Facilitating Access for Older Adults in Residential Care to Computers and the Internet

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Abstract

The Australian Bureau of Statistics predicts that older adults aged 65 and over will number 4 million in 2021 (18 percent of the population, ABS, 1998a). Consequently, the psychological and social factors that may improve quality of life for these older adults, and especially those in residential care, need to be examined. The goal of this study was to look at some of the social factors that may improve older adults’ quality of life. A model of quality ageing was tested. This model proposed that if an activity that satisfies psychological needs of competency, autonomy and relatedness is undertaken by older adults, then their quality of life may be improved. Facilitating access to computers and the Internet is one activity that could satisfy needs for competency, autonomy, and relatedness.

This study used a quasi-experimental longitudinal design over a twelve-month period, with measurements at baseline, post-test, and follow-up. An experimental group of older adults was instructed on using computers and the Internet with a training program devised for the current study. A control group was visited regularly but was not taught to use computers. Meanwhile, a comparison group was taught to use computers and access the Internet through an alternative program run by the Victorian state government.

Results showed that whilst older adults may be stereotyped as being “over the hill” and incapable of embracing new technology (for example the Internet), the reverse may be true. There was significant improvement in the overall quality of life of the experimental group (who were instructed with the special program) and this improvement was sustained at follow-up. In contrast, the control group showed a significant deterioration in well-being and psychological functioning over time, whilst
the comparison group showed some improvement in psychological functioning but deterioration in well-being. Statistical tests of an indirect effects model also suggested that many of the benefits for the experimental group were through improvements in competency and relatedness, lending support to the proposed model of Quality Ageing.

This study illustrated the psychological and social value of assisting older adults to access information technology. It was concluded that there is a need for greater discussion and understanding in the selection, development, and delivery of quality activities to older adults to ensure the ageing population will have a better quality of life.
Acknowledgments

The thesis would never have been attempted or completed without the ever-supportive encouragement of my colleagues, family and friends. Especially I would like to thank Dr Lesley DeMello without whose initial guidance and vision this research may not have been formulated. Words cannot express my deep gratitude to my supervisory team led by Associate Dean Everarda Cunningham and assisted by Dr Kay Lipson and Dr Josie Arnold. They shared my vision of the value of the research and were very much there for me in so many ways.

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The industry partner for the study was Strategic Planning Australia through Mr Denis Moriarty who was helpful in every way possible. Without Strategic Planning Australia’s financial assistance it is doubtful if the research would have been possible.

I would also thank my family and friends for support in the “little” things that actually were major at times. Finally, I would thank the staff and participants of the residential facilities in which the research was conducted. They were interested, keen and understanding.
Declaration

I, Vincent Kiss, declare that this thesis contains no material that has been accepted for the award to the candidate of any other degree or diploma. To the best of my knowledge, this thesis contains no material previously published or written by another person except where due reference is made in the text of the thesis.

Vincent Kiss.
Table of Contents

CHAPTER 1 ....................................................................................................................................................... 1

THESIS OVERVIEW........................................................................................................................................... 1

1. INTRODUCTION........................................................................................................................................... 1

1.1 OLDER ADULTS WITHIN SOCIETY ................................................................................................. 2

1.1.1 Defining ‘Older Adults’ .................................................................................................................. 2

1.1.2 Demographics of Older Adults ...................................................................................................... 3

1.1.3 Implications of an Ageing Population for Society ......................................................................... 5

1.2 AIMS OF THIS RESEARCH .................................................................................................................. 6

1.3 THESIS PRESENTATION..................................................................................................................... 7

CHAPTER 2 ........................................................................................................................................................ 10

TOWARDS A THEORY OF QUALITY AGEING .......................................................................................... 10

2. INTRODUCTION........................................................................................................................................... 10

2.1 DEFINING QUALITY OF LIFE ........................................................................................................... 10

2.2 THE CONSTRUCTS THAT ENCOMPASS THE QUALITY OF LIFE AS ASSESSED BY

OLDER ADULTS........................................................................................................................................... 14

2.2.1 Psychological Well-being ............................................................................................................ 15

2.2.2 Psychological Functioning ........................................................................................................... 18

2.2.3 Physical Functioning ..................................................................................................................... 18

2.2.4 Transitory Mood States ............................................................................................................... 20

2.3 THEORIES OF AGEING..................................................................................................................... 23

2.3.1 Introduction ................................................................................................................................... 23

2.3.2 Disengagement Theory ............................................................................................................... 23

2.3.3 Abandonment Theory ................................................................................................................. 25

2.3.4 Activity Theory ............................................................................................................................. 27

2.3.5 The Life Span Development and Ageing Model ......................................................................... 31

2.3.6 Socioemotional Selectivity Theory ............................................................................................. 33

2.3.7 Theory of Gerotranscendence ................................................................................................... 36

2.3.8 Summary of Ageing Theories ..................................................................................................... 38

2.4 SELF-DETERMINATION THEORY..................................................................................................... 40
<table>
<thead>
<tr>
<th>4.2</th>
<th>INFORMATION TECHNOLOGY: RECOMMENDATIONS FOR A COMPUTER MANUAL FOR OLDER ADULTS</th>
<th>73</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.1</td>
<td>Manual Size and Format</td>
<td>74</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Language and Method</td>
<td>74</td>
</tr>
<tr>
<td>4.2.3</td>
<td>Typeface</td>
<td>75</td>
</tr>
<tr>
<td>4.2.4</td>
<td>Pictorial Usage</td>
<td>75</td>
</tr>
<tr>
<td>4.2.5</td>
<td>Use of Colour in Text</td>
<td>76</td>
</tr>
<tr>
<td>4.2.6</td>
<td>Summary of Format Recommendations</td>
<td>76</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.3</th>
<th>SUITABILITY OF EXISTING COMPUTER TRAINING MANUALS</th>
<th>77</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3.1</td>
<td>Review of Training Notes</td>
<td>77</td>
</tr>
<tr>
<td>4.3.2</td>
<td>Review of Online Programs and Web Sites</td>
<td>79</td>
</tr>
<tr>
<td>4.3.3</td>
<td>Review of Popular Manuals</td>
<td>80</td>
</tr>
<tr>
<td>4.3.4</td>
<td>Summary</td>
<td>81</td>
</tr>
</tbody>
</table>

| 4.4 | DEVELOPMENT OF THE RESEARCHER-DESIGNED COMPUTER MANUAL | 82 |

<table>
<thead>
<tr>
<th>4.5</th>
<th>RECOMMENDATIONS FOR A COMPUTER TRAINING PROGRAM FROM THE INFORMATION TECHNOLOGY LITERATURE</th>
<th>83</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5.0</td>
<td>INTRODUCTION</td>
<td>83</td>
</tr>
<tr>
<td>4.5.1</td>
<td>Goal Oriented</td>
<td>83</td>
</tr>
<tr>
<td>4.5.2</td>
<td>Self-Paced Learning with Flexibility</td>
<td>84</td>
</tr>
<tr>
<td>4.5.3</td>
<td>Facilitating Interest and Enjoyment</td>
<td>85</td>
</tr>
<tr>
<td>4.5.4</td>
<td>Value of Positive Feedback in Training</td>
<td>86</td>
</tr>
<tr>
<td>4.5.5</td>
<td>Summary</td>
<td>86</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER 5</th>
<th>METHODOLOGY</th>
<th>88</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5.1</th>
<th>INTRODUCTION</th>
<th>88</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2</td>
<td>PILOT STUDY</td>
<td>88</td>
</tr>
<tr>
<td>5.2.1</td>
<td>Participants</td>
<td>89</td>
</tr>
<tr>
<td>5.2.2</td>
<td>The Procedure for Testing the Computer Manual</td>
<td>90</td>
</tr>
<tr>
<td>5.2.3</td>
<td>Recommendations from the Trial of the Manual</td>
<td>91</td>
</tr>
<tr>
<td>5.3</td>
<td>MAIN STUDY: THE INTERVENTION RESEARCH PROCESS</td>
<td>91</td>
</tr>
<tr>
<td>5.3.1</td>
<td>Participants</td>
<td>92</td>
</tr>
<tr>
<td>5.3.2</td>
<td>Instruments</td>
<td>94</td>
</tr>
<tr>
<td>5.3.3</td>
<td>Analysis Outline</td>
<td>103</td>
</tr>
</tbody>
</table>
7.6 Development of a Role and Identity .................................................. 175
7.7 Additional Analyses ............................................................................. 178
7.8 Practical Applications of the Study of Quality Ageing ...................... 182
7.9 Additional Evidence: Journal Extracts from the Experimental Group about the Intervention ................................................................. 184
7.10 Limitations of the Study .................................................................... 189
7.11 Future Research .................................................................................. 191
7.12 Conclusion ......................................................................................... 192

REFERENCES .............................................................................................. 194

APPENDICES .................................................................................................. 229

APPENDIX A .................................................................................................... 230
APPENDIX B .................................................................................................... 258
Attitudes Towards Computers Questionnaire ........................................... 258
APPENDIX C .................................................................................................... 259
Short Profile of Moods Questionnaire ....................................................... 259
APPENDIX D .................................................................................................... 261
Locus of Control Questionnaire ................................................................. 261
APPENDIX E .................................................................................................... 264
Leipad Questionnaire .................................................................................. 264
APPENDIX F .................................................................................................... 268
Friedman Well-being Scale ........................................................................ 268
APPENDIX G .................................................................................................... 269
General Perceived Self-efficacy Questionnaire ......................................... 269
APPENDIX H .................................................................................................... 270
Sociability Questionnaire ............................................................................ 270
APPENDIX I .................................................................................................... 271
Demographics Questionnaire .................................................................... 271
APPENDIX J .................................................................................................... 272
Subjective Pain Questionnaire ................................................................. 272
APPENDIX K .................................................................................................... 273
Staff Assessment Questionnaire ............................................................... 273
APPENDIX L .................................................................................................... 274
List of Tables

Table 1.............................................................................................................................93
Table 2...........................................................................................................................104
Table 3...........................................................................................................................109
Table 4...........................................................................................................................119
Table 5...........................................................................................................................120
Table 6...........................................................................................................................121
Table 7...........................................................................................................................122
Table 8...........................................................................................................................123
Table 9...........................................................................................................................125
Table 10.........................................................................................................................129
Table 11.........................................................................................................................135
Table 12.........................................................................................................................136
Table 13.........................................................................................................................142
Table 14.........................................................................................................................143
Table 15.........................................................................................................................146
List of Figures

Figure 1. The Theory of Quality Ageing at Time 1 and Time 2. .................................44
Figure 3. Single-factor CFA of Self-efficacy with the deletion of item 7.................126
Figure 4. Single factor congeneric model for Sociability with Item 3 and Item 6 deleted
...............................................................................................................................127
Figure 5a. Patterns of change across time for each of the groups on LEIPAD
   psychological functioning. Low score is positive..............................................131
Figure 5b. Patterns of change across time for each of the groups on
   Friedman Wellbeing. High score is positive .............................................. 131
Figure 5c. Patterns of change across time for each of the groups on
   Profile of Moods..............................................................................................131
Figure 6a. Patterns of change across time for each of the groups for internal locus of
   control, high score is positive......................................................................139
Figure 6b. Patterns of change across time for each of the groups for self-efficacy, high
   score is positive...........................................................................................139
Figure 6c. Patterns of change across time for each of the groups for sociability, high
   score is positive...........................................................................................139
Figure 7. Patterns of change across time for each of the groups for Attitudes towards
   Computers. ............................................................................................................143
Figure 8. The initial measurement model of Quality Ageing without any deletions...148
Figure 9. The final model of Quality Ageing with the non-significant pathways deleted.
...............................................................................................................................149
## Summary of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Univariate Analysis of Variance</td>
</tr>
<tr>
<td>ATC</td>
<td>Attitude towards computers</td>
</tr>
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<td>CFA</td>
<td>Confirmatory factor analyses</td>
</tr>
<tr>
<td>CFI</td>
<td>Comparative Fit Index within SEM</td>
</tr>
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<td>FWB</td>
<td>Friedman Well – Being Scale</td>
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<td>GES</td>
<td>General Efficacy Scale</td>
</tr>
<tr>
<td>GFI</td>
<td>Goodness of fit index within SEM</td>
</tr>
<tr>
<td>HREOC</td>
<td>Human Rights and Equal Opportunities Commission</td>
</tr>
<tr>
<td>ILOC</td>
<td>Internal locus of control</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>LEIPAD</td>
<td>First letter of formulators of scale</td>
</tr>
<tr>
<td>LOC</td>
<td>Locus of control</td>
</tr>
<tr>
<td>MANOVA</td>
<td>Multiple analysis of Variance</td>
</tr>
<tr>
<td>OTA</td>
<td>Report of Technology and Ageing in America (1985)</td>
</tr>
<tr>
<td>POMS</td>
<td>Profile of Moods Scale (short form)</td>
</tr>
<tr>
<td>QOL</td>
<td>Quality of life</td>
</tr>
<tr>
<td>RMSEA</td>
<td>Root mean square error of approximation within SEM</td>
</tr>
<tr>
<td>SDT</td>
<td>Self Determination Theory</td>
</tr>
<tr>
<td>SDV</td>
<td>Self Determination Theory variables.</td>
</tr>
<tr>
<td>SEM</td>
<td>Structural Equation Modelling</td>
</tr>
<tr>
<td>SOC</td>
<td>Theory of Selection, Optimisation and Compensation</td>
</tr>
<tr>
<td>SOC</td>
<td>Socibaility scale</td>
</tr>
<tr>
<td>SRMR</td>
<td>Standardised Root Mean within SEM</td>
</tr>
<tr>
<td>SST</td>
<td>Socioemotional Selectivity Theory</td>
</tr>
<tr>
<td>TLI</td>
<td>Tucker Lewis Index within SEM</td>
</tr>
<tr>
<td>TSAO</td>
<td>Surname of Foundation establisher</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
</tbody>
</table>
Chapter 1

Thesis Overview

1. Introduction

The primary aim of this study was to develop and empirically test a theory of quality ageing using an intervention activity that facilitates access to computers and the Internet. Quality ageing is defined as a process of ageing that provides for, and maintains, quality of life (QOL) and fulfils psychological needs for autonomy, competency, and relatedness, as described by Deci and Ryan (1985, 1991). Quality ageing encompasses outcomes such as an older persons’ ability to function, both physically and psychologically, in a manner that evokes a sense of well-being and satisfaction with life. The theory of quality ageing proposes that the quality of life of older adults may be enhanced when older adults undertake activities that are enjoyable, recreational, challenging, and socially involving, and also involve making personal choices and decisions. If such a theory was empirically supported, it may assist in the development of positive activity programs to enhance the quality of life of older adults, including those in residential care. Such programs may also strengthen the cognitive abilities of older adults.

A theory of quality ageing will become increasingly important given that the life expectancy of adults in developed countries may exceed 120 years in the foreseeable future (Finch, 1997). As older adults can expect to live longer in an environment that is continually changing, they may need particular life skills such as foresight, self-reliance, independence, flexibility and ingenuity. Fostering such skills will require supportive environments that promote lifelong education, upgrading of skills, and healthy lifestyles.
This chapter examines definitions of ‘ageing’, before presenting demographic information about ageing populations. Some of the psychological and social implications of an ageing society are outlined and the chapter concludes by outlining the aims of the current study and presenting an overview of subsequent chapters.

1.1 Older Adults within Society

1.1.1 Defining ‘Older Adults’

Defining the terms ‘old’ or even ‘older’ can be problematic. One definition of ‘older’ that has been formulated in the economic context is based on eligibility for receiving a pension. In Australia, older adults are eligible for the aged pension at 65 years (Australian Institute of Health and Welfare, 1997a). The Commonwealth Department of Aged Care defines ‘older’ as adults 70 years and above (Australian Institute of Health and Welfare, 1997a). In Australian workplaces, some employers classify workers as being older adults when they are over 45 years (Encel, 1998). However, research suggests that notions of ‘old’ are undergoing change and people who are now in their sixties are unlikely to classify themselves as old (Worthington, 1998a).

Some older adults define themselves by their cognitive age. Cognitive age is defined as the age individuals may feel they are (Barak & Gould, 1985). Such personal judgments may be based on how older adults see their role, what they feel they are capable of achieving, as well as their physical and mental health (Barak & Gould, 1985). Researchers have suggested that cognitive age may more accurately reflect how young or old a person is and propose cognitive age as an alternative to more traditional chronological age measures (Blau, 1956; Butler, 1968). In their study, Barak and Schiffman (1981) found that older adults frequently perceived themselves as being younger than their chronological age.
Satin (1994) suggests that the term ‘older’ may be used to include any person aged from 65 years to 90 years. Older adults may also be defined in terms of their vocational role, and when they are no longer able to continue in that role, others classify them as old (Satin, 1994). As such, older adults may be defined in terms of their functional capacity and, although they may be over 65 years old and still working, they may not be classified as old. Satin (1994) suggests a division of older adults into two groups, namely the ‘young elderly’ which is the age group from 65 to 75 years, and the ‘old elderly’ being those over 75.

While debate continues around what it means to be elderly, for the purposes of this current study the term ‘older adult’ refers to a person who is 65 years of age or older. The reasons behind the use of the term in this way are: (1) the study was conducted in residential care facilities where it was unlikely that there would be any adults under 65; and (2) the pensionable age for older adult males (as recognised by the Commonwealth Government) is 65. The female pensionable age is also being gradually moved to 65 (Australian Institute of Health and Welfare, 1997a). The minimum age of 65 for older adults was chosen for this study as it is frequently used in Australia. While a minimum age was set, there was no maximum age applicable to the study.

1.1.2 Demographics of Older Adults

The population, both globally and in Australia, is ageing. The World Health Organisation predicts that by 2020 the number of older adults worldwide will be one billion (Hart, 1996). Australia is one of the most rapidly ageing countries in the world (Australian Bureau of Statistics, 1998a), and between 1997 and 2051 the population in Australia aged 65 years and older is expected to rise in terms of numbers and proportion
of the total population. This age group is predicted to rise from 2.2 million in 1997, to 4 million in 2021, and to 6.3 million in 2051. As a proportion of the population, this represents increases from 12 per cent in 1997 to 18 per cent in 2021 and 26 per cent in 2051 (ABS, 1998a). The highest annual rate of growth (increase in numbers) for the 65 years and older group will occur between 2011 and 2021, when the peak of the baby boom generation (born from the mid 1940s to early 1960s) reach this age (ABS, 1998a).

Projections also show that substantial increases in the number of people aged 85 years or more will occur in Australia, rising from 216,000 in 1997 to around 440,500 in 2021, and reaching between 1.1 and 1.2 million in 2051. This is equivalent to 1.2 percent in 1997 and increasing to between 4.4 and 4.8 per cent in 2051 (ABS, 1998a). This promise of substantial increases in numbers of the aged has increased interest in the ageing process and concern about the problems faced by older adults in society.

The societal impact of an ageing population will be dramatic in future years (Hart, 1996). Many studies of the ageing population have focused on economic issues, and particularly the fiscal impact of an ageing population on healthcare, aged care, and income support programs. The World Bank has used the term “crisis” in relation to the economic implications of an ageing world population:

“…as the world’s population ages, old age security systems are in trouble worldwide. Informal community and family based arrangements are weakening and formal programs are beset by escalating costs that require high tax rates and deter private sector growth, while failing to protect the old” (World Bank, 1994, p.75).

The World Bank argues that policies for the aged must balance the welfare of older adults with the welfare of the economy (for example, balancing older adults’ welfare with additional costs for infrastructure and medical support).
1.1.3 Implications of an Ageing Population for Society

The shifting demographics of an ageing population present various challenges to society. There are a range of potential psychological and sociological outcomes that must be considered in the wake of an ageing population. In economic terms, the income security of retirees and the potential impact of such financial concerns on quality of life and longevity are unknown. Other issues relevant to older adults involve their work (for example, will they have work?), leisure (for example, how will they occupy their spare time?), family and social interaction (Baldi, 1997; Fisher & Specht, 1999). Further considerations involve the mental and physical health of current and future generations of older people, and how disease and disability profiles of the older population may change in future years (ABS, 1999; Birren & Renner, 1988). Further, given that older adults have made solid contributions during their lifetimes, they may have expectations of forms of assistance from their families, communities and government (Crockett & Hummert, 1987).

Recent research (for example, Baldi, 1997; Scott, 2001; Russell, 2005) suggests that if assistance for older adults is forthcoming, such intervention can lead to positive outcomes. Until recently, it was believed that thinking and memory declined in old age as irreplacable brain cells died (Cohen, 1999). However, Brown (1996) argues that such declines occur gradually and in some cases only minimally over time. For example, it has been shown that the brain can generate new cells, even well into old age (Cohen, 1999). There is also evidence that the network of connections among brain cells can strengthen over time (Cohen, 1999). Cohen’s research indicated that intellectually challenging activities could boost cognitive skills in older adults. He also suggests that most healthy older adults can both retain good mental functioning, and enhance this functioning by staying mentally, physically and socially active.
The explicit interest by governments and researchers in social and psychological theories of ageing reflects both the increasing social visibility of older adults in society and the realisation that healthy social integration is essential to successful ageing (Capiocco, 2000, Cohler, 1982). Over the years, theories of ageing have attempted to provide strategies for assisting older adults to achieve a satisfactory degree of integration and adaptation within society (Brown, 1996). A theory that explores the challenging use of positive opportunities within the daily lives of older adults and which may result in the enhancement of their quality of life would be beneficial (Creed, 1993).

The World Health Organisation (WHO, 2002) emphasises the need for society to explore resources that will enhance the quality of life of older adults throughout the world. WHO points out that older adults can be an important resource if their skills and talents are utilised properly. In this way, society can benefit from the skills of older adults and older adults can benefit from the opportunities provided by society.

1.2 Aims of this Research

Given that older adults are increasing in number, living longer, and have the potential to maintain and enhance their cognitive abilities, there is a need to investigate opportunities to enhance quality of life for this age group. The overall aims of this study were to develop a theory of quality ageing and empirically test the theory through implementing an appropriate activity that would engage the interest of, and be beneficial to, older adults. Such an activity could be engaging with information technology (IT) or, more specifically, facilitating access of older adults to computers and the Internet. Many older adults believe that they are not computer literate and that the acquisition of new skills and knowledge could be useful to older adults to enhance their quality of life. The specific aims of this study were to:
1. Examine the facets that comprise quality of life in an elderly population and formulate a definition of quality of life that lends itself to empirical measurement;

2. Review the literature on ageing and establish a theory of quality ageing that can be empirically tested;

3. Develop a suitable intervention activity that meets the psychological needs of competency, autonomy and social relatedness of an elderly population. Such an intervention would facilitate testing the proposed model of quality ageing;

4. Evaluate the effectiveness of the chosen intervention through an examination of longitudinal changes in quality of life of older adults over a twelve month period; and

5. Conduct an analysis of the effects of the program in order to test the proposed theory of quality ageing and investigate the underlying mechanisms through which the intervention has its effect on quality of life.

1.3 Thesis Presentation

This thesis is presented in seven chapters. Chapter 1 has presented an overview of the thesis, described the context for the study, and identified the target population, namely older adults 65 years of age and older. Demographic trends were then examined, together with some societal implications of an ageing population. The chapter concluded by presenting the aims of the study.

In the next chapter (Chapter 2), literature pertaining to the quality of life of older adults is examined. The variables and measures used to assess quality of life in older
adults are reviewed, prior to the formulation of a definition of quality of life. Theories of ageing are then discussed in order to identify which factors may influence quality of life in the elderly. A theory of quality ageing is then described, and proposes that when older adults engage in activities that increase their sense of belonging, sense of control, and sense of personal worth, this indicates the development of a relevant role and identity. This, in turn, may result in improved quality of life.

Chapter 3 considers the appropriateness of using information technology as the proposed intervention activity to test the theory of quality ageing. The literature recommends certain qualities within an activity that may contribute to an older adult’s well-being. The use of information technology and its relevance to older adults is reviewed, together with the trends in information technology use by older adults. The possible relationship between using computer technologies and the fulfilment of the psychological needs of competency, autonomy, and sociability is explored. The important aspects of the learning experience for older adults accessing information technology are reviewed, such as the benefits, barriers, and attitudes they may encounter.

Chapter 4 describes the development of a computer manual and training program designed to facilitate for older adults’ use of computers and access to the Internet. Recommendations for older adults from the IT literature for a computer manual are reviewed. The results of a small study of current manuals available are presented with the suggestion of a need to develop a computer manual for the current research. The recommendations from the IT literature for a computer training program are examined. The procedure for trialling the research designed computer manual is outlined.
Chapter 5 summarises the intervention research process and study procedures. The instruments used in the study are presented together with the design of the main study. Some statistical issues and analyses are then discussed. Finally, the research plan for testing the model of Quality Ageing with the experimental, control and comparison groups is submitted.

Chapter 6 describes the results of the intervention study and is presented in four sections. The first section presents baseline comparisons of demographic characteristics across participant groups, before describing the participants who dropped out of the study. The second section presents a series of measurement models using the baseline data in order to provide support for the factorial validity of the study constructs. The third section reports the results of mixed design MANOVAs and ANOVAs that compares the differences between study groups across the range of constructs (for example, well-being, psychological functioning). The final section presents a structural equation model of the theory of quality ageing to test the direct and indirect effects of the variables within the theory.

Finally, Chapter 7 discusses the findings in relation to the theory of quality ageing. Links are then made between the results and Self-determination Theory and the three psychological needs of competency, autonomy and relatedness. Relationships between the current findings, the theory of quality ageing, and other theories of ageing are then discussed. The possible development of role and identity within the activity is outlined, before the practical applications of computers within the intervention are presented, together with the limitations of the current study, directions and signposts for future research.
Chapter 2
Towards a Theory of Quality Ageing

2 Introduction

In its Active Ageing Policy (2002), the World Health Organisation (WHO) defines active ageing as “the process of optimising opportunities for health, participation and security in order to enhance quality of life as people age” (p.12). Strategies for achieving and maintaining this goal in the twenty-first century need imaginative and productive research (Russell, 2005).

This chapter is divided into two sections. Firstly, relevant literature pertaining to quality of life is examined, with a view to defining and operationalising this concept for this research. The second section reviews a range of theories of ageing in order to identify variables and associated processes that may influence quality of life in the elderly. Theories discussed include Disengagement, Abandonment, Activity, Lifespan Development, Socioemotional Selectivity, and Gerotranscendence Theories. Self-determination Theory is then examined in relation to the needs for autonomy, competency and relatedness, and their links with the ageing theories. Based on this literature, the chapter concludes by presenting a theory of Quality Ageing that can be empirically tested.

2.1 Defining Quality of Life

Quality of Life (QOL) has frequently been used as a generic term referring to economic, physical, or psychological states. However, the variables which have been measured in QOL research are often poorly defined, either wholly or in part (Schwartz, 1999). To ensure a better understanding of what is meant by QOL, the literature relevant
to this concept is reviewed, with particular attention to how QOL can be assessed in older adult populations.

Assessment of QOL has its intellectual roots in the psychology of stimulation, where the functions of environmental and intrapersonal factors in determining behavioural and affective outcomes are considered (Farquar, 1995). In this context, QOL is a complex, multifaceted concept that has not been clearly defined by researchers, even though it is frequently used within the health and behavioural science literature. Farquar (1995) suggests that this lack of a clear definition is attributable to QOL being used by many people in a range of theoretical disciplines, ranging from advertising to politics.

In the health and behavioural sciences, QOL is also poorly defined. For example, in their review of research articles published before 1993 in the health and behavioural sciences, King et al. (1997) found that many authors did not define the concept of QOL at all or measured related concepts such as life satisfaction and well-being (for example, Bowling, 1995; King et al., 1997; Mast, 1995; Meeberg, 1993). In other words, an explicit definition of QOL was lacking (Baxter et al., 1998; Eden & Ejlertson, 1999). These researchers either discussed the ways that QOL is defined and used by others or presumed that the concept was understood in the context of their article (Schwartz, 1999).

An historical development in the ‘quality of life’ construct provides further insight into its use (Day & Jankey, 1996). Day and Jankey suggested that QOL was originally assessed in a purely economic context. They describe how during the 1960s, the United States of America was experiencing strong economic growth, and an increase in violence, crime, and public disorder. These seemingly contradictory events suggested that economic growth alone was insufficient to describe QOL and that other
factors had to be considered. In response to this, researchers began to collect data on various social indicators of QOL, such as level of education, type of housing, and neighbourhood crime rates. Over variables measured to capture QOL included homelessness, domestic violence, and poverty (Day & Jankey, 1996).

Moving into the 1970s, QOL was redefined. Day and Jankey (1996) point out that there were serious limitations in the objectively measured social indicators from the 1960s. For instance, education level and housing type typically accounted for only 15 percent of an older adult's expression of QOL. Despite this, psychological (or subjective) indicators of QOL were not seen as valid measures because of difficulties in accurately estimating them (Day & Jankey, 1996). These psychological indicators reflected an individual's subjective reaction to their life experiences and included such concepts as happiness and life satisfaction.

The 1980s saw the proposal of Gap Theory (Day & Jankey, 1996), which reflected a gradual move towards the use of subjective indicators of QOL such as personal, physical, and psychological health. Gap Theory is based on the difference (or gap) between what individuals possess and some ideal, whether for themselves alone or for their social group. Gap theorists (e.g., Day & Jankey, 1996) suggested that QOL was best described as the difference between present life circumstances and a standard to which one aspired or compared oneself. However, one of the difficulties associated with Gap Theory involved determining the appropriate comparison referent. For instance, Day and Jankey (1996) suggested that some people measured the difference between what they had and what they imagined would be ideal, while others compared what they had against what a particular reference group owned or possessed. Although these multiple interpretations complicated its use, Gap Theory reflected a move away from purely objective measures of QOL to measures that included subjective evaluations of
objective indicators. In this way, Gap Theory was instrumental in acknowledging the role of subjectivity in the measurement of QOL.

A review of relevant articles published in the 1990s (see below) showed a diverse range of definitions for QOL. Most authors stressed the subjective nature of QOL, and described it variously as: (a) an individual's personal perception of their life (Bowling, 1995; Schipper, Clinch & Powell, 1990); (b) satisfaction with their own life (Ferrans, 1990; Meeberg, 1993); or (c) a feeling of well-being (Ferrans, 1990; Ferrell, 1996; Mount & Cohen, 1995). As such, the trend among researchers was to place an emphasis on the personal and psychological nature of QOL. However, there was also some reliance on other objective factors, including education, housing and income.

Another example of the changing manner through which QOL was assessed across time comes from its usage in dictionaries. In 1987, QOL was an adjective meaning ‘affecting quality of urban life’ (Random House Dictionary, 1987). In 1992, the American Heritage Dictionary described QOL as a noun meaning ‘the degree of emotional, intellectual or cultural satisfaction in a person’s everyday life as distinct from the degree of material comfort’. This latter definition of QOL emphasises the subjective, rather than objective, nature of QOL.

Bach and Rioux (1996) reviewed relevant literature from the past 40 years and concluded that even though the concept of QOL had evolved in that time, no specific definition had emerged as superior. Some studies have continued to use objective indicators to assess QOL, such as health or environmental factors (for example, Bar-Tur, Levy-Shiff & Burns, 1998). Bar-Tur et al. (1998) suggest that this is because objective indicators are easily quantifiable and measurable.

A criticism of the objective indicator approach is that objective measures often fail to take into account ethnic or cultural differences in QOL. For example, Campbell,
Converse and Rodgers (1976) found that older African Americans in the USA reported higher levels of happiness than Caucasians despite inferior housing conditions. As such, objective indicators alone cannot fully assess QOL. Without an understanding of the beliefs and values held by a particular cultural or ethnic group, the importance and priority attached to specific objective indicators is unknown. In contrast, subjective measures of QOL allow the inclusion of a person’s implicit cultural and personal values (Aaronson, 1991). Furthermore, Aaronson (1991) points out that because there is such a wide diversity of cultural and personal values in society, older adults in the same residential care facility with similar objective characteristics but from different backgrounds may demonstrate different evaluations of their QOL.

