constantly juggling between sifting through emails, surfing the internet, downloading documents or in our spare time chilling out by tweeting, facebooking, playing online games….sometimes all at the same time?
Yet people still have issues with technology that directly affects their performance. Murrell and Sprinkle (1993, pp.58) explain that a change at work due to technology has sometimes resulted with employees having low job satisfaction, lack of involvement and stress that and have been associated with high rates of absenteeism and ultimately turnover. Robinson-Staveley and Cooper (1990, pp.169) agree and state that such issues can cause people to perform more poorly and become averse to learning, working or playing with the computer with the consequence of facing increasing difficulties as society and the work place become increasingly technological. Wang, Shu and Tu (2008, pp.3003) state that over tree quarters of managers in a survey felt that technology, instead of alleviating their job and job related stress, has actually increased stress and their workloads as it, not only affected usability but also availability. Who could blame them with urgently ringing mobile phones, hundreds of emails sent each minute, all awaiting their attention and feedback while the cursor on their screen blinks away awaiting their action? Just to put the cherry on the cake, generally they are often expected to be reachable by email or mobile while at home or on vacation as new technology has brought with it a greater sense of urgency with a compulsion not to waste time (Lu & Su 2009, pp.431) which can create negative thoughts and negative attitudes towards the technology used (Rosen & Weil 1992, pp.4). Such issues are not just felt by the working people but also by students who might tend to choose a course or a career over another due to these negative attitudes towards technologies (Todman 2000, pp.27) or worse off be constrained by their anxieties about computers to choose one course over another (Todman 2000, pp.28). The workers and students efficiency and productivity can also be hindered in some ways. Since technology
has made it easier for information to flow, we are now facing an “information overload” where the employee looses control over the situation with overwhelming feelings due to the bombardment of massive amount of relevant and potentially useful information available to them (Bawden, Holtham & Courtney 1999, pp.249) whether they are actively seeking it or not (Klausegger, Sinkovics & Zou 2007, pp. 697). This problem can be related to performance and work but also to the individual personal life, infact it has been acknowledged as a main stressor in recent years (Klausegger, Sinkovics & Zou 2007, pp.700). In a Reuters survey of business managers (cited in Bawden, Holtham & Courtney 1999, pp.250) two thirds of the respondents believed information overload causes loss of job satisfaction, damage their personal relationships and hinder their effectiveness in making timely important decisions, with technology such as the Internet being the main culprit for the flooding of information in a highly unstructured nature (Klausegger, Sinkovics & Zou 2007, pp.692). This might be news for some but not to others, but in a recent study (PEW Internet and American Life Project 2003, cited in Lazar et al 2006, pp. 190) it has been shown that 42% of people do not go online because technology is too frustrating and overwhelming for them.

Contrary to beliefs, this does affect the technology inclined just the same, if not worse. IT professionals, whom due to the fast growing industry and competitive pressures their companies are in, are put into an environment whereby they must continually learn and apply new technology into their projects even when, most of the time this effects their spare time and holidays (Brosnan 1998, pp. 20). This can be seen as stress that can be added to the frustration and anxiety, that computer users feel when a program crashes with no warning taking the last hours of work with it or when error messages pop-up for un-seemingly no reason or when incompatible/damaged files do not open, making the processes annoyingly delayed (Rosen & Weil 1992, pp.4). Brosnan (1998, cited in Lazar et
al 2006, pp.190) states that such experiences will surely affect performance as it makes anxious people even more anxious making large quantities of time to be wasted.

Much time is sometimes lost while we struggle with machines, yet do we know why for some of us, it is so painful to use such technology? Do we understand that such struggles and symptoms that have been coming up all through the research such as attitudes, feelings and thoughts towards a company, school or a particular job, work or course, can effect our day or mood and worsen our opinion on technology? The actual and imagined ramifications of these experiences can have a huge impact on society. But what is this? And is this widespread or are these one off cases? Is this the dark side of the computer revolution? Everything seems to lead us only to one direction… Technophobia (Murrell & Sprinkle 1993, pp.61).

**What is Technophobia?**

Substantial numbers of people express serious concerns about living in a computerized society. In the above literature, psychological factors such as anxiety, negative attitudes, negative thoughts or cognitions seem to be common amongst these people. These generally lead to stress, fear, overwhelming feelings and frustration which make this an unpleasant human experience that can lead to avoidance. Technophobia according to Rosen and Weil [cited in (Korukonda & Finn 2003, pp.81), (Rosen & Weil 1995, pp.11), (Weil & Rosen, 1995 pp.96) (Rosen & Weil 1992, pp. 7 & 8), (Brosnan 1998, pp.13), (McIlroy *et al* 2001, pp.22)] is evidence of one or more of the following:
“(a) Anxiety about present or future interactions with computer or computer-related technology
(b) Negative global attitudes about computers, their operation or their social impact; and/or
(c) Specific negative cognitions or self-critical internal dialogues during present computer interactions or when contemplating future computer interaction”

Brod (1984, cited in Sami & Pangannaiah 2006, pp.430) describes the above definition as the modern disease of adaptation caused by the inability to cope with the new computer technologies in a healthy manner and Brosnan and Lee (1998, pp.560) agree with him as they also believe that Technophobia can have associated behavioral consequences. Wang, Shu and Tu (2008, pp.3004) keep faithful to Rosen and Weil definition of Technophobia and highlight how this can be a reflection of someone’s discomposure, fear, tenseness and anxiety when one is learning and using computer technology directly or indirectly, that ultimately ends in psychological and emotional repulsion that prevents one from using such technology. Selwyn (2003, pp.103) delves more into the human experience of it all as he believes that Technophobia encompass the fear and apprehension felt by an individual when considering the implications of using technology, even when it poses no real or immediate threat. This clearly shows how technophobia can cloud an individual’s perception of technology, appearing to be “not for them”. Although other terms are sometimes used such as computer phobia, computer anxiety, techno stress and cyber phobia (Todman 2000, pp.27), (Korukonda & Finn 2003, pp.81) (Murrell & Sprinkle 1993, pp.57) (Wang, Shu and Tu 2008, pp.3003) (Sami & Pangannaiah 2006, pp. 430), there is a general consensus in literature on the word Technophobia and the definition given by Rosen and Weil as seen above, thus for purposes as well as specificity of operation, Technophobia as defined by Rosen and Weil will be used in this study.
It is important to note that people may hold both positive and negative attitudes towards computers (Brosnan 1998, pp.26), and this is confirmed by Glass and Knight (1988, cited in North & Noyes 2002, pp.136) and also by Shaw (1994, cited in Brosnan 1998, pp.26). This makes sense as it is possible to believe that for example a computer can be deskillling at an individual level but be efficient at an organizational level. Selwyn (2003, pp.111) agrees and believes that people can move between not using technology and using technology during their lifetime for example a Public Service employee could daily use his work computer yet never use their home computer on weekends. People may also be technophobic (Selwyn 2003, pp.111) according to which type of technology they use (selective) for example a real estate agent can use daily his mobile phone due to the nature of his work yet never use the computer and Internet at home.

To label someone as a technophobe (someone that has technophobic symptoms) the individual may suffer from, severe reactions on all 3 dimensions described by Rosen and Weil above, to mild discomfort on just one of the single dimensions (Rosen & Weil, 1992 pp.8). Brosnan & Lee (1998, pp.560) expand to this and state that when a technophobe does use technology, they are likely to experience negative feelings and cognitions or self-critical internal dialogue resulting in slower and less accurate performance and subsequent increase in levels of computer anxiety and negative attitudes (1990 Rosen & Maguire, cited in Brosnan & Lee 1998, pp. 560). The explanation on these 3 dimensions follows:
Technophobia – Computer Anxiety

Anxiety can be defined in a range of definitions from uneasiness and apprehension to “a state of diffuse arousal following perception of “threat” to “unresolved fear” (Epstein 1972, cited in Brosnan 1998, p.13). What is common is that it is sometimes interrelated with fear for example, for some people air travel is a real anxiety. Computer anxiety is sometimes portrayed as the irrational fear invoked by computers (Howard, 1986 cited in Brosnan 1998, pp.16) which can be seen as a symptom of modern times, partially brought on by the constant and rapid changing nature of computers and the subsequent pressure for social change. The anxious technophobe according to Sami & Pangannaiah (2006, pp.430) is the person who exhibits the usual signs of being anxious such as headaches, sweaty palms, heart palpitations while showing the below indicative behavior (Brosnan 1998, pp.16):

1. Total avoidance of computers, computer labs, internet café’s and anywhere related
2. Extreme caution with computers
3. Negative remarks about computers
4. Attempts to minimize as much as possible the necessary use of computers.

Technophobia - Negative Global Attitudes

Negative attitudes can be explained as a state of mind or a feeling towards someone or something or “a learned predisposition to respond in a consistently negatively manner with respect to an object” (Fishbein and Ajzen 1975, pp. 25). Subsequently computer negative attitudes are negative dispositions towards computers that can sometimes lead to computer misuse (Desmond 1984, cited in Brosnan 1998, pp.26). Although literacy in computers has been found as unrelated to negative global attitudes towards computers, illiteracy did
slightly impact such attitudes (Mahmood & Medewitz 1990, cited in Brosnan 1998, pp.32), thus most of the time “uncomfortable users” are slightly anxious, that leads to negative attitudes, as they lack enough information about computers to use them effectively (Sami & Pangannaiah 2006, pp.431).

- **Technophobia - Specific negative cognitions or self-critical internal dialogues**

  Cognition or internal dialogue are thoughts we have every day such as “what a nice day today is” or “I like that car” and can be described as the act or process by which knowledge is acquired such as intuition, perception and reasoning, and thus negative cognitions are negative perceptions or intuitions vis-à-vis computers such as “I am going to make a mistake”. This, most of the time, effects directly or indirectly self-efficacy i.e. a judgment of how well one can execute courses of action required to deal with prospective situations (Sami & Pangannaiah 2006, pp.433), which can be translated to self confidence in actually managing to use well a computer. Cognitive technophobes may appear cool, calm and relaxed externally but internally they are bombarding themselves with negative cognitions such as “everyone else seems to know what they are doing except me” (Sami & Pangannaiah 2006, pp.431).
Why and who should care about technophobia?

