



Technophobia amongst older adults in Ireland

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Author(s)	Hogan, Mairéad
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TECHNOPHOBIA AMONGST OLDER ADULTS IN IRELAND

Submitted by:

Mairéad Hogan, National University of Ireland, Galway

Address: Dept. of Accountancy and Finance, National University of Ireland, Galway.

e-mail: mairead.hogan@nuigalway.ie

Phone: 091-493007

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INTRODUCTION

Older Adults and Computer Usage

The number of older adults is growing worldwide. The United Nations (2002) estimates that by the year 2015 those over sixty will represent 23.7% of the population in the more developed regions of the world, with 24% of the European population being over sixty. This population represents an important segment of computer users, as evidenced by a recent survey which states that older adults are the fastest growing online population in the US (NUA Internet Surveys, 2003). Internet usage in the EU 15 (the member countries before expansion in 2004) has increased from 11.5% to 16.9% between 2001 and 2003, although older adults still lag behind younger adults (Commission of the European Communities, 2005). This is supported by data from the UK which also suggests that older adults lag behind younger adults in terms of computer usage (Selwyn, Gorard, Furlong and Madden, 2003).

Various governments, companies and voluntary organisations recognize the importance of ensuring that older adults are able to avail of the opportunities afforded by information and communications technology. In the United States, the Department of Health and Human Services began a program called 'Computers for Seniors' in order to give older Americans access to the Internet and enable them to make better use of various health programs (Leavengood, 2001). The British government has pledged to achieve universal access to the Internet by 2005, resulting in various initiatives such as the establishment of distributed community sites for technology access in places such as museums, schools and libraries, as well as offering low-cost, re-conditioned computers to adults over sixty who are on state pensions (Selwyn et

al., 2003). Here in Ireland, the government has committed to “including everyone in the information society” as part of the social partnership agreement (Department of the Taoiseach, 2003, p21) while the Information Society Commission in Ireland identify the retired as low adopters of Information and Communications Technology (ICT) and recommend that retired people should be one of the groups to be “given priority in the national eInclusion Action Plan and all eInclusion activities” (Information Society Commission, 2003, p64).

Companies like Microsoft and Intel carry out research into the older adult market, as well as supporting programmes for older adults by donating hardware and software (Leavengood, 2001). Smaller companies, such as Sageport, develop applications specifically aimed at simplifying the technology of the PC, as well as providing applications that make access to the Internet more user-friendly for older adults by compensating for the natural limitations associated with aging, such as deteriorating vision and reduced dexterity (Leavengood, 2001). Non-profit organisations for older adults are also concerned with ensuring that the information needs of older adults are met. One such organisation, Creative Retirement Manitoba (CRM), has created an Internet site featuring a wide range of informational, educational and interactive resources for older adults, designed to explore the ability of electronic networks to meet the information needs of older adults (DeGraves and Denesiuk, 2000). CRM also provide computer training to older adults, with current demand outstripping their classroom space. This would seem to indicate that older adults are embracing computer technology and the Internet with growing confidence (DeGraves and Denesiuk, 2000). Here in Ireland, many of the Active Retired Associations (ARAs) provide computer courses for older adults on a regular basis as do a number of Vocational Educational Committees.

Studies suggest that older adults who use computers use them predominantly in connection with other interests or hobbies (White and Weatherall, 2000) and for Internet communication (DeGraves and Denesiuk, 2000; White and Weatherall, 2000). Figures in the UK suggest that the most popular activity for older adult computer users in the UK is word processing, with Internet use being quite low (Selwyn et al., 2003). However, the most popular use of the Internet identified by Selwyn et al (2003) was e-mail usage, (a finding supported by Morrell, Mayhorn and Bennet (2000) in the US), whereas more advanced usage (e.g. banking, purchasing goods or services, chat rooms or bulletin boards) was very low. As aspects of daily life continue to become increasingly reliant on information technology, it is important that older adults be able and willing to use it (Morrell et al., 2000; Selwyn et al., 2003).

However, older adults often lack confidence in their computer skills, according to Marquie, Jourdan-Boddaert and Huet (2002). They concluded that older adults are less confident in their own computer knowledge than younger adults, despite an age equivalence in actual performance. The results of their study suggest that this under confidence of older adults in their own abilities may result in difficulties in mastering new computer technologies, a view supported by Morrell et al (2000) who found that lack of knowledge about the Web was a major reason for older adults not using it. Selwyn et al (2003) found that even those older adults who did have access to a computer had low levels of usage and that the main reason for not using computers was lack of interest or relevance to the older adult's life. They also found that the majority of older computer users were male, well educated, and in the younger cohort of older adults.