In summary, the reviewed literature indicates that QOL: (a) is an evaluation of an individual's current life circumstances; (b) is multidimensional in nature; (c) is value based and dynamic; and (d) comprises both subjective and/or objective dimensions.

### 2.2 The Constructs that Encompass the Quality of Life as Assessed by Older Adults

For older adults, the notion of QOL may have particular importance as ageing may reduce feelings of competency, autonomy and social interaction (Deci & Ryan, 2000). Consistent with the notion of QOL encompassing physical, psychological, and social dimensions, Walker and Avant (1995) used concept analysis to formulate a definition of QOL for use with older adults. Concept analysis considers the critical attributes of a concept and gathers these together for analysis (Walker & Avant, 1995). Results showed that constructs by which older adults primarily evaluate their QOL (King et al., 1993; Lawton, 1996; Schwartz, 1999) generally fall into four dimensions: (1) psychological well-being, (2) psychological functioning, (3) physical functioning,
2.2.1 Psychological Well-being

Psychological well-being refers to the psychological aspects of QOL (Bowling, 1995; Schipper at al., 1990). Ryff (1996) describes the multidimensional nature of psychological well-being, which is illustrated within literature on development psychology, clinical psychology, and mental health. In developmental psychology, psychological well-being is described as a progression of continued emotional and psychological growth across the lifespan. Within clinical psychology, in contrast, there are many formulations of well-being, including Maslow’s (1970) idea of self-actualisation, Roger’s (1980) concept of the fully functioning person, and Jung’s (1964) notion of individuation. In the mental health literature there is, for example, Birren and Renner’s (1988) concept of positive functioning in later life. Based on these diverse terms, Ryff (1996) distinguishes six dimensions of psychological well-being, namely “self acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth” (p. 367). A number of these dimensions will now be discussed in more detail.

**Self-acceptance**

Self-acceptance (Ryff, 1996) describes a person’s evaluation of their psychological well-being, and is encompassed in the notion of self-esteem (Ferrell, 1996; Presant, Klahr, & Hogan, 1981). This notion refers to a positive or negative evaluation an individual makes regarding himself or herself. High self-esteem is
described by Branden (1995) as a readiness to take greater responsibility for oneself and a willingness to confront fear, conflict, and discomforting realities. Branden sees self-esteem as a critical factor in positive living and ageing.

Positive relations with others

Positive relations with others describes a feeling of being connected to people who are able to love, care, and to be loved and cared for in return (Baumesiter & Leary, 1995). Consistent with Ryff’s (1996) dimension of positive relations with others, the gerontology literature emphasises that social contacts and social networks with family and friends are important to older adults’ psychological well-being (Charness & Schaie, 2003; Everard, 1999; Luszcz, 1998; Ryff, 1989). For instance, the WHO Active Ageing Policy (2002) identified group social interaction as an essential component for personal and social well-being. The TSAO Foundation (2004) also emphasises the importance of social contacts and networks in healthy ageing, and suggests that social interaction promotes psychological well-being and a better quality of life, especially where there is a mutual exchange.

Autonomy

Ryff (1996) defines autonomy as the experience of personal choice and being able to act from a sense of self. Autonomy is another dimension of well-being that is relevant to older adults, and particularly those in aged care facilities (Baltes & Silverberg, 1994; Langer & Rodin, 1976). It does not refer directly to independence, but rather, to the feeling that older adults have a sense that their behaviour reflects their own personal choices and decisions (Deci & Ryan, 2000).
Emotional and physical health both correlate with autonomy (Sarafino, 1994). In particular, a strong sense of autonomy or internal locus of control appears to help maintain good health and prevent illness (Baltes & Silverberg, 1994). Furthermore, people who become ill and possess a strong sense of autonomy seem to adjust to illness better and show faster rehabilitation (Sarafino, 1994). Rodin (1986) describes how individuals with higher autonomy are typically healthier and live longer. However, this degree of control may change with age, especially if the older person becomes more dependent on others due to disability (Rodin, 1986). Research has shown that if older persons believe that they are in control of the decisions affecting their health and are able to make choices, then they can respond more positively to treatment (Perrig-Chiello, Perrig & Stahelin, 1999).

**Personal growth**

Personal growth occurs when individuals use past experiences to cope with the present and to set goals for the future. It is a learning process which occurs in the course of daily living through which an individual comes to maintain a positive view of the future (Fisher & Specht, 1999). This emphasis on being able to adapt and cope with daily experiences is an important component of psychological well-being (Brandstader & Renner, 1992). Fisher and Specht (1999) found that personal growth which promotes psychological well-being is aided by being happy, hopeful and creative.

Associated with personal growth, Ryff (1989) includes happiness and joviality. Lu and Argyle (1994) also suggest that while happiness and joviality promote personal growth, they are also key aspects of psychological well-being and can provide a buffer against depression and anxiety. Joviality is a component of happiness (Lawton, 1996), and may be defined as a deep-seated sense of good humour (Macquarie, 2000). While
some theorists such as Campbell (1981) define happiness as a momentary subjective evaluation of a positive affect subject to daily mood fluctuations, other researchers such as Lu and Argyle (1994) and Ryff (1989) conceptualise happiness as self-fulfilment. The latter view seems more consistent with personal growth as an ongoing process which is and not dependent on transitory states.

In summary, as Ryff (1996) suggests, psychological well-being encompasses multiple dimensions, including self acceptance, positive relations with others, autonomy, and personal growth. Psychological well-being is linked to personal health (Bowling, 1995).

2.2.2 Psychological Functioning

Psychological functioning is the second dimension implicated in the measurement of QOL in older adult populations (King et al., 1993; Lawton, 1996; Schwartz, 1999; WHO, 2002). It is defined as the capacity to think rationally, to make decisions, having coping skills, and being emotionally active (WHO, 2002). The WHO (2002) emphasises the importance of healthy psychological functioning for older adults in maintaining a reasonable QOL. Researchers, such as De Leo et al., (1998), have suggested that psychological functioning may be assessed by life satisfaction, loneliness/social isolation, depression, and cognitive functioning.

2.2.3 Physical Functioning

Physical functioning is the third dimension of QOL (WHO, 2002) and refers to the level of physical activity that an older adult is capable of undertaking. It encompasses such things as being mobile, able to climb stairs, walk long distances, and care for oneself on a daily basis.
There are well-documented health benefits from elevated physical functioning, and it is widely accepted that regular physical activity is associated with a decline in mortality rates among older adults (Ryan & Plotnikoff, 2005). The potential benefits that result from increased physical functioning include a reduction in chronic heart fatigue and the risk of cardiac death. The WHO (1998) also suggests that physical functioning can be benefit mental health by encouraging social contact and reducing social isolation. An older adult who has reasonable physical functioning has greater discretion to participate in social activities. For example, a study by Tilburg et al., (2004) found that where physical functioning declined, social networks also diminished. Likewise, a study by Ungar, McAvay, Bruce, Berkman and Seeman (1999) found that social interaction and maintaining social networks was linked to better physical functioning and self-care in older adults. They used data from the MacArthur Studies of Successful Ageing involving older adults aged 70 to 79 years, and found that physical functioning was enhanced and maintained by activities that increase social interaction. The activities need not be of a physical nature, but should be relevant, enjoyable, and socially positive.

Finally, physical functioning is closely linked to self-care in older adults (Levy & Myers, 2004). Where there is a low level of physical functioning, there is also a low level of self-care and a greater need for nursing assistance. However, it is important to note that older adults’ self-care behaviours may be moderated by their social environment and expectancies of family, friends, and health providers (Levy, 2003). For example, if carers perceive their older adult clients as decrepit, they may also have a low expectation of what they can achieve and may fail to offer encouragement. Consequently, the more positive older adults feel about their ageing, the better their self-care should be. In similar fashion, a lack of recognition by older adults of their own
self-worth and competency may be a barrier to self-care (Guinn, 2004). Family can unknowingly perpetuate such poor perceptions in an older adult about self and their ageing friends with comments like “what do you expect for your age?” Guinn suggests that older adults need to find positive support in their social networks and be encouraged in the range of self-care activities in which they may engage.

### 2.2.4 Transitory Mood States

Another dimension of QOL that is important for older adults is transitory mood states (Suls & Bunde, 2005). Transitory moods may be either momentary or longer lasting (Derbaix & Pecheux, 1999), but generally tend to be more subtle, longer lasting, and less intensive than emotions (Derbaix & Pecheux, 1999). Negative moods include anxiety, tension, anger, confusion, and fatigue, and may be risk factors for poor physical health, suicide, poor quality ageing (Suls & Bunde, 2005; Conwell, Duberstein & Caine, 1998), and may affect cognitive ability (Phillips, Smith & Gilhooly, 2002). Mood states may be either positive or negative and, if longer lasting, may affect older adults’ assessment of their QOL (Derbaix & Pecheux, 1999). In particular, reports of subjective well-being may be context dependent and people may use their current mood to evaluate their life satisfaction without looking at the global picture (Schwartz & Strack, 1999)

The assumption that mood states can affect self-reports of well-being has been explored by Eid and Diener (2004) who studied a sample of 249 participants. Eid and Diener (2004) examined whether personality judgements change with mood fluctuations and how strong such fluctuations need to be to influence self-reports. Their results indicated that assessment of life satisfaction is typically dependent more on stable traits
than variable states. As such, it would seem that where the mood is brief and transitory, there is little effect on self-reports of well-being. However, where the mood is long lasting, it may influence assessments of subjective well-being. This may apply to a mood state such as anxiety where an older adult experiences an ongoing anxious state of mind due to social or economic problems.

**Anxiety**

Anxiety is a common mood state experienced by older adults (Lawton, 1996). Gurian and Miner (1991) define anxiety as a subjective state of internal discomfort, dread and foreboding, and which is accompanied by autonomic nervous system arousal. Anxiety differs from fear and tends to occur without any apparent conscious stimulus. Sheikh (1996) defines anxiety as "a sense of apprehension or nervousness about some future event" (p. 76), and suggests that while anxiety occurs in the lives of most people, older adults are especially prone to it. Older adults may feel particularly anxious when they cannot anticipate what the outcome may be from a particular situation or task. The danger for older adults is that this anxiety may become excessive, and even pathological.

Anxiety, like loneliness and depression, is often associated with the loss of valued objects, such as a person, position, or thing. This object loss can leave the older adult feeling helpless, vulnerable, and alone (Seligman, 1975). Associated with object loss may also be anxiety about being deserted by family or friends due to the burdens of old age (Lawton, 1996). In addition, object loss may also result in various stages of depression (Bauer & Bonanno, 2001; Fries & Crapo, 1981).
Depression

Depressed moods involve sad states that may persist for a short period of time (Alexopoulos, 2005; Fries, Mehr, Schneider, Foley, & Burke, 1993). This state may be caused by psychosocial adversities such as interpersonal conflict, thoughts of lost loved ones, personal difficulties, and forced relocation (Alexopoulos, 2005).

Other transitory mood states that may affect reports of well-being can be caused by daily tensions and stress brought on by problems such as paying bills, fear of violence and abuse, housing problems, poor personal health, and social difficulties (Bauer & Bonanno, 2001). This tension and stress can affect older adults’ sense of well-being. Mood states such as anger, confusion and frustration, may result from loneliness and social isolation that older adults typically experience through retirement and relocation to aged care facilities (Mullins et al, 1988). Bewilderment and confusion are also mood states often experienced by older adults (Kaufman, 1988), and can be exacerbated by communication failure with family and friends (Guinn, 2004).

In summary, transitory moods states, both positive and negative, may be caused by many aspects of daily life. However, by definition, these moods swings are transitory and may either be momentary or longer lasting. Where they are brief they should not unduly affect self-reports of well-being. The next section examines several theories of ageing that have been proposed over the last half-century to shed light on the ageing process.
2.3 Theories of Ageing

2.3.1 Introduction

Over the last half-century, several theories of ageing emerged in an attempt to describe the ageing process and understand some of the barriers to positive ageing. Early theories (such as, Abandonment Theory) attempted to account for why older adults had poor QOL. In contrast, later perspectives suggested that QOL in later years might be maintained and enhanced. The following sections provides an overview of several theories of ageing that have endeavoured to describe the ageing process and explain how people can maintain and enhance their QOL. These theories include: Disengagement Theory; Abandonment Theory; Activity Theory; Socioemotional Selectivity Theory; and Gerotranscendence Theory. A theory model of quality ageing is then proposed which draws from these theories and can be empirically tested.

2.3.2 Disengagement Theory

One of the first theories on ageing was Disengagement Theory (Cumming & Henry, 1961) which contends that it is normal for older adults to decrease their levels of activity along with the inevitable loss of social roles and relationships. Disengagement is thus viewed as a process of change enabling older adults to adapt to issues such as biological decline, physical decline, and human loss (Cumming & Henry, 1961).

Disengagement theory speculates that with ageing, older adults “willingly” take on an identity characterised by negative passivity and social withdrawal. The major contention is that as individuals grow into old age, they “wish” to escape the stress resulting from recognition of their own diminished sense of competency. Consequently,
they willingly prepare for their death by a gradual withdrawal from involvement with others (Baum & Baum, 1980).

Disengagement Theory presents a pessimistic view of ageing as preparation for death. It proposes that with increasing age there will be: (a) a voluntary severing of ties between older adults and others in society; (b) a change in the quality of remaining ties; and (c) a reduction of personal energy (Henry, 1965). As such, disengagement from society is seen as a necessary precursor for successful ageing as helpful to society and as helpful to older adults who can become more focussed on their inner lives (Passuth & Bengston, 1988).

Many critics have refuted Disengagement Theory. For example, Butler (1985) and Gubrium (1974) suggest that the concept of disengagement in the “golden years of old age” is a myth. They claim that the theory was developed to discourage planned intervention programs to help older adults integrate into a rapidly changing technological society. Equally, Maddox and Campbell (1985) point out that Disengagement Theory requires a belief that developmental processes are context free and that all people grow old in the same way. They dispute the notion that disengagement is a voluntary process. Kasser and Ryan (1999) conducted a study of residents in nursing homes and found that residents did have important needs for quality (rather quantity) in their social relationships. As such, disengagement took the form of an active decision reflecting a preference for a small number of close relationships rather than a large number of acquaintances.

Despite these criticisms, Disengagement Theory has had a profound effect on gerontology research because it was one of the first formal theories that attempted to explain the process of growing old (Passuth & Bengston, 1988) and proposed that disengagement from social networks by older adults is normative (Cuming & Henry,
1961). In particular, Disengagement Theory encouraged the development of other theories which represented other authors’ reactions towards its negativity and pessimism about ageing.

### 2.3.3 Abandonment Theory

Abandonment Theory was developed by Burgess (1960) and provided an early alternative to Disengagement Theory. In contrast to Disengagement Theory, Burgess argued that older people did not withdraw from social life, but rather were abandoned by society in their old age. Abandonment Theory proposes that being old amounts to a state of relative deprivation in an industrial and technological society that has little use for older people. There is little genuine demand for the services of older adults and this lack of demand leads to stereotyping of older adults as being useless and obsolete (Baum & Baum, 1980; Hoffman, 2005).

A stereotype is defined in the Oxford Dictionary (1989) as “a person possessing or believed to possess characteristics or qualities that typify a particular group” (p. 1406). When people are stereotyped by the term ‘old’, they are judged according to characteristics and qualities that society assumes older people possess (Russell, 2005). Buzan (1990) suggests that older adults are usually placed in the same category as ‘the poor’, ‘the sick’, and ‘the marginalised’, and these stereotypes may affect the behaviour of other people and subsequently reinforce myths about older adults. The WHO (2002) supports Buzan (1990) and emphasises the need to develop a new paradigm that encourages society to value older adults and assist them to be active participants in society during changing times and technological innovation.

According to Abandonment Theory, older people are encouraged to disengage from society and cause no further problems. However, the resulting relative deprivation
(for example, physical, social and psychological) may result in hopelessness, loss of control, and loss of independence (Andersson, 1986; Bates & Rankin-Hill, 1994). Lowenthal and Robinson (1976) cite involuntary severance from family ties and a life partner as a major source of abandonment, and older adults often express dissatisfaction with the absence of meaningful relationships (Everard, 1999). The Theory of Abandonment also denies the myth of the “golden years,” which is idealistically defined as a happy retirement filled with peace (Gubrium, 1973).

Evidence supporting Abandonment Theory is currently mixed. Atchley (1991, 1992), for example, disputes whether older adults feel lonely, isolated or abandoned, and argues that empirical evidence does not support Abandonment Theory. George (1990) also points out that the social conditions assumed to produce feelings of abandonment, such as poverty and mandatory retirement, are not empirically associated with such negative feelings. However, both Mullins and Elston (1996) and the WHO (2002) emphasise the reality of poverty and loneliness in old age. Segrin (1994) also argues that older adults, and especially those in low income brackets, are likely to be lonely, isolated and lacking income security. In Australia, Scott (2001) reports data indicating that almost half of retirees fall in the poorest third of the population. As such, older adults are among the most vulnerable to social isolation and loneliness.

Despite these contrasting perspectives, Abandonment Theory has driven Governments towards improving the quality of life for ageing populations. For instance, the WHO promoted the International Year of the Older Adult in 1999 and an Active Ageing Policy in 2002 that endeavoured to change society’s view of older adults and their capabilities. In its Active Ageing Policy, the WHO (2002) pointed out the importance of activity in the lives of older adults as a means of promoting healthy psychological and physical living.
2.3.4 Activity Theory

Activity Theory (Neugarten, Havinghurst & Tobin, 1961) rejected the stereotyping of older adults and suggested some approaches to overcome their lack of QOL. According to Activity Theory, optimal ageing can be achieved by staying active, resisting declines in social contacts, and finding substitutes for roles and identities lost through retirement and ageing (Neugarten et al, 1961). It suggests that when a positive activity is undertaken repeatedly, there will be positive outcomes for the older adult. For example, older adults with an interest in gardening may experience heightened interest facilitated by the appearance of the garden, the comments of others, or achievements with the garden. These factors reinforce the interest and, as a result, the older adult may feel good about himself/herself. In addition, the older adult may develop the role of a gardener and the identity of a gardener with particular skills in this area.

A major premise of Activity Theory is that active older adults can maintain their positive outlook and degree of activity from middle age, and thus maintain their QOL over time (Passuth & Bengston, 1988). Lemon, Bengston and Peterson (1972) argue that the older-aged and middle-aged people share similar psychological and social needs, and suggest that activity provides the roles necessary for older adults to retain their sense of personal worth and self-esteem. They also posit that losing social roles can be particularly detrimental to older adults in their later life. However, an assumption that Neugarten et al., (1961) did not clarify or expand upon was that for an activity to be beneficial to older adults, a positive sense of self-efficacy needed to be experienced. This omission, and it’s implications for understanding the ageing process, will be discussed shortly.

A large base of empirical evidence lends support to Activity Theory. Research has shown that older people who stay mentally, physically, and socially active tend to
demonstrate better psychological well-being and cognitive functioning (Cohen, 1999; Jenkins, Pienta & Horgas, 2002). Mancini and Orthner (1990) studied this notion in 104 older adults living in residential care and found positive relationships between activity level, leisure satisfaction and well-being. Furthermore, where activity programs were available in residential care, participants perceived activities as worthwhile and meaningful. A number of factors may play a role in the positive effects of activity for older adults. These include the ability to challenge negative stereotypes of ageing; stimulate cognitive activity; and experience a sense of community. Each is discussed in turn.

First, engaging in an activity may allow older adults to challenge stereotypes about ageing. Wearing (1995), for example, suggests that older adults can construct adaptive expectations about older adulthood through meaningful activity, and thus reject the stereotype of physical decline and the label ‘old’ (for discussion of more traditional ‘old age’ norms, see Havinghurst and Albrecht, 1953; Cowgill, 1974). Leisure activity, in particular, may offer a means of challenging societal images and expectations of old age by emphasising the potentials of older adults’ capabilities (Wearing, 1995). Iso-Ahola (1980) supported this premise, and reported how leisure educational activities promoted social interaction and overcame feelings of social isolation and loss for elderly adults who were relocated to a residential care facility. In addition, Andersson (1986) reported that when elderly adults who had lost mobility were involved in an activity, their sense of loneliness was reduced. As such, participation in an activity has been found to benefit older adults’ psychological and physical health.

Secondly, older adults may benefit from engaging in activities because they stimulate their cognitive abilities. Russell (2005) reported that when older adults participated in an activity which engaged their cognitive abilities, they experienced
reductions in depression and stress. Noice et al., (2004) also showed the value of designing an activity that required cognitive functioning. This study had three groups of participants aged 60 to 86 years: the first group received theatre art training which consisted of “increasingly demanding exercises to have participants experience the essence of acting” (p. 570); the second group received a visual art course and learned to appreciate and comment on various art mediums; the third group received no training. Training took place over a four week period and resulted in the theatre training group, which presumably experienced the highest level of cognitive stimulation, showing significant gains in cognitive functioning when compared to the other groups. The stimulation of the cognitive abilities by an activity that is challenging and enjoyable appears to have a positive effect on older adults QOL.

Thirdly, engaging in activities may provide older adults with the opportunity to develop a sense of community and social connectedness. Russell (2005) conducted an exploratory study of older adults and suggested that an advantage of sharing a common interest with others (such as a shared activity) can be the resulting sense of community within the group. The activity need not be physical and could, alternatively, be intellectually stimulating and take the form of, for example, Internet activities, study programs or discussion groups (Jenkins et al., 2002; Robinson & Kestnbaum, 1999). Russell (2005) suggested that where there was an activity that was relevant and in which the participants fully engaged, there was also an improvement in their self-efficacy and well-being. If older adults believe that they are capable of undertaking an activity, their self-efficacy may subsequently predict their future involvement and readiness to persevere with the activity (Deci & Ryan, 2000).

One problematic assumption of Activity Theory is that engaging in any activity will be beneficial for older adults (Lemon et al., 1972). If this proposal holds true, then
level of activity should strongly predict positive outcomes for older adults. However, research has shown that the amount of activity is not uniformly and positively associated with life satisfaction. Everard (1999), for example, found that engaging in a large number of activities did not necessarily enhance the well-being of older adults and may, in fact, have been detrimental to their well-being. In particular, Everard demonstrated that only activities involving social interaction (and not the quantity of activities undertaken) had positive impacts on the well-being of older adults. This was consistent with early findings reported by Weiss (1969), who also suggested that activities directly associated with either domestic duties or employment would not significantly protect against negative feelings. As such, an activity must have certain relevant qualities (like social interaction) for it to enhance QOL (this will be further discussed).

Activity Theory has two additional limitations. First, it presumes that older people have control over the types of activities available to them (Gubrium, 1972). However, this is frequently not the case in residential care facilities (Kasser & Ryan, 1999) nor for many economically deprived older adults who are devoid of social support and financial resources. In these instances, there may be no possibility of fulfilling goals due to the lack of choice and independence. Second, Activity Theory sheds little light on the specific characteristics of activities that may enhance QOL. Thus, the mechanisms through which activities result in positive ageing are not explicated.

Despite these limitations, Activity Theory has encouraged the development of other theories addressing the potential role of activity in developing older adults’ QOL. Such theories include the Life-Span Development and Ageing Model (Baltes, 1987), Socioemotional Selectivity Theory (Carstensen, 1991), and Gerotranscendence Theory.
(Tornstam, 1989). These might inform the nature of activities that enhance QOL in older adults and are discussed in the following sections.

### 2.3.5 The Life Span Development and Ageing Model

A theoretical framework of the human ageing process was proposed by Baltes (1987) in the Lifespan and Development Model. The main premise of this model is that development and ageing are a natural part of a lifelong change process. Based on this framework, Baltes and Baltes (1990) developed a theory of 'successful' ageing called the Theory of Selection, Optimisation and Compensation (SOC), that argues for selective optimisation with compensation. This means that successful ageing can be achieved if older adults can: (a) select the activity they wish to be involved with; (b) focus on and optimise their capabilities, making allowances for what they can and cannot do given their age, health, and physical functioning; and (c) make allowances for what they are not able to do (i.e., compensation; Baltes & Baltes, 1990).

Baltes (1987) proposed that as people age they become more selective in the activities they undertake. Riediger and Freund (2006) point out that this selectivity reflects an increased emphasis on the quality or content of the activity rather than the quantity. Desirable activities require that older adults experience: (a) a sense of belonging; and (b) choice. Baltes and Baltes (1990) also suggest that this selectivity applies to social relationships. In particular, older people become more selective in their relationships due to the time and effort required to maintain relationships, combined with a heightened awareness of their own mortality. Riediger and Freund (2006) conducted a longitudinal study of 177 participants aged from 20 to 69 years, and examined whether older adults become selective by: (a) restricting the number of relationships they have; or (b) focusing on the relationships that they see as important.
The findings from this study are consistent with the notion that older adults do not disengage or restrict their relationships, but rather, focus on the small number of relationships that are most central. Kasser and Ryan (1999) found that “quality of relatedness with friends and relatives was significantly correlated with positive well-being and life satisfaction” (p. 949) for these older adults.

As is evident from the above discussion, Baltes (1987) and Baltes and Baltes (1990) present a positive view of the ageing process, describing old age as a time during which mental and social processes are modified along with environmental changes (for example, relocating to an aged care residential facility). As such, the Life Span Development and Ageing Model as well as SOC are consistent with Activity Theory, and suggest that older adults undertaking an activity would naturally try to engage with activities to optimise their capabilities. As discussed previously, in their endeavour to be involved with the activity, it is expected that older adults can compensate for their reduced ability to perform the activity equally as well as a younger person. An example of selectivity due to reduced capabilities comes from the study by Czaja and Sharit (1993) on the computer performance of 65 women aged 25 to 70 years. They found that the older women were more selective, choosing tasks they knew they were capable of and adjusting their completion times to reflect their capabilities relating to those tasks.

Despite its strengths, the Lifespan Development and Ageing Model presents with a number of limitations. In particular, Baltes (1987) points out that the process of selection, optimisation and compensation will vary substantially in individuals and may depend on the individual’s life history. As such, the constructs may prove difficult to operationalise and measure. For instance, Freund and Baltes (2002) describe how compensation may involve substitution for lost capabilities such as hearing by: (a)
obtaining a hearing aid; or (b) activating unused resources such as help from other people. These wide individual variations can be difficult to assess.

In sum, the Lifespan Development and Ageing Model (together with SOC) presents a positive view of ageing. It describes ageing as a natural process in which people become more selective in their relationships, maintaining those that are valued and disengaging from those that are not. Older adults also become more selective choosing activities that are of interest to them and which optimise their skills while compensating for deficiencies.

2.3.6 Socioemotional Selectivity Theory

Socioemotional Selectivity Theory (Cartensen, 1995) builds on the Lifespan Development and Ageing Model and proposes that as adults age, they increasingly select relationships that provide emotional support. As such, whilst older adults are expected to restrict the number of relationships that provide information and fulfil affiliative needs, they will also have more relationships that fulfil emotional needs. Thus, it is suggested that older adults will make decisions about their relationships according to principles of quality rather than quantity, and seek relationships that provide emotional support and care. It is also expected that this may improve with age as older adults develop better control of their emotions.

There are a number of reasons why adults are expected to become more selective in their relationships with age. First, adults are expected to have changing needs for seeking information from social interaction over time (Lansford, Sherman & Antonucci, 1998). In particular, gathering information is most important during younger years as people gather information that will be benefit them (for example, in their careers) as they age. People become aware of others who may give them the
information they need and form social networks on this basis. However, as people age they become more selective in the information they require and, as a result, the need for a large social network decreases. Likewise, the desired outcomes from social interaction change when the future is viewed as limited (Lansford et al., 1998). Second, older adults are expected to become increasingly conscious of their mortality and, as such, wish to use their remaining lifetime in the pursuit of meaningful ‘quality’ relationships. Carstensen, Isaacowitz and Charles (1999) discuss time-mediated socioemotional selectivity and point out that older adults may be more inclined to maintain and regulate existing relationships rather than pursue new ones. As such, older adults would be expected to be more interested in undertaking activities that maintain or enhance existing and selected friendships.

Predictions from Socioemotional Selectivity Theory about social withdrawal contradict those from Disengagement Theory (see Section 2.3.2). Carstensen (1991, 1995) suggests that whilst older adults may disengage in their latter years, such disengagement is due to older adults becoming more selective for quality relationships that provide meaningful emotional contact and expression. As such, Carstensen critiques Disengagement Theory which does not address the changing needs of people as they grow old and presupposes that older adults have lost their sense of belonging and control and are preparing for death. In contrast, Socioemotional Selectivity Theory suggests that older adults become more selective, and value relationships and activities that are meaningful and beneficial to them.

Support for Socioemotional Selectivity Theory comes from a number of studies. For example, an investigation of older adults in residential care (Kasser & Ryan, 1999) found that older adults’ social disengagement actually reflected a preference for sincere relationships. This study found that quality social interaction with family and selected
friends was an important adjunct to the quality of life of older adults. Lawton (1996) also supports the notion that older adults learn to manage their affect more effectively as they age and to ‘disengage’ from social contacts or activities that are not relevant or fulfilling.

Other studies suggest that older adults assess their satisfaction with life, in part, through their relatedness to, and support from, family and friends. Carstensen (1991) found that older adults who felt supported by family and friends had better mental and physical health than those who were socially isolated. However, other studies have shown differences in the relative contribution of family and friends to an older adult’s life satisfaction. In particular, whilst family members make up at least 50 percent of an older person's social network (Antonucci, 1994), support from friends can, at times, be more important (Lee & Shehan, 1989; O’Connor, 1995). This may be because older adults feel that family relationships are obligatory, while friendships are voluntary (Russell, 2005). Consistent with this possibility, Sibert and Mutran (1999) conducted a longitudinal study of 800 pre-retirement men and women in their early sixties and found that having a strong friendship was a more important predictor of life satisfaction than income or marital status. They found that older people without friendships often had low life satisfaction. An earlier study by Lustbader (1996) also found that an older person’s life satisfaction was substantially reduced when lacking a friend with whom to discuss their difficulties.

While Socioemotional Selectivity Theory refers to age, it is not solely a theory of old age. However, it does have strong relevance to older adults as it shows how they may adapt and regulate their emotional climate “to maximise the potential for positive affect and minimise the potential for negative affect” (p. 155). The main difference between Socioemotional Selectivity Theory and other models of ageing (for example,
Lifespan Development and Ageing Model) are that the former contests the notion “that similar sets of social goals motivate social contact throughout life” (p. 155). Rather, it is suggested that goals are reorganised through life due, mainly, to the perception of time constraints.

2.3.7 Theory of Gerotranscendence

Tornstam’s (1989) Theory of Gerotranscendence provides another positive perspective on old age. Tornstam suggests that there are two life periods, and the second (old age), involves a natural progression towards greater maturity and wisdom. Gerotranscendence, thus, describes a change from a materialistic and pragmatic view of society to a more cosmic (appreciation of nature in itself) and transcendent (going beyond normal experience) approach (Tornstam, 1989). This mature perspective is usually accompanied by greater life satisfaction. Rather than preserving mid-life ideals and activities, Gerotranscendence Theory adopts and emphasises change and development.

Cosmic transcendence involves the realisation that time is no longer as important as before and that old age is not heralding an end to life (in contrast, Socioemotional Selectivity Theory suggests that time is valuable and should be used selectively; see Section 2.3.6). Death is no longer absolute and the person realises that they are a link in a long chain of earlier and future generations. Tornstam (1989) proposed that adults may view their present situation as the ‘first part of their life’ as they grow into old age, then become more aware of their limited existence and experience a new definition of time, space, life and death. For many older adults, this is expected to bring with it a sense of coherence across life’s paths and makes the
individual’s life more meaningful. That is, there is a sense of belonging to the past and future.

Transcendent changes are argued to be part of the ageing process and occur on three levels: self, social and cosmic (Tornstam, 2005a). Changes on the self level produce a less selfish approach to life and a reduced egocentric attitude. Socially older adults are less interested in non-salient relationships and, as proposed by Socioemotional Selectivity Theory and SOC, become selective in their social networks. On the cosmic level, there is connectiveness with nature and, perhaps, a new definition of time, space, life and death.