Are you a Government entity trying to implement a new IT system to facilitate and improve your customer care, maybe driven by the new call-centre idea? Are you a Director that is trying to implement a strategy based on technology automating some processes to achieve better results? Are you a middle manager trying to push forward the idea to change the current software for another to cut down the bills or maybe just updating from one version to another? Are you a teacher trying to train people to use computers? Well if you are any person that is trying to implement technology in their organization/school then individuals who are technophobic can slow you down, and in some cases, even prevent you from achieving your goals. We often label technophobes as “not in line with company goals” or “hard-headed” or “unwilling to accept new responsibilities” or just plain “old-minded”. To the contrary these people might appreciate the end result of technology but are simply afraid to embrace it. A simple example would be that, most people carry around mobile phones but those who prefer not having one, possibly due to technophobic reasons, might still like the idea that if they call from their landline phone they can reach anyone anywhere on their mobile phones. Life at home might give you the possibility to choose to avoid technology but life at work, technology is mandatory and for a technophobe, it will be tough, stressful and an anxiety-driven experience with feelings that leave them wondering if they are always one step behind the others. This can lead up to even more frustration, anxiety, and even despair. Even in Education, although computers where first introduced as mainframes that even to see required elevated privilege, nowadays computers are part of the standard curriculum (Rosen & Weil 1992, pp.5) with students required from writing on word processors to producing artistic masterpieces with computer graphics. So regardless of which end of the above scenarios you may fall, technophobia affects you.
**Technophobic Demographics**

Several researchers have tried to pin down Technophobia to specific age groups. For example in a study of adoption of interactive teleshopping, Eastlick (1996, cited in Meuter et al 2003, pp.900) states that non adopters were the older generation, similarly Raub (1981, cited in Brosnan 1998, pp.20) reported that older people where more anxious then younger people with Laguna and Babcock (1997, pp. 323) supporting this notion. However demographic variables have not consistently explained technology usage and adoption (Meuter et al 2003, pp.900). In the study of Rosen and Weil (1995, pp.18) for Technophobia amongst Public School Teachers it transpired that teachers age was not related to computer use. Similarly in a study of about 3,000 university students among 23 countries, age was not related consistently with technophobia. This is in line with Charness, Schumann and Boritz (1992, cited in Laguna & Babcock 1997, pp.319) that found no significant age differences in computer anxiety between younger and older adults.

Similar there is a no empirical support of studies related to Technophobic subjects being predominantly male or female (Rosen and Maguire 1990, cited in McIlroy et al 2001, pp.22). This is not inline with Shashaani’s (1993, pp.179) research in 5 public schools in Pennsylvania. She found out that out of 1754 students aged 13-19, girls contrary to the boys, experienced greater fear and anxiety of being involved in computers. Cooper and Hall (1986, cited in Robinson-Staveley & Cooper 1990, pp.169) created a similar study but with students aged 6-8, and found that girls were more anxious then boys. Goyal (1996, pp.41) agrees to this notion. One of the strategy points of ICT in Malta is to attract women
in the technological world while exploring reasons why this has not yet happened
(Government of Malta 2008, pp.28, 33), which adds a further point to the above two
researches.
On the other hand although Heinssen Jr, Glass and Knight (1987, pp.55) found differences
in gender vis-à-vis technophobia, it was so fractional that it was deemed by the authors as
significant sex differences in their study. Anthony, Clarke & Anderson (2000, cited in
McIlroy et al 2001, pp.22) have found that technophobia is not associated with gender in
their study of university students. Rosen and Weil (1995, pp.22) in their study of Public
school teachers explain that female teachers suffer more of computer anxiety then male
teachers while the same authors in their university students study around 23 countries
(Rosen & Weil 1995, pp.102) show that there is no worldwide consensus on whether males
or females are more technophobic.

In studies of Technophobia relating to both Age and Gender, there is clearly no consensus
and thus from the Literature Review it was deemed that Technophobic people do not have
particular demographics.
Are we Technophobic?

In many cases, individuals are unaware that they are technophobic and even if they are aware, understandably many individuals are reluctant to admit their phobia as they believe that such things are of the past (Rosen & Weil 1995, pp.27). Early studies in the 1980s showed that 30-35% of all users showed some degree of anxiety (Brosnan 1998, pp.136). Williams (1994, cited in Meuter, et al 2003, pp.900) says that in his study in 1994 he found that 55% of Americans suffer from some degree of technophobia with estimates from 10% to 50% holding negative attitudes towards computer (Gardener et al. 1945, Rosen and Maguire 1990, Weinburg & Feurust 1984, cited in North & Noyes 2002, pp.136 & Todman 2000, pp.27). In 1996, Bozionelos (1996, cited in Brosnan 1998, pp.136) identified that 21.3% of UK managers suffered from technophobia. In the year 2000 PEW Foundation reported (2000, cited in Bruber 2004, pp.81) that 41% of Americans over the age of 18 were not connected to the Internet, a figure that fortifies Williams and Bozionelos study and that shows that two decades on, technophobia remains just as relevant (Brosnan 1998, pp.3). On the other hand, how many mothers have you heard recently complaining that their children spent too much time online and too little with their real friends? In 2005 PEW created a further study, but this time focusing just on teens and technology where to most people’s astonishments, teens (aged 12-17) preferred spending more time physically with their friends doing social things then with friends through technology (email, Instant Messaging or text messaging). Other typical findings though calculate that one-third of the population in the industrial world is uncomfortable with technology (Brosnan & Davidson 1994, Heinssen, Glass & Knight 1987, Rosen et al 1992, cited in North & Noyes 2002 pp.136 & 17, pp.22 & 60, pp.7) (Brosnan 1998, pp.2).
Brosnan (cited in Korukonda & Finn 2003, pp.81) based on review of literature concludes that technophobia is in up to 50% of many populations. In 1992, Rosen and Weil (1992, cited in North & Noyes 2002, pp.143) fortified such figures by studying 503 American schools students and found that 26% of them had low technophobia and a staggering 44% had moderate/high technophobia. Rosen and Weil (1995, pp. 25) made a further study in 1995 to try and understand their 1992 findings of school students and they found out that:

1) a substantial segment of teacher population are avoiding computer technology
2) Results showing that 52% of elementary teachers, 45% secondary humanities teachers and 35% secondary science teachers are technophobic.

This possibly meant that technophobia was being transmitted from teachers to students and for Rosen, Weil (1995, pp.26) and Brosnan (1998, pp.123 & 128) this is defined as a “no-win situation” with teachers deciding, or to avoid technology or to teach computers while passing their anxiety, negative cognitions and attitudes to their students. This portrays a scenario whereby rather then technophobia disappearing with the increase of technology in society, this process may actually promote the continuation and diffusion of the phobia.

Yesterday’s teens become today’s college students and to this effect, DeLoughry (1993, cited in Meuter et al 2003, pp.900) states that he found out that one-third of college students suffer from computer-related anxiety, luckily with only a small percentage suffering sever anxiety (Rosen and Maguire 1990, cited in Meuter et al 2003, pp.900). To add to this, over a 2 year period Weil and Rosen (1995, pp.98) collected 3,392 data relating to technophobia from first-year university students at 38 universities in 23 countries. One of the many results can be seen below in Figure 1 (Weil & Rosen 1995, pp.101) where a percentage of Technophobic students are listed per country:
Figure 1 clearly shows that this phenomenon is spread and experienced worldwide, and this only depicts students that suffer from High Technophobia. This just shows how much this phobia is common with particular focus on countries such as Poland, Indonesia and India suffering from a great amount of students with high technophobia. Motorola in 1996 (Brosnan 1998, pp. 11), a year later, commissioned a survey with results showing that 49% of the general British public do not use a computer with 43% not even using any form of new technology (mobile phones, computer games etc) thus fortifying the results in Figure 1.

Figure 2, below (Weil & Rosen 1995, pp.107) gives us a hint of how much technophobia can influence a person’s choice, when they actually have one. While most students are imposed to work on a computer at the university due to digital assignment, tests and more, the same students are choosing not to buy a computer at home. This strengthens PEW foundation research discussed before where teens prefer face-to-face communications then
via technology with figure 2 showing that home computer ownership is quite to a minimum, possibly due to technophobia, with only a few countries reaching or surpassing the 50% mark.

Figure 2

Since ATMs are a common technology in most countries, with some people deeming it as part of the everyday routine, Weil & Rosen (1995, pp.110) have decided to put it as part of their research by asking the same students if they at least had used once an ATM. Figure 3 portrays the figures. Italy, a neighboring country to Malta, with possibly similar cultures and trends does not even reach the 20% usage of an ATM by it’s students.
Besides the above, other studies can be viewed in Appendix A (below) of such phenomenon that show that it can be a factor for reducing the effectiveness of increased computerization of society (Dorina, 1995 & Heinssen et al 1987, cited in Meuter _et al_ 2003, pp.900). This is so much so that awareness has increased drastically in this field! While back in the 1990 Rosen and Maguire (1990, cited in Weil & Rosen 1995, pp.96) only found 39 empirical studies, just 3 years later, Weil & Rosen (1995, pp.96) found over 100 studies reflecting an increase of three times as much in three years. Out of these only a few studies have examined technophobia in other countries (Weil & Rosen 1995, pp.98) and unfortunately none of these studies depicted the scenario in Malta. In fact, originality and curiosity sparked this author to study this phenomenon particularly through the Public Service lens.
IT in the Maltese Government

The Internet alongside computers is the medium that changed the world by creating a virtual community where businesses do business, where organizations collaborate and discuss issues and where people share, interact and communicate. 20 to 30 years later the Internet was invented, most companies now use the Internet daily to gather the benefits of information and communication technology (ICT) in general whether by using a website to market it’s products or services and offers, share experiences, or to communicate over large geographical regions amongst others. While the Internet was evolving, the Maltese Government didn’t just stand and stare at such advancements, to the contrary it created a serious of strategies so that citizens could benefit out of these new technologies. One was to reduce the cost for broadband to encourage more people to get internet in their homes (Grech, 2004), another was that Government employees could have the latest computer setup on their desks with all the necessary software they require through an exercise called “PC Leasing” (Anon, 2009) whereby the Government in 2007 leased approximately 15,000 computers for civil servants instead of buying the hardware for the fraction of their cost, while still being able to make full use of them. Not only the public employees though benefited from these strategies in fact, in 2008, Malta decided to embark on a new and more ambitious strategy named “The National ICT Strategy for Malta 2008-2010 – The Smart Island” where it’s aim is to lead, not follow, other European countries so that it can become the main ICT services hub in Europe and turn the latest economic crisis of manufacturing to a new and vibrant ICT-led economy (Government of Malta 2008, pp.4). To do this Malta created a serious of programs, agreements and initiatives that where aimed to translate ICT into better jobs, higher salaries, greater added value while improving
quality of life (Government of Malta 2008, pp.3). Some examples follow: (Government of Malta, 2008):

(1) ICT in Education

An initiative whereby huge investment were made in all schools so that children are introduced to and learn computers with more then 6,800 training programs provided over 3 years that included roughly 3,800 laptops to teachers and 6,000 computers in schools. The aim is to be amongst the leading countries in Europe such as United Kingdom and Luxembourg with a computer for every four students.

(2) ICT Training & Incentives

myPotential, a program that gives rebates to applicants that undertake specialized ICT training courses. This program had 670 people using it only in the first year.

SmartWomen, a program launched to give the necessary capability to women to start using a computer with the aim to increase women’s participation in the work market.

Blueskies was another initiative with nearly 6000 people registering for the first time, which offered free access to internet to citizens.