Computer Anxiety and Attitudes

Computer anxiety has been found to adversely affect performance (Anderson, 1996; Brosnan, 1998) and acceptance of computer technology (Fagan, Neill and Wooldridge, 2004). This finding is further supported by a meta-analysis carried out by Chua, Chen and Wong (1999), who state that computer anxiety causes computer use avoidance. Chua et al (1999) also found that while there are a number of different instruments available to measure computer anxiety, they are not compatible with one another. However, the instruments are generally reliable.

Rosen, Sears and Weil (1992) developed a series of measurement instruments to assess levels of technophobia, which they describe as “anxiety about present or future interactions with computers or computer-related technology; negative global attitudes about computers, their operation or their societal impact; and / or specific negative cognitions or self-critical internal dialogues during actual computer interaction or when contemplating future computer interaction” (pp 8). These research instruments have been used and validated in more recent studies (Anderson, 1996; Anthony, Clarke and Anderson, 2000; McIlroy, Bunting, Tierney and Gordon, 2001; Gordon, Killey, Shevlin, McIlroy and Tierney, 2003; Havelka, Beasley and Broome, 2004; Korukonda, 2005) and are used in this study in order to assess levels of technophobia in older adults. Both users and non-users of computers were tested.

The central question of this research is whether gender affects levels of technophobia (as defined above by Rosen et al (1992)) in older adults. The researcher hypothesizes that older adults would be more likely to adopt traditional gender roles where men would be seen as more ‘technically able’. Older women, whether they are computer users or not, would thus be more likely to display higher levels of technophobia than

older men. If this were so, it would subsequently result in lower use of computers by older women.

Some studies suggest that technophobia, as measured using the scales developed by Rosen et al (1992), is not related to gender (Anderson, 1996; Anthony et al., 2000; Havelka et al., 2004; Korukonda, 2005) or that the effect is small (McIlroy et al., 2001). Other studies have been carried out using a variety of measurement instruments. However, the results are conflicting, with some indicating a (generally small to moderate) gender difference in computer anxiety (Whitley, 1996; Broos, 2005; Zhang, 2005) and others indicating no significant difference in computer anxiety or attitudes (Brosnan, 1998; Orr, Allen and Poindexter, 2001). Brosnan and Lee (1998), however, noted no gender differences for computer anxiety in the United Kingdom but a higher level of anxiety amongst males in Hong Kong, suggesting that cultural influences may be relevant. Chua et al (1999), in their meta-analysis of relationships between computer anxiety and its three correlates (age, gender and computer experience) found that females are generally more anxious than males among a university undergraduate population, but that the strength of this relationship is not conclusive. Anthony et al (2000) suggest that the reason for a reduced gender gap in technophobia over the last number of years is women's increased exposure to computers at third level.

However, all the studies cited (bar Broos (2005) and Zhang (2005), both of whom looked at a wide age range) dealt with students and younger adults, rather than the elderly. A recent study of older adult computer users (Karavidas, Lim and Katsikas, 2005) suggest there is a gender difference in anxiety levels in older adult computer users, with women displaying more anxiety and reporting less computer knowledge, despite the fact that males and females reported similar levels of computer usage.

The researcher further hypothesizes that the level of technophobia will be higher as the age of the older adult increases. A study by Anthony et al (2000) suggests that technophobia, as measured using the scales developed by Rosen et al (1992), is correlated with age. This result is supported by Zhang (2005) who found that computer anxiety increases with age, albeit using a different measurement scale. However, Chua et al (1999) found that the effect of age on computer anxiety is not easily observed when the age range is narrow.

The third hypothesis of this study is that the level of technophobia will be lower for older adults who have computer experience than for those who have not. Previous research (Weil and Rosen, 1995; Anderson, 1996; Chua et al., 1999; Anthony et al., 2000; Havelka et al., 2004) suggests that higher levels of computer experience should result in lower levels of technophobia or computer anxiety.