Cosmic transcendence may express itself in the feeling that the border between life and death is less striking than when compared to an earlier age; the sense that individual life is not as important as a continuing life; a feeling of greater connection with the universe; or the experience of a close presence of persons who are not physically present. These possible experiences have a positive impact on the social well-being of older adults (Sadler, Braam, Van Groenou, Deeg & Van Geest, 2006).

Gerotranscendence Theory is a model for understanding positive ageing and the progress into the second half of life. Like Socioemotional Selectivity Theory, Gerotranscendence Theory presents a positive view of disengagement that reflects older adults’ need for solitude and a small number of relationships with people of similar interests (Tornstam, 1997). Old age is seen as opening the mind to previously unattainable knowledge which holds its own joys and privileges. Older adults are also expected to be motivated to try new technology and accept new and challenging roles and identities. This is because with increasing selectiveness, older adults expected to become more discerning about what they take part in (for example, activities, relationships).
Tornstram provided empirical support for his theory of Gerotranscendence in a number of studies. For instance, Tornstam (1994) conducted a longitudinal mail survey of 912 non-institutionalised Danish men and women aged 74 to 100, and concluded that the concept of gerotranscendence was relevant to this sample of older adults. Tornstram (1997) also conducted open-ended, qualitative interviews with 50 Swedish men and women aged 52 to 97 to examine their self-attitudes and developmental changes. Again, he found that respondents frequently reported an awareness of the cosmic dimension of reality and a less selfish view of life (for example, were less interested in material possessions).

The primary strength of Gerotranscendence Theory is that it presents a positive view of older adults as being able to make informed decisions about their welfare and realising that they are part of a greater universe. It also suggests that older adults will have an interest in challenging activities. However, a limitation of the theory is that it appears to focus on a specific group of older adults, namely those from middle- to upper-class backgrounds. As such, this theory may exclude older adults who are poor or marginalised.

2.3.8 Summary of Ageing Theories

Interest in gerontology and quality ageing has increased over recent decades. Over the last 40 years, this interest has manifested in a growing number of ageing theories (Fisher & Specht, 1999). Each of these theories of ageing has contributed to the ongoing research in gerontology.

Disengagement Theory (Cumming & Henry, 1961) sought to explain why people withdrew from society in old age, and presented a negative view of older adults passively accepting inevitable death and withdrawing from society. Abandonment
Theory (Burgess, 1960), however, then argued that older adults were not ‘disengaging’, but, instead, were abandoned by society. Abandonment Theory challenged society and governments to actively combat the exclusion of marginalised groups, especially older adults.

Activity Theory (Neugarten et al., 1961) provided another alternative to Disengagement Theory and proposed that older adults could find meaning and new roles in their senior years through engaging in new activities. It was suggested that more active older adults were better off, whilst others also emphasised that the type of activity was an important variable (Lemon et al., 1972). The importance of quality within activities and social networks thus gained recognition (Noice et al., 2004; Wearing, 1995).

The Lifespan Development and Ageing Model (Baltes, 1987) and SOC (Baltes & Baltes, 1990) were presented subsequently, and argued that older adults were selective in their relationships and activities. In addition, older adults adapted and optimised their opportunities to develop new roles and identities, which heightened their self-efficacy and quality of life. Baltes’ theory is consistent with Socioemotional Selectivity Theory (Carstensen, 1991; 1995), which also emphasised older adults’ preferences for quality (over quantity) in their relationships and activities. Carstensen argued that older adults do not disengage from society, but seek a small number of relationships that provide emotional support. Gerotranscendence Theory (Tornstam, 1989) also argued that older adults would seek quality in relationships and activities and become selective about them. These more positive perspectives on older adult life and the emphasis placed on the capabilities of older adults provided a drive towards overcoming prevalent stereotype of older adults as being no longer useful.
2.4 Self-Determination Theory

Along with the recognition of possibilities for positive ageing, some researchers have studied aspects of the activities that may enhance older adults’ quality of life (Kasser & Ryan, 1999; Sheldon & Kasser, 2001; Russell, 2005). This approach was reflected in the development of Self-determination Theory. Self-determination Theory (SDT; Deci & Ryan, 1985, 1991) is a model of motivation and personality that is based on a concept of human needs. A “need” is defined as any motivational force that synthesises a person’s perception and goal-directed action (Murray, 1938). As such, a need is equated with any desire an older person may have, although the distinction is made between what people “want” (by virtue of their lifestyle and habits) and what they actually “need” to sustain their quality of life or well-being. Deci and Ryan (1991) describe the fulfilment of three psychological needs as necessary for well-being and integrity. These psychological needs are: competency, autonomy and relatedness.

Competency refers to the need to successfully complete the task at hand (Deci & Ryan, 2000). It carries with it a sense of accomplishment and subsequently enhanced motivation (Deci & Ryan, 2000). Autonomy, in contrast, describes the need for a personal sense of control and the feeling that actions are undertaken freely and voluntarily (Deci & Ryan, 2000). The literature strongly supports the opinion that autonomy is central to older adults’ well-being (Langer & Rodin, 1976; Bandura, 1977; Taylor, 1990; Baltes & Silverberg, 1994). Finally, relatedness is defined as the need to feel securely connected with, and loved by, other people (Baumeister & Leary, 1995).

Evidence supports the notion that a sense of relatedness, autonomy and competency can bring about enhanced mood and quality of life. Lane, Milton and Terry (2005), for example, studied 90 older women and found that activities involving social interaction (and presumably enhancing personal relatedness) reduced negative mood
states such as anger, tension and depression. A sense of greater personal autonomy and perceived support from staff, family and friends was investigated by Kasser and Ryan (1999). In their study of 50 older adults in residential care, a sense of personal autonomy and perceived support was positively associated with well-being and quality of life. Sheldon, Houser-Marko and Kasser (2005) studied 175 social psychology students and 278 of their parents aged between 39 and 95 years, finding that a sense of autonomy was consistently associated with psychological well-being. Thus, a number of studies support the notion that fulfilling psychological needs for competence, autonomy and relatedness may have positive effects on older adults’ psychological outcomes.

Sheldon and Kasser (2001) provided evidence to suggest that people do strive for more autonomous (or self-determined) reasons to engage in activities as they grow older. Furthermore, when older adults are ‘forced’ into participating in events, they may experience frustration, anger, and hostility (Russell, 2005). These negative affective states may result in self-centredness, anti-social behaviour, and a danger of becoming reclusive (Deci & Ryan, 2000). Such states could stifle any formation of a role or identity within that environment (Sheldon, et al. 2005).

The application of SDT to an older adult population was illustrated by Luszcz (1998), who reported longitudinal changes in cognition and well-being for older adults. Luszcz noted that a sense of autonomy, competency and relatedness may be “precursors to well-being rather than alternative dimensions of it” (p.55). Tijhuis et al. (1999) studied older males in institutional care and found that if older adults had a sense of independence and personal control, their social and psychological functioning improved. These studies indicate that SDT may be applied to older adults and that the fulfilment of psychological needs for competency, autonomy, and relatedness, can enhance their QOL.
SDT can be integrated with existing theories of ageing. For instance, Activity Theory suggests that engaging in activities may be beneficial to the well-being of older adults. However, as discussed previously, activity participation is not uniformly associated with improved outcomes and activities may need certain qualities in order to bring about positive effects for older adults. In particular, SDT suggests that to be beneficial, activities need to: (a) facilitate voluntary choice (autonomy); (b) allow older adults to exercise their capabilities (competency); and (c) experience quality relationships (relatedness). SDT is also consistent with Gerotranscendence Theory (Tornstram, 1989) and emphasises how old age can be a time of challenge and creativity. Similarly, SDT is consistent with Socioemotional Selectivity Theory and the proposal that older adults feel the psychological need for relatedness or meaningful social contact. However, Socioemotional Selectivity Theory extends SDT to suggest that older adults will seek quality relationships (rather than quantity of interactions) to satisfy needs for relatedness.

In summary, SDT emphasises the importance of psychological needs for competency, autonomy and relatedness, and illustrates how satisfying these needs may promote well-being and quality of life. SDT suggests that people may be motivated to engage in activities that they find creative, novel, challenging and goal oriented, but only when these activities facilitate them exercising their capabilities (competency), freedom of choice (autonomy), and connection to social groups (relatedness). When such needs are satisfied, interest in and commitment to the activity may be maintained and enhanced well-being and quality of life may result. To further the study of gerontology a theory of quality ageing is proposed which draws on the richness of SDT and the Ageing Theories discussed above.
2.5 Limitations and Linking of Existing Research Theories

While existing theories of ageing have made contributions to knowledge of healthy ageing, a number of questions remain. Two of these are emphasised here. First (and as touched upon earlier), whilst Activity Theory emphasises the value of taking part in activities, it fails to specify the qualities of an activity that may benefit well-being. Second, although both Lifespan Development and Ageing Theory and Socioemotional Selectivity Theory highlight how older adults’ can become more selective in their choices of relationships and activities, they say nothing about the qualities of an activity or relationship that may motivate a decision to engage (as opposed to withdraw). As such, there remains a need for a theory to integrate these different perspectives on the ageing process and to provide some answers to these questions. One such model is now proposed.

2.6 A Theory of Quality Ageing for Empirical Testing

The aim of this section is to describe a theory of quality ageing that outlines possible ways to maintain and enhance QOL for older adults. The theory of quality ageing proposed in this section has its basis in the previously discussed theories of ageing and SDT and is shown in Figure 1.
As can be seen from Figure 1, the proposed theory of quality ageing suggests that the QOL of older adults (as measured by their psychological functioning and well-being) will be enhanced over time when they undertake activities that facilitate experiences of autonomy, competency and relatedness. This is consistent with Activity Theory, which states that activities can be beneficial to an older adult’s quality of life, and Self-determination Theory, which emphasises the fulfilment of the psychological needs of competency, autonomy and relatedness in older adults. As discussed earlier (see Section 2.4), much research suggests that activities meeting psychological needs for competency, autonomy and relatedness may enhance quality of life (Deci & Ryan, 2000). Thus, it is proposed that these factors may contribute to an enhanced quality of life for older adults.
The theory of quality ageing shown in Figure 1 provides a series of hypotheses that can be empirically tested. In particular, it is hypothesised that:

1. An intervention activity (in this case, accessing computers and the Internet; see Chapter 3) can be designed to provide experiences of successful learning (that is, competency), making voluntary choices (that is, autonomy), and social connection. Where older adults engage in such an activity, their competency, autonomy and relatedness will be enhanced over time. These improvements will be greater than any changes experienced by older adults who do not participate in such an activity.

2. Older adults’ QOL (that is, Psychological well-being; Psychological functioning; Mood states) will also show improvement over time following the intervention activity. These improvements in QOL will be greater than any changes experienced by older adults who do not participate in such an activity.

3. The effects of the intervention activity on QOL indices will be indirect through the effects on competency, autonomy and relatedness.

2.7 Summary

Chapter 2 was presented in several parts. First, it discussed the notion of ‘quality of life’, and its development and application in psychological research. It was suggested that both subjective and objective indicators of psychological well-being, psychological functioning, and mood states were required in a thorough assessment of quality of life. Theories of ageing were then reviewed. These included Disengagement Theory (Cumming & Henry, 1961) which viewed older adults as waiting to die and with little interest in living, and Abandonment Theory (Burgess, 1960) which reflected society’s
realisation that it needed to do more for older adults. Activity Theory (Neugarten et al. 1961), in contrast, proposed that the physical and mental health of older adults could be enhanced through engaging in useful activities. It was recognised, however, that Activity Theory is flawed by the assumption that all activity is beneficial. Other theories of ageing outlined were Lifespan Development and Ageing Model (Baltes, 1987) together with SOC (Baltes & Baltes, 1990), Gerotranscendence Theory (Tornstam, 1989) and Socioemotional Selectivity Theory (Carstensen, 1991, 1995). Each of these emphasises possibilities for positive ageing and the capabilities of older adults. These theories suggested that older adults would be selective in their activities and would optimise their capabilities. This brought forward the importance of both freedom of choice and capabilities in activities for older adults.

Chapter 2 then discussed Self-determination Theory (Deci & Ryan, 1985, 1991) which emphasised the importance of engaging in activities that fulfil three primary psychological needs of autonomy, competency and relatedness. It was suggested that SDT has particular relevance to older people, who may not be as engaged with family, work and social activities as they were during earlier stages in the life-cycle. Finally, a theory of quality ageing was described which suggests that older adults’ quality of life may be enhanced by participating in an activity that meets psychological needs of autonomy, competency, and relatedness. In order to test the model of quality ageing empirically it is critical that an appropriate activity that meets the psychological needs of autonomy, relatedness and independence is selected. The next chapter considers whether or not facilitating access to computers and the Internet might be one such activity.
Chapter 3

Information Technology and Enhancing Quality Ageing

3. Introduction

The goal of this chapter is to consider the appropriateness of using information technology as an intervention activity to test the proposed conceptual theory of quality ageing. In order to achieve this aim, Chapter 3 comprises three parts. First, the relevant evidence illustrating trends in information technology use in populations of older adults is reviewed. Second, the possibility that information technology may meet psychological needs of competence, autonomy and relatedness for older adults, and thus enhance their quality of life, is discussed. Third, factors are considered that may affect (both positively and negatively) older adults’ access to computers, including motivation, attitudes, and barriers to technology access.

3.1 Information Technology and Older Adult Populations

Information technology (IT) is changing the ways in which society functions and the ways in which people communicate and socialise. Croucher (2006) estimates that around the world, approximately 135 billion e-mails are sent each day. The Internet can also be a forum for discussing interests, hobbies, crises or physical ailments. Using such forums, people can interact and establish relationships online without ever meeting face to face (Scott, 2001; Oblinger & Verille, 1999).

In its Active Aging Policy (2002), the WHO argues that if older adults are not given the opportunity to engage with new technology, they may become increasingly marginalised. Russell (2005) argues that encouraging older adults to use IT could
reduce social isolation and accompanying problems such as depression, loneliness and anxiety. Additional research suggests that computers could also promote rehabilitation, self-sufficiency, and improved education (Chute & Bills, 1994; Hoot & Hayslip, 1983; Taira, 1994). These positive effects may be particularly beneficial to older adults from rural areas who may suffer from geographical isolation (Adler, 2002, 1996; Scott, 2001).

There are a number of other specific benefits for older adults from having improved access to IT. These benefits relate, in particular, to accessing economic and health services that normally require being physically present with the service provider. Economic resources, for instance, take the form of online banking. In terms of health services, it may be that IT access could facilitate the remote monitoring of medication, blood pressure, and other services that typically require visits to a doctor. Alternatively, IT access could be a more accessible and reliable medium for communicating with health professionals regarding medication and medical conditions. There would appear to be concrete and tangible benefits to older adults from being able to access new information technologies.

### 3.1.1 Current Use of Information Technology by Older Adults

Several studies have demonstrated that IT may be increasingly influential in the lives of older adults. For example, a national survey conducted in the United States by SeniorNet found that older adults frequently used computers for word processing, managing personal finances and playing games (Adler, 1996). One third of older respondents used computers for creating graphics, desktop publishing, and managing a home business, whilst approximately one quarter communicated online, either through
e-mail or a chat room. Writing and communicating online were significantly related to education and competency with computers (Adler, 1996).

With respect to Internet usage, Adler (2002, 1996) noted that three-quarters of older adults used the Internet for either social activities, such as exchanging e-mails, or for information purposes, such as accessing news or reference information. One third used the Internet to pay their accounts and/or accessed bulletin boards. Interestingly, only a very small number used online chat rooms. In relation to the time they spend online, the majority of older adults surveyed spent less than two hours per week online, whilst about one third spent three to ten hours per week online and a small number spent more than ten hours per week online.

While Australian data is less comprehensive than that from the United States, the Australian Bureau of Statistics (ABS, 2005) reported that the number of computer users in the age group 65 years and older has increased since 1998. The percentage of Australian households with a computer in their home in 2005-05 was 67 percent, whilst 20 percent of these households were occupied by people aged 65 years or older. Fifty-six percent of all adults using computers in 2002 also accessed the Internet, and 16 percent of these were 65 years or older. Only a quarter of those aged 65 years or older were located in rural areas. The main reason given for using the computer or accessing the Internet was personal use (97 percent). Although the 65 years and older demographic group appears to be relatively small in number, it is one of the fastest growing groups in Australia to access the Internet (ABS, 2005). It is worthwhile noting, however, that these statistics pertain to older adults living independently and do not include those in residential care.
3.1.2 Information Technology and Older Adults: Empirical Evidence

Given that IT use seems to be increasing in many groups of older adults, several studies have begun to explore the potential consequences of this use for individual well-being. For example, Purnell and Sullivan-Schroyer (1997) introduced computers into nursing homes and reported beneficial effects for residents, including enhanced well-being. An earlier study by Danowski and Sacks (1980) reported increased levels of self-confidence and lower levels of loneliness for older adults using computers, compared to the residents who did not use computers. Groves and Slack (1994) stated that older adults using computers had potential for improving their life satisfaction and quality of life. Russell (2005) conducted a qualitative investigation of nineteen adult computers learners in Sydney and found that they “position themselves favourably to achieve well-being outcomes from their learning” (p.1). A common theme amongst these studies is that older adults experienced increased levels of self-esteem, productivity and creativity. Collectively, these studies suggest that the use of IT by older adults has the potential to enhance their QOL. The next section explores the value of IT as a worthwhile intervention activity.

3.2 Computers and Internet Access as an Intervention Activity

According to the proposed theory of quality ageing (see Section 2.6), QOL can be improved by engaging in activities that satisfy psychological needs of autonomy, relatedness, and competency. This section argues that facilitating access to computers and the Internet through a computer training program may be one intervention that could satisfy such needs and thus improve QOL. The ways in which IT use may satisfy these needs and relate to well-being are now considered. In particular, it is suggested here that facilitating access to IT can provide: (a) social interaction; (b) voluntary
choice; (c) experiences of achieving goals; (d) feelings of being meaningful and affirming; and (e) recreational and enjoyable experiences, which will all bring about gains in QOL by satisfying needs for competency, autonomy and relatedness. However, IT may also bring about additional gains in QOL by providing intellectual challenge and facilitating creative thought.

3.2.1 Social Interaction

Opportunities for social interaction may be one way that IT usage may benefit well-being for older adults. This is consistent with Self-determination Theory (Deci & Ryan, 1985, 1991) and Socioemotional Selectivity Theory (Carstensen, 1993), which emphasise that relatedness is an important psychological need for older adults. Social interaction is presumed to be a primary factor fulfilling needs for relatedness (Deci & Ryan, 2000), and has been found to relate positively to well-being (Russell, 2005; WHO, 2002). Everard (1999), for example, studied 249 older adults aged over 65 years, and found that activities undertaken for social reasons and that prompted social interaction predicted increases in well-being. Similarly, Haberkost and Dellman-Jenkins (1996) showed that the psychological well-being of older adults was enhanced when they were given opportunities for social contact.

Besides promoting direct increases in well-being (as predicted by SDT), social interaction can also improve older adults’ well-being indirectly, through positive gains in cognitive functioning (De Leo at al., 1998). Aartsen, Van Tilburg, Smits and Knipscheer (2004), for example, conducted a longitudinal study of 1552 adults aged 55 to 85. They found that social interaction was beneficial for the general well-being of older adults but also their cognitive functioning. A similar finding was made by Seeman, Lusignolo, Albert and Berkman (2001) in their study of social support and
cognitive ageing. They concluded that social interaction enhanced older adults cognitive functioning in addition to their well-being. As such, consistent with SDT, the empirical literature supports the notion that social interaction can satisfy needs for relatedness and have positive impacts on QOL, both directly and also through gains in cognitive functioning.

Facilitating computer and Internet access is one strategy that can potentially promote social interaction (Czaja & Lee, 2003), and through this, enhance QOL. In particular, e-mail access facilitates communication with family and friends regardless of geographical location (Russell, 2005), and research has shown that e-mails can provide older adults with a sense of social interaction (Czaja & Lee, 2003). Computer games can also promote social interaction where participants are able to compete against each other online. Furthermore, a mentor system, whereby the more computer literate older adult helps the less literate user, can also be initiated in computer training (where possible). This may encourage mutual sharing and support among participants (Czaja, Hammond & Joyce, 1989). Chat rooms add another social dimension to IT use, allowing users to talk to others in live time. These chat rooms may offer social interaction on a global level and older adults may converse with anyone they choose (Czaja & Lee, 2003). However, the major problem with chat rooms for older adults is the pace at which the dialogue takes place and the skills required. This difficulty may be overcome with time and increasing proficiency with computers, but initially, chat rooms can be “too busy” for many older adults.

3.2.2 Voluntary Choice

Facilitating voluntary choice is another way that IT use may benefit older adults’ QOL. Self Determination Theory (SDT) suggests that providing a sense of autonomy
will have direct effects on QOL (Deci & Ryan, 2000). In particular, assisting older adults to make (autonomous) choices should help develop a sense of responsibility for the activity, which enhances their self-esteem and well-being (Bauer & Bonanno, 2001; Deci & Ryan, 1991; Langer & Rodin, 1976; Lomranz, Bergman, Eyal & Shmokin, 1988; Russell, 2005).

The importance of voluntary choice (and thus autonomy) for older adults is shown in the classic study of Langer and Rodin (1976), who gave residential care facility residents the freedom to make choices and decisions relating to their lives and accommodation needs. In addition, the older adults were asked, if they wished, to accept responsibility for nurturing a plant. It was found that having the freedom to make choices gave older adults a sense of autonomy and an internal locus of control, which resulted in a significant improvement in their psychological health. This finding was supported by Steinkamp and Kelly (1987) who also suggested that where older adults had a sense of belonging and responsibility fostered through choice to an activity, their quality of life might be enhanced.

Aspects of computer use and Internet access that give the opportunity for voluntary choice are: (a) the selection of fonts; (b) text colour and size; and, (c) the potential use of pictures and symbols. Internet access also facilitates choices and making decisions regarding playing games, visiting web sites, and chatting to family, friends, or strangers online (Czaja & Lee, 2003). This sense of autonomy and choice helps to make the task recreational and enjoyable and may also help maintain motivation to persevere with the activity (Bauer & Bonanno, 2001). A select range of potential decision opportunities involved with access computers and the Internet are shown in Figure 2.
Figure 2 shows that when an older person turns on the computer, there are a wide variety of choices available to them. They may choose to write a letter, or access the Internet. They may also choose to read their e-mail, or search for new information. Alternatively, they may choose to engage with a chat room. As such, computer access can be seen to facilitate choices amongst a wide range of potential features and functions.

3.2.3 Goal-oriented and Productive

Activities that are goal-oriented and productive may also improve the QOL of older adults (Fisher, 1995; Fisher, Day & Collier, 1998; Russell, 2005). The importance of achieving goals, particularly for older adults, is strongly emphasised in several theories of ageing (Deci & Ryan, 1991; Cartensen, 1995). In particular, Self-determination Theory (Deci & Ryan, 1985, 1991) proposes that having experiences of achieving set goals and being productive will encourage and fulfil needs for
competency. Kaufman (1988) studied older adults in residential facilities and found that where goals were set and there were productive outcomes the well-being of the participants was enhanced.

The link between having achievable goals and psychological well-being was shown in a study by Sheldon, House-Marko and Kasser (2005). Their investigation of 178 social psychology students and 278 of their parents (aged 39 to 95 years) showed that setting goals in life was positively associated with psychological well-being and life satisfaction. In addition, achieving a goal, like producing a product or providing a service, can heighten an older adult’s experience of competency (or self-efficacy) and self-esteem (Sheldon et al., 2005). Kaufman (1988) found that goal-oriented and productive leisure activities aided emotional well-being in older adults, reduced their levels of anxiety, and counteracted the stress of boredom.

The possibility of structuring goals and ensuring experiences of productivity can be strongly associated with computer and Internet use (Czaja & Lee, 2003; Gueldner & Loeb, 2003; Russell, 2005; Scott, 2001; WHO, 2002). When using computers, older adults can set goals for each session. The goals may include sending an e-mail or searching the Internet for a specific piece of material.

With increasing competency, older adults are expected to experience improved well-being (Russell, 2005; Scott, 2001). Self-determination Theory (Deci & Ryan, 1985, 1991) argues that goal-directed behaviour needs to be autonomous to facilitate such positive outcomes. Furthermore, participation in activities should be intrinsically motivated (Deci & Ryan, 2000). External rewards, on the other hand, can detract from autonomy and older adults may feel they are controlled by the reward. As such, external influences such as threats or deadlines for completion of tasks can be detrimental to intrinsic motivation and, subsequently, to the satisfaction of psychological needs (Deci
& Ryan, 2000). In summary, goal-oriented activities have been found to be beneficial to older adults’ well-being, provided that motivation is intrinsic and older adults have a sense of autonomy.

3.2.4 Meaningful and Affirming

Deci and Ryan (2000) argue that an activity that is meaningful and affirming will also have positive affects on well-being. Meaningful and affirming activities are presumed to satisfy, in part, needs for competency and autonomy. A meaningful activity reflects the following qualities: (a) participation is voluntary (that is, without external pressure); (b) it reflects personal interest; and (c) it is salient. A ‘salient’ activity is one that older adults find relevant to their needs and can be undertaken freely and without undue external pressure. Affirming qualities, in contrast, reflect subsequent feelings of achievement and increased self-efficacy (Lombardo & Kuntaler, 1987). Furthermore, an activity is typically assessed as meaningful and affirming when the participant perseveres in an activity and their autonomy is enhanced (Buettner, 1988, Deci & Ryan, 2000; Russell, 2005; Shary & Iso-Ahola (1989). As such, this sense of an activity being meaningful and affirming can be operationlised by variables such as self-efficacy, self-esteem, and internal locus of control (Lombardo & Kuntaler, 1987; Lilley & Jackson, 1990, Deci & Ryan, 2000).

The importance of activities being meaningful and affirming is illustrated in a number of empirical studies. Buettner (1988), for instance, found that participation in activities that were meaningful and affirming promoted improved physical functioning and mental alertness for older adults in residential care. Similarly, Shary and Iso-Ahola (1989) found that older adults’ well-being was enhanced following activities that were meaningful and affirming. Lilley and Jackson (1990) suggested that meaningful and
affirming activities can increase feelings of independence and autonomy. Studies also suggest that computer and Internet use can be a meaningful and affirming activity and, as such, can be beneficial to older adults’ well-being (Russell, 2005; Czaja & Lee; 2003, Scott, 2001). These studies showed that where older adults had the ability to send e-mails, use computers for personal correspondence, and search the Internet for sites of interest, they typically found the activity to be meaningful and affirming. It is expected that these participants also experienced enhanced well-being.

3.2.5 Recreational and Enjoyable

The experience of an activity as being recreational and enjoyable is another factor that may improve older adults’ well-being (Haberkost & Dellmann-Jenkins, 1996; Kaufman, 1988). Deci and Ryan (2000) argue that an activity may be experienced as recreational and enjoyable when participants have a feeling of competence within an activity. A recreational activity is defined as involving either physical or psychological functioning and associated pleasure at this undertaking. An enjoyable activity is one that is recreational but, in addition, facilitates a sense of happiness and the desire to persevere and/or repeat the activity (Kaufman, 1988; Voelkl, Fried & Galecki, 1995). Voelkl et al., (1995) studied older adults’ aged over 65 years in residential care and found that where an activity was both recreational and enjoyable, it facilitated a sense of freedom of choice, competency, and social interaction. The researchers also reported that older adults who took part in recreational and enjoyable programs reported increased feelings of well-being, while participants in programs that lacked those qualities reported decreased well-being. Similarly, Lawton, Winter, Kleban and Ruckdeschel (1999) found that participation in communal activities that were enjoyable and recreational promoted improved mental health for older adults.
Computer and Internet access can be an enjoyable and recreational activity because it may offer options and choices (Russell, 2005). The ability to contact family and friends through e-mail can be enjoyable for older adults and may reduce feelings of social isolation (Czaja & Lee, 2003). Russell (2005) suggests that the Internet provides older adults with enjoyment as they successfully search for items of personal interest. Several studies have found that the Internet can combat feelings of social and geographic isolation, especially where information and knowledge obtained fulfils a sense of purpose (Guelder & Loeb, 2003; Russell, 2005; Scott, 2001; WHO, 2002). Feelings of social interaction and autonomy when using computers can also be accompanied by a sense of enjoyment and recreation (Hebblethwaite, 2005). Mayhorn, Stroge, McLaughlin and Rogers (2004) conducted structured interviews with older adults and found that their motivation for learning to use computers was enjoyment in a satisfying leisure activity.

The sections above discuss ways in which engaging with IT might satisfy needs for competency, autonomy and relatedness, and thus bring about gains in older adults’ QOL. However, facilitating access to IT might also have additional, more direct, effects on older adults QOL by providing intellectual challenge and encouraging creative thought. These possibilities are discussed below.

3.2.6 Intellectual Challenge

Promoting intellectual challenge and stimulation is another way that IT access may benefit older adults. Several theories of ageing propose that older adults will seek activities that are intellectually challenging and suggest that these activities can benefit well-being (Carstensen, 1995; Deci & Ryan, 1991; Tornstam, 1989). Both Tangley (2000) and Cohen (1999) have found that activities that are intellectually challenging
can both maintain older adults’ cognitive abilities, and increase them. Research by Kandel (2004) also suggests that intellectually challenging and stimulating activity may help older adults who are suffering Alzheimer’s disease. A range of studies on different populations (both clinical and non-clinical) suggest that intellectually challenging and stimulating activity may be beneficial for older adults.

One way that intellectually challenging activities can benefit well-being is by limiting older adults’ typical loss of cognitive functions (Cohen, 1999; Kandel, 2004; Seeman et al., 2001; Tangle, 2000). For instance, studies have shown that older adults’ cognitive functioning can be improved through the use of educational training programs. One of these studies was the Penn State’s Adult Development and Enrichment project (Baltes & Willis, 1982), which provided five training sessions of one hour each to older adults in different types of reasoning. Results showed that educational training programs that were intellectually challenging improved indicators of cognitive functioning. In another, more recent study, researchers provided 3000 American older adults (aged 65 to 94) with access to a range of training programs that were intellectually challenging (Brain Workout, 2005). Three groups received ‘mental sharpness’ training that involved mathematical problems and memory tests over a six week period. The fourth group received no training. Results showed that the groups which had received training demonstrated significant improvement in their cognitive functioning, whereas the control group did not. Another recent study by Noice, Noice and Staines (2004) used a similar methodology where groups of older adults were exposed to different ‘art-based’ activities. The first group undertook exercises designed to help them experience the essence of acting, whilst the second group undertook a visual arts course. The third group received no training. Consistent with previous studies, it was found that after four weeks, the older adults involved in the dramatic art
training showed significant improvements in their well-being and cognitive functioning compared to that of the control group. As such, a range of investigations indicate that intellectually challenging activities are beneficial to older adults and can enhance their well-being.

Information technology and computer training can offer an intellectual challenge to all users, including older adults (Russell, 2005; Scott, 2001; WHO, 2002). For example, Robinson and Kestnbaum (1999) demonstrated older adults’ improved short and long-term memory after using computers for memory skills training, and concluded that the impact of computer use by older adults could be beneficial. In an earlier study, Eilers (1989) pointed out those older adults who received computer training that was intellectually challenging experienced enhanced self-esteem and cognitive functioning. These studies are consistent with the notion that engaging with computers and the Internet can facilitate intellectual challenge which can, in turn, lead to improvements in older adults’ well-being.

3.2.7 Creative Thought

Activities that encourage creative thinking have also been found to be beneficial to the wellbeing of older adults (Deci & Ryan, 2000; Fisher & Specht, 1999; Goff, 1992; Kaufman, 1988). For example, Fisher and Specht found that creative thinking opportunities were important elements in the reduction of nervousness and anxiety. In particular, creative thinking can assist older adults to meet new challenges and dilemmas by distracting them from thinking about their difficulties and sources of anxiety. For example, it was found that creative thinking assisted in the successful personal adjustment of relocating from home to a residential care facility (Fisher &
Specht, 1999). However, there is also evidence to suggest that gains in well-being may be partly attributed to links between creative activity and a sense of autonomy.