(3) Investments

An agreement was reached with Tecom Investments to change Malta into an ICT services hub (the SmartCity project) through an investment of up to US$300 million. This is estimated to bring around 5,600 jobs amongst other benefits.
(4) **Electronic Government (e-gov or eGovernment) Services**

E-gov service is an initiative to revisit all services offered to the public and transform them through technology into a more efficient and user-centered way to deliver public services. Governments around the world have embraced e-gov services due to its benefits that range from greater interaction, efficient public services, transparency, to saving the “taxpayer money” (Gauld, Goldfinch & Horsburgh 2010, pp1). The e-gov sites can become personal when for example a citizen wants to see his personal customer care request or his request for a new passport. This personalization is done using an electronic identification named as “E-id” (authentication mechanism) which is an electronic copy of your identity card. Citizens need to apply to get this e-id. Some Maltese e-gov sites that use e-id are:

- [www.passaporti.gov.mt](http://www.passaporti.gov.mt)
- [www.recruitment.gov.mt](http://www.recruitment.gov.mt)
- [www.mepa.gov.mt](http://www.mepa.gov.mt)
- [www.servizz.gov.mt](http://www.servizz.gov.mt)
- [www.foi.gov.mt](http://www.foi.gov.mt)

**How is Malta doing vis-à-vis other Countries?**

Paul Morris, chairman of the International Network of E-communities (INEC) defined Malta and its strategy to be “the most revolutionary, up-to-date broadband community within southern Europe within 5 years” (Government of Malta 2008, pp.21). This is true as results (CapGemini 2007, cited in Government of Malta 2008, pp.8) showed that Malta was ranked second among all EU member states in terms of availability and sophistication of e-government services with the most frequently used public services, now on-line. In the World Economic Forum (Dutta & Mia, 2009), Malta achieved very good results when compared to the other 134 countries, with some being:

(a) 17th for Internet access in Schools
(b) 2\textsuperscript{nd} for Government prioritization of ICT
(c) 5\textsuperscript{th} for Availability of Government online services
(d) 2\textsuperscript{nd} for Importance of ICT to government vision of the future
(e) 2\textsuperscript{nd} for Government success in ICT promotion
(f) 15\textsuperscript{th} for Presence of ICT in government offices.

- **What about the demand side of such services?**

Results have showed that the Maltese strategy is e-ready, but are people using it? Has the investment paid off? Have the aims of creating a better, more efficient public service been reached? These are tough questions to answer as there is a lack of studies that examine the citizen’s demand for and use of e-gov services (Gauld, Goldfinch & Horsburgh 2010, pp. 177). What is certain is that for e-gov to succeed, similarly to any website, you need to know a lot of things about your users, as they are the audience that can guarantee your success or failure. What the author means is, what’s the point of opening a ski shop when people want to swim or go to the beach? Capgemini (Wauters & Colclough 2006, p.16) agree with this line of thought and stated that the issue of low take-up of eServices by people is an important question. This is so much so that Capgemini decided to capture such data (see Figure 4 below) in their quest to understand how Europe is progressing in online availability of Public Services. Unfortunately, Malta amongst other countries did not provide any data. This raises further interest as, as can be seen below most countries such as the United Kingdom, Poland and Greece amongst others that did reply, seem to have only a few individual citizens using them.
Other studies confirmed this research and showed low use of e-gov services, with one example being a recent British study finding that 22.1% of citizens had downloaded government information, 7.1% downloaded forms and only 4.8% returned completed forms (Kolsaker & Lee-Kelley 2008 cited in Gauld, Goldfinch & Horsburgh 2010, pp. 178) which confirms that access to government services are quite low although still used. Gauld, Goldfinch and Horsburgh (2010, pp.184) through 435 telephone interviews in Australia and 498 in New Zealand found that the majority of respondents are reluctant to use e-gov services with less than half never even visited an e-gov website. The majority of respondents (70% in New Zealand) by far still preferred to deal with government through non-digital means.
Unfortunately systems still fail, even if successful in technical ways, if the intended recipients simply do not use them. Could technophobia be the reason for such slow usage and adoption? Since Malta is deemed as one of the top countries offering its Governmental services online (e-gov), it would be a great testing platform to identify if such non-adoption could be resulting from it’s citizen being effected by Technophobia. These assumptions have been made since obstacles such as “a bad website” or an “inefficient e-gov services” are not an option due to the high ranking these website have been given across Europe and the World.

Literature shows that contrary to belief, computer experience does not eliminate technophobia (Rosen & Weil 1995, pp.12-13, 27). To the contrary there are signs showing that technophobia might even increase (Brosnan & Lee 1998, pp.573) in technophobic people, with the notion that anxiety can bring more anxiety that can result to avoidance. This is very similar to public service employees who used to provide customer service face-to-face and which are now “forced” to provide this over a computer system and use an internet browser to liaise with customers or use word processing to create a letter, email to send it and a shared virtual environment to store the data (McIlroy et al 2001, pp.22). If when teaching, technophobic teachers (who can also be public service employees) passed on their anxieties and fears to the students (Rosen & weil 1995, pp.25) so can Public Service employees that offer customer service through the use of e-gov systems to their clients. When these communicate and help citizens to use such technology online they might pass their negative attitudes or cognitions and this can create a ripple effect resulting in the non-adoption of such e-gov services by the clients, possibly making such results vital for strategy makers. Teachers felt that computers didn’t aid their work process (Rosen & Weil 1995, pp.26), so what do the Public Sector Employees feel? Are these technophobic
or do they welcome with arms wide open technology and technological advancements?

With services more and more dependant on the internet and with government encouraging business to move towards e-commerce (Government of Malta 2008, pp.48) what impact will this have on the Maltese Public Service?
Chapter 3
Chapter 3 - Research Methodology

Research Paradigms

A paradigm is a set of shared assumptions or ways of thinking about some aspects of the world (Oates 2006, p.282). It is a set of lenses through which we view the world that will portray the way we will do research and gain or create knowledge.

Different philosophical paradigms have different views about the nature of our world and the ways we acquire knowledge about it, and thus this process of choosing a Paradigm is a reflective process where one evaluates beliefs, opinions and interests (Burke 2007, pp. 477). Once a Paradigm is chosen it demands commitment to its principles (Goulding 1999, pp.870). A paradigm includes three elements (Naslund 2002, pp.323):

- **Ontology**

Ontology can be defined as theories of reality, i.e. the underlying assumptions made about phenomena under study (Cornford & Smithson 2006, pp.61). Ontology focuses on the basic questions of whether an objective reality exists or not (Naslund 2002, pp.323). This philosophical dimension will help this study focus on the reality constructed by the respondents of the Maltese Public Sector involved in the research following their experience with technology (Akehurst et al 2011, pp.5). In ontology this perspective is called Realism i.e. things really exist with real concrete characteristics (Cornford & Smithson 2006, pp.61), and it will be used to guide the study in answering its Research questions.
• **Epistemology**

Epistemology deals with how the world is perceived by the individual, and the relationship between the individual and the known (Naslund 2002, pp.323). It deals with how one might understand the world or the phenomena under study and communicate this as knowledge to others (Cornford & Smithson 2006, pp.61). Positivists believe that all true knowledge we may obtain is based on the observation or experience of real phenomena in an objective and real world (Cornford & Smithson 2006, pp.59). The aim of the study goes hand in hand with the positivist’s perspective as it will use a questionnaire to obtain knowledge (facts that are reliable) about technophobia and that is why such perspective will be used (Oates 2006, pp.283). In the study of Orlikowski and Baroudi (1991, cited in Cornford & Smithson 2006, pp.62) in leading information systems journals, they found that 96.8% of such research followed the positivist perspective, which further fortifies this choice.

• **Methodology**

Methodology describes how we will gain knowledge about the world for this research (Naslund 2002, pp. 323), the data generation methods. There are two types of data generation methods: The Quantitative and the Qualitative method.

The Quantitative method is characterised by the assumption that human behaviour can be explained by facts (numbers) which can be gathered and investigated through specific tools (eg questionnaire) to describe a phenomena under study (Cornford & Smithson 2006, pp.62) (Amaratunga et al 2002, p. 22). This method would deal with using mathematical
approaches for testing the research questions/hypothesis by measuring objectively the “how much”, the “how often” or the presence or absence of a given situation in a particular scenario (Oates 2006, p.38, 246). Therefore a quantitative approach involves collecting and analysing numerical data for patterns to gather facts about the subject (Amaratunga et al 2002, p.30). The quantitative method is sometimes criticised for being past oriented, complex, focusing just on numbers and for not going into any depth of the problem or the meaning of the problem (Naslund 2002, pp.329) (Oates 2006, pp.263).

The Qualitative method is based on an investigation of the broad and rich descriptions, ideas and meanings of the individual concerned (Naslund 2002, p.328). Denzin and Lincoln (1994, cited in Naslund 2002, pp.329) believe that such researchers applying such method should study things in their natural settings while attempting to make sense or interpret the phenomena under study in terms of the meanings it brings to people. Amaratunga et al (2002, pp.19) agree and state that such method focuses on the meaning of things while trying to understand what is happening. A typical researcher using a qualitative method spends time “in the field” investigating small samples in depth by using non-numeric data such as words, images and sounds (Oates 2006, pp.266). This method is sometimes criticised for being just an exploratory type of research due to the lack of enough information about the data analysis and thus not scientific, while full of bias (Naslund 2002, pp.329) (Oates 2006, pp.267).

Quantitative and Qualitative methods are not divergent but they focus on different dimensions (Amaratunga et al 2002, p.23) and that is why Cornford and Smithson (2006, pp.153) believe that both methods can be seen as complementary to each other, as each contain their particular useful set of tools. This method is called the Triangulation method.
and is the combination of methodologies in the study of the same phenomenon (Amaratunga et al 2002, p.23) (Oates 2006, pp.37). The idea was spurred out of the assumption that triangulation is a possible solution to counter-balance each methodologies weaknesses with the strengths (Amaratunga et al 2002, pp.23). This method would help in elaborating this research analysis of the quantitative data by providing richer details, meanings and experiences using qualitative data thus providing fresher insights to the heart of the problem. It can be deducted that researches sometimes suggest that a single methodology fails to explore different aspects of a study as research results generally mean different things to different people thus a balanced mode of methodologies might just provide the clarity a research so desperately needs (Oates 2006, pp.37).

**Research Strategy**

- **Surveys**

The survey strategy is a strategy closely associated with the positivist philosophical paradigm, where the author can focus on collecting the same kinds of data from a large group of people in a standardized and systematic way (Oates 2006, pp.35). Data obtained this way could then be analysed for patterns using statistical measures to understand the phenomenon under study. A cluster sampling technique will be used whereby Public Service employees within the Ministry for Justice and Home Affairs and the Ministry of Foreign Affairs will be asked to participate to get an idea of how a sample of the Maltese Public Service reacts to computer or related technology.
Data Collection

Since a Triangulation method will be used under a Survey strategy, it was decided to use Questionnaire as the Quantitative method to assist the researcher in gathering data that can be analysed and interpreted for this research. On the other hand Interviews were chosen as a vessel for the Qualitative method to gather better an understanding on the meaning and experiences that people feel.

- Questionnaire

The questionnaire will be divided into 4 parts as seen in Appendix D (below). The first part will collect demographics and also a “Yes” or “No” answer to the question of whether the respondents have an Electronic Identification (e-id) to access E-gov services. The other three parts will be related to the actual Technophibia tests created by Dr Rosen and Dr Weil (1992). One will hold questions related to Computer Anxiety named Computer Anxiety Rating Scale (CARS), another will hold questions related to Computer thoughts named Computer Thoughts Survey (CTS) and the other will have questions related to General Attitudes towards Computers named General Attitudes Towards Computer Scale (GATCS).
CARS (Form C) (Rosen & Weil, 1992)

CARS contains 20 likert scale questions scored from 1 to 5 with 1 indicating a response of “not at all” and 5 reflecting a response of “very much”. CARS contains items created to assess technological anxiety that includes anxiety about the machines, their role in society, computer programming, use (including consumer use) and issues with computers and technology. Scoring is divided into three parts: Interactive Computer Learning Anxiety, Consumer Technology Anxiety and Observational Computer Learning Anxiety with the higher the score the more computer anxious the subject is.