METHODOLOGY

Participants

The participants in the study consisted of older adults who were members of various ARAs in counties Galway and Clare, in Ireland. They ranged in age from early fifties to seventy five plus (although only six, all of whom were women, were younger than 60) and consisted of thirty-two men (all bar two of whom were over 65) and 128 women (all bar 33 of whom were over 65). Their level of computer experience ranged from none to extensive.

Measuring Technophobia

The study was conducted using Rosen et al's (1992) 'Measuring Technophobia Instruments' and a demographic questionnaire. The questionnaires developed by Rosen et al (1992) consisted of:

1. Computer Anxiety Rating Scale Form C (CARS-C)

This consisted of 20 questions that refer to activities and experiences with computers that might cause anxiety. Respondents were required to indicate how anxious or nervous each situation would make them feel by selecting one of “Not at all”, “A little”, “A fair amount”, “Much”, or “Very much”.

2. Computer Thoughts Survey Form C (CTS-C)

This consisted of 20 statements, reflecting both positive and negative cognitions while using a computer or thinking about using a computer. Respondents were required to indicate the extent to which they would have each of these thoughts by selecting one of “Not at all”, “A little”, “A fair amount”, “Much”, or “Very much”.

3. General Attitudes Towards Computers Scale Form C (GATCS-C)

This consisted of 20 statements, reflecting both positive and negative attitudes towards computers. Respondents were required to indicate their level of agreement with the statements using a five-point Likert scale.

The demographic questionnaire requested information such as gender, age, and computer experience.

Administration of the Questionnaires

The demographic questionnaire was prepared and pilot tested. This was then administered, in conjunction with the CARS-C, CTS-C and GATCS-C tests. The CARS-C, CTS-C and GATCS-C were counter-balanced with each appearing first, second and third equally often while the demographic questionnaire appeared last in order to minimize hypothesis guessing on the part of the research participants (Rosen et al., 1992).

The questionnaires were designed to be self-administering. Participants were told to carefully read the instructions on each questionnaire as they vary for each

questionnaire. They were also assured that: 1) their responses would remain anonymous and be kept confidential; 2) that they should answer honestly and candidly; and 3) that the questionnaires are not a test and that there are no right answers (Rosen et al., 1992). The researcher was also on hand to answer any questions. No time limits were imposed on the questionnaires but they were generally completed within 30 minutes.

RESEARCH RESULTS

Computer Use by Older Adults

A large percentage of the respondents were computer users, with 51.3% using computers, 46.3% not using computers and 2.5% not responding to that question. This is at odds with the figures for this population generally. Selwyn et al (2003) reported only 22.4% of older adults having used a computer within the previous 12 months, while in the EU15 Internet usage in the over 55's was 16.9% in 2003 (Commission of the European Communities, 2005) and in Ireland, the Information Society Commission defined 90% of retired people as "late adopters", that is, "adults without Internet access or using it less than once a month" (Information Society Commission, 2003). The higher level of computer usage in this group is presumably due to the fact that the ARAs offer computer courses on a regular basis.

Those that use computers, use them for a variety of purposes, with the most popular use being e-mail. This concurs with the findings of other studies (DeGraves and Denesiuk, 2000; Morrell et al., 2000; White and Weatherall, 2000), where e-mail usage was identified as one of the main uses of computers by older adults. However, it contrasts with the findings of Selwyn et al (2003) who found internet usage to be quite low amongst older adults, although e-mail was identified by them as the most popular use of the Internet. The main uses of computers by older adult computer users

in this study are shown in Table 1. The high use of e-mail was supported by informal discussions with a number of the older adults who stated that their main reason for getting a computer was to stay in touch with family who live abroad.

Insert Table 1 about here

Reliability of the Measures

Whilst the reliability of the measures has been established previously by Rosen & Weil (1992) it was decided to confirm this since their study did not exclusively involve older adults. Cronbach's alpha coefficient was calculated for each of the research instruments. As can be seen in Table 2, the CARS-C and CTS-C both exhibited a high degree of reliability, whereas the GATCS-C did not. This finding corresponds with other studies of participants who were not from the United States (Weil and Rosen, 1995; Anthony et al., 2000). Due to its questionable reliability, the GATCS-C data were excluded from subsequent statistical analysis in this study.