Self-determination Theory (Deci & Ryan, 1985, 1991) proposes that a sense of autonomy (or the opportunity to make choices) assists in the development of creative thought. Deci and Ryan (2000) propose that autonomy promotes intrinsic motivation which, in turn, can foster creativity. Fisher and Specht (1999) also argued that a person is not able to be creative unless they have autonomy and can be open to different paths to achieve a set goal. Goff (1992; cited in Fisher & Specht, 1999) supports this position. He argues that creative thinking skills are central to successful ageing and that a sense of autonomy is essential to creative thinking. Computer use may encourage creative thinking in older adults (Czaja & Lee, 2003). In particular, creative thought may be prompted in response to the variety of choices computer users typically have when engaging with IT. For example, choices must be made regarding the presentation of e-mails, fonts, inserts, and word art, and in a range of programs (Czaja & Lee, 2003). As such, activities that facilitate creative thought (such as computer and Internet access) are linked with satisfying needs for autonomy, and subsequently, may help enhance well-being.

3.2.8 Summary

Deci and Ryan (2000) argue that the fulfilment of psychological needs for competency, autonomy and relatedness can enhance the QOL of older adults. This section considered how certain qualities within an activity may bring about the satisfaction of these needs. The qualities that may help to create interest and saliency for older adults in an activity are that it: (a) offers social interaction; (b) facilitates voluntary choice; (c) provides experiences of achieving goals and being productive; (d) is
meaningful and affirming; (e) is recreational and enjoyable; (f) provides intellectual challenge; and (g) facilitates creative thought.

One major difficulty for social workers in aged care appears to be in implementing activities that provide the attributes necessary to secure a benefit (Scott, 2001; WHO, 2002). Consequently, the possibility that facilitating access to computers and the Internet has these necessary attributes has great practical significance and is worthy of further investigation. Importantly, IT can be used by all older adults, whether disabled or in good health. It can also be adapted to suit the individual needs of older adult users (Czaja & Lee, 2003). The next section examines IT as a learning experience for older adults and some of the additional benefits associated with computer use. Several important factors are reviewed that can influence computer use by older adults, including motivation and attitudes towards learning. Barriers that can prevent older adults from using computers are also discussed.

3.3 Information Technology (IT) as a Learning Experience for Older Adults

This section reviews several important aspects of the IT learning experience for older adults that may affect their participation in the chosen intervention activity of facilitating access to computers and the Internet for older adults. These are: (a) additional benefits from using IT, (b) the possible motivation of older adults to learn IT, and (c) the barriers that may prevent them using IT.

3.3.1 Additional Benefits of Older Adults Using Information Technology

Self-determination Theory (Deci & Ryan, 1985, 1991) argues that an activity that older adults find interesting and salient can fulfil psychological needs of
competency, autonomy and relatedness. However, in learning to access computers and
the Internet there can be additional benefits. An understanding of these additional
benefits may be important in encouraging older adults to engage with IT, and thus
facilitate improvements in their QOL.

Research supports the notion that engaging with computers and the Internet
would be a positive learning experience for older adults. Furthermore, previous studies
also suggest that such successful learning experiences can promote improvement in both
physical and mental health for older adults. James (1993), for instance, reported that the
process of continuing to learn (generally) can be beneficial to an older adult’s life
satisfaction and self-esteem. Sihvola (1985) argues that for older adults, taking part in
personal educational development programs resulted in improved QOL and life
expectancy. IT has the potential to be a personal development program for older adults
together with its many adjuncts such as mobile phones, MP3 players, faxes and
computers.

Another potential benefit from using IT is to assist with overcoming the
stereotyping and marginalisation of older adults. This can be an outcome of: (a) older
adults having positive experiences of successfully learning to use computers and the
Internet that disconfirms stereotypes of them being unable to learn new things; and (b)
having access to a widely used technology and preventing marginalisation on this
dimension. The WHO (2002) recommends that older adults be shown the advantages of
IT as a means of preventing marginalisation, both social and geographic.

Access to the Internet may also foster a stronger internal locus of control
(ILOC). In particular, IT usage may provide older adults the discretion to decide when,
where, and what to access on the Internet, and also who they will meet and what
personal identity they will assume in forums or ‘chat’ rooms. When such autonomous
actions are attributed to internal causes, the older adult is said to have a sense of ILOC (Sheldon & Kasser, 2001). Sarafino (1994) found that there was a correlation between health, emotional and physical, and ILOC. He suggested that individuals with a strong sense of ILOC are more likely to maintain good health and prevent illness. A further example of the importance of a sense of ILOC is found within a study by Reeves (2000) with HIV-Positive individuals. The study supported the development of a stronger sense of autonomy and ILOC from using computers, and especially accessing the Internet. Participants stated that they felt empowered by accessing the Internet and by being able to source information about HIV treatments. This reaffirmed their ability to make personal choices and take some control of their lives, enabling them to be more productive while living with HIV.

Studies have also found that positive computer experiences may help maintain good mental health in older adults. Noer and Wandycz (1995) reported instances where going online for both healthy and frail older adults became a type of preventative medicine. That is, while online, the participants became so involved that they forgot their aches and pains. One case from this study, for example, was 76, had severe arthritis in his legs, and was virtually confined to his one bedroom apartment. This participant reported that “the network is better than pain medication as I am absorbed for hours and completely forget myself” (Weiusman, 1994, p. 240).

Despite these apparent benefits, there remain contrasting positions on the potential health benefits of IT access for older adults. Kraut, Lundmark, Kiesler, Mukopadhyay and Scherlis (1998), for example, suggest that the use of the Internet may promote depression by reducing social involvement. Their study examined home-based access to the Internet and analysed the effects of using different types of Internet software. Specifically, the study used e-mail to exemplify interpersonal uses of the
Internet, and the World Wide Web to exemplify information or entertainment uses of the Internet. Kraut et al., (1998) found that more time spent on the Internet was associated with decreased social interaction with family and friends, whether it be for social or informational use. The authors concluded that the main benefit of the Internet is as a tool for interpersonal communication, much like the telephone. However, this benefit may be lost and negative effects may result if it is overused. Although the conclusions reached by Kraut et al., (1998) were limited in that their study excluded communal e-mail, newsgroups, Internet chat rooms, forums, and games, this study highlights the possibility of negative outcomes if IT is not used effectively as a tool to enrich older adults quality of life (Czaja & Lee, 2003).

In summary, as WHO (2002) points out, there are many advantages for older adults who are encouraged to use computers. The benefits are seen to be in addition to the known gains in psychological needs for competence, autonomy, and relatedness. Such potential benefits potentially result from having a positive learning experience, overcoming stereotyping and marginalisation, promoting a stronger ILOC, and distracting older adults from other current problems. However, it is possible that IT access can have negative outcomes if not used effectively.

3.3.2 The Motivation of Older Adults in Learning Information Technology

Understanding the motivations for older adults to learn to use computers and access the Internet is important because this knowledge could be useful to encourage older adults to use and persevere with IT. Self-determination Theory (Deci & Ryan, 1985, 1991) argues that older adults are naturally active and have a natural tendency to become involved in activities that they find interesting and salient. Deci and Ryan (2000) propose that individuals are intrinsically motivated to undertake such activities.
A review of previous research suggests that one primary motivation for older adults to learn about computers is the opportunity to be in regular contact with their family and friends through e-mail (Eilers, 1989; Russell, 2005; Scott, 2001). A study of SeniorNet members in California found that over half of the older adults surveyed used the Internet to keep in touch with their close family, relatives and friends (Furlong, 1989). Studies have also shown that family can play a major role in encouraging older adults to learn computers in order to better communicate. As such, the realisation that sending e-mails creates the opportunity for social interaction with family may be one factor that encourages older adults’ to use and become interested in IT (Czaja & Lee, 2003; Russell, 2005; Scott, 2001).

Another factor that may heighten older adults’ intrinsic motivation to undertake personal development learning programs may be the acquisition of a role or identity within the activity. In a study that examined social factors influencing older adults to undertake educational courses during retirement, Dowd (1975) found that gaining the social identity of a 'student' was an important variable. He proposed that when older adults retire, they might feel that they have lost a role or an identity. They may even perceive their future as bleak and without challenge due to the loss of their career role identity. However, by using their time in retirement to undertake an educational course, they may gain new knowledge and develop a new role identity as a student. Consistent findings were provided by Timmer and Aartsen (2003), who researched over 1,000 older adults’ aged 61 to 75 about their participation in education and volunteering. They found that older adults searched for new roles within these areas and aimed to “develop his/her potential for further personal growth” (p. 644). Other studies have suggested that older adults may, alternatively, wish to remain mentally alert, alive and study subjects of interest such as computers (Kelly, 1989a; 1989b; Voelkl et al., 1995). However, both
the motivation and ability of older adults to use computers can be thwarted by barriers preventing learning. Some potential barriers will now be discussed.

3.3.3 Barriers that May Prevent Older Adults Learning Information Technology

The potential barriers to older adults learning and accessing IT should also be explored if older adults are to be successfully encouraged to engage with IT (WHO, 2002). Zajicek (2004) argues that the IT industry has not yet fully grasped the potential benefits from designing interface models that are friendly to older adults. The Human Rights and Equal Opportunities Commission (HREOC, 2000) indicates that major barriers to older adults’ adoption of computers and information technology are economic, psychological, and informational. Each of these factors will now be considered in turn.

In the final report of a forum conducted by the Office of Learning Technologies in Canada (1999), older adults listed the barriers that they felt existed for them in becoming computer literate. The first of these were economic factors. User-friendly hardware was often too expensive given that older adults are frequently pensioners and/or disabled with limited finances available. For example, hardware options and alternatives, such as touch screen and voice commands, would make computer use easier, especially for frail and disabled older adults. However, when added to the expense of software and Internet connection, lack of funds may prevent older adults from accessing these.

In addition to economic barriers, older adults may also face psychological barriers to Internet use. These include a lack of perceived competency or self-efficacy in relation to using computers. Deci and Ryan (2000) argue that a sense of competency can
assist in motivation to undertake an activity, and can be strengthened by relevant training, encouragement and small manuals (Czaja & Sharit, 1993).

Lastly, older adults may face informational barriers. Studies have shown that when older adults are endeavouring to follow instructions in user-unfriendly computer manuals, they can feel that the task is beyond them and give up (Compeau & Higgins, 1995a, Czaja & Lee, 2003). Computer vocabulary or jargon can also be an informational barrier. It can be initially difficult for older adults to comprehend IT language and jargon (Compeau & Higgins, 1995a). Another factor may be difficulties associated with having teachers who do not understand older adults’ learning abilities (Forum Report, 1999). There is a clear link between the psychological and informational barriers and, as pointed out by Czaja and Lee (2003), appropriate training and information can overcome many of the psychological barriers that older adults may feel due to a sense of incompetency (Deci & Ryan, 2000) and a fear of failure (Compeau & Higgins, 1995a).

Traditionally, the needs of older adults have not been considered in IT hardware and software development (Charness & Schaie, 2003). However, improvements in the design and development of IT products and services has started to take place as manufacturers become more aware of the increasing market of older adult computer users (Morrell, Dailey & Rousseau, 2003). For instance, older adults need to have directions that are: (a) simple to follow; (b) presented in a clear and precise format; and (c) in familiar speech with a minimum of jargon and acronyms. Many researchers also encourage greater effort towards overcoming the physical and psychological barriers that prevent access (Russell, 2005; Scott, 2001; WHO, 2002). However, in order to overcome some of the barriers experienced by older adults in the use of IT, both Scott (2001) and the Report on Technology and Aging in America (1985) suggest that society
needs to understand the varying attitudes of older adults towards IT that also facilitate or prevent accessing IT.

3.3.4 Attitudes of Older Adults to Learning How to Use Information Technology

Attitudes towards using computers are explored in this section because negative attitudes may prevent older adults from benefiting from IT usage. The importance of attitudes and beliefs towards learning to use new technologies is widely acknowledged (Dupagne & Krendl, 1992; Francis-Pelton & Pelton, 1996; WHO, 2002). Attitudes can affect older adults’ interest in learning (Charness, Schumann & Boritz, 1992). Factors that may contribute to the development of a positive or negative attitude towards learning to use new technologies may include the older adults’ physical and/or psychological health, the proposed computer training program, and the encouragement they may receive from their family, peers or friends (Compeau & Higgins, 1991). These factors are now discussed in more detail.

During the 1980s, there was a widely held belief that older adults were not interested in learning computer technology. Early studies found that older adults expressed a resistance towards learning computer technology (Samli & Wills, 1985; Smith & Mocshis, 1985). Sherman and Delener (1987) suggested that this resistance was frequently due to perceived incompetence resulting from a lack of knowledge about using IT and a subsequent fear of failure. However, Gilly and Zeithamel (1985) suggested that older adults were eager to learn information technology if they were shown that the technology was understandable and beneficial. In addition, The Report on Technology and Aging in America (OTA, 1985) stated that based on the evidence available, older adults could be quite receptive to computer technologies. Scott (2001) also found readiness by older adults to use IT provided it was presented in an
understandable format. Australian Bureau of Statistics (ABS, 2005) data additionally show that older adults are the fastest growing group of computer users amongst all age groups. This would indicate the readiness of this age group to take advantage of the opportunity to learn to use computers and access the Internet.

A study of the attitudes of older adults towards IT by Ansley and Erber (1988) indicated that older adults should not be stereotyped as being resistant to computer technology. Their study compared attitudes of older adults to those of younger students, and found that both groups were similar in terms of their attitudes toward potential uses of computers, despite the fact that some older adults may have been computer illiterate. A study by Brown, Brown and Baack (1990) also examined attitudes of older adults towards IT. They found that older adults favoured and adopted the use of the technology when they perceived that this technology was of benefit to them and would meet their needs, including needs for social interaction and autonomy. Other studies have also reported that older adults can be very positive about their experiences with computers and that their overall anxiety level towards computers was low (Furlong & Kearsley, 1986; Gilly & Zeithamel, 1985; Mayhorn et al., 2004).

Research indicates that some factors can be manipulated to help strengthen older adults’ positive attitudes towards IT. Morris (1994), for example, indicated that older adults had more optimistic attitudes towards gaining computer skills after they had undergone an introductory computer course that was suited to their needs. The participants in the study, aged from 60 to 79 years, expressed a desire to use computers for word processing, education, entertainment, genealogy research and e-mails. After the course, the participants demonstrated a greater awareness of the technology and its uses. Likewise, in a study in which older adults had access to computers, Weber (1995)
concluded that older adults were willing to use information technology if they were
given the opportunity to undertake training that was in an understandable format.

Information technology has a wider application than just computers. For instance, Scott (2001) emphasises the potential applications of IT, including Automatic Teller Machines and e-commerce transactions for paying accounts and for medical consultations. However, Eastman and Krendel (1987) have suggested that computers could be used as a primary tool to help older adults develop a more positive attitude towards IT, and thus facilitate their accessing these additional benefits. Their study supported the notion that computer use may help older adults develop positive social and educational attitudes towards IT.

In summary, from the 1980s, research has supported the view that older adults typically held strong negative attitudes towards IT (Samli & Wills, 1985; Smith & Mocshis, 1985). However, studies have since shown that apparent negative attitudes may have been due to a lack of perceived competency and autonomy in samples that believed that they were incapable of acquiring computer literacy skills (Baldi, 1997; James, Gibson, McAuley & McAuley, 1995; Russell, 2005; Scott, 2001). With greater awareness of IT and its benefits, the attitudes of older adults reported in research have become more positive (Czaja & Sharit, 1993; Scott, 2001). One main factor that has helped facilitate a positive attitude in older adults is practical training. This training must be relevant to their needs and presented in a manner that is meaningful and understandable (Mayhorn et al., 2004). A small supportive manual can be a valuable tool in computer training for older adults (Czaja & Sharit, 1993; Scott, 2001; Zajiek, 2004). Consequently, a researcher-designed computer manual called “Fun with Computers” (Appendix I) was developed in the light of the recommendations made by the IT literature.
3.4 Chapter Summary

This chapter has discussed whether and how IT could be beneficial to older adults. Self-determination Theory (Deci & Ryan, 1985, 1991) argues that for an activity to fulfil the three psychological needs of competency, autonomy and relatedness, it must be relevant and salient to the participant. The first part of this chapter discussed the relevance of IT to adults and current patterns of usage. It was suggested that there is a strong advantage for society generally if older adults are able to use computers and access the Internet. In particular, IT is one potential activity that can be used to enhance well-being in older adults. Accessing computers and the Internet possesses a number of qualities that are necessary to satisfy psychological needs for competence, autonomy, and relatedness. These qualities include: (a) providing social interaction (through e-mails, chat rooms and personal correspondence); (b) being intellectually challenging; (c) meaningful and affirming; (d) evoking creativity; (e) offering autonomy and choice; and, (f) being recreational, enjoyable, and goal oriented.

This chapter then discussed additional benefits to older adults from using computers. Such benefits included the provision of a positive learning experience in which a role and identity may be established. Motivation for older adults to learn IT was also explored, as were barriers to using and accessing computers and the Internet. Finally, attitudes towards computers were reviewed. Attitudes are important as many older adults are put off using computers due to negative perceptions resulting from misinformation.
Chapter 4

Development of a Computer Manual and Training Program for Older Adults

4.1 Introduction

The Information Technology (IT) literature suggests that training aids may encourage older adults to use computers and the Internet (Morrell et al., 2003). Many authors recommend either a small manual or a ‘help card’ (Charness et al., 1992; Czaja & Sharit, 1993; Zajieck, 2004). A small manual is one that covers a single software package (for example, MS Word) and explains the basic steps without unnecessary detail. The help card is an adjunct to the manual and could be kept beside the computer for easy access. Previous studies (Charness et al., 1992; Czaja & Sharit, 1993; Zajieck, 2004) argue for the use of a small manual for two main reasons. The first reason is that a manual assists with short-term memory recall. The second reason is that a small user-friendly manual may assist in developing a sense of competency (Morrell et al., 2003).

Some studies have found that certain fonts, text sizes, and colours are particularly well suited to facilitate older adults use of IT (Czaja & Lee, 2003; Czaja & Sharit, 1993). These ideas are presented in the following section. A review of some available manuals is then provided and the need for a special computer manual for the intervention in the current study is presented. The chapter also describes the development and trial of the researcher-designed computer manual.

4.2 Information Technology: Recommendations for a Computer Manual for Older Adults

In recent years, a number of studies have indicated that a single style of computer manual will not suit every user (Mayhorn et al., 2004) and that different
groups will have different needs. Scott (2001) found that as older adults are the fastest growing group of computer and Internet users (ABS, 2003), factors impacting on their ability to use IT should be addressed in manuals and training programs (Zajieck, 2004). Some of these factors potentially affecting older adults’ ability to engage with IT are now discussed.

4.2.1 Manual Size and Format

Research has found that any manual used as a training guide for older adults should be small, direct, and easy to follow (Charness et al., 1992; Czaja and Sharit, 1993; Danowski & Sacks, 1980; Zajieck, 2004; Zandri & Charness, 1989). Studies have shown that older adults were more comfortable and relaxed when using a small manual, whilst many felt overwhelmed by larger manuals exceeding 50 pages. The barriers associated with larger manuals may be psychological (Mayhorn et al., 2004). For example, a large manual may evoke feelings of incompetence (Czaja & Sharit, 1993). Large manuals can also present a physical problem associated with the handling of a large, heavy volume, especially for older adults with disabilities (Czaja & Sharit, 1993). Consequently, recommendations are for a manual that is less than 50 pages, easy to handle, and only covers one software package at a time.

4.2.2 Language and Method

To assist in text comprehension, some studies recommend easy-to-follow directions with minimal computer jargon (Charness, 2003; Danowski & Sachs, 1980; Mayhorn at al., 2004). Research has shown that older adults are less able to make inferences from recently presented material and are less able to ignore irrelevant information than younger adults (Hoyer, Rebok & Sved, 1979). Accordingly, the
information should be presented in a clear, precise and understandable fashion, with statements and directions that can be clearly understood. In addition, the manual should describe a step-by-step process and cover only the immediate needs of the particular lesson being undertaken (Czaja & Sharit, 1993; Mayhorn et al., 2004).

4.2.3 Typeface

Echt (2002) points out that older adults may suffer reduced eye function with age that can result in a lessening of visual acuity, contrast and sensitivity. Therefore, the type should be intense enough that older adults are able to read it without difficulty. Furthermore, it is suggested that text be a minimum of font size 12, and use a medium or boldface style (Hartley, 1994). Words in all capitals are also hard to read for older adults and should be used as headlines only (Morrell & Echt, 1996; Hartley, 1994). Texts set in upper and lower case letters form words that are distinct and increases reading speed of older adults (Carter, Day & Meggs, 1993). In response, the recommendations here are for a clear bold type that is easy to read and without flourishes such as used in old English font styles.

4.2.4 Pictorial Usage

The use of a pictorial format in procedural tasks may reduce errors made by older adults (Morrell & Park, 1993). Morrell and Park found that it was helpful to older adults if a direction was shown pictorially so that they could compare their effort with what was expected from the directions. Pictures could also be used to represent computer parts, such as the keyboard and mouse, and to highlight their useful features. However, pictures should only be used if they add meaning to the text (Morrell & Echt, 1996).
4.2.5 Use of Colour in Text

Echt (2002) found that older adults might experience decreased sensitivity to colour with age. As a result, they may experience difficulty in distinguishing between yellow and blue/green combinations, and a combination of these colours should be avoided. Furthermore, any direction referring to a text in a particular colour, for example ‘see the text in green for the next direction,’ should be avoided because the colours may not be detectable to older adults, and especially those who are colour blind (Hartley & Harris, 2001).

4.2.6 Summary of Format Recommendations

This section described evidence supporting guidelines for a computer manual for older adults to assist in their training to use computers. The recommendations are practical and have been found to assist older adults’ in accessing computers. The IT literature indicates that the best test of any manual is its useability by older adults and if they persevere in its use (Czaja & Lee, 2003; Mayhorn et al., 2004). In summary, the recommendations from the IT literature are that the manual:

1. Be small and easy to manage;
2. Contain language that is understandable and in everyday English without jargon;
3. Use clear and readable typeface;
4. Use large font size;
5. Use pictorial representations of equipment and directions (but use these sparingly);
6. Be cautious in the use of colour.
These recommendations were incorporated into the manual that was designed for this study.

4.3 Suitability of Existing Computer Training Manuals

In this section, a range of computer training programs and manuals for older adults is evaluated in the light of the recommendations made in the previous section. These training programs include those used by the University of Third Age, Vicnet (A Victorian government agency), and the American Association of Retired Persons. The purpose of the review was to ascertain if there was any available material that could be used in the proposed intervention to test the theory of Quality Ageing.

4.3.1 Review of Training Notes

Collins (1999), from the University of the Third Age in Melbourne, has produced training notes for several computer courses. One of these is “An Introduction To Computers including the Hardware and Software” (Collins, 1999). These notes cover an eight week course on accessing and using computers. The aims of the first module are to explain, in non-technical language, what a computer is, does, and how it can be used. There are several limitations to these training notes. In particular, the notes presume basic computer literacy and older adults who are working with a computer for the first time may find these difficult to follow. For example, the notes presume knowledge of the difference between right and left click on the mouse. Although the terminology and jargon is explained in a simple manner, it may be too difficult for older adult users in many instances. The print is small and older adults with eye problems may find it difficult to read. There are few pictorial representations of the various
applications and what happens on the computer screen. However, the notes may be helpful for a slightly younger age group with some degree of computer literacy.

Vicnet (1999) is a division of MultiMedia Victoria, and conducts training courses for the trainers of older adults and older adults themselves. The computer notes for beginners are normally used with an instructor present and are appropriate for a classroom setting. However, the courses are designed for all ages and not specifically older adults. The Internet module of the course has two sections. The first section gives some background, explains how the Internet functions, and the meaning of the World Wide Web. The second section of the notes shows how to download files from the Internet. These notes demonstrate good use of pictorial representations of computer drop-down menus. However, the font size is small and may be a problem for visually impaired older adults. Specific goals for lessons are not set and it is presumed that users will set these themselves. The notes are not in the form of a manual and are more suitable as handouts in a structured lesson.

The American Association of Retired Persons of the United States of America has produced an introduction to e-mail document using excerpts from Berger (1999). The introduction includes a good explanation of the acronyms that are used in IT. Overall, the notes are presented in a readable format with illustrations for better understanding. However, these notes presume a medium level computer literacy. The font is small and while the format is well set out, the amount of information presented may be overwhelming for an older adult computer learner. So, while the manual was designed for older adults, it was not sufficient for the needs of the current research.
4.3.2 Review of Online Programs and Web Sites

A number of relevant websites also offer online computer training programs that are available for older adults. While the participants in the study would not initially be able to access online programs, relevant websites were reviewed to give a wider picture of online computer training programs that are available when older adults have obtained the competencies necessary to do so. For example, SeniorNet (www.seniornet.org) is a popular resource for older adults in the United States. This organisation has established computer learning centres for older adults throughout the United States of America. However, there is a presumption that there would be someone available to download the program for them. Furthermore, most of the courses offered are fee paying and not available online. This means that potential users must be able to afford the course and be able to physically access the learning centre. Likewise, in Canada, the Older Adults and Learning Technology Centre gives information about possible training methods and manuals. However, once again, there is a fee for training and no courses appear to be available online.

In Australia, Senior Link is an organisation that provides a range of computer training programs once older adults understand the basics of information technology and computers. However, there is a presumption that older adults know how to “log on” and find the site (www.seniorlink.com.au). This is problematic because some older adult learners do not know how to turn on the power or where to find the switch, and initial lessons are needed to address this lack of knowledge. Senior Link does offer training days with volunteers in certain areas. Alternatively, SkillsNet, which is a Victorian State government funded organisation, has many good programs established around the state and located in Adult Learning Centres and Neighbourhood Houses. They offer extensive information about information technology and where and how to access training programs at various locations. However, little attention has been given to
the need of non-ambulatory and disabled older adults who are unable to attend learning centres or who may be in residential care.

4.3.3 Review of Popular Manuals

There are many computer manuals available as introductions to computer use and the Internet. However, most were too expensive for older adults on limited budgets or pensions. Furthermore, some research shows that giving large manuals to beginners, and especially older adults, can have a negative effect on training. That is, older adults can easily become frustrated and experience a loss of perceived self-efficacy in response to a large manual (Charness & al., 1992; Czaja & Sharit, 1993; Zajieck, 2004). Consequently, it is better for older adults to have access to these resources after they have achieved initial computer skills. Three currently available will now be reviewed.

One commonly used training manual is Furlong and Lipson’s (1999) “Grown-Ups Guide to Computing”. The authors have close connections with SeniorNet in the United States and the manual was expressly written for older adults. While extremely comprehensive, this manual is more than 100 pages and its length would be overwhelming. It goes into too much detail for an older adult beginner. Furthermore, the manual presupposes basic computer knowledge, including the name of the various hardware devices and drives, how to turn the computer on and off, and how to access software. While the training manual has much to recommend it, the manual was not suitable for the current research where the participants would be basic beginners.

Another popular manual examined was Gookin’s (2000) “PCs for Dummies”. This is a simple to follow manual and could be helpful as it presents lessons in a step-by-step fashion, and uses good pictorial representations. However, the amount of data
was thought to be overwhelming for older adults who are basic beginners and, for this reason, it was judged unsuitable for the purpose of this research.

A manual explicitly for Internet access is Ebbs and Hory’s (1996) “The Australian Internet”. This manual offers help in how to access the Internet. However, this manual would likely be too difficult for an older adult beginner. It presupposes basic knowledge of computers and assumes the user knows how to access the Internet and search engines, and how to use the results from a search. While the directives are clear, the manual by itself would be beyond the competency of the participants in this research study who are not computer literate.

**4.3.4 Summary**

In summary, these programs and manuals demonstrated many positive features for training older adults. However, none addressed all requirements listed in Section 4.2.6 for a hands-on computer training program for older adults. For instance, the instructions in most manuals presume a basic level of computer literacy. Furthermore, while there was a logical and systematic format in most of the programs, a step-by-step outline was not clearly presented in many instances. Overall, there was little use of pictorial or graphic representations of what the next steps would achieve. Some program manuals, possibly due to costs, were not attractive in appearance. Colour was seldom used and the notes were presented in a dull format.

The print in some of the manuals presented concerns about the darkness and size of the print, which are important considerations for older adult groups who may be visually impaired (Charness et al, 1992). Many of the manuals had only normal print size. Likewise, some authors argue that the use of colour in the print format can be used to emphasise directions about what to do next and this was lacking in most of the
manuals (Morrell & Park, 1993). Finally, there seemed to be a lack of supportive direction by authors to encourage older adult learners to work through the various steps explained and to persevere in their learning. Given that these existing packages seem to be inadequate in some respects, it was necessary to develop a small computer manual utilising the recommendations discussed in Section 4.2.

4.4 Development of the Researcher-designed Computer Manual

Given the apparent need for a computer manual that fulfils the recommendations made earlier, one was developed for the current research and entitled “Fun with Computers” (see Appendix L). The title “Fun with Computers” was chosen to highlight that the learning experience would be a happy and an enjoyable experience without any pressure on the participant. The manual aimed to help older adults understand the computer and accomplish specific and simple tasks. These tasks include logging on and off the computer, using the mouse and keyboard, searching the Internet, and sending e-mails. The pages of the manual were illustrated with small cartoons to maintain levity and reduce computer anxiety. Some explanation of MS Word was also provided so that the older adults could use these skills when composing e-mails. While the IT literature provided data to form the basis of recommendations for the use of a relevant computer manual for older adults, it also provided guidance about the training program that should be used with the manual. These recommendations are discussed in the next section.
4.5 Recommendations for a Computer Training Program from the Information Technology Literature

4.5.0 Introduction

While the previous section covered the importance of an appropriate computer manual for training older adults in IT, this section outlines additional recommendations for computer training programs. Research in the areas of ageing and training has indicated that older adults may experience increased motivation if participating in a training program that is sensitive to their unique needs (Czaja & Sharit, 1993; Russell, 2005). For a training program to be effective, it needs to have certain qualities. These are that the program: (a) heightens feelings of task motivation and is goal oriented; (b) allows flexible lesson structures and is sensitive to the learning pace of older adults; (c) involves training in areas that they find interesting, relevant and enjoyable; and (d) gives positive and reinforcing feedback (Bolton, 1978; ; Czaja & Sharit, 1993; Knowles, 1980).

4.5.1 Goal Oriented

Self-determination Theory (Deci & Ryan, 1985, 1991) suggests that goals and intrinsic motivation may help to fulfil the psychological needs for competency and autonomy and are important for positive ageing. Hollis and Stern (1999) suggest that for older adults, setting a specific goal could be an effective method for enhancing task specific competency and motivation. They studied the effect of participants being given achievement goals when learning to use computers. The participants consisted of 116 computer novices aged from 50 to 89 years, who were divided into two groups. The first group was told that their goal in learning computers was to “do your best”. The second group was encouraged to set a goal for each lesson, such as to complete a section or
achieve a particular task (for example, learning to format a paragraph). Results showed that the participants in the goal-oriented approach achieved a significantly greater mean change in attitudes towards computers and computer task proficiency than the participants who were just directed to “do their best”. Sterns and Doverspike (1989) argue that the “do your best” approach implies that older adults are not capable of the task. Instead, challenging and goal-oriented approaches may be more beneficial for the older adult learner. Sterns, Laier and Doresett (1994) suggest that a goal-oriented approach increases feelings of task accomplishment and that this is related to task persistence and competency. A similar opinion was supported by Bandura (1987) who regarded experiences of “enactive mastery” as the most powerful source of information for enhancing feelings of competency and self-efficacy.