CTS (Form C) (Rosen & Weil, 1992)

CTS was modelled after the CARS with a similar 20 likert scale questions that ranks from “not at all” to “very often”. CTS reflects how often the respondent had each thought (depending on the question) when working or thinking of technology and assesses directly computer enjoyment. CTS differs from CARS as 11 questions are phrased negatively while the other 9 items are phrased positively. Negative items were reversed-scored to yield a summated score with higher numbers reflecting more positive cognitions and lower numbers reflecting more negative cognitions.

GATCS (Form C) (Rosen & Weil, 1992)

GATCS is also modeled with a 20 likert scale questions that ranges from “Strongly Agree” to “Strongly Disagree”. GATCS contains items created to assess attitudes towards
computer in education, in employment and in health care. It also assesses attitudes towards computer control, inequity in computer ability, solving societal problems using computer and computers and future jobs. Similar to the CTS, GATCS also was formed with 10 items stated negatively while the others positively. After reverse scoring the 10 negative items, the GATCS higher scores will yield more positive attitudes towards computers and technology while lower scores reflect more negative values.

- **Interviews**

Interviews will be used to get a more colourful picture of how the interviewee will react to certain questions and explore related topics into more depth with the purpose to try and understand better the meaning of such outcomes and gain an appreciation of the organizational context within which the interviewee is addressing the topic. Cornford and Smithson (2006, pp.120) view Interviews as a complement to questionnaires and in fact, for this research the author decided to use Interviews to collect data before the Questionnaire so that he can obtain themes and privileged or personal data such as experiences and opinions in a qualitative way (Oates 2006, p.187). Denzin and Lincoln (1994, cited in Naslund 2002, p.329) support this idea and explain how qualitative methods can be used effectively before a quantitative method to familiarise oneself with a scenario before the sampling and counting begins.

As can be seen in Appendix B (below), the Interviews will be held in a structured way by using pre-determined identical questions for every interviewee. Besides collecting demographics, the first three questions will be based on Technophobia and Self Negative cognitions or self-critical Internal Dialogue, Technophobia and Computer Anxiety and
Technophobia and Negative Global Attitudes (based from the questionnaire). The last 3 question will be related to Technology and the Public Service.

**Sample Selection Rationale**

For the Interview, 10 people from different sections within both Ministries where chosen randomly to attend an interview. The idea was to avoid that these people talk between themselves before or after the interview and thus minimise the risk of influencing one another.

For the questionnaire, the author distributed both online and hardcopy versions to 250 participants within the Ministry for Justice and Home Affairs and the Ministry of Foreign Affairs in Malta. As described previously, the subjects where chosen due to their sure interaction with computers and technology both as a Public service employee offering a service to the public through technology or as a normal citizen of Malta making use of an e-gov service. Participants of the questionnaire may have different roles within the Ministries, which reflect the top to bottom organisational structure. Some roles to provide a better range follow:

Permanent Secretary, Director General, Director, Chief Information Officer, Assistant Registrar, Assistant Director, IT Staff, First, Second and Third Secretaries, Customer Care Officer, Senior Principal, Principal, Executive Officer, Clerk, Receptionist.
Research Instruments Rationale

The Questionnaire was created both as a hardcopy version and an online version using SurveyGizmo (www.surveygizmo.com). Data collected this way will be used in Pie Charts, Bar Graphs and Cross tabulation Reports to understand if certain patterns exist and the meaning of these results. In both versions the author asked for volunteers to participate while explaining the purpose of research and how their data will be used, and in no way or form obliged people to participate (view Appendix C below). In the same way the respondents where not asked for any personal details but instead where left to be anonymous contributors. To make sure that data collected would be reliable CTS, CARS and GATCS questions where marked as mandatory. The hardcopy versions where left at a central location within the Ministries for participants to take. Two big boxes where strategically placed in each floor of each Ministry so participants that used the hardcopy versions could submit their questionnaire while still keeping their anonymous state.

Interviewees were approached and notified by word of mouth to attend such Interviews. This included discussing the purpose of such task, the permission to use audio–tape recorder to provide a complete record of everything said, and also the use of transcription while keeping their contribution anonymous. The rationale of using this method is to extract significant statements to attempt to formulate meanings out of each statement. These are then themed into a rich description of the phenomenon under study (Goulding 2005, pp.303).
**Instrument Validity and Reliability**

The Questionnaire was developed originally by Rosen and Weil (1992) following 14 studies using research best practices with thousands of university students, elementary and secondary school teachers, Business people and second school students. This included a study of 3,392 students in 38 universities from 23 countries (Weil & Rosen 1995). These instruments have been used by a lot of other authors [(Shashaani 1993, pp.172), (Heinssen Jr, Glass & Knight 1987, pp51-56), (North & Noyes 2002, pp.140), (McIlroy et al 2001, pp.23-25)] validating Dr Rosen and Dr Weil’s work. In their original studies, CARS was used 9 times, CTS 2 time and GATCS 8 times. **Appendix A (below)** shows how in Study 1, 2 and 8, CARS, GATCS and CTS where validated while the rest of the studies show how Technophobia correlates amongst university students, school students, with Literacy and Experience and many more with each measure assessing the relative part of technophobia.

The Interview items were developed from leading research examples and following research best practices [(Cornford & Smithson 2006, pp.210) and (Oates 2006, pp.187)]. The questions where molded from the Questionnaire, involving CTS, CARS and GATCS, thus it’s validity and reliability applies also for the Interview.
Chapter 4 – Findings & Analysis

This chapter will document the major findings of this research and analyse the data collected for related significance and correlations to provide answers to the Research Questions. It will also compare and contrast past beliefs and studies discussed during the Literature Review, strengthened or weakened by statistics collected with quantitative measures (questionnaire) that will include an evaluation and cross-referencing of items such as Demographics, the analysis of attitudes, cognition and anxiety vis-à-vis technophobia and in depth analysis of the scores of the instruments used and their subsequent subscales. These will then be “brought to life” by further insights through data collected using qualitative data measures (interviews). Although extracts of results will form part of this chapter, for more details please view Appendix E and F.

- General Statistics

The questionnaire was sent to 250 Government of Malta employees, out of which 116 (46.4%) submitted the completed form back. Out of these 116 respondents a staggering 96.6% (112) of respondents used the online questionnaire while only 3.4% (4) of respondents used the manual forms. Out of all respondents 64% are currently registered and own an E-id to access e-gov website while 36% do not, as can be seen in Figure 5 below. On another note, 10 people where asked to participate in an interview, but only 4 (40%) accepted such invitation.
Figure 5 – E-id Findings

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>72</td>
<td>63.7%</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>36.3%</td>
</tr>
</tbody>
</table>

Demographics

As can be seen in Figure 6, there were a fair mix of different ages in the responses, with the age group between 30 and 40 being the major respondents of the questionnaire. 55% of all respondents were female while 44% were male. The remaining 1% did not disclose this information.
Figure 6 – Age Group Findings

Details of interview respondents follow:

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Position Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>54</td>
<td>Operational Staff</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>Senior Management</td>
</tr>
<tr>
<td>Female</td>
<td>33</td>
<td>Senior Management</td>
</tr>
<tr>
<td>Male</td>
<td>55</td>
<td>Middle Management</td>
</tr>
</tbody>
</table>
### Findings - Technophobia Scores

Results of the questionnaire can be seen on Appendix E and these were based on Drs’ Weil and Rosen (1992) instruments and studies. Each dimension or instrument (i.e. CARS, CTS and GATCS) was divided into 3 possible scoring: No Technophobia, Low Technophobia and Moderate/High Technophobia and the findings are as follows:

(a) Scores resulted from the instruments used, show that a staggering 58.6% of respondents suffer from some degree of technophobia.

(b) Out of these 58.6% technophobic respondents, 19% suffered from moderate to high technophobia while 39% suffered from Low Technophobia in any of the three dimensions.

(d) From all of respondents, 64% had an E-id and 36% of these where technophobic.

(e) From all technophobic respondents (58.6%), 35.3% of these had E-id

(f) As can be seen below in Figure 7, out of a total of 58.6% respondents, 25% were male while 33% were female.

(g) 56% of all male respondents suffered from Technophobia on any of the 3 dimensions

(h) 59% of all female respondents suffered from Technophobia on any of the 3 dimensions

(i) Figure 8 below shows the age group of the 58.6% Technophobic respondents.

(j) Figure 9 below shows the technophobic percentages of the age groups out of all the respondents
Figure 7

Statistics of Respondents & Technophobic Respondents vis-a-vis Gender

- Total
- Male
- Female
- Unknown

Figure 8

Age Group of the Technophobic Respondents

- u20
- 20-30
- 30-40
- 40-50
- 50-60
- 60+

Percentage (out of a total of 58.6%)
Interview results will be synthesised in the analysis phase to bring more colour to the questionnaire results obtained.
Analysis - Technophobia Scores

Answer to Research Question 1 (RQ1) & Research Question 2 (RQ2):

- Does Technophobia (fear or dislike of Computers and related technology) exist in the Maltese Public Service?
- How vast is Technophobia spread within the Maltese Public Service?

Out of 116 replies from participants of the questionnaire, more than 58% of the respondents suffers from a degree of technophobia on any of the 3 dimensions. So, YES Technophobia in 2011, does exist in the Maltese Public Service and the group is quite hefty in numbers. This is contrary to the majority of beliefs of the interview respondents who strongly refuted that technophobia exists within the Public Service with common answers such as "employees today embrace computers as it facilitates their job" with one particular statement being “…whoever still fears technology is in the minority and can blame his/her own self for not availing themselves of the opportunities provided”. Questionnaire results though are clearly inline with studies mentioned in the Literature Review from Williams (1994, cited in Meuter et al 2003, pp.900) and Brosnan (cited in Korukonda & Finn 2003, pp.81) and also the study of Weil and Rosen (1995, pp.101) where, as was seen in Figure 1, technophobia seemed a common symptom felt by most of the 23 countries studied. This meant that, Malta or at least the Maltese Public Service can unfortunately form part of such group which could result with Technophobia having a major effect on Government ICT plans and strategies. This is because, as discussed earlier, regardless of your title or role within a company, technophobia affects you as it inhibits the business effectiveness of workers and managers alike (Brosnan 1998, pp.136) by simply slowing you down. This
happens as since work is now considered a computer related activity, for technophobic people, everyday work will be tougher, stressful and an anxiety-driven experience which may result in slower productivity, inaccurate results or even sometimes avoidance (Brosnan 1998, pp.16) (Brosnan & Lee 1998, pp.560). Now imagine having 58.6% of your staff suffering from such symptoms, and imagine yourself as a manager, trying to teach your staff to offer certain services to the public over computers or related technologies while meeting tight response times set by top management. Yes, even reading this myself makes me feel stressed, and that is why understanding that the Maltese Public Service is Technophobic is a very good start and is inline with what Capgemini (view Figure 4) tried to understand when they gathered statistics to compare between supply and use of e-gov services in Europe. Countries then had the advantage to at least see results black on white, and thus had the possibility to improve. This is the same advantage this research is hoping to provide to Malta, with the possibility of viewing exactly where the problem lies. After all to promote anything, for people to consume or use, one needs to understand what is requested and who wants it and if there is a lack in results/sales, to understand why this is so. If we had to take Malta’s case, although one might try to solve the problem of slow adoption for e-gov services by bettering the overall service, such as by introducing more intuitive menus or easier access, it would result futile, at least for the 58.6% that suffer from technophobia, as their problem is another. Although this research will not delve into how to cure technophobia, it still wants to point out that such symptom should be part of everyone’s Strategic agenda as, as it was seen, technophobia will affect your end results and goals if not tackled. These can be affected as follows:

(1) If an IT project is successful with big profits within a country, imagine how much bigger the profits and the success would have been if it included also the percentage of
people that did not utilize your service or product because they suffer from Technophobia. Translated to the Maltese Public Service it would be 58.6% bigger.