Insert Table 2 about here

Levels of Technophobia

Rosen and Weil (1992) partitioned each of the three measures (Computer Anxiety; Computer Thoughts; and General Attitudes Towards Computers) into three levels of technophobia: No Technophobia, Low Technophobia and Moderate/High Technophobia. They also defined an overall measure of technophobia based on a combination of the measures. Given that only two of the men in the study were under the age of 65, it was decided to only look at participants over the age of 65 for the gender comparisons. The levels of technophobia for this group are shown in Figure 1. Studies in other countries (Weil and Rosen, 1995; Anthony et al., 2000) show a range of technophobia levels, with the percentage of technophobia levels displayed here not

being untypical. In fact, the Weil and Rosen (1995) study showed approximately 40% of respondents in Northern Ireland had a moderate to high level of technophobia.

Insert Figure 1 about here

Technophobia Levels and Gender

The percentage levels of technophobia in men and women over 65, who participated in this study, can be seen in Table 3. Chi-square analysis was carried out in order to determine whether males and females differed in terms of their levels of technophobia. When broken down into its individual components (i.e. Computer Anxiety and Computer Thoughts as measured by CARS-C and CTS-C respectively) there was no significant difference in levels of technophobia on either of the scales. However, when the overall levels of technophobia (based on a combination of the measures from CARS-C and CTS-C) were compared for men and women over 65, there was a significant difference in the levels of technophobia ($p < 0.05$), with a higher percentage of women exhibiting moderate/high technophobia than men, despite the fact that there was very little difference in the percentage of computer users in both groups (see Figure 2). This is in contrast to previous findings (Anthony et al., 2000; Havelka et al., 2004) where no significant difference in levels of technophobia by gender was found. Anthony et al (2000) state that while there had been a gender difference in the past (a finding supported by Weil and Rosen (1995) in an earlier study) this gender difference in levels of technophobia no longer exists. They suggest that this may be explained by an increased number of women attending university and enrolling in computer courses.

Insert Table 3 about here

In contrast to most studies discussed herein, this study looks at older adults. It was expected that older women, whether they are computer users or not, would be more

likely to display higher levels of technophobia than older men. The results from the analysis suggest that this is the case. It was also hypothesized that this increased level of technophobia would lead to a reduced level of computer usage amongst older women. The research revealed that this was not the case. As can be seen in Figure 2, the percentage of computer users was similar for both men and women, despite the higher level of technophobia exhibited by the women in this study.

Insert Figure 2 about here

Technophobia and Age

Chi-square analysis was used to test the null hypothesis that “People in each of the age groups do not differ in terms of their levels of technophobia”. The analysis suggests that this is the case for all three measures of technophobia ($p > 0.05$ for all three measures). However, the age range within the population was quite narrow, and so, this result is consistent with the findings of Chua et al (1999) who found that when the age range is narrow, the relationship between age and computer anxiety is not easily observed.

Technophobia and Experience

As can be seen in Figure 2, there is very little difference in the percentages of older men and women in this study who use computers. Previous research (Weil and Rosen, 1995; Anderson, 1996; Chua et al., 1999; Anthony et al., 2000; Havelka et al., 2004) suggests that computer experience should result in lower levels of technophobia or computer anxiety as the level of experience increases. When the levels of technophobia for computer users and non-computer users were compared using Chi-square analysis, a significant difference existed for overall technophobia and for computer cognitions (both with p values < 0.001), with a higher percentage of non-computer users exhibiting moderate/high levels of technophobia than users. However, there was no significant difference for levels of computer anxiety (see Table 4).

Insert Table 4 about here

The figures in Table 4 suggest that while older computer users with experience, in common with those in previous studies (Weil and Rosen, 1995; Anderson, 1996; Chua et al., 1999; Anthony et al., 2000; Havelka et al., 2004), have lower overall levels of technophobia (based on the combination of the other two measures) and have more positive thoughts about using technology than older adults who do not use computers, there is no significant difference in computer anxiety levels between the two groups. This suggests that experience alone is not sufficient to reduce computer anxiety. This finding is in contrast to previous studies that suggest levels of computer anxiety are reduced as computer experience increases (Weil and Rosen, 1995; Anderson, 1996; Chua et al., 1999; Anthony et al., 2000; Havelka et al., 2004), although it concurs with the findings of McIlroy et al (2001) who found that experience led to more positive attitudes but no reduction in anxiety in their study of students. However, all of those studies (bar Chua et al (1999)) assessed university students rather than older adults.