4.5.2 Self-Paced Learning with Flexibility

Various studies suggest that facilitating flexible and self-paced learning is important when instructing older adults to acquire computer skills (Charness & al., 1992; Czaja & Sharit, 1993; Danowski & Sacks, 1980; Zandri & Charness, 1989). These studies emphasise that older adults should not be rushed and that time should be allowed for the completion of activities. Self-paced learning, where the participants move through the lesson at their own pace (rather than with the group), appears to be the preferred style, with the instructor there to guide and encourage (Mayhorn et al., 2004).

The value of self-paced lesson structures for older adults is evidenced by studies showing that older adults have more difficulty than younger adults in learning to use computers. It takes older adults longer to learn, they make more errors on performance, and they require more help than younger age groups (Charness & Bosman, 1990; Kelley
Zandri and Charness (1989) compared younger and older computer learners and found that older adults took twice as long as younger students to complete the training. However, they were nearly equal in performance levels. Furthermore, older adults requested help more often during training than did the younger participants. This need for additional assistance during computer training was also shown in studies by Jones and Bayen (1998) and Fisher (1986), which reported that older adults made more errors initially (when learning to use a computer), required more help during training, and had greater difficulty using some of the hardware (for example, keyboard and mouse).

Zajicek (2004) points out that many aged service providers fail to appreciate that older adults do not all age in the same fashion. Many have different needs. For example, interface designs need to be more flexible for older adults than for standard users given the possible loss of vision or cognitive abilities (Craik & Salthouse, 1992). Interested readers are referred to Mayhorn et al. (2004), who summarised additional recommendations for optimising hardware and training course design.

### 4.5.3 Facilitating Interest and Enjoyment

Any training for older adults should provide an interesting, relevant and enjoyable experience (Czaja & Lee, 2003; Czaja & Sharit, 1993). Lu and Argyle (1994) propose that engaging in a computer training program that is enjoyable and relevant may produce a psychological experience of happiness. A component of happiness is self-fulfilment, which embraces purpose in life and personal growth (Ryff, 1989). Thus, an interesting and enjoyable training program may not only encourage older adults when learning about computers and the Internet, but may also positively enhance their QOL (Deci & Ryan, 2000). Computer training programs become more enjoyable and
interesting where there is a lack of stress or external pressure (Russell, 2005). Deci and Ryan (2000) argue that possible threats or pressure on older adults to perform tasks would be detrimental to encouraging their interest and enjoyment in the task.

4.5.4 Value of Positive Feedback in Training

Positive encouragement and feedback in computer training with older adults has been found to be important and may motivate participants to persevere with the training (Czaja & Sharit, 1993). Feedback and encouragement are linked to competency and self-esteem (Russell, 2005). Branden (1995) suggests that high self-esteem involves readiness to take greater responsibility for self, a willingness to move through fear and a willingness to confront new challenges such as computer training. He saw self-esteem as critical for positive living and conducive to quality ageing. However, negative feedback can influence older adults’ motivation to undertake challenging activities (Brockner, Derr & Laing, 1987). As such, older adults should be given feedback that is positive and encouraging (Russell, 2005; Scott, 2001).

4.5.5 Summary

In this section, a range of relevant literature addressing computer training manuals and programs was reviewed in order to inform the identification of methods for helping older adults to use computers and the Internet. The reviewed literature suggests that computer training should take into account the needs of older adults due to their age and abilities (Czaja & Lee, 2003). The recommendations are that the computer training program facilitate task motivation and be goal oriented, self paced and flexible, interesting and enjoyable, and ensure positive feedback and encouragement. While the recommendations could be helpful in any computer training program regardless of age,
these recommendations are particularly important if older adults are to overcome psychological (for example, low self-efficacy) and physical barriers (such as, financial costs) to learning to use IT (Russell, 2005; Scott, 2001). The methodology of trialling the computer manual “Fun with Computers” to be used in testing of the model of Quality Ageing is outlined in the next section.
Chapter 5
Methodology

5.1 Introduction

This chapter outlines the methodology used in the current study. First, the development and trialling of the computer manual “Fun with Computers” is described. The recommendations from the trial study are then reviewed. This chapter then outlines the intervention research process used to test the theory of quality ageing. The current study evaluated the effects of facilitating access to computers and the Internet on older adults’ psychological needs for competency, autonomy and relatedness. This research used a longitudinal methodological design in which data was collected three times over six month intervals. Measurement took place prior to the computer intervention at baseline (time 1), Six months later at posttest (time 2), and then again six months later at follow up (time 3). This study facilitated the analysis of the variables of locus of control, attitudes towards computers, sociability, and self-efficacy, and the effects these had on quality of life. In addition, the effect of the program over time was examined. This chapter provides information about the participants, the measurement instruments, the research design, and statistical analyses.

5.2 Pilot Study

The research designed computer manual was developed using the recommendations presented in Section 4.2.6. The manual was entitled “Fun with Computers” to encourage participants to see the training experience as interesting and enjoyable. Before using the research designed computer manual in the intervention activity (that is, the main study), it was trialled with a small group of volunteers to
assess its practicality as a teaching instrument. The procedure used in this trial is described below.

5.2.1 Participants

Ethics approval for trialling the computer manual was obtained from the University of Ballarat Research Ethics Committee and the Boards of Management of the Aged Care Facilities (see Appendix M). In addition, informed consent was obtained from each volunteer. Two groups trialled the computer manual. The first group comprised ten recreational staff who comprised the total number of recreational staff from one residential care facility that was later used in the main study. These recreational staff was chosen to trial the manual because they would be instructing with the manual in the future. As such, the trial was also an opportunity to advise them and obtain immediate feedback on the manual. These participants rated their ability to use computers from none at all to a small knowledge of word processing. All participants were female, in good health, and did not have any disabilities that would influence their use of computers. Their ages ranged from 40 to 55 years. Five of the ten recreational officers had computers in their home. They were informed that there would be three sessions of training and they were encouraged to use their own computers at home.

The second group were older adults living independently (that is, not in residential care facilities) and known to the researcher. They gave informed consent and agreed to test the manual. Their ages ranged from 60 to 75 years, two were female, one was male, and they were all in reasonably good health. They had little computer knowledge and, while each had a computer in their home, none had accessed the Internet.
5.2.2 The Procedure for Testing the Computer Manual

The procedure for testing the manual was conducted in three stages. The first two stages were with the recreational officers of the residential facilities and the final stage was with the three older adult volunteers.

**Stage One:** The participants met as a group and were informed about the future research (that is, the main study) and the purpose of the computer manual. This was a question/answer and discussion session which aimed to inform participants about the research and how it would proceed in the residential care facility. A secondary aim was to obtain support from facility staff for the research. The meeting took place within the aged care facility. Each participant was given a copy of the manual to take home and study before the group training.

**Stage Two:** The first session of stage two occurred one week after the initial session. Participants took part in three training sessions of two hours which occurred weekly. All sessions took place as a group, although some individual tuition was given either before or after the session. Discussions were held during and after each training session to obtain feedback and evaluation on the manual. All communication and discussion occurred orally and these were recorded as minutes by the researcher.

**Stage Three:** The computer manual was trialled by the three older adults in their own homes over a two week period. The lessons were self-paced and the participants were encouraged to set a personal goal for each lesson. At the end of the two weeks, informal discussion was held with each participant independently to obtain comments and/or recommendations.
5.2.3  **Recommendations from the Trial of the Manual**

Feedback on the manual “Fun with Computers” was obtained from the participants who trialled it during group discussions, during the actual training sessions and in informal conversations. The anecdotal evidence from both groups of participants was that the manual “Fun with Computers” was of practical help. However, in their feedback, the participants emphasised that the manual should:

1. Be readable, easily understood, with clear directions about what to do and how to do it;
2. Provide a sense of enjoyment;
3. Make good use of explanatory pictures.

Given the endorsement of the manual by the participants it was subsequently used without change in the main study. The next chapter describes the participants in the main study, the instruments used, and the method for testing the proposed theory of quality ageing.

5.3  **Main Study: The Intervention Research Process**

A comprehensive outline of guidelines for the theory and application of intervention programs is given by Cunningham (2001). The model of an intervention program proposed by Mrazek and Haggerty (1994) involves a five-step process in which the problem is identified and a theoretical basis is established. The next step involves the review of relevant literature. In Stage 3, the design and explicit program materials are developed for use within the intervention. Finally, the program materials are tested in a trial phase and the program itself is tested in a normal setting over a more extended period of time. Cunningham (2001) recommends an additional phase with a “specific focus on the measurement and structural models to be used in the program
evaluation using confirmatory factor analyses (CFA)” (p. 141). Cunningham emphasises the importance of this phase given that many measures are self-report and have been validated within a population different from the one studied in the current research. “With the establishment of measurement models, the hypothesised pathways can be evaluated through structural equation modelling (SEM) analyses” (p. 141). The next section outlines the research process in testing the theory of quality ageing.

5.3.1 Participants

Table 1 shows the number of participants at each time period during the intervention and follow up. At baseline, there were 179 participants who were all 65 years of age or older with a mean age of 79.44 (sd = 8.19). Participants lived in aged care facilities in rural Victoria and were all able to read and speak English. Some participants possessed disabilities including amputations, arthritic conditions, visual difficulties, Parkinson’s disease, or were wheelchair bound. Overall, 27 percent assessed themselves as in good health, 50.3 percent as in fair health, and 22.7 percent as in poor health. There were three groups of participants, namely the experimental, control and comparison groups. Their living conditions were all similar in that all had single rooms with an ensuite, meals were taken in a communal dining room, whilst activities staff organised the recreational activities.
Table 1

*Number of Participants in each Group across Three Assessment Times*

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline</th>
<th>Posttest</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>63</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Control</td>
<td>56</td>
<td>56</td>
<td>53</td>
</tr>
<tr>
<td>Comparison</td>
<td>60</td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>179</td>
<td>173</td>
<td>163</td>
</tr>
</tbody>
</table>

As can be seen from Table 1, the experimental group had the largest number of participants at baseline and posttest, and, due to attrition, had equal numbers with the comparison group at follow up. The control group had the smallest number of participants at each of the measurement times. For all groups, the decline in numbers across time points was due to the death or hospitalisation of the participants. While the numbers varied at baseline between groups, at follow up the experimental and comparison groups each numbered 55 and the control group numbered 53. Only the participants who had complete data across time were used in the analysis. The self-assessed health of the participants of the experimental group was not significantly different to either the control group or the comparison group. However, there was a significant difference in the health of the control group compared to the comparison group (p = .002). The control group had the largest percentage of participants who assessed themselves as having “good” health (41.5%), compared to the comparison group (12.7%; see Table 6.4). Despite the fact that gender analysis was not a factor within the study, it is of interest to note that the groups did differ in their gender numbers (See Table 6.2).
5.3.2 Instruments

The aim of the study was to test an indirect effect and longitudinal theory of quality ageing. The theory proposes that the quality of life of older adults will be enhanced by undertaking an activity that fulfils their psychological needs for competency, autonomy, and social interaction. The activity chosen to test the theory was facilitating access to computers and the Internet. It was hypothesised that the effect of the program would be indirect through improvements in participants’ sense of competency, autonomy, and sociability.

The constructs used to assess QOL included psychological well-being, psychological functioning, and transitory mood states. Each of these constructs was estimated using participants subjective self-reports. Psychological well-being is often quoted as the most commonly measured aspect of QOL (Bowling, 1995) and includes components of self-esteem (Bowling, 1995; Charness & Schaie, 2003; Lu & Argyle, 1994). Psychological functioning is distinct from well-being and measures different aspects of QOL, including life satisfaction, loneliness, depression, and cognitive functioning (De Leo et al., 1998; WHO, 2002). Other constructs evaluated in the current study were self-efficacy, internal locus of control, sociability (which operationalised competency, autonomy and relatedness, respectively), and attitudes towards computers.

All constructs were measured using validated self-report instruments. The first variable was Attitudes towards Computers. This was part of the scale developed by Festervand and Meinert (1994) and updated by Durodoye and Ennis-Cole (1998). The second variable measured was the Short Form of the Profile of Moods Scale (without the Vigour Subscale). The third variable was the internal locus of control subscale from Levenson’s (1973) Locus of Control. The fourth variable was LEIPAD psychological functioning (De Leo et al., 1998) from which the subscales of cognitive and social functioning were used. The fifth variable was the Friedman Well-Being Scale.
(Friedman, 1994). The sixth variable was the Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 2000), which measured the perceived competency of older adults in the program. The seventh variable was Sociability scale (UCLA, Russell, Peplau & Ferguson, 1980), which measured the social interaction of older adults within the program. The final variable was a demographic questionnaire that included general health, gender, age, time in residential care and any familiarity with computers. Descriptions of the scales used to measure these variables are provided below.

**Attitudes towards Computers Scale**

The Attitudes towards Computers Scale was adapted from Festervand and Meinert (1994) and updated by Durodoye and Ennis-Cole (1998). The complete scale had three subscales of computer self-efficacy, attitude towards computers, and computer anxiety. However, these scales were too lengthy for the purpose of this research. As such, only the ‘attitudes towards computers’ subscale was used. This was an 8-item self-report checklist in which responses were measured on a 5-point Likert scale with values ranging from 1 = “disagree strongly” to 5 = “agree strongly”. A reliability analysis provided a Cronbach’s Alpha internal consistency reliability of .50 with split-half reliability reported at .48. An example of an item was “I think learning to use a computer is a valuable experience.” A high score in Attitudes towards Computers indicates a positive or improved attitude (a copy of Attitudes to Computers scale is presented in Appendix B).

**Profile of Mood States (POMS) (Short Form)**

The variable ‘Transitory Mood States’ was measure using The Profile of Mood States (Short Form), which is an abridged version of the original Profile of Mood States
(McNair, Loor & Droppleman, 1971), and was designed to measure emotional health in the terms of transient or fluctuating affective states. The abridged form was designed primarily for older adults by McNair and colleagues (1971, 1992). Participants provide self-reports of 5 mood states they have experienced during the past week, and responded on a 5-point Likert scale ranging from 0 = “not at all” to 4 = “extremely”. Results from factor analytic studies (McNair et al., 1992) indicate five factors made up of five items each, namely, tension/anxiety; depression/dejection; anger/hostility; fatigue; and confusion/bewilderment. These factors are referred to as POMS subscales. Scores are calculated by summing the item scores and low scores are positive (i.e., healthy) for all subscales. An example of an item is that the participants are directed to rate from 0 - 5 how they have been feeling for the past week on being “tense”.

Evidence supporting the validity (predictive and construct) of the POMS comes from a number of studies (for a review, see McNair et al., 1992). For example, the concurrent validity of the POMS (Short Form) Tension/Anxiety subscale was demonstrated through significant positive correlations with measures of similar constructs, such as the Speilberger State-Trait Anxiety Scale (McNair et al., 1992). Internal consistency reliability was reported to be .90 or greater for all subscales, except vigour and confusion/bewilderment. For these subscales the reliability was .84 and .82 respectively (McNair et al., 1992). The ‘Vigour’ subscale was omitted in the current study because it was the only ‘positive’ affective state measured and it was thought that this might confound the overall findings. A low score in Profile of Moods indicates an improved or positive mood state (a copy of Profile of Mood States (Short Form) scale is presented in Appendix C).
Multidimensional Scale of Locus of Control

The variable Autonomy was measured using the Multidimensional Scale of Locus of Control (Levenson, 1973), which is a 24-item self-report questionnaire designed to measure variables reflecting internal locus of control, powerful others, chance, and external locus of control. The scale was originally developed by Levenson (1973) as a three-factor locus of control scale, and advanced Rotter’s (1966) Internal and External Locus of Control Scale. Levenson’s three factors included: (a) internal locus of control, capturing the respondents feelings that they are making decisions and have freedom of choice; (b) powerful others, which reflects beliefs that other people are making decisions (whilst the individual has little or no say in these); and (c) chance, which reflects beliefs that things happen by either fate or luck. Each subscale consists of eight items and responses are measured on a six-point Likert scale with values ranging from 1 = “disagreeing strongly” to 6 = “agreeing strongly”. An example of an item is “My life is determined by my own actions”. The two subscales of powerful others and chance combine to provide a score for external locus of control.

Levenson (1981) reported Cronbach’s Alpha coefficients for the overall scale ranging from of .64 to .78. He also reported test-retest reliability coefficients of .69 to .79 over one week and .62 to .73 over seven weeks. Evidence in support of the internal consistency of the scale also comes from Ward (1994) who reported an acceptable internal consistency of .78 in samples of university students from New Zealand and the United States (Ward, 1992), and small business managers in the United States (Ward 1993). Levenson (1981) reported the reliability for the internal locus of control subscale as .64, powerful others as .77, and chance as .77. Hyman and Stanley (1991) found a significant correlation between Levenson’s scale and the Rotter’s scale of Internal and
External Locus of Control (1971), suggesting concurrent validity. A high score indicates an improved or positive internal locus of control (a copy of the Multidimensional Scale of Locus of Control is presented in Appendix D).

**LEIPAD Quality of Life of the Elderly**

The variable psychological functioning was measured using the LEIPAD Quality of life of the Elderly Scale, which is a 47-item self-report checklist developed under the auspice of the World Health Organisation to assess quality of life of older adults. It contains seven subscales with 31 of the 47 items grouped into six subscales, including physical functioning, self-care, depression/anxiety, cognitive functioning, and life satisfaction. The remaining 18 items capture potential moderators, including social desirability and personality characteristics. De Leo et al., (1998) reported Cronbach’s Alpha internal consistency reliabilities ranging from .55 to .79. Internal consistency was satisfactory for all subscales. Concurrent validity was also illustrated by a high correlation with the Rotterdam Questionnaire. De Leo et al., (1998) stated that the results of their study suggest that LEIPAD Quality of Life scale adequately covers the range of quality of life domains of older adults. An example of an item in this scale (for example, social functioning subscale) is “How satisfied are you in your social ties and relationships?” Responses are scored from very satisfied to very dissatisfied. A low score in LEIPAD Quality of Life of the Elderly Scale indicates an improved or positive assessment of QOL (a copy of the LEIPAD Quality of Life of the Elderly Scale is presented in Appendix E).
Friedman Well-Being Scale

Well-being was measured using the Friedman Well-Being Scale (Friedman, 1994), consisting of 20 bipolar adjectives, assesses general well-being. Some examples of the bipolar adjectives are Angry-Calm; Tense-Relaxed; Emotional-Unemotional. There are five subscales each with five items, and these include emotional stability, self-esteem/self-confidence, joviality, sociability, and happiness. Friedman (1994) reported Cronbach’s Alpha coefficients ranging from .92 to .98, whilst the test-retest reliability was .73. The scale correlated highly with a wide range of positive measures of attitude, balance, beliefs, dispositions, subjective well-being, and life satisfaction (Friedman, 1994). These relationships suggest good concurrent validity. A high score indicates a positive assessment of well-being (a copy of the Friedman Well-being Scale is presented in Appendix F).

Perceived Self-Efficacy Scale

The Perceived Self-Efficacy Scale (Schwarzer & Jerusalem, 2000) is a ten item self-report checklist that measures optimistic beliefs about being able to cope with a variety of stressors. These items include “solve difficult problems” and “deal efficiently with unexpected events.” It also measures the sense of self-efficacy or competency a person may feel within an activity or event. An example of an item is “I can always manage to solve difficult problems if I try hard enough.” The responses are measured on a four point Likert scale with responses ranging from 1 = “not at all” to 4 = “exactly true”. A high score on the self-efficacy scale reflects high levels of self-efficacy. Schwarzer and Jerusalem (2000) report that the scale has been used in numerous research projects and typically yields Cronbach’s Alpha reliability estimates ranging from .75 to .91. They suggest that the scale is parsimonious, reliable, and has proven
convergent and discriminant validity. The scale appears to be particularly useful for older adult populations because it is brief and easy to understand. A high score indicates a positive assessment of self-efficacy (a copy of the Perceived Self-Efficacy Scale is presented in Appendix G).

**Sociability scale**

The Sociability scale is a 10 item self-report checklist that is part of the larger UCLA Loneliness Scale (R-UCLA; Russell, Peplau & Ferguson, 1980). The scale consists of two five item subscales: Social Others; and Affiliative Environment. Social Others measures a person’s sense of social interaction and being generally sociable. An item example is “I feel part of a group.” Affiliative Environment, in contrast, measures how social a person feels towards others in their environment. An example item is “There are people about me with whom I can converse.” Responses are measured on a five-point Likert scale ranging from 1 = “disagree strongly” to 5 = “agree strongly”. A high score on the Sociability scale indicates high levels of sociability. In Russell et al.,’s (1980) original study, all items on the R-UCLA scale had inter-item correlations above .50, whilst the internal consistency and split-half reliability estimates were .84 and .76 respectively (a copy of the Sociability scale is presented in Appendix H).

**Demographics Questionnaire**

A series of questions were designed for the study to obtain basic demographic data from the participants. These included questions about age, length of time in residential care, gender, general state of health, social contact with family and friends,
and any previous computer use (a copy of the Demographic Questionnaire is presented in Appendix I).

**Subjective Pain Scale**

Participants were asked to indicate the level of personal pain they experience on a daily basis on a two item self-report checklist. The participants were asked: (a) if they had experienced any pain in the last week; and (b) whether the severity of the pain interfered with their activities. The responses were measured on a five point Likert Scale ranging from 1 = “none at all” to 5 = “very severe”. An example of an item in the Subjective Pain Scale is “Have you had pain during the past two weeks?” A low score in this scale indicates a low subjective pain. Cronbach’s Alpha was .89 (a copy of the Subjective Pain Scale is presented in Appendix J).

**Staff Assessment of Participants**

An eight item questionnaire was developed for the current study to assess staff perceptions of participants’ physical and mental capabilities, their observed sociability with others, and their mood states. This scale was developed in discussion with staff at the Aged Care facilities. This assessment was completed by a staff member of the Aged Care facility in which the participant was located. Items included questions about physical and mental health and responses were measured on a five point Likert scale ranging from 0 = “not at all” to 4 = “extremely”. A high score in this scale indicates a positive assessment by staff. A copy of the Staff Assessment of Participants is presented in Appendix K.
The Computers

Important to the proposed intervention was the placement of the computers in the Aged Care facilities where the experimental group was located. These were superseded models donated by the University of Ballarat. Two computers were placed in all residential facilities in which the experimental group was located, except one. This was solely due to space limitations. No computers were placed in the facilities where the control group was located as that group was not to have access to computers or the Internet. The computers used by the comparison group were supplied by the Aged Care Facility. Of the two computers placed in the Aged Care facilities where the experimental group was located, one of the computers was connected to the Internet. Only half of these facilities had a direct connection to the Internet. The others had their connection through the Hospital or Health Care Service. However, this was not considered a problem for the intervention, as the download speed on both connections was very similar and the participants were not downloading sites with heavy graphic content.

Care was taken in positioning the monitors so that they were at or near to eye level for the participants and to avoid glare on the screen. The screens were also customised to suit an older population by enlarging the toolbars and menus on the monitors to a readable size. Touch screens were available in three of the four facilities. However, the fact that one of the facilities did not have a touch screen was not considered a problem because the screens were seldom used by any of the participants during the intervention (participants preferred to use the mouse). The mouse was also adjusted to allow a longer time between clicks, as rapid or sharp clicks can be difficult for older adults (Czaja & Sharit, 1993). Likewise, the keyboard was modified to ensure that a delay in lifting the finger after touching a letter or number did not result in the letter or number being repeated.
As stated previously, the four Aged Care facilities supplied the computers for the comparison group from a grant from the Commonwealth government’s pilot program providing access to computers for older adults in residential care. They were customised to be similar to the computers in the experimental group. There was at least one computer in each facility. However, in most cases there were two and one of these was connected to the Internet.


As described in Section 4.4, a computer manual was developed to be used in the intervention. The title of the manual was “Fun with Computers”. The manual comprised 26 pages of 13 modules that are fully outlined in Section 5.3.3 (a copy of the manual is included as Appendix L).

5.3.3 Analysis Outline

The research consisted of two phases. The first involved the development and trial phase in which the computer manual was tested using the recreational staff of the Aged Care facilities and three older adult volunteers. The main phase of the study, as shown in Table 3, investigated the following areas:

1. The structure of older adults’ quality of life
2. The effectiveness of the Fun with Computers program
3. A measurement model for quality of life research in older adults
4. Testing a theory of Quality Ageing
5. A longitudinal analysis of program effects.

The research plan that was adopted in the current study is summarised in Table 2. As may be seen in Table 2 the first step in the study was to establish the measurement
models. This stage aimed to obtain evidence supporting the construct and discriminant validity of the selected measures using Confirmatory Factor Analysis (CFA). The means and standard deviations were then calculated for the demographic variables in order to compare the groups on these variables at baseline. The proposed theoretical model of quality ageing was then tested using MANOVA and SEM analyses.

Table 2

*Intervention Analysis Plan for the Main Study*

<table>
<thead>
<tr>
<th>Research Plan</th>
<th>Purpose</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Measurement models</td>
<td>To establish construct and discriminant validity for selected measures</td>
<td>CFA analyses of participants’ responses</td>
</tr>
<tr>
<td>2. Means comparison between groups</td>
<td></td>
<td>MANOVAS</td>
</tr>
<tr>
<td>3. Mediational Models</td>
<td>To test proposed theoretical model of quality ageing</td>
<td>Baseline and Posttest data used in SEM mediational analyses of pathways of program change</td>
</tr>
</tbody>
</table>

5.3.4 Design of the Main Study

The current study used a longitudinal design over three waves to test the effects on QOL of the program facilitating older adults’ access to computers and the Internet. The study adopted a quasi-experimental methodology in which the participants came from “intact” or pre-existing groups in residential care facilities in rural Victoria (i.e., there was no randomised allocation to groups). The first stage of data collection involved the completion of the questionnaires at baseline by the participants and facility
staff. The second stage involved the training program for each of the groups for six months, followed by the posttest assessment. The third stage included a follow-up assessment after an additional six months.

An important factor to note when questionnaires are used, and especially with older adults, can be carry over or fatigue effects. This can constitute a threat to internal validity of all within-subject comparisons (Bandura, 1965). For this reason, where possible, the questionnaires were completed in the mornings. This was mostly the case except where participants had medical appointments at this time. In addition, computer generated randomised counterbalancing of the questionnaires as formulated by Winkelman (personal communication) was used in all assessments to avoid any sequence or fatigue effects. This randomised counterbalancing of the questionnaires was important to avoid a confounding problem scale order if all questionnaires were answered in the same sequence. For example, if Attitudes towards Computers was always answered first, a false-positive response may result as the participant was at their freshest when answering this questionnaire. As a result of the random counterbalancing the questionnaire packages were compiled with the measurement scales in a different sequence.

5.3.5 Procedure

Initially, the researcher was a student at the University of Ballarat and approval for the research was obtained from the University of Ballarat Research Ethics Committee. Approval was also obtained from the specific Boards of the residential aged care facilities used in the current study. Prior to commencing the intervention, a meeting was held with the staff of each facility to obtain their cooperation with the training program. The facility staff advised that having both the experimental and control groups
from the same facility could cause ill will among the residents due to a feeling of being
passed over, and this could confound the study. Consequently, it was decided that
participants for the experimental and control groups would be recruited from separate
facilities. Comparison group participants came from the facilities selected by the
Commonwealth Government’s Aged Care Department for their own pilot study.

Having obtained consent from facility boards and staff, individual residents for the
experimental group were approached individually and asked if they were interested in
learning to use a computer and taking part in the study. It was emphasised that
participation was voluntary and that they could withdraw from the study at any time.
They were also told that: (a) it was a voluntary training program to learn how to use
computers and access the Internet; (b) this may be beneficial to other older adults in
residential care in the future; (c) they would be assisted to learn to use computers and
the Internet and this would require 30 to 45 minutes each week for six months; and (d)
that there would be a set of questionnaires to be completed before the training program
started, at the completion of the training program, and after a further six months.

The control group, which did not receive the computer training program were
told: (a) that a researcher would visit them for 30-45 minutes each week for six months;
(b) these visits would be either one-on-one or in a group, and the researcher would be
available to help them in any way they wished, such as writing letters, reading to them,
playing bingo or card games; and (c) that there would be a set of questionnaires to
complete at the start, after six months, and again after a further six months.

The facilities located in rural Victoria (that made up the comparison group) were
part of the Commonwealth government pilot program and were approached and asked if
they were interested in being part of the research. They agreed and permission was
sought (and obtained) from the Boards of individual facilities. Participants from these
facilities were also approached individually and asked if they would be interested in filling out three sets of questionnaires during their computer training. These questionnaires were completed in the same time frame as the experimental and control groups. The computer training was determined and administered by the local recreation officer and visiting SkillsNet’s staff (SkillsNet is a Victorian government funded body which assists community groups to access computers and the Internet). Additional information about the training will be detailed later in this chapter (see Section 5.3.5).

Upon completion of data collection, the researcher’s supervisor, Dr Lesley De Mello, retired from the University of Ballarat due to ill health. The University of Ballarat was not able to provide alternative supervisory assistance and, consequently, the primary researcher transferred to complete the project at Swinburne University of Technology.

*Experimental Group Computer Training*

For the experimental group, the computer training program was conducted over the first six month period. Each participant was given a copy of the “Fun with Computers” training manual at the beginning of their first lesson. Discussions were held with each participant to determine an appropriate lesson time for them each week. Each lesson was scheduled for 45 minutes and allowed 30 minutes lesson time and 15 minutes for the participants to settle in and ask questions. In all instances the lesson was terminated immediately if a participant felt overtired or unwell. Most lessons were conducted on a one-to-one basis, which was necessary given that some of the participants had disabilities such as severe arthritis or Alzheimer’s disease.

The computers were located in an accessible area within each facility and participants were encouraged to use the computers outside of lessons. While level of access to computers differed across the facilities, this was only in relation to free time
and did not apply to the actual training program. Furthermore, this differing level of access was not substantial and was not thought to be a confounding factor. The training program was divided into modules and individual goals were set with the participants at the beginning of each lesson. In some cases the goal was to complete the whole module whilst in other cases it was to become proficient in some aspect of the module. Overall, the first 14 weeks of the program aimed to teach participants how to use computers and MSWord at an introductory level. Table 3, which follows shortly, shows an outline of the computer manual structure (also see Appendix L) and the anticipated outcomes.

As outlined in Table 3, the first module aimed to provide very basic introductory knowledge about computers and also reduce participants’ computer anxiety. The components of the computer were explained to the participants, who were encouraged to learn by “doing” the tasks. Basic aspects of computer use were explained, including how to turn the computer on and off, the purpose and function of the monitor and the location of the various drives within the computer. It was emphasised that they could not break the computer. The second module provided an introduction to the use of the mouse and the keyboard (or touch screen). In addition, this module included an introduction to the use of card games. The main purpose of the card games was to help participant gain experience in the use of the mouse. The third module aimed to provide a basic understanding about computer features including the desktop display on the monitor, the icons, the start button, and the task bar. The participants were encouraged to try these features and change or move them where appropriate. The fourth, fifth and sixth modules consisted of an introduction to word processing by using MSWord. As a result of the initial trialling of the manual it was found that this basic introduction was sufficient for participants to be able to type a letter, respond to an e-mail, or be involved
in a chat room. This introduction included actions such as how to open a document, save it, correct mistakes, and change the font.