(2) If Rosen and Weil (1995, pp.26) and Brosnan (1998, pp.123 & 128) are correct when stating that Technophobia can be transmitted from teachers to students, the same way will the majority of the Maltese Public Service that suffer from technophobia transmit their symptoms to whoever they teach to use such e-gov systems whether internal users or the citizens who are trying to learn how to use it, diffusing technophobia even further. Although this cannot be proven since this is the first kind of such study known to the author within the Maltese Public Service, the eventuality of this happening could create havoc to businesses promoting IT or to the Government’s ICT Strategy as they would be creating a service which less and less people would use.

(3) Most people are unaware that they are technophobic, or if they are, they are reluctant to admit it (Rosen & Weil 1995, pp.27) and this does not benefit the workplace as if they do not admit it, they would not try to improve the situation and that can lead to aggravating even further their phobia. This was clearly seen during the interview process whereby it was noted that all respondents discussed the subject with a firm believe that they where not technophobic yet some were very defensive in their answers and showed signs of uneasiness when confronted with diverse questions. This is why such issue needs to be tackled at a strategic level.
**Answer to Research Question 3 (RQ3):**

- Who is being affected by Technophobia?

This question can be analysed in two parts, Age and Gender. With regards to Gender, there was quite a slight shift on females being more technophobic than males with a 33% and 25% respectively out of the 58.6% of technophobic respondents. This percentage though still required fine tuning since originally 55% of the questionnaire respondents were female while 44% were male. One can so deduct that 59% of female respondents suffered from technophobia on any of the 3 dimensions compared to 56% of male respondents. This brings the percentages tilting slightly to the Female gender, although one must admit that this was not so strong to call. This finding is in agreement with the majority of authors, (Rosen and Maguire 1990, cited in McIlroy et al 2001, pp.22), (Colley et al, 1994, cited in McIlroy et al 2001, pp.22) (Weil & Rosen 1995, pp.102) that found no correlation of technophobia with gender, or with finding that females are slightly more technophobic than males but with statistics too close to call (Heinssen Jr, Glass & Knight 1987, pp.55). This was also the voice of all respondents of the interview process whom strongly believed that gender has nothing to do with technophobia but had to do with “computer ability and will”. The main fact though still is that when discussing genders, more then 50% where technophobic which tells us more than any other fact. This proves once again that technophobia is not gender related but confirms that it is an issue that still lives on in both genders.

With regards to age groups, as was seen in Figure 8 above, there was quite a balanced mix, with 30-40 year olds having the highest percentage of 17% out of 58.6% of technophobic
respondents. This again needed some fine tuning and Figure 9 uncovers the truth by showing us that more then 85% of the 60+ year olds age group are technophobic, with 40-50 year olds closing in with 76% and 30-40 year olds with 62%. Here results confirm that due to the high percentage of the 60+ age group, any respondent falling within this age group, would have a higher possibility of being technophobic, then in any other age group. On the other hand one must still mention that this does not mean that the older one gets, the more technophobic he/she becomes. To the contrary, results showed that there was no gradual increase of technophobic respondents per age group as for example, from all respondents falling between the age of 50-60, only 46% were technophobic while for the respondents between 20-30 age group, this was higher (48%). This finding is in line with the majority of researches discussed previously that concluded that age is not correlated to technophobia. During the interview process, although age was not tackled directly, the majority of respondents still voiced their opinion and believed that Age does play a part in technophobia, which is again in contrast to the questionnaire results. According to them, this was so because they believed that the older generations, most of the time, had managerial jobs and thus would find it embarrassing to admit their troubles to others. It was also believed that an odd 18 year old was more likely to live on a laptop connected to the internet then your odd 60 year old mainly because the younger generations were more likely, due to studies, to have the infrastructure to do so.

So to answer the question, the majority of people that suffer from technophobia have a slight possibility of being more Female than Male but with a higher possibility of being aged 60 and over.
Other Questionnaire Findings

Maltese Citizens can only avail themselves of E-gov services by using an E-id. Findings show that 64% of the Maltese Public Service has registered for an e-id. This does not mean that 64% use e-gov services, but means that 64% can actually make use of such services. Mind you, this is not at all a low score, but one must assume that out of these 64%, there is also a small percentage that might have been obliged to apply for one, due to work related matters and so this percentage starts to feel a bit tighter. This is especially fortified if such percentage was equal to the respondents that are technophobic and have e-id, i.e. 36%. If this was so, only 28% actually have the possibility to make use of such e-gov services which begs the questions… Has the investment paid off? Results have showed that the Maltese strategy is e-ready, but are people ready to use it? Have the aims of creating a better, more efficient public service been reached? These are questions where Technophobia might be affecting the answer for. What is meant is that Yes, technophobia has all the ingredients to provide slow usage and adoption of such services as it was proven that people living in 2011 still suffer from it, and if statistics could be reduced to 28% due to it’s cause, if technophobia was tackled, it could open up doors that can lead up again to 64%, that could in turn further increase per year since transmission of technophobia would be reduced drastically. Having said so, the Maltese Government ICT Strategy plan for advancement of the ICT in Malta in general is still required, what is being discussed here is the realization that Technophobia is an issue and that we should introduce ways to combat it within the strategy itself to further enhance the already big success of such National plans.
Microanalysis of Scales

The author delved into more depth of the respondent’s questionnaire by microanalysing the scales of the 3 dimension and dividing them into smaller segments so as to provide further insights and opportunities for understanding the results. The most interesting results have been analysed and their description follows:

CARS – (i) Interactive Computer Learning Anxiety

As can be seen in more detail in Appendix F (below), this category includes items such as learning through a course or a class about computers, operating them, applying for jobs that require computer ability and dealing with computer purchasing, errors and mistakes.

Looking at the respondents’ answers to such questions or statements it is immediately visible that out of 11 questions the majority (5) of the questions showed that they are anxious when faced with such scenarios with answers such as 58.6% of all respondents stating that they feel anxious when “learning how a computer works”. Today everyone buys his or her own computer or laptop, some are also utilizing online shopping for this, and in such circumstances it might seem that such task nowadays can be considered as mundane. Yet the Maltese Public Service respondents felt otherwise with a striking 50% of responses showing that tasks such as “Thinking about buying a new personal computer” or “Erasing or deleting material from a computer file” makes them anxious. While asking respondents during the interview about their bad experiences with computers and related technology, the majority agreed that with different countries using different systems, with new systems always being introduced and updated, with how the internet and emails has made communication easier, problems with file extensions is becoming popular. They said
that not having the ability to open a document due to “unrecognized” file extensions, especially when urgency is mandatory, made them feel very anxious and helpless.

CARS - (ii) Consumer Technology Anxiety

This segment included 4 questions (view Appendix F) with respondents providing a balanced level of answers, with for example, respondents not feeling anxious when “Resetting a digital clock after the electricity has been off” but offsetting this trend with being anxious when “Programming a microwave oven”. This is very similar to the results found by Selwyn (2003, pp.111) discussed earlier in the Literature Review whereby people can be selective on which technology they feel technophobic. Another interesting factor is that respondents felt that they would be anxious if they where “Taking a test using a computer scoring sheet”. This is in total conflict to the nature of the data collection process of this questionnaire whereby only 3.4% used a manual form, clearly showing that they preferred using the online questionnaire.

CARS - (iii) Observational Computer Learning Anxiety

This segment included 6 statements placing the respondents in a situation where they have to observe computer equipment or technology or be observed using these. Respondents answered favorably with no-one feeling neither slightly anxious on any of the statements. The striking factor was that 76.7% of respondents admitted in using ATM’s with no problem what so ever, which clearly contrasts results by Weil and Rosen (1995, pp.110) discussed previously, showing that most students in most countries did not use ATMs (view Figure 3).
.CTS – (i) **Computer Enjoyment**

Respondents replied very positively to such subscale and clearly expressed feelings of enjoyment while using a computer with over 90% “enjoying learning about this” and over 80% stating that “this will be fun”. This was also the feeling perceived by all respondents during the interviews, although it was also mentioned that building a project based on IT meant extra effort for the owner of the project. This was so because, everyone knows how to use paper and pen and thus can easily work on a manual system. With the IT system, this was not possible as skills of using a computer varies and thus where required to go through the hassle of meeting with people, training them so on so forth.

**CTS – (ii) Individual Scales**

Since this scale is based on positive and negative cognitions it was decided to take a deeper look at the individual replies of CTS, where one can notice that respondents seem to still believe that they “are going to make a mistake” (52%), “everyone else knows what they are doing” (68%), “I am totally confused” (51%), “What if I hit the wrong button?” (54.3%), “I feel overwhelmed by how much I don’t know” (67.2), “I won’t be able to get a computer to do what I want” (61.2%), clearly showing that the majority show signs of lack of confidence in computer ability. During the interview process, respondents did not feel so negative when posed with statements such as “Afraid to explore due to fear of breaking a computer system” or “I won’t be able to get a computer to do what I want” as in both cases the majority felt that although this feeling is sometimes felt by people, it is only felt in the minority of the cases. These thoughts of incompetence that where expressed also by Murrell and Sprinkle (1993, pp.60) in their study can lead to stress, apprehension and anxiety and when people are thinking like this (negatively), using a computer can become something out of the norm, when in reality it isn’t (Selwyn 2003, pp.103).
Though clearly in the minority, in the total of the individual scales, there were still respondents who found computers as interesting (92.2%) and were willing to give them a try (94.8%) and also believed that this will make their work easier (87.9%). This was in line with statistics gathered by Wang, Shu and Tu (2008, pp.3003) whereby the majority of managers felt that computers where actually increasing stress and workloads.

GATCS - (i) **Attitudes towards computers in education**

On the whole, respondents had a positive attitude towards computers in education with 87.1% believing that “computers are a good teaching tool” and 80.2% stating that “computers prepare students for the future”. Only 30.2% of respondents stated that “computers increase the amount of time we have for other activities” which is in complete agreement with the argument discussed previously on “information overload” whereby Bawden, Holtham and Courtney (1999) and Klausegger, Sinkovics and Zou (2007) portrayed that bombardment of massive amounts of information has made it harder to make a quick decision while giving you the feeling of “losing control”. Yet this was in complete disagreement with Cronin *et al* (2006) findings, that earlier stated that in the HR field, computers did increase the amount of time for other activities and this was felt strongly.