Similar figures emerge when looking at technophobia levels of those who have attended a computer course and those who have not (see Table 5), indicating that those who have attended a computer course have more positive thoughts about computers and lower overall levels of technophobia ($p \leq 0.001$), but that there is no significant difference in levels of computer anxiety between those who have attended, and those who have not attended, a computer course. This may suggest that the approach taken during the courses is not an appropriate one for older adults. This supposition is supported by anecdotal evidence as a number of the older adults in this study who attended courses stated that they felt the courses were not suited to their needs (see Table 1 which shows the main activities of older adults in relation to

computers). The courses quite often covered topics such as spreadsheets that had no relevance to the daily lives and needs of the older adults. This finding suggests that the structure and content of computer courses aimed at older adults should be assessed and amended in a way that would help to reduce levels of computer anxiety.

Insert Table 5 about here

DISCUSSION

Levels of Technophobia

Figure 2 shows that approximately half of the sample show moderate/high levels of technophobia. This level is not untypical when compared with other studies (Weil and Rosen, 1995; Anthony et al., 2000). However, the majority of the respondents in this study have computer experience and results from previous studies (Weil and Rosen, 1995; Anderson, 1996; Chua et al., 1999; Anthony et al., 2000; Havelka et al., 2004) suggest that higher levels of experience should lead to lower levels of technophobia. The finding here is that the respondents exhibit high levels of technophobia despite high levels of computer usage. However, this may be explained by their limited knowledge of computers since when asked to rate their knowledge of computers, 33.3% said they had no knowledge, while 56.5% said they had a little knowledge and only 10.2% rated themselves as having considerable knowledge. The fact that this sample consisted only of older adults may also have had a bearing on the results as the other studies mainly consisted of students and so, the effect of experience may be different for older and younger adults.

Technophobia and Gender

The results from the data clearly show that higher overall levels of technophobia were associated with females. Previous studies (Rosen and Maguire, 1990; Weil and Rosen, 1995; Anthony et al., 2000; Havelka et al., 2004) have shown contrasting results,

with some showing gender differences while others do not. Anthony et al (2000), in their study of university students, suggest that the current lack of gender difference could be due to increased exposure to computers amongst females at college level. However, the older adults in this study would not have benefited from this increased access to computers at college and therefore may have been more likely to exhibit the gender differences consistent with those that would have been found in the past.

The results of this study also show that despite displaying higher levels of technophobia than older men, older women were no less likely to use computers than older men. This concurs with the findings of Karavidas et al (2005) who found increased levels of anxiety (using a different measurement scale) in older female computer users, despite no difference in levels of computer usage. However, their study looked at computer users only, whereas this study examines both computer and non-computer users.

Technophobia and Experience

The results from the data show that, in common with previous studies (Weil and Rosen, 1995; Anthony et al., 2000), overall levels of technophobia were lower, and more positive cognitions were exhibited by those with experience. However, in contrast to those studies and those of Anderson (1996), Chua et al (1999) and Havelka et al (2004), there was no significant difference in levels of computer anxiety between those with experience and those without. This may be due to the fact that many of the older adults with experience were relatively new to computers and as such, may not have built up sufficient experience to reduce anxiety levels. The fact that the levels of anxiety in those that have completed a computer course and those that have not, are not significantly different suggests that the approach taken in computer courses for older adults is not reducing levels of anxiety and that a different approach may be

required for older adults. This is supported by the findings of Morris (1992), who found that a positive initial experience was required to reduce anxiety, and by McIlroy et al (2001) who found that a positive first experience, rather than the level of experience, in computing appeared to alleviate anxiety and that the characteristics of the initial computer instructor may negatively affect anxiety levels for some students.

Dealing with Technophobia

A high level of technophobia was found in the participants in this study, with higher levels being evident in women. This would suggest that an important area for further study would be interventions to treat technophobia, particularly in women.

Rosen et al (1993) developed a technophobia reduction programme aimed at reducing levels of technophobia. This programme resulted in all participants displaying less computer anxiety, improved computer cognitions and enhanced computer attitudes. The results were markedly better than those achieved by participants in a general computer course. Appropriate intervention techniques could be incorporated into computer courses offered to older adults, allowing those that are more technophobic to deal with this as part of their learning process. The inclusion of intervention techniques is supported by a study carried out by Beckers and Schmidt (2001) who suggest that training programs that enhance self-efficacy (one's confidence in one's own abilities) and computer literacy may reduce computer anxiety.