Table 3

Summary of the Modules in the Researcher-Designed Manual “Fun with Computers”

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Module Content</th>
<th>Anticipated Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Basic information tasks: Computer; Monitor;</td>
<td>Knowledge of how to turn on computer; Understanding “how” computer works; Reduce anxiety.</td>
</tr>
<tr>
<td>Two</td>
<td>Use of mouse and keyboard; Access card games.</td>
<td>Use mouse and keyboard; Card games</td>
</tr>
<tr>
<td>Three</td>
<td>Understanding of desktop; icons; task bar</td>
<td>Able to change or move icons and desktop display.</td>
</tr>
<tr>
<td>Four</td>
<td>Introduction to MSWord 1; What is a file? Opening and saving files.</td>
<td>Access MSWord. Able to open new file and save it.</td>
</tr>
<tr>
<td>Five</td>
<td>MSWord 2: Typing and basic formatting</td>
<td>Highlighting, copy, paste text, change font size.</td>
</tr>
<tr>
<td>Six</td>
<td>MS Word 3. Tools Menu</td>
<td>Able to use Spell check, grammar.</td>
</tr>
<tr>
<td>Seven</td>
<td>Introduction to Internet 1: Terminology and access.</td>
<td>Basic understanding of terminology and how to log on to Internet.</td>
</tr>
<tr>
<td>Eight</td>
<td>Introduction to Internet 2: Using search engines.</td>
<td>Able to log on, search and download information.</td>
</tr>
<tr>
<td>Nine</td>
<td>E-mail and Terminology</td>
<td>Setting up e-mail account.</td>
</tr>
<tr>
<td>Ten</td>
<td>MS Word &amp; E-mail</td>
<td>Sending an e-mail to family.</td>
</tr>
<tr>
<td>Eleven</td>
<td>E-Mail continued</td>
<td>Reading &amp; Answering an e-mail.</td>
</tr>
<tr>
<td>Twelve</td>
<td>Introduction to chat rooms</td>
<td>Understanding &amp; access chat room</td>
</tr>
<tr>
<td>Thirteen</td>
<td>Joining a chat room</td>
<td>Able to join in discussion by typing question or answers.</td>
</tr>
</tbody>
</table>
The seventh and eighth modules introduced the participants to the Internet and to the use of the search engine. This included demonstrating how to limit a search so that they would not be overwhelmed with a large number of responses, or how to select another search provider. The ninth, tenth, and eleventh modules showed participants how to use the Internet for e-mail purposes. Initially participants were shown how to register an e-mail account with “Hotmail”. The primary reason for using an account with “Hotmail” was to ensure the participants had privacy for their e-mails even though all computers were shared.

The twelfth and thirteenth modules were an introduction to the use of chat rooms. The fourteenth module was an advanced use of games on the computer. The last module encouraged social interaction between participants by sharing their skills and by being socially competitive.

While the training modules were set for a fourteen week period, some participants required longer. At no stage were participants rushed, and the completion time for each module was open-ended (although individual goals were set). However, as each participant completed the set course, the available time left from the initial six months was spent going over anything that the participants wished to revise from previous lessons. Help was given in answering any questions or with difficulties participants experienced.

After the first six months of the training, the researcher continued to visit each facility on a weekly basis during the follow up period of six months. The purpose of these visits was to assist participants with any computer problems they were experiencing.
**The Control Group**

During the six month period of the computer training intervention with the experimental group, the researcher visited the control group participants on a weekly basis. Visits were generally in a group situation, although interaction with individual participants was a priority where time allowed. The time of the visit varied depending on how many of the volunteers wished to be visited or if they wished to have a group activity. This time was spent in conversation, taking participants for a walk, or playing some form of group recreational game (for example, bingo). Several visits were made on an irregular basis during the follow up time before completing the final set of questionnaires at the end of the twelve month research period.

**The Comparison Group**

The use of a comparison group had two purposes. The first purpose was to provide a comparison with the experimental group in relation to the training program. The second purpose was to provide a comparison that would enable an examination of the efficacy of the training manual. The computer training given in the Commonwealth government’s aged care pilot program varied in each residential care facility. SkillsNet (a Victorian state government computer training unit) assisted in the pilot programs.

There were four Aged Care facilities in rural Victoria that made up the comparison group. Each facility adapted the computer-training program appropriate to their needs. The recreational officer, a volunteer, or a combination of both, ran the actual programs. All had access to the Internet and introduced their participants to e-mails. None of the facilities used a formal computer manual or help cards.
Post-Test and Follow-up Assessment

The post-test assessment took place after the initial six months. Participants in all three groups (Experimental, Control and Comparison) were requested to complete questionnaires a second time. These were: Short Form of Profile of Moods (POMS), the multidimensional scale of Locus of Control (LOC), LEIPAD Quality of Life of the Elderly (LEIPAD), Friedman Well-being Scale (Friedman Well-being), Perceived Self-Efficacy Scale (Self-Efficacy), Sociability scale and Attitudes towards Computers (Attitudes). After a further six months, all group participants were requested to complete questionnaires for the final time. Facility staff was requested to complete the Staff Assessment form at each of the measurement point, namely, baseline, post-training and follow-up.

5.4 Statistical Issues and Analyses

In this section the statistical techniques that were used in the main study are outlined with a rationale for the choice of particular techniques and processes.

5.4.1 Data Analysis

SPSS for Windows (2005, Version 13.0) and Amos 5.0 (Arbuckle, 1999) were used to analyse the data. All variables had subscales except the General Self-Efficacy Scale which was a composite score. The variables with subscales were Friedman Well Being (FWB), LEIPAD Quality of Life (LEIPAD), Locus of Control (LOC), Profile of Moods (POMS), Attitudes towards Computers (ATC), and Sociability (SOC). Only General Self Efficacy (GSE) provided a single composite score.
Data for the three groups were initially examined and compared using SPSS. Baseline comparisons on the seven measures among the three groups were made to determine the most appropriate statistical procedure to use to determine changes within and between groups over time. Mixed design Multivariate Analysis of Variance (MANOVA) was conducted for all groups on all variables at the three measurement times to test the effect of the program. More specifically, mixed MANOVAs and follow-up ANONVAs were conducted on all variables at each measurement time. All tests are evaluated at the .05 level of significance. Structural equation modelling (SEM) was then employed to assess the model of Quality Ageing.

5.4.2 Sample Size

Mixed design MANOVAS were used to assess the effect of within- and between-groups variables over time. Tabachnick and Fidell (1996) and Kline (1998) recommend a sample size large enough to ensure that number of participants exceed the number of dependent variables. While the SEM literature recommends that sample sizes of about 200 or larger are appropriate for analysis, Kline (1998) cautions that it is difficult to set an exact number since other factors must be taken into account. These factors include the complexity of the model being tested. He does suggest that a sample size of less than 100 is small and may be untenable. As a guide, sample sizes of between 100 to 200 participants may be considered medium and over 200 may be considered large (Kline, 1998). The sample size in the current study was 179 at baseline, and 163 at follow up. However, all analysis used 163 participants who had fully completed the questionnaires and study.
5.4.3 Outliers and Missing Data

As Tabachnick and Fidell (1996) describe, outliers are data points with extreme values either in one variable or a group of variables that may distort results. Outliers may result from: (1) data entry errors; (2) missing data value codes; (3) the case not being from the population intended; or (4) legitimate but exceptional data. The data was checked for points one and two. The third option was unlikely given that residential care residents were volunteers. The data was tested for outliers and two cases were deleted. The cases were screened for missing data and showed that there were 16 cases with missing data. While there was no missing data from the participants at baseline, there were 16 cases of missing data at post and follow up times. This was solely due to the death or ill health of the participants. These cases were deleted completely leaving a final sample size of 163 participants.

5.4.4 Factor Analysis

An important issue when using measures in interventional research is that the measure (variable) allows the assignment of an unambiguous meaning to each variable under study (Tabachnick & Fidell, 1996). It is also important to use measures that have been validated with the population generally. This is especially important for self-report data and in the current study because all the measures used had been previously validated on the general population rather than a population of older adults. The literature advises that factor scores are more reliable than raw data scores as there is less susceptibility to sample specific variation (Tabachnick & Fidell, 1996). In addition, factor scores can be used to remove the unique and error variance from the observed variables, as only the variance shared with other items is used in the solution (Kline,
1998; Tabachnick & Fidell, 1996). As such these scores give a more accurate estimate and allow sets of scores to be compared equally.

5.4.5 Testing the Theory of Quality Ageing Employing Structural Equation Modelling (SEM)

When evaluating theories and program outcomes in intervention research, Kline (1998) recommends that the traditional analysis of variance techniques should be supported through the use of Structural Equation Modelling (SEM; Tabachnick & Fidell, 1996; Kline, 1998). The flexibility of SEM is a major advantage in modelling and testing hypotheses because it allows competing theoretical formulations to be statistically evaluated. SEM is able to include the types of effects associated with MANOVA and ANOVA, including within-group and between-groups analyses (Kline, 1998). SEM is particularly useful in experimental or quasi-experimental models as it allows mediational processes to be tested and “information regarding the adequacy of the manipulation to be included in the analysis” (Tabachnick, 1996, p.718). Throughout this analysis, standardised estimates rather than unstandardised estimates are used. As standardisation gives all variables the same scale and the scores of these variables can be interpreted in the same way (Kline, 1998).

Assessment of Goodness of Fit

Kline (1998) recommends that the assessment of model fit both in confirmatory factor analysis (CFA) and structural equation modelling (SEM) is best achieved by using a selection of fit indices. This ensures that results from testing the model are appropriately interpreted (Byrne, 2001; Kilne, 1998; Tabachnick & Fidell, 1996). The first of the recommended fit indices is the chi squared statistic ($\chi^2$), which is frequently
used to assess goodness of fit. However, Byrne (2001) points out that the $\chi^2$ statistic alone may present problems due to sample size, especially if the sample is small. Kline (1998) suggested that a more acceptable measure was the normed chi square ($\chi^2$), where the $\chi^2$ is divided by its degrees of freedom (df) and the minimal value is less than three. However, many researchers recommend that other measures also be used to assess goodness of fit.

The Goodness of Fit Index (GFI) is “analogous to a squared multiple correlation, in that it indicated the proportion of the observed covariances explained by the model-implied covariances” (Kline, 1998, p.128). The Comparative Fit Index (CFI; Bentler, 1988) and the Tucker Lewis Index (TLI; Tucker & Lewis, 1973) are recommended by some authors (Tabachnick & Fidell, 1996; Kilne, 1998; Byrne, 2001). Researchers (Kline, 1998; Byrne, 2001) state that CFI is a reliable index in estimating the fit of the model, even in those models that may have a small sample size (Tabachnick & Fidell, 1996). The values of the three Indexes may range from zero (poor fit) to 1 (a perfect fit) and values greater than .90 indicate a reasonable fit.

The Root Mean Square Error of Approximation (RMSEA) is also recommended by Byrne (2001), who suggests that it is “one of the most informative criteria in covariance structure modelling” (p.84). A value of .05 or less is seen by most researchers as providing good fit whilst values below .08 are thought to reflect reasonable fit (Kline, 1998).

The Standardised Root Mean Squared Residual (SRMR) was also used to estimate the goodness of fit of the model. The SRMR reflects the average differences between the sample variances and covariances and the estimated population variances and covariances. The literature indicates that a good fitting model would have a small SRMR with values less than .05 (Tabachnick & Fidell, 1996; Kline, 1998; Byrne,
The criteria used in the current study to determine a reasonable fit of the model to the data was:

\[ \chi^2/df <3; \text{GFI, CFI, TLI}>.90; \text{RMSEA} <.08; \text{SRMR} <.06. \]

### 5.5 Summary

This chapter has described the intervention research process and the study procedure. The intervention was facilitating access to computers and the Internet for older adults in residential care facilities. The instruments used were described, together with the actual design of the study, statistical issues, and analytical methods. In review, the current study hypothesised that:

1. Autonomy, competency, relatedness of the experimental group would be directly enhanced from time 1 to time 2 by the program;

2. QOL (as reflected in psychological functioning, well-being, and POMS) would be enhanced from time 1 to time 2 by the indirect effect of the program through the psychological needs of autonomy, competency, and relatedness and independently of mood states;

3. Attitudes for both the experimental and comparison group would be significantly improved, whilst the control group was expected to demonstrate no significant change.

The results for the main study are presented in the following chapter.
Chapter 6

Results

6.0 Introduction

The previous chapter outlined the methodology for testing the proposed theory of quality geing. This chapter describes the results from the current study and is presented in four sections. The first section presents baseline comparisons of demographic characteristics across participant groups, before describing the participants who dropped out of the study (that is, patterns of attrition). The next section presents a series of measurement models using the baseline data to support the validity of the study constructs. Section 3 then reports multiple comparisons between the three study groups across the range of study constructs (for example, well-being, psychological functioning) using MANOVA and ANOVA. Finally, Chapter 6 presents a structural equation model testing the indirect effects of the program on indices of QOL.

6.1 Attrition and Baseline Comparisons

Tabachnick and Fidell (1996) define outliers as data points with extreme values and suggest that they are problematic because they may distort results. Data were screened for outliers and two cases were deleted because they fell beyond three standard deviations from the variable mean. At baseline, there were 179 participants distributed across the experimental, control and comparison groups. The distribution of participant numbers across groups is shown in Table 4. Due to death or severe illness, 16 participants were lost from the study between baseline and follow-up waves. Most of the participants who were lost from the study from baseline to follow up were from the
experimental (n = 8) and comparison (n = 5) groups, and only three participants were lost from the control group. As can be seen in Table 4, this pattern of attrition resulted in similar numbers of participants across the research groups at follow up. Only the participants who remained in the study at the follow-up stage of data collection were used in the baseline comparisons. No data were missing for the remaining 163 participants.

Table 4

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline</th>
<th>Post-test</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>63</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Control</td>
<td>56</td>
<td>56</td>
<td>53</td>
</tr>
<tr>
<td>Comparison</td>
<td>60</td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>179</td>
<td>173</td>
<td>163</td>
</tr>
</tbody>
</table>

The overall aim of experimental research is to isolate the effects of an independent variable by comparing an experimental group (exposed to a particular level of this independent variable) with a control group (exposed to a different level of the independent variable) both of which are recruited from a single homogeneous population. As such, it was assumed that the groups used in the current study (that is, experimental, control and comparison) came from the same population before being exposed to the intervention (Tabachnick & Fidell, 1996). In order to test this assumption, baseline comparisons between the three groups (after deletion of data from participants who were eliminated due to attrition) were conducted for the variables of gender, age and health.
Gender

The first baseline comparison examined the distribution of gender across experimental, control, and comparison groups. Table 5 shows the percentages of males and females within each group.

Table 5

Percentages of males and females in study groups

<table>
<thead>
<tr>
<th></th>
<th>Experimental (%)</th>
<th>Control (%)</th>
<th>Comparison (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n = 55 )</td>
<td>( n = 53 )</td>
<td>( n = 55 )</td>
</tr>
<tr>
<td>Female</td>
<td>51</td>
<td>62</td>
<td>80</td>
</tr>
<tr>
<td>Male</td>
<td>49</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

As can be seen from Table 5, there were more females than males in the control and comparison groups, whilst the experimental group had similar numbers of males and females. A chi square test revealed that there was a significant relationship between gender and group at baseline, \( \chi^2 (2, N = 163) = 10.312, p < .05 \). The comparison group had the greatest number of females and the experimental group the smallest number of females. Within the experimental group (which received the intervention), the gender distribution was almost equal.
Age

Means and standard deviations for ages across the three groups at baseline are shown in Table 6.

Table 6

*Means and Standard Deviations for Age across Experimental, Control and Comparison Groups*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>55</td>
<td>79.11</td>
<td>7.64</td>
</tr>
<tr>
<td>Control</td>
<td>53</td>
<td>76.74</td>
<td>7.72</td>
</tr>
<tr>
<td>Comparison</td>
<td>55</td>
<td>82.36</td>
<td>8.33</td>
</tr>
<tr>
<td>Total</td>
<td>163</td>
<td>79.44</td>
<td>8.19</td>
</tr>
</tbody>
</table>

As can be seen from Table 6, the comparison group was the oldest on average, whilst the control group was the youngest. A one-way independent groups ANOVA was conducted with age as the dependent variable and showed significant differences in age across the groups, $F(2,162) = 6.908, p < .05$. Post hoc comparisons using Bonferroni post hoc tests ($p < .05$) showed that there was no significant difference in mean age between the experimental group and the control group ($p = .36$) or comparison group ($p = .097$). However, there was a significant difference in mean age between the control and comparison groups ($p = .001$), with the comparison group being significantly older than the control group.
Health

The third baseline comparison examined the subjective experience of health of the participants in the experimental, control, and comparison groups. Health was self-assessed using a three point self-report scale ranging from “generally good” to “poor”, and reflecting how participants had felt during the past week. Table 7 shows the health assessment of the participants across the three groups.

Table 7

Percentages of participants reporting good, fair and poor health across the three groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Experimental</th>
<th>Control</th>
<th>Comparison</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 55</td>
<td>N = 53</td>
<td>N = 55</td>
<td>N = 163</td>
</tr>
<tr>
<td>Good</td>
<td>27.3%</td>
<td>41.5%</td>
<td>12.7%</td>
<td>27%</td>
</tr>
<tr>
<td>Fair</td>
<td>63.6%</td>
<td>39.6%</td>
<td>47.3%</td>
<td>50.3%</td>
</tr>
<tr>
<td>Poor</td>
<td>9.1%</td>
<td>18.9%</td>
<td>40%</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

As may be seen in Table 7, the control group assessed themselves as having the highest levels of “good” health, whilst the comparison group assessed themselves as having the highest level of “poor” health. A chi square test indicated that there were significant differences between the groups at baseline ($\chi^2 (4, N=163) = 23.613, p < .001$). The nature of this difference was that the control had the highest percentage of “good” health followed by the experimental group and the comparison group had the lowest “good” health.

In addition to the self-assessment of health, participants estimated any serious pain they had experienced during the previous week that had prevented them from
carrying out their normal routines. The means and standard deviations for this variable are shown in Table 8.

Table 8

Means and standard deviations for subjective pain ratings for the experimental, control and comparison groups

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>55</td>
<td>3.491</td>
<td>.199</td>
</tr>
<tr>
<td>Control</td>
<td>53</td>
<td>3.170</td>
<td>.203</td>
</tr>
<tr>
<td>Comparison</td>
<td>55</td>
<td>4.145</td>
<td>.199</td>
</tr>
<tr>
<td>Total</td>
<td>163</td>
<td>3.602</td>
<td>.200</td>
</tr>
</tbody>
</table>

As may be seen in Table 8, the control group reported the least amount of subjective pain, while the comparison group reported the most. A one-way ANOVA was conducted with subjective health as the dependent variable and group as the independent variable, and showed a significant difference between the groups ($F (2,162) = 6.164, p <.05$). A Bonferroni post hoc test ($p <.05$) showed that the only significant difference was between the control and comparison groups ($p = .002$), with the comparison group assessing themselves as feeling more pain than the control group.

In summary, the experimental group was not significantly different from either the control or comparison groups in age or subjective pain. The control group was the youngest and healthiest of the three groups, whilst the comparison group was the oldest and least healthy. As such, whilst there were some statistically significant differences between groups, these differences were (mostly) not apparent for the experimental group. Furthermore, the differences that were apparent between the control and comparison groups were small and not practically significant. As such, this was
concluded to be sufficient evidence that the groups were originally from a similar, “homogenous” population, and that making comparisons between these groups following the intervention was justified.

6.2 Measurement Models

A measurement model depicts the relations between observed indicators (for example, scale items) and underlying latent factors (Kline, 1998). Furthermore, a measurement model can facilitate examination of several measures of a single construct, and provides the link between scores on these estimates and the underlying constructs they are designed to measure. The assessment of goodness of fit in Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) is best achieved by using a range of measures (Tabachnick & Fidell, 1996; Kline, 1998; Byrne, 2001). As outlined in Chapter 5, the goodness of fit indices chosen in the current study to estimate the goodness of fit of the model to the data were (criteria indicative of good fit are provided in parentheses):

$$\chi^2/df (< 3.0); \ GFI, CFI, TLI (> .90); \ RMSEA (< .08); \ SRMR (< .05).$$

Confirmatory factor analysis (CFA) was used to analyse the scales measuring each of the seven variables. These included: (1) attitudes towards computers; (2) internal locus of control; (3) sociability; (4) self-efficacy; (5) profile of moods; (6) Well-being; and (7) LEIPAD psychological functioning. Measurement models were conducted for each of the scales at baseline, and figures representing these CFA measurement models are shown in Appendix L. The results of these CFA’s are shown in Table 9.
Table 9

<table>
<thead>
<tr>
<th>Variable</th>
<th>SRMR</th>
<th>$\chi^2$</th>
<th>DF</th>
<th>p</th>
<th>$\chi^2/df$</th>
<th>GFI</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>.02</td>
<td>.679</td>
<td>1</td>
<td>.403</td>
<td>.67</td>
<td>.99</td>
<td>1.02</td>
<td>1.00</td>
<td>.00</td>
</tr>
<tr>
<td>Internal LOC</td>
<td>.03</td>
<td>10.13</td>
<td>9</td>
<td>.323</td>
<td>1.15</td>
<td>.98</td>
<td>.99</td>
<td>.99</td>
<td>.03</td>
</tr>
<tr>
<td>Sociability</td>
<td>.06</td>
<td>88.68</td>
<td>35</td>
<td>.000</td>
<td>2.53</td>
<td>.91</td>
<td>.89</td>
<td>.91</td>
<td>.10</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.06</td>
<td>70.34</td>
<td>35</td>
<td>.000</td>
<td>2.78</td>
<td>.91</td>
<td>.92</td>
<td>.96</td>
<td>.10</td>
</tr>
<tr>
<td>POMS</td>
<td>.04</td>
<td>12.22</td>
<td>5</td>
<td>.032</td>
<td>2.44</td>
<td>.97</td>
<td>.93</td>
<td>.97</td>
<td>.09</td>
</tr>
<tr>
<td>LEIPAD Psych Functioning</td>
<td>.01</td>
<td>.175</td>
<td>2</td>
<td>.92</td>
<td>.09</td>
<td>1</td>
<td>1.1</td>
<td>1</td>
<td>.00</td>
</tr>
<tr>
<td>Well-being</td>
<td>.05</td>
<td>77.22</td>
<td>27</td>
<td>.000</td>
<td>2.86</td>
<td>91</td>
<td>90</td>
<td>93</td>
<td>.10</td>
</tr>
</tbody>
</table>

As can be seen from Table 9, the variables Attitudes, Internal LOC, POMS, LEIPAD psychological functioning, and well-being all provided a reasonable fit to the data, as illustrated by: SRMR less than .05; GFI, CFI and TLI all greater than .90; and $\chi^2/df$ less than 3. Where the measurement model does not provide a good fit to the data, it is important to re-examine the constructs that fit poorly in efforts to identify and rectify the source of the misfit (Kline, 1998). For instance, measurement models representing (1) self-efficacy and (2) sociability were not a good fit to the data, as illustrated by SRMR greater than .05, TLI less than .90 (sociability only), and RMSEA greater than .08. Given the poor fit to the data for these measurement models, further analyses were conducted to identify and rectify the sources of misfit.

**Self-Efficacy**

The initial single-factor CFA for self-efficacy showed reasonable fit to the data on selected indices, as illustrated by the GFI, TLI and CFI (all > .90), and $\chi^2/df$ (< 3).
However, both the SRMR and RMSEA were marginally outside acceptable ranges. Further analysis showed that Item 7 was demonstrating a non-significant factor loading on the latent variable and was deleted for the sake of parsimony (Byrne, 2000). A further CFA was conducted on these items, and is shown in Figure 3. The revised CFA for self-efficacy provided a better fit to the data.

![Figure 3. Single-factor CFA of Self-efficacy with the deletion of item 7. SRMR = .04, \( \chi^2 = 52.051, p = .003, \chi^2/df = 1.93, GFI = .94, TLI = .96, CFI = .97, RMSEA = .08 \).](image)

As can be seen from Figure 3, the deletion of Item 7 resulted in a satisfactory fit to the data. The content of Item 7 was “I can remain calm when facing difficulties because I can rely on my coping abilities.” Examining the remaining item content suggested that deleting this item did not substantially alter the meaning of the construct (for example, Item 8 had similar item content).
**Sociability**

A single-factor congeneric model for sociability was tested and did not provide a good fit to the data. In particular, Item 3 and Item 6 did not demonstrate a significant relationship with the latent variable. A subsequent CFA was conducted with these items deleted and is shown in Figure 4.

![Figure 4](image-url)

*Figure 4. Single factor congeneric model for Sociability with Item 3 and Item 6 deleted. SRMR = .04, $\chi^2 = 41.859$, $p = .003$, $\chi^2/df = 2.09$, GFI = .94, TLI = .94, CFI = .96, RMSEA = .08.*

As can be seen from Figure 4, the deletion of Item 3 and Item 6 resulted in an acceptable fit for the data. The meaning of the latent variable was not substantially altered by the removal of these two items. In particular, Item 3 asked “Are you part of a group of friends?” and Item 6 asked “Are you an outgoing person?” Similar content was demonstrated in the remaining scale items. Cronbach’s Alpha coefficient for this reduced scale was .84.

Once satisfactory fit was achieved for each of the measurement models, factor weights were obtained for each of the constructs. These factor weights were used to convert the raw scores to factor scores, which were then used in subsequent analyses (Thompson, 1997).
6.3 **Comparison of Mixed MANOVAS across the Three Groups**

Once measurement models were tested and found to be satisfactory, mixed design MANOVAs were conducted for “sets” of dependent variables reflecting Quality of Life (QOL) outcomes and Self-determination (SDT) psychological needs. A mixed design ANOVA was also conducted for Attitudes to Computers. The groupings of dependent variables were:

A. Quality of Life (QOL)
   1. LEIPAD psychological functioning
   2. Friedman Well-being.
   3. Profile of Moods.

B. Self-determination Variables (SDV)
   1. Self-efficacy
   2. Internal Locus of Control
   3. Sociability

C. Attitudes to Computers.

6.3.1 **Mixed Design MANOVAs for QOL between Groups.**

In this section, the effect of the intervention on QOL is explored. QOL was measured using three variables: (1) LEIPAD psychological functioning; (2) Friedman well-being; and (3) Profile of Moods. The means and standard deviations for these variables across group and time are shown in Table 10. These patterns of change across time for each of the groups and dependent variables are also shown in Figure 5.
Table 10

Means and Standard deviations for the QOL variables across group and time

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wave</th>
<th>Experimental (n = 55)</th>
<th>Control (n = 53)</th>
<th>Comparison (n = 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Psychological Functioning</td>
<td>Baseline</td>
<td>1.190</td>
<td>0.538</td>
<td>0.931</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>1.069</td>
<td>0.449</td>
<td>1.020</td>
</tr>
<tr>
<td></td>
<td>Follow up</td>
<td>0.929</td>
<td>0.403</td>
<td>1.201</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>41.055</td>
<td>4.461</td>
<td>39.843</td>
</tr>
<tr>
<td></td>
<td>Follow up</td>
<td>43.520</td>
<td>3.222</td>
<td>41.323</td>
</tr>
<tr>
<td>Profile of Moods</td>
<td>Baseline</td>
<td>3.327</td>
<td>1.877</td>
<td>4.467</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>2.447</td>
<td>0.939</td>
<td>4.155</td>
</tr>
<tr>
<td></td>
<td>Follow up</td>
<td>2.438</td>
<td>0.895</td>
<td>4.145</td>
</tr>
</tbody>
</table>

(Note: Low score is positive for Psychological functioning and Profile of Moods. High Score is positive for Well-being)

As may be seen in Table 10 and Figure 5(a), observed trends in LEIPAD psychological functioning were similar for the experimental and comparison groups, with both groups showing significant improvement (decreases in scores) over time. However, the control group showed deterioration in psychological functioning (increased scores) from baseline to follow up. Figure 5(b) shows trends suggesting that the experimental group improved in their well-being over time. In contrast, the control group showed trends towards deterioration in well-being from baseline to posttest, and improvement from posttest to follow up. In similar fashion, the comparison group also
showed trends towards deterioration from baseline to posttest and improvement in Well-being from posttest to follow up. As may be seen from Figure 5(c), trends also suggested that all groups demonstrated improvement in their mood states over time.

A 3 (group) x 3 (time) Mixed Multivariate Analysis of Variance (MANOVA) was conducted to compare change in QOL over time across the three groups. The independent variable was group (experimental, control, and comparison) and the repeated measures variable was time (baseline, posttest and follow up). This MANOVA revealed a significant interaction between time and group, *Wilks Lambda* = .538, *F*(12,310) = 9.398, *p* < .001. In order to examine the statistical significance of these differences, follow-up repeated measure MANOVAs were conducted separately for experimental, comparison and control groups, with time as the repeated measure variable. The results of each MANOVA will now be discussed in greater detail (a summary of these findings is also shown in Table 11).
Figure 5 (a). Patterns of change across time for each of the groups on LEIPAD psychological functioning. Low score is positive.

Figure 5(b). Patterns of change across time for each of the groups for Friedman Well-being. High score is positive.

Figure 5(c). Patterns of change across time for each of the groups for Profile of Moods. Low score is positive.
Experimental Group

A repeated-measures MANOVA was conducted for the experimental group, with LEIPAD psychological functioning, Well-being, and POMS as the dependent variables, and time as the repeated-measure variable. MANOVA found that the effect of time on the dependent variables was statistically significant, Wilks Lambda = .30, $F(6,49) = 19.37, p < .001$. Follow-up univariate ANOVAs were conducted for each dependent variable, and significant effects of time were found for LEIPAD psychological functioning, $F(2,108) = 8.854, p < .001$, Well-being, $F(2, 108) = 24.4, p < .001$, and mood states, $F(2,108) = 20.24, p < .001$. Planned comparisons (using simple contrasts) indicated that the experimental group did not significantly improve in psychological functioning from baseline to posttest, $F(1,54) = 3.041, p > .05$, although they did improve significantly from baseline to follow-up, $F(1,54) = 12.182, p < .05$ (see Table 6.8). Planned comparisons also showed significant increases in well-being from baseline to posttest, $F(1,54) = 6.42, p < .05$, and from baseline to follow-up, $F(1,54) = 31.07, p < .001$. Finally, the experimental group also showed significant improvements in mood states from baseline to posttest, $F(1,54) = 21.22, p < .001$, and from baseline to follow-up, $F(1,54) = 21.18, p < .001$ (see Table 10).

Control Group

A repeated-measures MANOVA was conducted for the control group, with LEIPAD psychological functioning, well-being, and POMS as the dependent variables, and time as the repeated-measure variable. MANOVA found that the effect of time on the dependent variables was statistically significant, Wilks Lambda = .12, $F(6,47) = 57.26, p < .001$). Follow-up univariate ANOVAs were conducted for each of the dependent variables, and significant effects of time were found for LEIPAD psychological functioning, $F(2,104) = 12.189, p < .001$, well-being, $F(2, 104) = 60.13$,
$p<.001$, and mood states, $F(2,104) = 3.76, p<.05$. Planned comparisons (using simple contrasts) indicated that the control group showed significant increases (and thus worse outcomes) in psychological functioning from baseline to posttest, $F(1,52) = 3.94, p<.05$, and from baseline to follow-up, $F(1,52) = 16.37, p<.001$ (see Table 6.8). Results also showed a significant decrease in well-being from baseline to posttest, $F(1,52) = 121.25, p<.001$. However, the change in well-being from baseline to follow-up was not significant, $F(1,52) = 2.14, p>.05$. Finally, the control group did show a significant improvement in mood states between baseline and posttest, $F(1,52) = 3.76, p<.05$, but no significant difference between baseline and follow-up, $F(1,52) = 3.83, p<.05$ (see Table 10).

**Comparison Group**

A repeated-measures MANOVA was conducted for the comparison group, with LEIPAD psychological functioning, well-being, and POMS as the dependent variables, and time as the repeated-measure variable. MANOVA found that the effect of time on the dependent variables was statistically significant, $Wilks\,\Lambda = .31, F(6,49) = 18.09, p <.001$). Follow-up univariate ANOVAs were then conducted for each of the dependent variables and significant effects of time were found for LEIPAD psychological functioning, $F(2,108) = 7.215, p<.01$, well-being, $F(2, 108) = 7.80, p<.01$, and mood states, $F(2,108) = 14.66, p<.001$. Planned comparisons (using simple contrasts) indicated that the comparison group improved significantly in psychological functioning from baseline to posttest, $F(1,54) = 7.25, p<.01$, and from baseline to follow-up, $F(1,54) = 10.554, p<.01$. Results also showed that whilst there were no significant differences in well-being from baseline to posttest, $F(1,54) = 2.10, p>.05$, there was a significant increase in well-being between baseline and follow-up, $F(1,54) = 6.26, p<.05$. Finally, the comparison group was also found to improve significantly in
mood states from baseline to posttest, $F(1,54) = 16.96, p<.001$, and from baseline to follow-up, $F(1,54) = 14.69, p<.001$ (see Table 10).