GATCS - (ii) **Attitudes about computer control**

Respondents made it clear that they are still fearful of computers taking over one day, with 63% agreeing to it. Only 30.2% disagreed to the statement “Computers are taking jobs away from people”. This is an important factor as all interview respondents believed otherwise and even stated that this was something that happened in the old days, yet the questionnaire again shows us another picture.
GATCS – (iii) Attitudes about Inequity in computer ability

One of strongest aspects whereby respondents showed a clear and concise agreement on, was that there was no inequity in computer ability by stating that only 8.6% agreed to “It takes a good math background to learn to use a computer” and only 9.5% agreed to “Men are better with computers than women” while only 16.4% agreed to “Some ethnic groups are better with computers than others”. This was inline with the interview process, as people responded very strongly with a “No” to computer inequity and advised that if some people still believe so, then this was a misconception as “Computer ability is based solely on ability and the person’s will to learn”.

- Further insights gathered from the Interview process

When confronting directly the Interviewees, about how would they feel if the Ministry told them that the next big project that relates to them will be based on an IT system that would be used daily, all respondents replied in favour of such circumstances, while being very assertive yet remaining quite calm, which gave me the impression that they were quite confident about using IT and a long way from being technophobic. This was fortified by the majority of the respondents positively believing that the Maltese Public Service would definitely be in favour of an electronic system instead of a manual system. Yet, when the author faced them with reality of an electronic version by questioning if “the Public Service would feel anxious if they would be faced with a new computer system or upgrade?” every belief seemed to crumble down, with half of the respondents believing that the majority of the Public Service would feel anxious while showing signs of uneasiness and the other half
turning quite defensively, stating that some would be anxious, but maybe not the majority of the lot. Again qualitative data, provided us with some insights, showing us it’s main attribute, which is that of getting a better understanding of the lived world by constructing the actual social reality with explicit values, by focusing on the in-depth detail that can only be collected when the researcher immerses himself to collect the “insider view”. This has helped the process to explore a complex research area about which little is known.
Chapter 5
Chapter 5 – Conclusions and Recommendations

It’s the year 2010, 6th March to be exact and while looking at the mirror I noticed my face was grinning and I could swear I could hear birds sing. I had just returned home following a whole day “unplugged” from all the gadgets and electronics due to the National Annual Day of Unplugging, to find all my precious technology flashing at me for attention and with my mobile phone ringing to my new bird sounding ring tone, the one I had totally forgot that I had set. Ok, so this was no Disney fairy tale, I admit, yet, actions during the whole day such as the continuous movement of my hands towards my trouser pockets whenever I heard the sweet ringing of mobile phones, thinking it was mine, yet realizing I had left it at home, on purpose, made me take a lot of deep long breaths. Yes, you heard it right from the horse’s mouth, every time I realized I had left it at home, and on purpose, I was going to have a stroke (through anxiety), still not everyone feels the same way. While some people simply feel that they cannot survive without their twitter or facebook account, it has been proven that there are still quite a number of people whom usage of such technology makes them anxious, stressed or even overwhelmed. Come to think of it, I believe anyone opening his phonebook (and yes I mean the one on your mobile phone not that hardbound set of papers with wavy corners and hardly legible scribbles on it) could identify a friend, colleague or family member who is almost always unreachable on his mobile phone, that most probably resulted in making you save his landline phone number under his/her name aswell. The same happens when new technology is introduced, some just wait in line to grab it on its first day of release while others seem to wait until it becomes almost necessary to buy one. Back last year I would have easily concluded that maybe this was because some people are technology enthusiasts while others aren’t, but
today I am of a different opinion and think, what if these people unfortunately suffer from Technophobia? The National ICT Strategy for Malta (Government of Malta 2008), had correctly tried to impose measures to remove or fairly reduce obstacles for all citizens to start using e-gov services, as in contrast to private organizations, that can just ignore certain customers, the Government has to somehow create a level playing field for all citizens to use (Pieterson, Ebbers & van Dijk 2007, pp.154), that ranges from the information elite, i.e. the active information and communication seekers, the electronic middle class i.e. those who have access to digital media, but use it moderately and ending with the digital illiterate, whom are unconnected for a range of reasons with an example being, the unemployed that are unconnected due to low or no income. Free or cheaper Internet, investing in ICT related infrastructure in schools and Training, and other related courses that were discussed in Chapter 2, are some of the measures the Government of Malta took to combat the lack of sufficient computer skills and to connect the unconnected. Although this is very useful in guaranteeing that citizens are benefiting from such services, it seems though that there is a missing group, one that may fall in any of these ranges, those that suffer from Technophobia. This was deducted through this research from the answers to the Research questions which depicted that:

(RQ1) The full extent of technophobia within Malta is now visible to the naked eye, and can no longer be called a myth or “something of the past”.

(RQ2) With 58.6% of respondents of the Maltese Public Service suffering from technophobia symptoms, the percentage is so high that it can be seen as more “normal” to be technophobic than otherwise.

(RQ3) Age and Gender are not correlated to Technophobia but it is the culture surrounding technology that people judge with, that fantasizes such connections. This is so much so that one of the results that is most astonishing in this research is that respondents falling
within the age group between 20-30 had a higher percentage of technophobes (48%) then for the age group between 50-60 (46%), which clearly defeats the notion that the older one is or gets, the more technophobic he is or can become.

With Technophobia being perceived to be one of the most challenging issues in Information Systems Research today (Sami & Pangannaiah 2006, pp.430), Governments around the world have quite a task on their hands, as in some way or another Technophobia affects them. With Governments like other Service Providers implementing a diverse range of technologies to allow citizens/customers to produce and consume services electronically (Gilbert, Lee-Kelley & Barton, 2003, pp.899), the last thing that they wanted to hear about, was a phobia that unfortunately affects use and adoption of such technologies. Moreover, a phobia that is affecting a large chunk of people, as for the Maltese Public Sector this can be translated to the majority, that could explain circumstances such as: slower performance of certain employees while using technologies, low reliance and usage on computers and related technologies to even users getting anxious, nervous or stressed to the extent of producing less accurate performances with a subsequent increase in levels of computer anxiety and negative attitudes (cited in Rosen & Maguire 1990, Brosnan & Lee 1998, pp. 560). Even worse, is the clear picture the author received from the interviews performed, where people felt that this was something of the past, that people are over technophobia and use computers and related technology regularly and willingly, with almost the conscious certainty that the majority of the Maltese Public Service being “always connected”. Well, results show otherwise, and such information brings to the plate just how much technophobia can be a problem if it is unnoticed. Without the realization of the problem, the problem will never be tackled let alone resolved.
Technophobia has to be taken seriously as in the USA alone, at least $4.2 billion per year are being lost due to technophobic-related symptoms (Elder et al 1987, cited in Brosnan 1998, pp.137) with Howard (1986, cited in Brosnan 1998, pp.137) even stating that managers suffering from technophobia accounted for the USA’s drop in competitiveness in the early eighties. Moreover with Technophobia having the ability to cloud an individual’s perception of technology, appearing to be “not for them” it can be defined as the modern disease of adaptation caused by the inability to cope with the new computer technologies in a healthy manner that can have associated behavioral consequences (Brod 1984, cited in Sami & Pangannaiah 2006, pp.430). Mind you, the author is not insinuating that strategies and initiatives should all be turned into paper balls and thrown in the garbage, while mimicking Michael Jordan’s movement (or thinking we are), to the contrary, having the knowledge that Technophobia exists can provide you enough insight to help adjust the current measures and align them to both businesses and customers alike, which will in turn help you reach new markets or further segments of people that possibly you never understood and catered for, at least until such phobia is tackled.

With Technophobia living on from the 1980’s and still being felt in 2011, it shows just how much such phenomenon was underrated by everyone, and such mistakes always come with a price tag, which today can be viewed as one of the main factors that reduces the effectiveness of the computerization of society (Dorina, 1995 & Heinssen et al 1987, cited in Meuter et al 2003, pp.900). And when the author says society he mean the whole lot, so if you are a Business trying to implement a new internal IT system, OR if you are a manager driving technological change, OR if you are an employee suggesting to replace the current technology with a newer version, OR if you are trying to implement a new cost-saving scheme involving more technology, OR if you are a Government, trying to increase
efficiency in the Public Service, Technophobia will affect you. That is why the following is being recommended:

(1) Governments should understand how Technophobia can or is currently affecting them and find ways to decrease such phobia. This will provide them with an opportunity to better understand citizens concerns with the aim of offering a level playing field for everyone to enjoy services, and achieve ICT related rewards.

(2) Businesses and Governments alike should not invest everything on on-line features only, as it was proven that a good segment of people still enjoy advancements in non-computer related items. This in turn will help ease the pressure on people suffering from technophobia and provide possibilities of increased adoption and profits of the service being provided, irrespectively if the manual or the electronic version of the service is being used.

(3) Even if Governments or businesses strategies are not ICT-driven, one should expect to be affected with Technophobia, especially since technology now, forms part of our daily lives.

**Future Research**

In general, there is vast range of research on Technophobia, although most of them are quite dated. This research has provided a fresh insight on Technophobia in 2011 with a particular focus on the Maltese Public Service, a sector in which this kind of research has
never done before. This emerging research has provided direct results on Technophobia that can become useful to both the Government and Businesses alike with in-depth analysis of each sub-issue of Technophobia and results that show that ICT strategies and investments would be unlikely fulfilled unless Technophobia is truly understood and tackled. Future research though, is still suggested to get a larger insight especially for Maltese businesses or on more, or the whole, of the Maltese Public Service. Such study could also include results found in this research as a baseline to further evolve the understanding of Technophobia, including but not limited to a possible alliance with other big studies on the matter, particularly in Europe, as these would help other parallel initiatives such as e-gov initiatives, to provide better meaning to their statistics.

(Total Word Count = 17,691)
References


Rosen, L., Weil, M. (1992) Measuring Technophobia, A Manual for the Administration and Scoring of the Computer Anxiety Rating Scale (Form C), the Computer Thoughts Survey (Form C) and the General Attitudes Toward Computers Scale (Form C), (Accessed: January 2011)


Appendices
Appendix A - Studies

Below is an extract of the studies done by Rosen and Weil (1992, pp.13-17) that further validate their work and tools:

Study 1: Technophobia Assessment and Instrument Validation

This initial validation study was undertaken in Fall 1983. The purpose of this study was to administer the CARS (Form A) and the GATCS (Form A) to a sample of university students who were not currently taking a course using computers and assess their validity and reliability. Two Psychology courses were used to provide a sample of 84 students. An Introduction to Psychology (lower division) course provided 62 subjects while an upper-division course in the Psychology of the Black Experience provided the remaining 22 subjects. A Technology Experience and Demographic Questionnaire (TedQ) was used to collect demographic information including age, ethnic identification, gender, class level, university major, plus information about computer/technology experiences including home computer ownership (current and planned), computer use in academic settings (courses, library uses, programming experience) and computer/technology consumer uses (banking, game playing, home appliances). Two additional self-report questions on the TedQ assessed the existence of physical signs of discomfort while using (or contemplating using) computers and technology (sweaty palms, queasy stomach, heart racing, headache, blank mind) and computer knowledge on a seven-point scale from no knowledge (1) to very knowledgeable (7). All measures were administered at the beginning of the course.