Further Research

The sample used in this study were all members of Active Retired Associations. As such, they may be different from the general population of older adults since those willing and able to join such an organisation may be more open to new experiences. Therefore, the study needs to be replicated across a broader population to assess whether the findings are consistent for the older population at large. It could also be

replicated for a younger population in order to see whether the levels of technophobia, and the gender differences, are consistent with those for younger people. This would help to determine whether the approach taken to training older adults should be different to that taken for younger adults.

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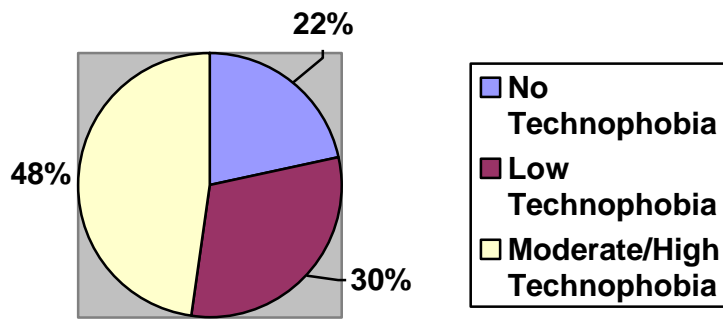


Figure 1 - Levels Of Technophobia In The Over-65 Age Group

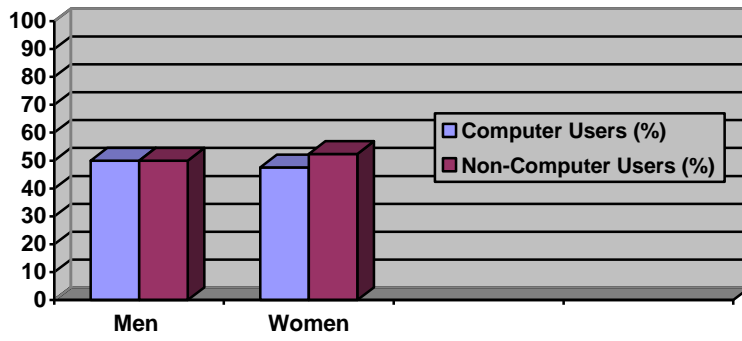


Figure 2 - Percentage Of Computer Users In The Over-65 Age Group

Computer Use	% of computer users (n = 74)
e-mail	74.3
Games	36.5
Work (including voluntary)	24.3
Banking	18.9
Letters	9.5
Shopping	8.1
Writing	4.1

Table 1 - Use Of Computers By Computer Users

Reliability Coefficients for Measurement Instruments	
Instrument	Cronbach's alpha coefficient
CARS-C (Computer Anxiety Rating Scale)	0.875
CTS-C (Computer Thoughts Survey)	0.825
GATCS-C (General Attitude Towards Computers)	0.277

Table 2 – Reliability Coefficients

	Computer Anxiety		Computer Thoughts		Overall Technophobia	
	Male (n = 29)	Female (n = 92)	Male (n = 28)	Female (n = 85)	Male (n = 28)	Female (n = 87)
No Technophobia	59%	49%	50%	38%	39%	16%
Low technophobia	24%	15%	28%	36%	25%	32%
Moderate/High Technophobia	17%	36%	22%	26%	36%	52%

Table 3 – Percentage Levels Of Technophobia In Males And Females

	Computer Anxiety		Computer Thoughts		Overall Technophobia	
	Users (n = 73)	Non-users (n = 69)	Users (n = 71)	Non-users (n = 63)	Users (n = 72)	Non-users (n = 64)
No Technophobia	51%	48%	69%	19%	36%	9%
Low technophobia	20%	19%	20%	38%	29%	27%
Moderate/High Technophobia	29%	33%	11%	43%	35%	64%

Table 4 – Percentage Levels Of Technophobia In Computer Users And Non-users

	Computer Anxiety		Computer Thoughts		Overall Technophobia	
	Yes (n = 92)	No (n = 49)	Yes (n = 90)	No (n = 45)	Yes (n = 90)	No (n = 45)
No Technophobia	47%	53%	61%	9%	30%	7%
Low technophobia	23%	12%	23%	39%	28%	24%
Moderate/High Technophobia	30%	34%	16%	52%	42%	69%

Table 5 – Percentage Levels Of Technophobia In Those Who Attended A Computer Course (Yes) And Those Who Did Not Attend a Computer Course (No)