Overall, analyses of changes in psychological functioning, well-being, and mood states over time, indicated that the experimental group showed significant improvement on all variables. In contrast, the control group showed significant deterioration in psychological functioning and well-being, although no differences in either well-being or mood. The comparison group demonstrated significant improvement in psychological functioning, well-being, and mood states. Based on these findings, it seems that the program has produced a significant improvement in the overall QOL of the experimental and comparison groups when contrasted with the control group.
Table 11

*Effect over time and planned comparisons of three groups over two measurement periods of baseline to posttest and baseline to follow up.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Experimental</th>
<th>Control</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 55</td>
<td>n = 53</td>
<td>n = 55</td>
</tr>
</tbody>
</table>

**Planned comparisons**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect over time</th>
<th>Baseline to posttest</th>
<th>Baseline to Follow up</th>
<th>Effect over time</th>
<th>Baseline to posttest</th>
<th>Baseline to Follow up</th>
<th>Effect over time</th>
<th>Baseline to posttest</th>
<th>Baseline to Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psych Functioning</td>
<td>8.88 .000</td>
<td>3.04 .087</td>
<td>12.18 .001</td>
<td>12.18 .001</td>
<td>3.94 .052</td>
<td>16.37 .000</td>
<td>7.22 .001</td>
<td>7.25 .009</td>
<td>10.55 .002</td>
</tr>
<tr>
<td>Well-being</td>
<td>24.4 .000</td>
<td>6.42 .014</td>
<td>31.07 .000</td>
<td>60.13 .000</td>
<td>121.25 .000</td>
<td>2.14 .150</td>
<td>7.80 .001</td>
<td>2.10 .153</td>
<td>6.26 .015</td>
</tr>
<tr>
<td>POMS</td>
<td>20.24 .000</td>
<td>21.22 .000</td>
<td>21.18 .000</td>
<td>3.76 .027</td>
<td>3.68 .061</td>
<td>3.86 .055</td>
<td>14.66 .000</td>
<td>16.96 .000</td>
<td>14.69 .000</td>
</tr>
</tbody>
</table>
6.3.2 Mixed Design MANOVAs for Self-determination Variables

In this section, the effect of the intervention on the three variables that operationlised the psychological needs outlined in Self-determination Theory (Deci & Ryan, 1985) is explored. The three psychological needs and their operatives were: (1) Autonomy, measured by internal locus of control (ILOC); (2) Competency, measured by self-efficacy; and (3) Relatedness, measured by sociability. The means and standard deviations for these variables across group and time are shown in Table 12. Patterns of change across time for each of the groups for each dependent variable are shown in Figure 6 (a), (b) and (c).

Table 12

*Means and standard deviations for ILOC, Self-efficacy and Sociability*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wave</th>
<th>Experimental (n = 55)</th>
<th>Control (n = 53)</th>
<th>Comparison (n = 55)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>ILOC</td>
<td>Baseline</td>
<td>4.504</td>
<td>.753</td>
<td>4.435</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>4.887</td>
<td>.397</td>
<td>4.457</td>
</tr>
<tr>
<td></td>
<td>Follow up</td>
<td>4.946</td>
<td>.422</td>
<td>4.452</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Baseline</td>
<td>2.480</td>
<td>.631</td>
<td>2.192</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>2.857</td>
<td>.554</td>
<td>2.256</td>
</tr>
<tr>
<td></td>
<td>Follow up</td>
<td>2.905</td>
<td>.506</td>
<td>2.258</td>
</tr>
<tr>
<td>Sociability</td>
<td>Baseline</td>
<td>3.682</td>
<td>.568</td>
<td>3.251</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>4.030</td>
<td>.438</td>
<td>3.423</td>
</tr>
<tr>
<td></td>
<td>Follow up</td>
<td>3.952</td>
<td>.398</td>
<td>3.300</td>
</tr>
</tbody>
</table>

(Note: High scores are positive)
As may be seen in Table 12 and Figure 6(a), ILOC showed trends suggesting improvement for all three groups from baseline to posttest. However, the experimental group showed continued improvement from posttest to follow-up, while the control and comparison groups showed slight declines in ILOC over this time. Figure 6(b) shows trends suggesting improvements in self-efficacy in all groups over time. Patterns of improvement appeared to be largest for the experimental group. As may be seen from Figure 6(c), trends also suggested that the experimental group and the control group showed improved sociability from baseline to posttest, while the comparison group showed a decrease in sociability. All three groups demonstrated patterns reflecting decreases in sociability from posttest to follow up.

A 3 (group) x 3 (time) Mixed MANOVA was conducted to compare changes in the dependent variables over time and across groups. The independent variable was group (experimental, control and comparison) and the repeated measures variable was time (baseline, posttest and follow up). MANOVA revealed a significant interaction between time and group, \( Wilks \Lambda = .658, F (12,310) = 6.012, p < .001 \). In order to examine these differences in greater depth, follow-up repeated measure MANOVAs were conducted separately for experimental, comparison and control groups, with time as the repeated measure variable. The results of each MANOVA will now be discussed in greater detail.

**Experimental Group**

A repeated-measures MANOVA was conducted for the experimental group, with ILOC, self-efficacy, and sociability as the dependent variables, and time as the repeated-measure variable. MANOVA found that the effect of time on the dependent variables for the experimental group was statistically significant, \( Wilks \Lambda = .382, \)
Follow-up univariate ANOVAs were conducted for each of the dependent variables, and significant effects of time were found for ILOC, $F(2, 108) = 16.246, p < .001$, self-efficacy, $F(2, 108) = 22.94, p < .001$, and sociability, $F(2, 108) = 20.97, p < .001$. Planned comparisons (using simple contrasts) indicated that the experimental group showed significant improvements in ILOC from baseline to posttest, $F(1,54) = 19.23, p < .001$, and from baseline to follow-up, $F(1,54) = 16.61, p < .001$ (see Table 6.10). Results also showed significant increases in self-efficacy from baseline to posttest, $F(1,54) = 20.95, p < .001$, and from baseline to follow-up, $F(1,54) = 25.73, p < .001$. Finally, the experimental group also demonstrated significant improvements in sociability from baseline to posttest, $F(1,54) = 34.32, p < .001$, and from baseline to follow-up, $F(1,54) = 15.62, p < .001$. 
Figure 6 (a). Patterns of change across time for each of the groups for internal locus of control. High score is positive.

Figure 6(b). Patterns of change across time for each of the groups for self-efficacy. High score is positive.

Figure 6(c). Patterns of change across time for each of the groups for Sociability. High score is positive.
**Control Group**

A repeated-measures MANOVA was conducted for the control group, with internal locus of control (ILOC), self-efficacy and sociability as the dependent variables, and time as the repeated-measure variable. MANOVA found that the effect of time on the dependent variables was statistically significant, *Wilks Lambda* = .12, *F*(6,47) = 3.76, *p* < .001. Follow-up univariate ANOVAs were then conducted for each dependent variable, and significant effects of time were found for sociability only, *F*(2,104) = 6.95, *p* < .001. The effects of time on ILOC, *F*(2, 104) = .21, *p* > .05, and self-efficacy, *F*(2,104) = 1.44, *p* > .05, were not significant. Planned comparisons (using simple contrasts) indicated that the control group showed significant increases in sociability from baseline to posttest, *F*(1,52) = 12.64, *p* < .05, but no significant differences from baseline to follow-up, *F*(1,52) = .81, *p* > .05 (see Table 12).

**Comparison Group**

A repeated-measures MANOVA was conducted for the comparison group, with ILOC, self-efficacy, and sociability as the dependent variables, and time as the repeated-measure variable. MANOVA found that the effect of time on the dependent variables for the comparison group was statistically significant, *Wilks Lambda* = .65, *F*(6,49) = 4.426, *p* < .05). Follow-up univariate ANOVAs were then conducted for each dependent variable, and significant effects across time were found for ILOC, *F*(2,108) = 3.34, *p* < .05, self-efficacy, *F*(2, 108) = 3.28, *p* < .05, and sociability, *F*(2,108) = 5.89, *p* < .05. Planned comparisons (using simple contrasts) indicated that the comparison group showed no significant changes in sociability from baseline to posttest, *F*(1,54) = 3.33, *p* > .05, but significant declines from baseline to follow-up, *F*(1,54) = 8.35, *p* < .01 (see Table 6.10). Results also showed that there were no significant differences from baseline to posttest in ILOC, *F*(1,54) = 1, *p* > .05, or from baseline to follow up, *F*(1,54)
= 3.27, \( p > 0.05 \). Finally, planned comparisons also showed that there were no significant differences from baseline to posttest in self-efficacy, \( F(1,54) = 1.40, p > 0.05 \), but there was a significant improvement from baseline to follow-up, \( F(1,54) = 4.57, p < 0.05 \).

Overall, analyses of changes in ILOC, self-efficacy, and sociability demonstrated that the experimental group showed significant improvement over time. In contrast, the control group showed significant improvement in sociability from baseline to posttest but no significant differences from baseline to follow-up. The comparison group demonstrated significant improvement from baseline to follow-up in self-efficacy, and significant declines in sociability. Based on these findings, it seems that the program produced significant improvement in the psychological needs of competency, autonomy and relatedness in the experimental group, and less improvement (and, in some instances, declines in these variables) for the control and comparison groups.
### Table 13

*Effect over time and planned comparisons of three groups over two measurement periods of baseline to posttest and baseline to follow up.*

| Group | Experimental | | | | | Control | | | | | Comparison | | |
|-------|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|       | n = 55 | n = 53 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 | n = 55 |
|       | Baseline to posttest | Baseline to Follow up | Baseline to posttest | Baseline to Follow up | Baseline to posttest | Baseline to Follow up | Baseline to posttest | Baseline to Follow up | Baseline to posttest | Baseline to Follow up | Baseline to posttest | Baseline to Follow up | Baseline to posttest | Baseline to Follow up |
|       | \(F\) | \(p\) | \(F\) | \(p\) | \(F\) | \(p\) | \(F\) | \(p\) | \(F\) | \(p\) | \(F\) | \(p\) | \(F\) | \(p\) | \(F\) | \(p\) |
| ILOC  | 16.246 | .000 | 19.231 | .000 | 16.612 | .000 | .212 | .809 | .272 | .604 | .142 | .708 | 3.346 | .039 | 1 | .322 | 3.271 | .076 |
| Self-efficacy | 22.945 | .000 | 20.953 | .000 | 25.73 | .000 | 1.448 | .240 | 1.397 | .243 | 1.50 | .226 | 3.28 | .042 | 1.40 | .242 | 4.57 | .037 |
| Sociability | 20.967 | .000 | 34.32 | .000 | 15.62 | .000 | 6.95 | .001 | 12.64 | .001 | .805 | .374 | 5.89 | .004 | 3.33 | .074 | 8.35 | .006 |
6.3.3 Mixed Design ANOVA for Computer Attitudes for the Three Groups

This section examines the effects of the program over time for the three groups on Attitudes to Computers. The means and standard deviations of attitudes towards computers for the three groups over time are shown in Table 14. The pattern of change across time for each of these groups are also shown in Figure 7.

Table 14

Means and standard deviations for the variables measuring the Self Determination Theory's Psychological needs

<table>
<thead>
<tr>
<th></th>
<th>Experimental (n = 55)</th>
<th>Control (n = 53)</th>
<th>Comparison (n = 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Baseline</td>
<td>3.975</td>
<td>.697</td>
<td>3.643</td>
</tr>
<tr>
<td>Posttest</td>
<td>4.547</td>
<td>.434</td>
<td>3.659</td>
</tr>
<tr>
<td>Follow up</td>
<td>4.561</td>
<td>.426</td>
<td>3.659</td>
</tr>
</tbody>
</table>

(Note: High scores reflect more positive attitudes towards computers)

Figure 7. Patterns of change across time for each of the groups for Attitudes towards Computers. High score is positive.
As can be seen in Table 14 and Figure 7, the experimental group showed trends towards improved attitudes towards computers over time. In contrast, the control group demonstrated little variation over time. Finally, although changes were relatively small, the comparison group showed trends towards more negative attitudes towards computers from baseline to posttest, and more positive attitudes from posttest to follow up. A 3 (group) x 3 (time) mixed design ANOVA was conducted to examine these changes in attitudes over time. The independent variable was group (experimental, control and comparison) and the repeated measure was time (baseline, posttest and follow up). This ANOVA revealed a significant interaction between group and time (F (2.160) = 19.315, p < .001. In order to test the statistical significance of apparent differences in attitudes towards computers, separate repeated-measures ANOVAs were conducted for each group with attitudes towards computers as the dependent variable and time as the repeated measure variable.

A repeated measures ANOVA was conducted for the experimental group with attitudes towards computers as the dependent variable and time as the repeated measure variable. ANOVA showed a significant effect of time on attitudes towards computers, $F(2,108), = 41.96, p<.001$. Planned comparisons (using simple contrasts) indicated that the experimental group showed a significant increase in attitudes from baseline to posttest, $F(1,54) = 45.59, p<.001$, and from baseline to follow up, $F (1,54)$ $F = 41.59$, $p<.001$ (see Table 14). A repeated measures ANOVA was conducted for the control group with attitudes as the dependent variable and time as the repeated measure. The ANOVA found no significant effect of time on the dependent variable for the control group, $F(2,104), = .150, p>.05$. A repeated measures ANOVA was then conducted for the comparison group with attitudes as the dependent variable and time as the repeated
measure. Once again, ANOVA found no significant effect of time on the dependent variable for the comparison group, F(2,108), = .751, p>.05.

Overall, analyses of changes in attitudes over time demonstrated that only the experimental group showed significant improvement. In contrast, the control group and comparison group showed no significant improvement over time. Based on these findings, it seems that the program has produced a significant improvement in the attitudes of the experimental group when contrasted to the control group and comparison group.
Table 15

*Effect over time and planned comparisons of three groups over two measurement periods of baseline to posttest and baseline to follow up.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Experimental</th>
<th>Control</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 55</td>
<td>n = 53</td>
<td>n = 55</td>
</tr>
<tr>
<td>Planned Contrasts</td>
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<td></td>
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<tr>
<td>Effect over time</td>
<td>F  p</td>
<td>F  p</td>
<td>F  p</td>
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<tr>
<td>Baseline to posttest</td>
<td>F  p</td>
<td>F  p</td>
<td>F  p</td>
</tr>
<tr>
<td>Baseline to Follow up</td>
<td>F  p</td>
<td>F  p</td>
<td>F  p</td>
</tr>
<tr>
<td>Effect over time</td>
<td>F  p</td>
<td>F  p</td>
<td>F  p</td>
</tr>
<tr>
<td>Baseline to posttest</td>
<td>F  p</td>
<td>F  p</td>
<td>F  p</td>
</tr>
<tr>
<td>Baseline to Follow up</td>
<td>F  p</td>
<td>F  p</td>
<td>F  p</td>
</tr>
<tr>
<td>Attitudes</td>
<td>41.96 .001</td>
<td>45.59 .000</td>
<td>41.59 .000</td>
</tr>
<tr>
<td></td>
<td>.150 .8</td>
<td>.61 .15</td>
<td>.61 .15</td>
</tr>
<tr>
<td></td>
<td>.700</td>
<td>.700</td>
<td>.700</td>
</tr>
</tbody>
</table>
6.4 The Testing the Model of Quality Ageing using Structural Equation Modelling (SEM)

As discussed earlier, the measurement model depicts the relations between indicators (items) and underlying (latent) factors (Kline, 1998). Alternatively, a measurement model facilitates examination of several measures of a single construct, and provides the link between scores on these estimates and the underlying constructs they are designed to measure.

In evaluating theories and program outcomes in interventional research over time, traditional analysis of variance techniques (for example, MANOVA) should be supported by Structural Equation Modelling (SEM; Tabachnick & Fidell, 1996; Kline, 1998) analyses. SEM techniques allow competing theoretical formulations of the data to be statistically compared, and also accounts for measurement error (Kline, 1998). In addition, SEM is useful in experimental and quasi-experimental designs because it allows mediational or indirect effect processes to be tested and “information regarding the adequacy of the manipulation to be included in the analysis” (Tabachnick & Fidell, 1996, p. 718).

6.4.1 Testing the Model of Quality Ageing

A model of Quality Ageing was formulated and tested using variables that operationlised QOL or acted as intervening variables (that is, psychological needs; see Figure 9). The program used was the computer intervention. All variable values at wave 2 controlled for previous values at wave 1 (measurements of the same variables at different times are denoted by the subscripts $_1$ and $_2$ for waves 1 and 2 respectively). It was hypothesised that the program would influence the attitudes, ILOC, self-efficacy and sociability, and that these variables would predict increases in QOL. As such,
attitudes, ILOC, self-efficacy and sociability were all hypothesised to be intervening variables accounting for the effects of the program on QOL. This structural model was tested and is shown in Figure 8.

Figure 8. The initial measurement model of Quality Ageing without any deletions. SMRM = .053; \( \chi^2 = 119.287; \) df = 55; \( \chi^2/\text{df} = 2.17; \) p = .000; GFI = .91; TLI = .89; CFI = .94; RMSEA = .09.

As can be seen in Figure 8, this structural model provided a reasonable fit to the data. An examination of the 22 pathways showed that 14 were significant at \( p < .001 \) level and two were significant at the \( p < .05 \) level. Pathways significant at the \( p < .05 \) level were Sociability\(_2\) to well-being\(_2\) (\( p = .002 \)), and Attitudes\(_2\) to well-being\(_2\) (\( p = .004 \)). Six pathways were non-significant: Attitudes\(_2\) to LEIPAD psychological functioning\(_2\) (\( p = .680 \)); ILOC\(_2\) to LEIPAD psychological functioning\(_2\) (\( p = .147 \)); ILOC\(_2\) to well-being\(_2\) (\( p = .220 \)); Sociability\(_2\) to LEIPAD psychological functioning\(_2\) (\( p = .01 \)); Socio
POMS2 to LEIPAD psychological functioning2 (p = .709); and POMS2 to Well-being2 (p = .079).

Some of these non-significant pathways were unexpected and inconsistent with the proposed model of Quality Ageing. These six pathways were deleted under the recommendation of Byrne (2001), who states that “in the interests of scientific parsimony they [non-significant pathways] should be deleted” (p.76). The final model of Quality Ageing was run and is shown in Figure 9.

Figure 9. The final model of Quality Ageing with the non-significant pathways deleted. SMRM = .06; $\chi^2 = 126.29$; df = 61; p = .00; $\chi^2$/df = 2.07; GFI = .91; TLI = .90; CFI = .94; RMSEA = .08.

As can be seen from Figure 9, this final Model of Quality Ageing provided an acceptable fit to the data. The autoregressive pathways for all seven variables were significant from time 1 to time 2, suggesting stability for these variables over time. More importantly, results showed that the program had significant effects (p<.001) on...
POMS, attitudes towards computers, ILOC, self-efficacy and sociability. Contrary to the hypotheses, although the program did predict increases in ILOC and self-efficacy, ILOC did not intervene the effects of the program on well-being, LEIPAD psychological functioning, or POMS, whilst self-efficacy was not significantly related to LEIPAD psychological functioning. However, the program did have an indirect effect on well-being through its relationship with self-efficacy (p = .000). The program also significantly predicted attitudes towards computers (p = .000), indicating that the experimental group became more positive in their attitudes after being exposed to the intervention. No variables were found to intervene the effects of the program on POMS, and the program had no effects on psychological functioning and well-being that were not accounted for by relationships with self-efficacy and attitudes towards computers.

6.5 Summary

The aim of this research was to test a theoretical model of Quality Ageing. The theory proposes that the quality of life of older adults will be enhanced when they undertake activities that are not only enjoyable, recreational, challenging and socially involving, but also involve making personal choices and personal decisions. This improvement in QOL is argued to be brought about through the satisfaction of psychological needs for competency, autonomy and relatedness.

Initially, data from the three groups were analysed in relation to age, gender and health, to ascertain whether there were any major baseline differences between the groups. It was concluded that apparent differences were not practically significant and there was sufficient evidence to justify making comparisons between these groups.

Given that the constructs used in this research were operationlised through multiple questionnaire items, CFA measurement models were conducted to confirm that
the underlying factor structures were consistent with previous research. Results from these analyses showed that one-factor congeneric models provided an acceptable fit to the data for most of the study constructs. The two variables that did not demonstrate adequate fit (that is, self-efficacy and sociability) were modified until fit was satisfactory.

Multivariate Analysis of Variance (MANOVA) was then conducted separately for the variables operationalising QOL and the SDT outcomes. Results showed that the experimental group improved significantly over time in well-being, psychological functioning, and mood states. In contrast, the control group showed a significant decline in well-being from baseline to posttest and in LEIPAD psychological functioning from baseline to follow-up. Meanwhile, the comparison group showed improvement in psychological functioning and mood states and in well-being from baseline to follow up. The direct effect of the program on the SDT outcomes variables also showed that the experimental group improved over time on ILOC, self-efficacy, and sociability. The control group also showed improvement in sociability from baseline to posttest, while the comparison group improved in self-efficacy from baseline to follow up. No other significant differences were observed for the control or comparison groups.

Following from the MANOVA analyses, the model of Quality Ageing was tested using SEM. Results showed that the program had a significant effect on the ILOC, self-efficacy and sociability. The program also had an indirect effect on both well-being and psychological functioning through the effects of self-efficacy. The program was also found to have a significant effect on well-being (but not psychological functioning) through the effects of sociability. None of the proposed intervening variables was found to have a significant effect on POMS.
These findings lend support to the conclusion that the program led to improvement in psychological well-being through the effects of self-efficacy and sociability. Furthermore, the program also led to significant gains in ILOC. Contrary to the hypotheses, the effect of the program on POMS was direct and not through any other variables. These findings lend some support to the proposed model of Quality Ageing. The next chapter discusses these conclusions in detail and elaborates on their implications for the model of Quality Ageing.
Chapter 7
Discussion

In this final chapter, the findings from the current study are summarised, before potential implications of these results for the quality of life of older adults are discussed. The chapter begins by discussing results from the mixed design MANOVAs and ANOVAs, with psychological functioning, well-being, ILOC, self-efficacy, sociability, and attitudes towards computers as the dependent variables. The independent variables for these analyses were group (experimental, control and comparison) and time (baseline, post-test and follow up). The SEM analyses are then discussed, together with the direct and indirect effects of the program on the outcome variables. These findings are then related to Self Determination Theory and more general theories of Ageing, before possible relevance to Identity Theory is also discussed. Finally, this chapter addresses the limitations of the current research and suggests possible directions for future investigation.

7.1 Introduction

The primary aim of the current study was to test a proposed theory of quality ageing (see Figure 1, Section 2.7). This theory suggests that older adults’ quality of life may be enhanced when psychological needs for autonomy, competency, and relatedness are satisfied. One activity that may partially satisfy these needs involves accessing computers and the Internet. In order to explore this possibility, three groups of older adults (that is, experimental, control, and comparison groups) were studied over time using a quasi-experimental methodology. The experimental group were given access to computers and the Internet, and were exposed to a specially designed training program.
The comparison group, in contrast, was given access to computers through a different, government sponsored program. Finally, the control group was visited regularly by the researcher but was not given access to computers. All groups were assessed at baseline, after six months (post-test), and then again six months later (follow-up).

Based on the proposed theory of quality ageing, it was hypothesised that the experimental group would show a greater improvement in their well-being, psychological functioning, and mood states, than either the control or comparison groups. These benefits were hypothesised to be indirect through improvements in their sense of competency (that is, self-efficacy), autonomy (that is, ILOC), and relatedness (that is, sociability). In addition, it was hypothesised that older adults in the experimental group would have a more positive attitude towards computers through greater knowledge and familiarity with information technology than either the control or comparison groups.

7.2 The Quality of Life of Older Adults

This section presents an overview of the results pertaining to whether there was significant change in QOL (i.e., well-being, psychological functioning, mood states) over time for each group. It was hypothesised that well-being, psychological functioning, and mood states, as reported by the experimental group, would be significantly enhanced as a result of the intervention. This change was expected to be larger than any change demonstrated by either the control or comparison group. Overall, the current results indicated that the experimental group showed significant improvement in their well-being and mood from baseline to post-test following the intervention. This improvement was maintained to follow-up. The experimental group’s improvement in psychological functioning, however, was not significant from baseline
to post-test, although there was significant improvement from baseline to follow-up. In contrast, the control group demonstrated a significant decrease in psychological functioning over time, and changes in both well-being and mood states from baseline to follow-up. However, the trends reversed and there were no significant differences in well-being or mood states from baseline to follow-up. Finally, the comparison group showed a significant improvement in psychological functioning and mood states. The comparison group also demonstrated no significant differences in well-being from baseline from post-test, although there was significant improvement from baseline to follow-up. These findings will now be discussed in greater detail.

First, it was hypothesised that the program would result in the experimental group showing a greater improvement in well-being, psychological functioning, and mood states, than either the control group or the comparison group. As expected, the control group did not demonstrate the same pattern of change in any of the variables as did the experimental group. More specifically, whilst the experimental group showed consistently improved outcomes over time, the control group demonstrated a decline in well-being from baseline to post-test, and a non-significant decline from baseline to follow up. The improvement in well-being from baseline to post-test for the experimental group (relative to the control group) suggests that that their QOL was enhanced as a result of engaging with the information technology intervention. The control group was not exposed to the intervention and, presumably, did not experience any benefits from this program.

Secondly, it was hypothesised that the program would also result in the experimental group showing a larger improvement in well-being, POMS, and psychological functioning, than the comparison group. One purpose for comparing the experimental and comparisons groups on QOL outcome variables was to test the
efficacy of the researcher-designed computer training program over an alternative intervention. In particular, whilst the experimental and comparison groups both received computer training, the experimental group was exposed to training based on recommendations from the IT literature (see Chapter 4.3.1). Based on previous research and theory, it was proposed that these specific qualities would help satisfy needs for competency, autonomy and relatedness.

Comparison of the experimental and comparison groups across the QOL variables of Well-being, psychological functioning and mood states, showed a positive effect of the researcher-designed computer training program above that of the government funded intervention used by the comparison group. Results showed that both the experimental and comparison groups demonstrated similar patterns of improvement in psychological functioning and mood states over time. However, consistent with the hypotheses, improvements in well-being were greater for the experimental group at post-test, and following the intervention. During the follow up period, both groups continued to show significant improvement in well-being, psychological functioning, and mood. These findings suggest that whilst the researcher-designed intervention has limited benefits above alternative programs, information technology interventions generally have the potential to enhance the QOL of older adults.

While there were no hypotheses relating to the comparison of control and comparison groups, it is worthwhile to note apparent differences between these groups of participants. Consistent with the notion that using information technology can bring about benefits to older adults, results showed that the control group demonstrated a different pattern of change over time than the comparison group. More specifically, whilst the comparison group showed generally improved outcomes over time (except in
well-being), the control group demonstrated either general declines or little change over time. These results emphasise the potential importance of an activity (e.g., engaging with information technology) that can satisfy older adults’ psychological needs and may bring about the enhancement of their QOL.

In sum, the hypothesis that the use of the computers would facilitate improved well-being and psychological functioning for the experimental group and, to a lesser degree, the comparison group, was supported by the current results. These findings were consistent with the results of previous studies indicating that computer use can benefit QOL (Czaja & Lee, 2003; Russell, 2005; Scott, 2001). For example, Purnell and Sullivan-Schroyer (1997) conducted a study in residential care facilities for older adults and found that the introduction of computers into the residential care facility resulted in improvements in well-being. However, this particular study was limited because it did not use either a control or comparison group. As such, the current study replicated these findings and further advanced this research by including a control group in a quasi-experimental design. Based on these findings, it may be said that the use of computers was a factor in the improved QOL experienced by older adult users.

Similar results to the current study have also been found in previous research studies using alternate intervention activities (that is, not IT). For example, Noice et al. (2004) investigated the benefits of a short-term intervention for older adults targeting their cognitive functioning and sense of life satisfaction. This study investigated 124 older adults aged from 60 to 86 years, and three types of intervention: theatre training, visual arts training, and no training at all. Results showed that the group who received the theatre training made significantly greater gains in psychological well-being that the other two groups. Collectively, these studies demonstrate that stimulating activities,
such as computer and Internet use, can have a positive effect on the quality of life of the participants.

7.3 The Program Effect on Autonomy, Competency and Sociability

The previous section discussed results indicating that accessing computers and the Internet had positive effects on older adults’ QOL. Deci and Ryan (1985, 1991) argue that satisfying psychological needs for autonomy, competency and relatedness can benefit well-being. As such, improved outcomes on these variables (that is, psychological needs) may account for the finding of positive effects on QOL following computer use. Based on this rationale, it was hypothesised that the program would have effects on the sense of autonomy, competency, and relatedness of the experimental group over time, and these changes would be greater than any observed for either the control or comparison groups. In the current study, ILOC was measured to reflect (that is, operationalise) the participants’ sense of autonomy, whilst self-efficacy was measured to reflect participants’ sense of competency. Finally, sociability was measured to reflect relatedness to others. The findings relating to each of these variables and links with previous research are now discussed in more detail.

**Autonomy**

It was hypothesised that experiences of autonomy within the experimental group would be increased over time through the effect of the program, whilst no such changes would be expected for the control or comparison groups. As expected, the experimental group showed significant improvement in ILOC during the intervention period. In contrast, the control group showed little change over time. This finding suggests that facilitating access to computers and the Internet improved the feelings of autonomy
experienced by the experimental group. Also contrasting the experimental group, the comparison group demonstrated no significant change in autonomy over time. This discrepancy between experimental and comparison groups suggests that the benefits to autonomy were a result of the researcher-designed training program, and not simply the outcome of computer and Internet access alone.

These results are consistent with the findings of Perrig-Chiello et al., (1999), Bates and Rankin-Hill (1994), and Taylor (1990), who found that a positive sense of independence and freedom of choice improved older adults’ reports of QOL. The significant improvement in ILOC and QOL for the experimental group is also consistent with research by Langer and Rodin (1976), who gave older adults in residential care an active role in making decisions about their lives and accommodation needs. They found that if older adults were given a sense of choice and autonomy, a positive effect on their health and quality of life was observed. As such, the current results are consistent with previous research suggesting that engaging older adults in stimulating activities involving computer and Internet access can have positive effects on their experiences of autonomy.

Deci and Ryan (2000) suggest that ILOC is the experience of integration and being free to choose and act. They argue that having such a sense of choice and independence can result in healthy functioning and QOL. Support for this notion comes from Kasser and Ryan’s (1999) study of 50 nursing home residents. This study revealed that where participants had a sense of ILOC, they also reported enhanced well-being. Likewise, Sheldon, Houser-Marko and Kasser (2005) found that a sense of ILOC was consistently associated with well-being.


**Competency**

It was hypothesised that feelings of competency reported by the experimental group would be improved through the effect of the program, and that no such changes would be observed for either the control or comparison groups. Self-efficacy was used to operationalise participants’ sense of competency or capability (Bandura 1997; Dowd 1975; Giarrusso & Bengston, 1996; Moen et al. 2000). As expected, the experimental group showed significant improvements in self-efficacy during the intervention and the follow-up period. In contrast, the control group and the comparison group failed to demonstrate any substantial change in their self-efficacy during the intervention. These results indicate that the experimental group developed a sense of competency through the program.

The finding of increased self-efficacy following the intervention for the experimental group is consistent with the predictions of SDT (Deci & Ryan, 1985). In particular, SDT argues that competency is one of three main human psychological needs which, if fulfilled, is central to improving QOL. A study by Compeau and Higgins (1995b) also supports this view of SDT. Compeau and Higgins conducted a study with older adults and found that engaging in the activity of using computers resulted in an improved sense of self-efficacy and improved QOL. In a similar fashion, Russell (2005) conducted a qualitative study with older adults using computers and found that where the participants’ described improved self-efficacy they also expressed greater satisfaction with life.