Study 2: Instrument Revalidation
The purpose of this study was to replicate the reliability and validity results in a different sample of university students. This sample included 71 students who were taking a variety of social science courses requiring computer interaction. These courses included a lower-division course in Critical Thinking (N=34), two upper division course sections of Measurement in Psychology (N=24) and a graduate-level seminar entitled “Computers in the Social and Behavioral Sciences” (N=13). Students were administered the CARS (Form A), GATCS (Form A) and the TedQ during the first week of the semester.

Study 3: Technophobia Correlates and Experience Effects

This study involved the administration of an instrument battery to 145 students at both the beginning and end of a course requiring the use of computers. The sample included students from a lower division Critical Thinking course (N=85), an upper division Measurement in Psychology course (N=25) and an Introduction to Computers course for non-majors (N=35). The pretest instrument battery, administered during the first week of the course, included the CARS (Form A), GATCS (Form A), TedQ, Bem Sex-Role Identity questionnaire (BSRI; Bem, 1974), State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1970) and Mathematics Anxiety Rating Scale (MARS; Richardson & Suinn, 1972). The posttest battery, administered during the final week of the ten-week course, included all of the above measurement instruments except the Bem Sex-Role Inventory plus additional questions that assessed course performance and computer utilization.
Study 4 and Study 5: Technophobia and Computer Aptitude, Literacy and Interest

Studies 5 and 6 involved the administration of the CARS (Form A) and the GATCS (Form A), plus the Computer Aptitude, Literacy and Interest Profile (CALIP; Poplin, Drew & Gable, 1984) to two separate samples of university students. The first sample (Study 5) included 105 students majoring in fields that required no direct computer interaction (e.g., English, Psychology, Sociology, Art). The second sample (Study 6) included 60 students majoring in either Computer Science or Computer Information Systems (in Business). All measures were administered during the first week of the semester.

Study 6: Technophobia and Hemisphericity

This unpublished study involved the administration of the CARS and GATCS along with the Brain Preference Indicator Test (Wonder & Donovan, 1984), a measure of hemisphere functioning to a group of 111 university students in a variety of courses.

Study 7: Effects of Technology Experience

This unpublished study involved a replication of Study 3 with a sample of 60 Summer School students in Psychology courses using computers. The instrument battery (CARS, GATCS, BSRI, MARS, STAI, TedQ) was administered during the first and last weeks of the six-week session to 60 students.

Study 8: Validation of the Computer Thoughts Survey

This study was designed to assess the measurement characteristics, reliability and validity of the CTS (Form A). During the first week of class, 69 students from two Introduction to Psychology courses and one Introduction to Computer Science course were administered the CARS (Form A) and the CTS (Form A) plus the TedQ.
Study 9: The Model Computerphobia Reduction Program

Students in 76 courses from all disciplines were administered the CARS (Form A) and the CTS (Form A). Based on a profile of their scores, they were invited to participate in a brief (5 hour) psychologically-based program that was either individualized or group-based to fit their profile. Upon beginning the program each participant completed the remaining measures (GATCS - Form A; TedQ). Following the completion of their program they again completed all four measures (CARS, CTS, GATCS and TedQ) plus other open- and closed-ended questions about their experiences. Six months later they were contacted and asked to complete the measures one final time in addition to answering additional questions about their activities during the six months following the program. In all, 204 students completed the pretests, 162 began a treatment program and 149 (92%) completed the program. Forty-one students completed the six-month follow-up questionnaire.

Study 10: Model Computerphobia Reduction Program Comparison Study

The CARS (Form A) and the CTS (Form A) were administered to 1,617 students in 76 courses across all academic disciplines. Course performance was assessed in terms of attrition and course grade. Results from two subsets of this large sample - students who participated in the program and those who did not - were compared in terms of attrition and course performance (Rosen et al., 1993).
Study 11: Technophobia in the Business World

A total of 56 employees of a large aerospace firm “volunteered” to take one of six brief computer-skill enhancement training workshops. Each workshop met for four hours per day on four consecutive days. Each employee completed the CARS (Form B) and the GATCS (Form B) plus an additional questionnaire assessing demographic characteristics and prior computer experience. These forms of the technophobia measures included portions of the original (Form A) version of each instrument, but were tailored to the business population under study. The measures were administered during the first and last workshop sessions (Rosen & Pardaffy, 1987).

Study 12: Technophobia Among Elementary and Secondary School Teachers

Study 12 examined the utilization of computers and technophobia among elementary school teachers (N=171), secondary science teachers (N=117) and secondary humanities teachers (N=200) in 54 schools across five urban school districts. Each teacher completed specially-adapted versions (Form T) of the CARS, CTS and GATCS, plus the TedQ (Rosen & Weil, 1995).

Study 13: International, Cross-Cultural Study of Technophobia and Computerization

This two-year study involved the translation and administration of the CARS (Form C), CTS (Form C), GATCS (Form C) and the TedQ to 3,392 university freshman students in 23 countries including the United States (N=473), Yugoslavia (N=179), Thailand (N=121), Spain (N=195), Singapore (N=52), Saudi Arabia (N=93), Poland (N=28), Northern Ireland (N=73), Mexico (N=50), Kenya (N=98), Japan (N=428), Italy (N=166), Israel (N=136), Indonesia (N=60), India (N=80), Hungary (N=232), Greece (N=63), Germany (N=235),
Egypt (N=93), Czechoslovakia (N=134), Belgium (N=82), Australia (N=278) and Argentina (N=43).

**Study 14: Technophobia in School Children**

This study involved the administration of three technophobia measures (CARS - Form C, CTS - Form C and GATCS - Form C) to 503 middle-school (N=156) and high school students (N=347). Additional data were collected using the TedQ and other demographic questions appropriate for school-aged children Rosen and Weil, 1995).

Another advantage of using a system that is already in place is to use the same Officers who currently use and manage the system. As discussed previously, Customer Care Officers are deployed across Government to support and attend to Customer Care requests. Using the same people, who are now well aware and know their way around the system would minimise the amount of training these officers would require on the IT system as basically they would only need to be trained on the 20% of the new system. Besides the technical nature of the job, we would be also utilising staff that are already trained to provide a good customer service and would thus fit in well with the FOI requirements.

*(Back to Pg30 or Pg48)*
## Appendix B - Interview

<table>
<thead>
<tr>
<th>Section A – Interview details</th>
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<tbody>
<tr>
<td>Age:</td>
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<tr>
<td>Gender:</td>
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<tr>
<td>Position of interviewee</td>
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<tr>
<td>(Senior, Middle Management,</td>
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<td>Operational Staff etc?)</td>
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<tr>
<th>Section B – Experiences</th>
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<tbody>
<tr>
<td>1. Mention one item at work</td>
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<tr>
<td>that you did manually and</td>
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<tr>
<td>that IT changed it for you?</td>
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<tr>
<td>How do you feel about this</td>
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<tr>
<td>change?</td>
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<td>Does it aid to your work?</td>
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<tr>
<td>2. Have you ever had a bad</td>
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<tr>
<td>experience with computers</td>
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<tr>
<td>or related technology where</td>
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<tr>
<td>you felt anxious, stressed,</td>
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<tr>
<td>overwhelmed or maybe angry</td>
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<tr>
<td>that IT failed you?</td>
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<tr>
<td>If yes, describe it?</td>
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<tr>
<td>If no, explain why?</td>
</tr>
</tbody>
</table>
### Section C – Opinions

3. Do you believe that there could be inequity in computer ability? For example Males are better with computers than females or some ethnic groups are better in computers than others? Explain?

4. How would you feel if the Ministry tells you that the next big project that relates to you will be based on an IT system that you would need to use daily?

### Section D – Perceptions

5. Do you think these scenarios/statements are common within the Maltese Public Service?
   - (1) Fear that computers are taking jobs away or taking over
   - (2) Afraid to explore or use a computer system due to the fear of breaking it
   - (3) Anxious for changing to a new computer system (upgrade or new system)
   - (4) I won’t be able to get computers to do what I want
   - (5) Manual system is better than an electronic version

6. Do you think the Maltese Public Service is technophobic (fear and dislike of computers and related technologies)? Why?

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**Thank you very much for your time and effort**

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Appendix C – Invitation to participate

Dear Sir/Madam,

For many of us, life without computers and related technologies is unimaginable, with the first thing that we do when we get to the office is to turn on the computer and check our email. Many others use computers 24 hours a day with technologies such as Instant Messaging and Email accounts showing them always as “available”, thanks to the help of the internet through portable computers and wireless devices.

We are living in a world where Google is King, Email Accounts are the norm and everyone seems to have a Facebook account and in such a world, fear or dislike of computers and related technologies known as technophobia sounds almost unnatural, yet this is an issue that affects many people in different ways. It invokes a wide range of negative emotions such as anxiety, fear, stress and nervousness that can lead to avoidance or non-adoption of such technologies.

As part of my final dissertation for a Masters Degree in Strategic Information Technology Management (M.Sc.), I aim to investigate how public service employees react to different situations when faced with computers and related technology. To gather such information I have drawn up a series of questions which seek to identify your views on diverse scenarios related to technology, from training to error messages that, every once in a while, pop up.

The information obtained from this questionnaire, will be kept anonymous and completely confidential. All questionnaire responses will remain with the researcher and information gathered from each response will be synthesised into the overall dissertation statistics.

You can access the online questionnaire by clicking (CTRL+click) the link below and fill in the required fields. For those interested in completing this questionnaire manually, I have left a few copies with the main reception area of House of Catalunya and have placed two big boxes in each floor of the Ministry so participants that decide to use the hardcopy versions could submit their questionnaire while still keeping their anonymous state. I would appreciate your kind response by latest 31st March. Your participation in this research is completely voluntary although your answers would be greatly appreciated as these are of great importance to the success of this study.

Should you have any questions about this research project, please email me on Conrad.aquilina@gov.mt.

Link: http://www.surveygizmo.com/s3/449640/conrad

I thank you in advance for your participation and assistance.

With appreciation,

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Appendix D - Questionnaire

Demographic Information
1.) What is your age group (years)?
   ( ) <=20
   ( ) > 20 and <= 30
   ( ) > 30 and <= 40
   ( ) > 40 and <= 50
   ( ) > 50 and <= 60
   ( ) > 60

2.) What is your gender?
   ( ) Female
   ( ) Male

3.) Are you currently registered and have an Electronic Identification (e-id) to access Government services online?
   ( ) Yes
   ( ) No

COMPUTER ANXIETY RATING SCALE (Cars, Form-C)
The items in this questionnaire refer to things and experiences that may cause anxiety or apprehension. For each item, select one option under the column that describes how anxious (nervous) each one would make you at this point in your life.

4.) Thinking about taking a course in a computer
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

5.) Taking a test using a computer scoring sheet.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

6.) Applying for a job that requires some computer training.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much
7.) Sitting in front of a home computer.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

8.) Watching a movie about an intelligent computer.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

9.) Looking at a computer printout.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

10.) Getting "error messages" from the computer.
    ( ) Not at All
    ( ) A Little
    ( ) A Fair Amount
    ( ) Much
    ( ) Very Much

11.) Using an automated bank teller machine (ATM).
     ( ) Not at All
     ( ) A Little
     ( ) A Fair Amount
     ( ) Much
     ( ) Very Much

12.) Visiting a computer center.
     ( ) Not at All
     ( ) A Little
     ( ) A Fair Amount
     ( ) Much
     ( ) Very Much

13.) Being unable to receive information because the "computer is down."
     ( ) Not at All
     ( ) A Little
     ( ) A Fair Amount
     ( ) Much
     ( ) Very Much
14.) Learning to write computer programs.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much

15.) Thinking about buying a new personal computer.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much

16.) Erasing or deleting material from a computer file.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much

17.) Taking a class about the use of computers.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much

18.) Re-setting a digital clock after the electricity has been off.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much

19.) Learning computer terminology.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much

20.) Reading a computer manual.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Much
( ) Very Much
21.) Watching someone work on a personal computer.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

22.) Programming a microwave oven.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

23.) Learning how a computer works.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Much
   ( ) Very Much

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COMPUTER THOUGHTS SURVEY (CTS - Form C)
Please select the button that indicates how often you currently have each of the following thoughts when you use a computer or think about using a computer.

24.) I am going to make a mistake.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

25.) This will be fun.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

26.) Everyone else knows what they are doing.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

27.) I enjoy learning about this.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

28.) I like playing on the computer.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

29.) I feel stupid.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

30.) People will notice if I make a mistake.
   ( ) Not at All
   ( ) A Little
31.) This will shorten my work.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

32.) I am totally confused.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

33.) I know I can do it.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

34.) I am willing to give it a try.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

35.) I hate this machine.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

36.) I'm afraid I'll wreck the program.
   ( ) Not at All
   ( ) A Little
   ( ) A Fair Amount
   ( ) Often
   ( ) Very Often

37.) I can get help if I get stuck.
   ( ) Not at All
   ( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

38.) What if I hit the wrong button?
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

39.) This is really interesting.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

40.) I'm too embarrassed to ask for help.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

41.) Others have learned this and so can I.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

42.) I feel overwhelmed by how much I don't know.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

43.) I won't be able to get the computer to do what I want.
( ) Not at All
( ) A Little
( ) A Fair Amount
( ) Often
( ) Very Often

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GENERAL ATTITUDES TOWARD COMPUTERS SCALE (GATCS - Form C)
The following statements address general attitudes toward computers. Select a button under the column that describes your level of agreement (Strongly Agree, Agree, Neutral, Disagree or Strongly Disagree) to each statement.

44.) Computers can save people a lot of work.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

45.) It takes a good math background to learn to use a computer.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

46.) You need to know how to use a computer to get a good job.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

47.) Computers can help solve society's problems.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

48.) Computers are taking over.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

49.) Computers can increase control over your own life.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

50.) Computers increase the amount of time we have for other activities.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

51.) Men are better with computers than women.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

52.) Computers may eventually act independently of people.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

53.) In the future there will still be jobs that don't require computer skills.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

54.) Computers are good teaching tools.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

55.) Use of computers can cause physical health problems.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

56.) Computers prepare students for the future.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

57.) Computers are taking jobs away from people.
58.) Some ethnic groups are better with computers than others.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

59.) There is an overemphasis on computer education in this society.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

60.) Computers can ruin interpersonal relationships.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

61.) In five years everyone will need to know how to operate a computer.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

62.) Computers create new jobs for people.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

63.) Computers will never be smarter than people.
( ) Strongly Agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly Disagree

©1985; 1988 Deborah C. Sears, Ph.D., Larry D. Rosen, Ph.D. and Michelle M. Weil, Ph.D.
Thank You!
Thank you for taking the time to fill in my survey. Your response is very important.

(Go Back to Pg 43 )
## Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>% of total Gender</th>
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## Total Technophobic on any of the 3 dimensions

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<th>% of all respondents</th>
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<td>68 respondents out of 116</td>
<td>58.62069</td>
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## Total Technophobic on any of the 3 dimensions divided by GENDER

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<th>% out of particular GENDER of all respondents</th>
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<tr>
<td>Males</td>
<td>29 OR 56.862745</td>
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If 58% are the total % of technophobic respondents then:

- Males: 25%
- Females: 32.75862%
- Unknown: n/a

## Age Group of the Technophobic

<table>
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<th>If 68 are 100% then:</th>
<th>if 68 are 58% then:</th>
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## Percentage Age Group of technophobic

(out of each Age group (eg all 20-30) what is the...
technophobic percentage?

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<td>24</td>
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How many moderate/high on any of the dimensions?

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<td>68</td>
<td>58.62069</td>
<td>Total</td>
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Out of all respondents how many had e-id and how many have e-id and are technophobic?

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How many of ONLY the technophobic had e-id?

35.34483 %
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<td>20-30</td>
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<td>69</td>
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</tbody>
</table>
**Appendix F – Microanalysis of Scales**

The most interesting scores of the CARS subscales are:

(i) **Interactive Computer Learning Anxiety**

<table>
<thead>
<tr>
<th>Questions related to such subscale</th>
<th>Not at all</th>
<th>A little</th>
<th>A Fair Amount</th>
<th>Much</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking about taking a course in a computer language</td>
<td>59.5</td>
<td>24.1</td>
<td>12.1</td>
<td>3.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Applying for a job that requires some computer training.</td>
<td>62.9</td>
<td>23.3</td>
<td>7.8</td>
<td>6</td>
<td>0</td>
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<tr>
<td>Getting “error messages” from the computer</td>
<td>16.4</td>
<td>40.5</td>
<td>28.4</td>
<td>8.6</td>
<td>6</td>
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<tr>
<td>Being unable to receive information because the “computer is down.”</td>
<td>10.3</td>
<td>22.4</td>
<td>22.4</td>
<td>25.9</td>
<td>19</td>
</tr>
<tr>
<td>Learning to write computer programs</td>
<td>19.8</td>
<td>13.8</td>
<td>25</td>
<td>17.2</td>
<td>24.1</td>
</tr>
<tr>
<td>Thinking about buying a new personal computer</td>
<td>50</td>
<td>29.3</td>
<td>13.8</td>
<td>4.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Erasing or deleting material from a computer file</td>
<td>50</td>
<td>28.4</td>
<td>12.9</td>
<td>7.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Taking a class about the use of computers</td>
<td>64.7</td>
<td>24.1</td>
<td>7.8</td>
<td>2.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Learning computer terminology</td>
<td>41.4</td>
<td>31.9</td>
<td>16.4</td>
<td>7.8</td>
<td>2.6</td>
</tr>
<tr>
<td>Reading a computer manual.</td>
<td>23.3</td>
<td>31.9</td>
<td>27.6</td>
<td>8.6</td>
<td>8.6</td>
</tr>
<tr>
<td>Learning how a computer works</td>
<td>41.4</td>
<td>27.6</td>
<td>19.8</td>
<td>7.8</td>
<td>3.4</td>
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</table>
(ii) Consumer Technology Anxiety

<table>
<thead>
<tr>
<th>Questions related to such subscale</th>
<th>Not at all</th>
<th>A little</th>
<th>A Fair Amount</th>
<th>Much</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking a test using a computer scoring sheet (percentages)</td>
<td>46.6</td>
<td>26.7</td>
<td>22.4</td>
<td>4.3</td>
<td>0</td>
</tr>
<tr>
<td>Re-setting a digital clock after the electricity has been off</td>
<td>75</td>
<td>16.4</td>
<td>5.2</td>
<td>0.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Watching someone work on a personal computer</td>
<td>76.7</td>
<td>13.8</td>
<td>7.8</td>
<td>1.7</td>
<td>0</td>
</tr>
<tr>
<td>Programming a microwave oven</td>
<td>50.9</td>
<td>31</td>
<td>12.1</td>
<td>3.4</td>
<td>2.6</td>
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(iii) Observational Computer Learning Anxiety

<table>
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<th>A Fair Amount</th>
<th>Much</th>
<th>Very Much</th>
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</thead>
<tbody>
<tr>
<td>Sitting in front of a home computer (percentages)</td>
<td>77.6</td>
<td>8.6</td>
<td>6.9</td>
<td>6</td>
<td>0.9</td>
</tr>
<tr>
<td>Watching a movie about an intelligent computer</td>
<td>65.5</td>
<td>15.5</td>
<td>13.8</td>
<td>4.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Looking at a computer printout</td>
<td>75</td>
<td>11.2</td>
<td>8.6</td>
<td>3.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Using an automated bank teller machine</td>
<td>76.7</td>
<td>8.6</td>
<td>6</td>
<td>5.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Visiting a computer center</td>
<td>64.7</td>
<td>21.6</td>
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<tr>
<td>Watching someone work on a personal computer</td>
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<td>13.8</td>
<td>7.8</td>
<td>1.7</td>
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The most interesting scores of the CTS subscales are:

(i) Computer Enjoyment

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<th>Often</th>
<th>Very Often</th>
</tr>
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<tbody>
<tr>
<td>This will be fun (percentages)</td>
<td>15.5</td>
<td>29.3</td>
<td>26.7</td>
<td>17.2</td>
<td>11.2</td>
</tr>
<tr>
<td>I enjoy learning about this</td>
<td>7.8</td>
<td>29.3</td>
<td>21.6</td>
<td>22.4</td>
<td>19</td>
</tr>
<tr>
<td>I like playing on the computer.</td>
<td>23.3</td>
<td>28.4</td>
<td>19</td>
<td>12.9</td>
<td>16.4</td>
</tr>
<tr>
<td>This is really interesting.</td>
<td>7.8</td>
<td>23.3</td>
<td>21.6</td>
<td>32.8</td>
<td>14.7</td>
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</table>
The most interesting scores of the GATCS subscales are:

(i) Attitudes towards computers in education

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<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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</thead>
<tbody>
<tr>
<td>Comps can save people a lot of work (percentages)</td>
<td>56.9</td>
<td>39.7</td>
<td>1.7</td>
<td>1.7</td>
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</tr>
<tr>
<td>Computers increase the amount of time we have for other activities</td>
<td>6.9</td>
<td>23.3</td>
<td>25</td>
<td>34.5</td>
<td>10.3</td>
</tr>
<tr>
<td>Computers are good teaching tools</td>
<td>25.9</td>
<td>61.2</td>
<td>9.5</td>
<td>3.4</td>
<td>0</td>
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<tr>
<td>Computers prepare students for the future</td>
<td>23.3</td>
<td>56.9</td>
<td>17.2</td>
<td>2.6</td>
<td>0</td>
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<tr>
<td>There is an overemphasis on computer education in this society</td>
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<td>5.2</td>
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(ii) **Attitudes about computer control**

<table>
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<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers are taking over</td>
<td>14.7</td>
<td>48.3</td>
<td>19.8</td>
<td>16.4</td>
<td>0.9</td>
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<td>(percentages)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Computers are taking jobs away from people</td>
<td>6.9</td>
<td>28.4</td>
<td>34.5</td>
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<td>6.9</td>
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(iii) Attitudes about Inequity in computer ability

<table>
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<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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</thead>
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<td>It takes a good math background to learn to use a computer (percentages)</td>
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<td>8.6</td>
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<td>35.3</td>
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<td>Men are better with computers than women</td>
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<td>24.1</td>
<td>34.5</td>
<td>31.9</td>
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<tr>
<td>Some ethnic groups are better with computers than others</td>
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<td>12.1</td>
<td>42.2</td>
<td>21.6</td>
<td>19.8</td>
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*(Go back to pg 63)*