It is important to note that the interest and commitment of participants from the experimental group may have been heightened by the fact that the intervention was domain specific. Studies have shown that improvements to self-efficacy or competency are strongest when the activity is situational or domain specific (Branden, 1995; Lennings, 1994). In the current study, the intervention was domain specific and
focussed on facilitating access for older adults to computers and the Internet. Compeau and Higgins (1995b) coined the phrase “computer self-efficacy” to define the self-judgement that people have regarding their capability to use computers successfully. Compeau and Higgins propose that computer self-efficacy is the expectation of an older adult about their performance when using a computer in the future. Once older adults have overcome their initial anxiety in undertaking a new challenge and sense they have competency in doing it, they may be more likely to persevere with the activity and feel more prepared to continue to learn.

**Relatedness**

Relatedness is a measure of social interaction an older adult may find in an activity (Deci & Ryan, 2000). In the current study, relatedness was operationalised by a measure of sociability. It was hypothesised that the experimental groups’ sociability would be enhanced as a result of the intervention, and that this improvement would be larger than any observed for the control or comparison groups. As expected, results showed that the experimental group experienced significantly improved sociability over time. The control group’s sociability also showed significant improvement between baseline and post-test. However, trends suggested that this then decreased between post-test and follow-up, and there were no significant differences in sociability from baseline to follow-up. In contrast, the comparison group showed a non-significant decrease in sociability from baseline to posttest, and a significant decrease from baseline to follow up.

The finding that the experimental group experienced increased sociability following the intervention is consistent with the predictions of SDT. Furthermore, the increase in sociability reported by the control group is presumably an outcome of the visits and activities (not computer usage) facilitated by the researcher. However, the
decrease in sociability for the control group between post-test and follow-up was unexpected and may have been due to these participants experiencing reactions to the reduced amounts of social interaction once the visits had ceased. This suggests that the researchers\' visits may have helped build a stronger sense of social connection in both experimental and control groups, irrespective of the computer intervention. However, the added feature of computer training in the experimental group evoked a stronger and more enduring sense of relatedness, as illustrated in their lasting gains in sociability.

Contrasts between the experimental and comparison groups, which both had access to computers and the Internet, indicated that whilst the experimental group showed a significant improvement in their sociability, the comparison group showed a significant decrease in sociability over time. This finding for the comparison group was unexpected. One reason for this finding may have been the varying emphasis placed on social interaction in the computer lessons for the comparison group. In particular, experimental group participants were recruited from a single aged-care facility and this permitted greater control over the nature of the intervention. For instance, sociability was strongly encouraged in the experimental group by having the participants share through playing games, working together on MSWord, and sharing the results of Internet searches. E-mail addresses were also set up for the experimental group participants who were encouraged to e-mail family and friends. In contrast, the extent to which sociability was encouraged for comparison group participants is less certain and may have varied between the aged care facilities from which participants were recruited.

Another possible explanation for the decreased sociability experienced by the comparison group may involve their becoming overly occupied by the computer activities at the expense of sharing their experiences with others. This is consistent with
an alternative, and more pessimistic, view of computer use provided by Kraut et al., (1998), who suggests that computer use can reduce sociability when people become involved with their computers to the detriment of potential social interaction with family and friends. However, the finding that no trend towards reduced sociability was observed for the experimental group suggests that this may be a potential risk when IT programs are not specifically designed to facilitate and encourage social interaction.

In summary, group comparisons indicated that the program facilitating access to computers appeared to have a positive effect on the experimental group, as measured by indices of QOL and variables reflecting autonomy, self-efficacy, and relatedness. The control group, in contrast showed deterioration in their quality of life as operationalised by the same measures. The effect of the program on the comparison group, which also received a computer intervention, was somewhat different from the experimental group. The comparison group showed a non-significant improvement in ILOC and self-efficacy and a non-significant decline in sociability during the intervention from baseline to posttest.

7.4 Testing the Theory of Quality Ageing

The previous section summarised the repeated measure analyses that were conducted to test for change in the variables reflecting QOL, competency, autonomy and relatedness, across the three study groups. These analyses indicated that the intervention program led to increases in both the QOL and the SDT outcomes over time. To further support these findings, and explicitly test the proposed theory of quality ageing, a Structural Equation Modelling (SEM) analysis of direct and indirect effects was also conducted. This section reviews these findings.
Program Effects on Quality of Life (QOL)

The primary aim of this research was to examine whether QOL was enhanced through participating in activities that were meaningful, creative, offered choice, and were socially interactive. The current theory predicted an indirect effect of the program on QOL. More specifically, it was hypothesised that the program would enhance QOL through its effects on participants’ experiences of autonomy, competency, and relatedness. This hypothesis received mixed support. Consistent with the hypothesis, results showed that the program did not have a direct effect on either psychological functioning or well-being, although there was a small effect on mood states. Rather, the program had significant direct effects on self-efficacy, ILOC, and sociability measured at post-test. Furthermore, self-efficacy and sociability (at post-test) both had significant direct effects on well-being measured concurrently. As such, consistent with the hypothesis, results showed that the program had indirect effects on well-being through relationships with self-efficacy and sociability. Contrary to the hypotheses, ILOC did not have a significant effect on well-being, psychological functioning, or mood states, whilst sociability had no significant effects on psychological functioning or mood states. As such, there was only limited evidence of effects of the program on psychological functioning and POMS (indices of QOL) through these variables. Each of these findings as they relate to the proposed model of Quality Ageing will now be discussed in greater detail.

As hypothesised, the program produced enhanced self-efficacy, which resulted in improvements in aspects of QOL for the older adults who undertook the program. In particular, the program was found to have an indirect effect on well-being and psychological functioning through improved self-efficacy. This result is consistent with the findings of Mayhorn, Stroge, McLaughlin and Rogers (2004), and McConatha, McConatha, Deaner and Dermigy (1995). These two studies found that where older
adults felt a sense of competency (that is, self-efficacy) in an activity, not only did they persevere with that activity, but also experienced improved well-being. As such, this result supports the theory of quality ageing and indicates that an activity that leads to an increase in self-efficacy may indirectly improve older adults’ QOL (Bandura, 1997; Dowd, 1975; Giarrusso & Bengston, 1996; Moen et al., 2000; Steinkamp & Kelly, 1987; Thoits, 1991).

Based on the proposed theory of quality ageing, it was also hypothesised that the program would enhance the sociability of the participants and this would indirectly predict improvements in QOL. Results showed that the program significantly predicted improvements in sociability, which further predicted increases in well-being. Again, no significant pathway between sociability and psychological functioning was observed. These findings support components of the theory of quality ageing, and was consistent with studies by Cacioppio (2000), Fisher and Specht (1999), McClure (1999) and Weiss (1987), who found that relatedness or sociability may alleviate feelings of depression, loneliness and anxiety, while also promoting positive feelings of happiness, joviality and belonging. However, the finding of a non-significant relationship between sociability and psychological functioning was unexpected, and may suggest that sociability has less influence in predicting specific QOL outcomes than does self-efficacy.

In contrast to the hypotheses, ILOC did not significantly predict any of the QOL outcome variables. Given the range of studies documenting relationships between ILOC and QOL (for example, Bates & Rankin-Hill, 1994; Perrig-Chiello et al, 1999; Taylor, 1990), this was unexpected. There are two likely explanations for this unexpected finding. The first is that ILOC (and autonomy) is a less powerful factor influencing QOL outcomes than either self-efficacy or sociability in older adult groups. However,
the more plausible explanation is that difficulties in measuring the study constructs led to the null finding. For instance, previous research has, at times, found that the ILOC scale demonstrates less than adequate reliability (see Section 5.2.3), which suggests that estimates of ILOC using this measure may be confounded by problematic levels of measurement error. Much of the data supporting the reliability of the ILOC scale has not studied older adult populations and, in consequence, the reliability of this scale when used with older adults remains unknown. Furthermore, the fact that sociability (as well as ILOC) did not significantly predict psychological functioning also raises the possibility that some of the outcome measures of QOL chosen in the current study were, perhaps, reflecting less important components of QOL as experienced by older adults. However, these interpretations remain tentative.

Collectively, these findings lend support to aspects of the proposed theory of quality ageing (Deci & Ryan, 2000). In particular, it was found that engaging in the computer training program predicted increases in self-efficacy and sociability which, in the current study, were used to reflect the psychological needs of competency and relatedness. Consistent with the proposed model, fulfilling these needs predicted increases in well-being.

**Summary**

Overall, the results discussed in the previous two sections provide general support for the proposed theory of quality ageing. In particular, results suggested improved QOL (predominantly well-being) as a result of the intervention which facilitated access to computers for older adults in the experimental group. More specifically, the experimental groups’ well-being and psychological functioning showed significant improvement during the intervention period which was maintained during the six month follow up period. In contrast, the control group showed decreases in well-
being, psychological functioning, and sociability, whilst the comparison group showed improvement in psychological functioning, deterioration in sociability, and no change in well-being. The SEM analyses supported these findings and indicated that the program had indirect effects on well-being through improved self-efficacy and sociability.

7.5 Relationship of Self-determination Theory and Theories of Ageing with the Theory of Quality Ageing

The previous section summarises the results and discusses links with the proposed theory of quality ageing. The aim of this next section is to relate these findings to more general theoretical models of ageing. In particular, the proposed theory of quality ageing made predictions about the outcomes of an activity that could satisfy needs of autonomy, competency, and sociability. These predictions were based on previous theoretical models, including SDT (Deci & Ryan, 1985, 1991) and more general theories of ageing. The current findings, as they relate to these theories, will now be discussed.

Self-determination Theory

Self-determination Theory (SDT; Deci & Ryan, 2000) proposes that satisfying psychological needs for competency, autonomy and relatedness can enhance QOL and are “essential for ongoing psychological growth, integrity and well-being” (p. 229). Such needs may be satisfied by involvement in an activity that is salient to a person. Furthermore, when an activity fulfils these needs, there is “needs satisfaction”, which promotes enjoyment and perseverance with the activity.

Overall, the current results supported the proposed theory of quality ageing and, subsequently, lent support to Deci and Ryan’s (2000) SDT. In particular, the current finding that the experimental group showed improvement self-efficacy, ILOC, and
sociability over the course of the intervention indicated the operation of “needs satisfaction”. Furthermore, the overall QOL of the experimental group showed significant improvement over time, as reflected by increased well-being and psychological functioning. As such, the findings support the notion that engaging in an activity can satisfy psychological needs and improve QOL.

The current results and proposed theory of quality ageing supported SDT in its major premise that satisfying certain psychological needs would lead to improvements in some aspects of QOL. Specific support for SDT from the current findings took several forms. First, the experimental group that partook in the intervention showed improved competency, sociability, and autonomy and, subsequently, also experienced improved QOL. Secondly, the comparison group that received the alternate intervention experienced improved competency and ILOC, but not relatedness. That is, the comparison group experienced improvement in only two of the three psychological needs. Furthermore, whilst the comparison group reported improvements in psychological functioning, they demonstrated no such improvements in well-being. Thirdly, the SEM analysis indicated that the improvement in QOL demonstrated by the experimental group was partly achieved through gains in self-efficacy and sociability. As such, improved outcomes relating to self-efficacy and sociability led, in part, to improved QOL, as predicted by SDT.

Some aspects of the results were found to be inconsistent with SDT. In particular, autonomy (that is, ILOC) was not found to significantly predict any indices of QOL. As discussed earlier, the most plausible explanation for this finding is one relating to measurement difficulties. However, an alternative possibility is that for populations of older adults, psychological needs for autonomy are relatively less important for maintaining QOL than are needs for either competency or sociability.
More specifically, a loss of roles, relationships, and feelings of competency associated with ageing, retirement, and physical decline, may make issues relating to sociability and competency particularly salient to older adults. In consequence, for older adults, psychological needs for sociability and competency may be particularly important and influential for QOL outcomes, and relatively more influential than specific needs for autonomy.

**Disengagement Theory**

Disengagement Theory contends that with ageing, older adults “willingly” take on an identity characterised by negative passivity and social withdrawal as they strive to escape the stress resulting from their diminished sense of competency. Consequently, they prepare for death through a gradual withdrawal from involvement with others and society (Baum & Baum, 1980). The current findings were found to be largely inconsistent with these predictions. In particular, Disengagement Theory proposes that with age, there will be a deliberate severing of relational ties from persons and things in preparation for death. In contrast, the current study supported the notion that when given the opportunity, older adults not only maintained their social contacts, but, where possible, strengthened these relationships. Additional evidence rejecting the notion of passive disengagement with age comes from previous studies by Maddox and Campbell (1985) and Kasser and Ryan (1999). Both of these investigations found that while older adults demonstrated a superficial form of disengagement, this reflected an active choice for a small number of quality relationships rather than a large number of more superficial relationships. The findings presented in this thesis suggested that Disengagement Theory has limited usefulness in attempts to understand the ageing process within groups of older adults.
**Abandonment Theory**

Abandonment Theory (Burgess, 1960) also emphasises older adults’ withdrawal from society, but contends that this withdrawal reflects the elderly being abandoned by a society which has few uses for their services. However, more contemporary perspectives (for example, Hoffman, 2005; Russell, 2005) criticise Abandonment Theory, and argue against stereotyping older adults as useless and obsolete. The current findings were consistent with the criticisms of Hoffman and Russel, and indicated that older adults have the potential to be enthusiastic about undertaking new and challenging activities. In particular, the older adults in this study were shown to be very capable of learning how to use information technology.

The current findings are inconsistent with Abandonment Theory and indicate that older adults’ abandonment and withdrawal from society is not an inevitable outcome of the ageing process. Rather, the evident improvements in competency and relatedness demonstrated by the experimental group highlights that any sense of abandonment by older adults can be overcome through activities that fulfil psychological needs for competency, autonomy and relatedness.

**Activity Theory**

In contrast to the pessimistic views presented by both Disengagement Theory and Abandonment Theory, Activity Theory suggests that adults can experience positive outcomes from ageing by staying active, resisting declines in social contacts, and finding substitute roles and identities lost through retirement and ageing (Neurgarten et al., 1961). The current study’s findings strongly support Activity Theory and highlight the value of such activity for older adults.

The current findings indicated that older adults who were given the opportunity to engage with an IT activity did so eagerly, and demonstrated subsequent longitudinal
improvements across a range of outcomes. The finding of positive outcomes for older adults from engaging in activity is consistent with Activity Theory and supported by a range of studies. Mancini and Orthner (1990), for example, conducted a study on residential care facilities, and found positive relationships between activity levels and well-being. Russell (2005) conducted a qualitative investigation on older adults and illustrated how activity, and especially information technology use, was beneficial to QOL. Noice (2004) also found that where an activity was cognitively challenging and interesting, there was significant improvement in older adults’ QOL.

As discussed in earlier chapters, a limitation of previous research on Activity Theory, including the studies cited above, is that none have attempted to identify the specific qualities of activities that make them potentially beneficial to QOL. Extending from this previous research, the current study drew on SDT to suggest that activities that satisfy psychological needs for competency, autonomy and relatedness will bring about benefits to well-being. The current results provided partial support for this hypothesis and found that older adults experienced improved QOL through the effects of increased competency and sociability. As such, the current study provides a useful extension of Activity Theory in older adult populations.

In summary, the theory of quality ageing theory proposed by the current study builds on the basic tenet of Activity Theory that participation in activity can be beneficial to older adults’ QOL. The current theory refines this and proposes that for the activity to be significantly beneficial to the QOL of older adults, it needs to possess qualities that promote competency, autonomy and relatedness.

*Lifespan Development and Ageing Theory*

Lifespan Development and Ageing Theory provides another positive perspective on the ageing process, and suggests that “successful” ageing can be achieved if older
adults are allowed to *optimise* (that is, focus on) their capabilities, and make allowances for what they are not able to do (i.e., *compensation*). The current study is consistent with Lifespan Development and Ageing Theory. In particular, it appeared that as older adults learned to use the computers and the Internet, they increasingly focussed on these new capabilities (optimisation). Furthermore, these new abilities were ones that provided participants with the discretion to compensate (for example, spend more time completing tasks) when they experienced difficulties. A similar study by Czaja and Sharit (1993) tested the computer performance of women aged 25-70, and also found that the participants focussed on what they were capable of and compensated for limited abilities by taking a longer time to complete the tasks. The enhancement of the competency of the experimental group in the current study is a further indication that the group felt a sense of achievement in their skill base.

*Socioemotional Selectivity Theory*

Socioemotional Selectivity Theory (Carstensen, 1995) contended that older adults have preferences for quality (rather than quantity) relationships and become more selective in the types of relationships they share. As such, Carstensen (1995) refutes Disengagement Theory and proposes that people do not passively disengage from people and things (that is, passive withdrawal), but rather, focus their efforts on a limited number of quality social ties. In the current study, the level of sociability reported by the experimental group improved significantly during the intervention. As such, these older adults were not seen to disengage, but rather, chose to maintain contact with select family and friends. The current study was consistent with previous work by Kasser and Ryan (1999), and thus lent support for Socioemotional Selectivity Theory. Kasser and Ryan conducted their research in a residential care facility and found that older adults had a preference for quality in, rather than quantity of, social interactions.
A Theory of Quality Ageing: An Integrated Perspective

As discussed above, the current findings were largely consistent with a number of existing theoretical models, including SDT, Activity Theory (Neugarten et al., 1961), Lifespan Development and Ageing Theory (Baltes, 1987), and Socioemotional Selectivity Theory (Cartensen, 1995). However, as noted in Chapter 2, these theoretical frameworks generally offer different perspectives on the ageing process. Furthermore, each individual theory leaves certain issues unaddressed. One aim of the current study was to inform a more integrated theoretical perspective on the process of successful ageing and, simultaneously, address some of these seemingly neglected issues. A theory of quality ageing was presented in this study in order to provide this integrated perspective.

The theory of quality ageing predicted that if given suitable opportunity, older adults could engage in a new and unfamiliar activity, such as engaging with computers and the Internet. The current results supported this prediction. Activity Theory (Neugarten et al., 1961) also proposes that older adults can engage with activities, both physical and psychological, and that these can be beneficial to the people who undertake them. However, research has shown that the amount of activity is not uniformly and positively associated with life satisfaction (Everard, 1999), and only certain types of activities may be beneficial to older adults. Despite this, Activity Theory offers few indications about what characteristics of activities typically benefit to well-being. The theory of quality ageing draws from previous work on SDT and proposes that any activity fulfilling psychological needs for competency, autonomy, and relatedness could enhance QOL.

In order to satisfy psychological needs for competency, autonomy and relatedness, the theory of quality ageing suggested that specific qualities would need to be present in any given activity. In particular, the activity should: (a) be creative; (b) be
challenging; (c) be meaningful; (d) be enjoyable; (e) offer freedom of choice; (f) promote social interaction; and (g) maintain independence. One activity that can be designed to include many of these qualities is information technology use. Therefore, IT was selected to test the theory of quality ageing. More specifically, computer illiterate older adults were given access to computers and the Internet, and trained in their use.

Consistent with the theory of quality ageing, it was found that older adults do not necessarily disengage from society if given a suitable alternative. Instead, the older adults in this study were seen to become involved in activities that facilitated their feeling competent, having freedom of choice, and promoting social interaction. The current study also found that engaging with the IT program had beneficial effects on the well-being of participants, and that these increases were larger than any changes observed for participants who did not take part in the program. In addition, part of the increase in well-being demonstrated by the experimental group was indirect through the operation of sociability and self-efficacy. This finding suggests that older adults are indeed capable of engaging with a new activity such as IT use, and they may experience benefits from engaging in such an activity.

Summary

The results from this study testing the proposed theory of quality ageing indicate that activity can be beneficial to older adults if it has qualities promoting a sense of creativity, choice, enjoyment, meaningfulness and social interaction. These qualities were expected to satisfy psychological needs for autonomy, competence and relatedness. The current results showed improvement in self-efficacy and sociability for the group that undertook the intervention. The major premise of SDT (Deci & Ryan, 1985) is that well-being is enhanced though the fulfilment of the psychological needs for competency, autonomy and relatedness. This proposal was also supported in the
current study. In particular, results showed that the well-being and psychological functioning of the experimental group participants was improved during the intervention, and this improvement was, in part, a function of parallel changes in self-efficacy and sociability.

Although not directly addressed in the current study, one potential benefit of engaging in an activity is the possible development of a new role and an identity (Stryker & Burke, 2000). This possibility is consistent with the theory of quality ageing, although it has not been directly addressed in the existing research or theory. However, further discussion is warranted and provided here to facilitate future research on the topic.

7.6 Development of a Role and Identity

Roles are defined as structured positions within a social framework (Oeser & Harary, 1964), and may develop from, amongst other things, group membership (Tajfel, 1981). Role theory proposes that both personal environment and social context influence role development. For example, as older adults progress from an active work life to retirement, there is a loss of roles and identities (such as worker). Furthermore, during retirement, older adults must cope with additional role and identity changes, including those associated with relocation to a retirement village and, potentially, the loss of a partner or physical immobility (Russell, 2005). As such, loss of roles and change to roles are a normal part of the ageing process (Dowd, 1975).

Closely linked with Role Theory is Identity Theory (Stryker & Burke, 2000). Identity Theory views people as subscribing to a number of potentially distinct identities. Thoits (1991) argues that these identities fall in a hierarchy of “salience”, or the “readiness to act out an identity as a consequence of the identity’s properties as a
cognitive structure” (Stryker & Serpe, 1994, p.17). More simply put, some identities are more important to self-concept than are others, and identities which fall higher in the hierarchy provide greater meaning and behavioural guidance than identities that are less salient (Burke, 1991). The more meaning that is derived from a specific identity, the greater the behavioural guidance and tendency to enact behaviours that are associated with that identity.

A role is the external manifestation of an identity, which reflects internally stored information and meanings that help to interpret life experiences (Stryker & Burke, 2000). Role theory defines successful ageing as the ability to enact social roles and behaviours appropriate for a new stage of development (Kutner, 1962). As it relates to the ageing process, issues concerning “identity” are expressed by Wilde (1966), who stated that the tragedy of ageing was not because a person is old; but rather, the fact that one is young. One interpretation of this is that people often take the identity they developed during youth into their old age. However, this causes conflict when applied at the beginning of old age, because older adults are no longer capable of the same actions (and enacting roles) they were capable of when they were younger (e.g., due to physical frailty). In effect, the maintenance of this identity becomes increasingly difficult.

Although losing a previous identity can be threatening, it stands to reason that developing new identities and roles in old age can lead to improved outcomes (Deci & Ryan, 2000). For instance, a new role may partially fulfil psychological needs for competency, autonomy and relatedness, as proposed by Self-determination Theory (Deci & Ryan, 1985, 1991). As such, whilst old age may involve losing some identities (e.g., from mid-life), it can also provide an opportunity to develop new and fulfilling identities which may benefit QOL outcomes.
Identity Theory proposes that where older adults experience a sense of autonomy in a situation or activity, they may develop an identity and role associated with the activity (Stryker & Burke, 2000). In the current study, it is argued that in learning to use computers, the experimental group participants developed a role and identity as a “student”. This role and identity is proposed as a potential substitute for other roles and identities that the participants had lost during the ageing and retirement process. Dowd (1975) also described how participating in education programs may help older adults develop a “student” identity. Importantly, Dowd (1975) distinguished between the student identity of a younger person (defined in terms of future career ambitions) and that of older adults, who identify as a student without reference to career ambitions. Instead, older adults are likely to participate because of personal ambition and enjoyment.

Bandura (1997) suggests that role and identity development may be measured through a person’s self-efficacy. More specifically, elevated self-efficacy during a specific activity may indicate that a role and/or an identity has been developed relating to that activity. Gist and Mitchell (1992) also argued that the improvements in self-efficacy within an activity could indicate the development of a role and identity. Existing research has shown that improvement in older adults’ self-efficacy resulting from engaging in new activities can enhance their QOL (Dowd, 1975; Moen, Erikson, & Dempster-McLain, 2000; Russell, 2005). Consistent with this previous work, the current findings indicated that the self-efficacy of the experimental group that undertook the intervention was significantly enhanced. These results are consistent with the possibility that participants may have developed a salient role and identity within the activity.
The development of a new role and/or identity was also supported anecdotally by participants in the experimental group. These participants made a number of comments, including: “I felt I was a student again”; “I enjoyed being in a positive learning mode;” “the experience made me feel so much younger and more purposeful in life”. These comments alluded to the positive influences that the learning experience with computers and accessing the Internet had on the participants. They were also indicative of the improved self-efficacy and the role/identity development process.

7.7 Additional Analyses

In addition to testing the theory of quality ageing, the current study provided other data that is potentially relevant to future studies using older adults and IT. In particular, issues relating to older adults’ attitudes towards computers and the efficacy of the training manual (used in the current study) may be important variables that will have implications for future studies using IT with older adult populations. The purpose of this section is to provide a brief preliminary discussion of relevant findings in order to inform and guide these future studies.

**Attitudes towards Computers**

It is widely believed that positive attitudes towards new technologies are important factors in facilitating older adults learning and engagement with IT (Dupagne & Krendly, 1992; Francis-Pelton et al., 1996; WHO, 2002). However, the attitudes of older adults towards using information technology have not been fully explored (Compeau & Higgins, 1991). In preliminary efforts to address this lack of research, a measure of attitudes towards computers was included in the current study to examine the effect of the intervention program. It was hypothesised that with increased
experience using computers, participants’ attitudes towards computers would be improved. As such, attitudes were expected to improve for both the experimental and comparison groups, whilst the control group was expected to demonstrate no significant change.

Consistent with the hypotheses, results showed that the experimental group demonstrated significant improvement in their attitudes towards computers over time. Attitudes were seen to improve throughout the program and, in turn, predicted improvements in well-being and psychological functioning. The finding of improved attitudes towards computers suggests a developing appreciation for the potential usefulness of computers and how they can benefit daily life. In particular, it seems that the experimental group’s computer use allowed them to recognise the potentially helpful functions of IT, such as e-mail and the Internet. Anecdotally, some participants described how they preferred to send e-mails (over using the telephone) for two reasons. The first was cost effectiveness, especially where the calls were long distance or overseas. The second was that if no one was at home to answer the phone, they would find the e-mail waiting when they returned.

Contrary to the hypotheses, the comparison group (who also used computers) showed no significant change in their attitudes towards computers during the intervention period. This would seem to suggest that it was not computer use in isolation that led to improved attitudes towards computers, but rather, something specific to the training program that was used with the experimental group. However, it is also possible that methodological limitations within the current study rendered invalid group comparisons on attitudes towards computers. For instance, as described earlier (see Chapter 5.3.5), the comparison group received various types of training depending on their residential facility location. Each location used a base training method
developed by a Victorian state government agency promoting the use of computers in communities (that is, VicNet), but acted independently within this framework. It is possible that variability between computer training programs and care facilities was responsible for the failure of the comparison group to demonstrate significant improvement in attitudes towards computers. As expected, however, the control group also showed no significant change in their attitudes towards computers during the study. This is presumably explained by the fact that the control group had no exposure at all to computers or the Internet.

Previous studies have found that positive attitudes towards computers predict perseverance with an activity and improved quality of life (Compeau & Higgins, 1991; Furlong & Kearsley, 1986; Gilly & Zeithamel, 1985; Mayhorn et al., 2004; Francis-Pelton et al., 1996). This study supports previous research and found that the experimental group which received the intervention showed significant improvement in their attitudes towards computers and QOL. Although this assumption was not tested, the researcher’s observations during the intervention were consistent with the notion of increased perseverance with computers as a result of the intervention. However, this possibility is speculative and remains to be tested.

Training Program and Researcher-designed Manual

A review of the literature (see Chapter 4) addressing the development of a computer manual for older persons provided a number of recommendations for the training program and manual design in the current study. For instance, the recommendations for a manual were that it should:

1. Be small and easy to manage;
2. Contain language that is understandable and in everyday English without jargon;
3. Use clear and readable typeface;
4. Use large font size;
5. Use pictorial representations of equipment and directions (but use these sparingly);
6. Be cautious in the use of colour.

The manual that was used in the current study is shown in Appendix A. Anecdotally, the experimental group participants stated that they found the manual “very useful”, “easy to read” and “a great help”. In relation to the training program, Mayhorn et al., (2002) list recommendations for training older adults in the use of computers, and many of these were utilised in the current research. Furthermore, Jones and Bayen (1998) suggest that older adults need understanding and encouragement when learning computers, and should not be rushed. Being pushed too much and pressured when learning information technology courses may be threatening to older adults who might develop a negative attitude towards the course (James et al, 1995). Instead, the recommendations are that a leisurely, relaxed pace be encouraged. This was observed during the intervention and participants in the experimental group were continually encouraged to go at their own pace and enjoy the learning process.

Czaja and Sharit (1993) state that it is important to emphasise to older adult participants that they cannot break the computer through normal use. Studies such as Danowski and Sacks (1980), Zandri and Charness (1989), Charness et al., (1992) and Czaja and Sharit (1993), suggest useful ideas for instructing older adults and helping them acquire computer skills. White and McConnell (1999), for instance, support the use of clearly stated and easy-to-read instruction cards. Czaja, Hammond and Joyce (1989) found that it was important to break up the computer training program into small modules with specific goals.
In the current study, the recommendations described above were followed as much as possible. Efforts were made to make the program goal oriented, self paced, flexible, interesting and enjoyable. The program also facilitated the provision of positive feedback as encouragement. The current study found improvement over time in levels of self-efficacy demonstrated by the experimental group, and illustrates the value of these recommendations for future intervention programs. The efficacy of the training program (see Chapter 4) was also illustrated by the experimental groups’ observed improvements in autonomy, competency and attitudes towards computers. As such, the current study provides a training program and instruction manual that may be extremely useful for both future research studies and training programs for older adults in IT use.

7.8 Practical Applications of the Study of Quality Ageing

With advances in medical science, people are now living longer (ABS, 1998a). Finch (1997) suggests that adults could live to 120 in the foreseeable future. Many adults are driving cars in their eighties and leading very active lives. In contrast, a decade ago society viewed an eighty-year-old person as close to the end of his or her life (ABS 1998a). In its active ageing policy, the WHO (2002) stressed the need to avoid stereotyping older adults. In similar fashion, this current study showed that older adults have the ability and motivation to undertake challenging activities using information technology. This, in turn, was found to have beneficial affects on their QOL. As the WHO (2002) emphasises, the challenge of achieving quality ageing is not only for older adults, but also for society as a whole. This section describes in greater depth some of the practical applications that may result from the current findings.

One main application of these research findings relates to their potential role in informing future official policies for improving QOL within older adult populations.
More specifically, the current results suggest that given appropriate training programs and learning aids (for example, computer manual), older adults are capable of engaging with new technologies. Furthermore, implementing such an IT intervention and helping older adults to engage with new technologies can be a strategy for improving older adults QOL.

A major advantage of using IT (over many alternative activities) when planning interventions for older adults is that such technologies can overcome access barriers imposed by geographical isolation and physical disability. In particular, computer access can be made available irrespective of an older adult being house-bound, confined to a wheelchair, or in residential care. Furthermore, IT can then be used to satisfy psychological needs for freedom of choice and sense of autonomy and allow social interaction with their family and friends.

Another added benefit of adapting IT for interventions with older adults is that these may also stimulate participants’ cognitive abilities and creativity. For instance, activities involving information technology can be specifically designed to promote creativity and intellectual challenge. Cohen (1999) stated that such activities can maintain cognitive ability, but may also regenerate, in part, ability that has been previously lost. The mental and physical health benefits would be substantial to the individual older adult, but might also bring about significant financial savings for society generally.

The results from this study also illustrate some of the needs experienced by older adults in residential care. In particular, the enthusiasm with which the experimental group engaged with the intervention suggests that groups of older adults may typically lack sufficient access to activities that are stimulating and satisfy their
psychological needs. Policy planners that have a role in designing and implementing interventions for older populations should be mindful of the following issues:

1. Activities that are creative and challenging can enhance the quality of life of older adults;

2. Promoting a strong sense of autonomy and freedom of choice is of prime importance when planning interventions. Participants should be involved in discussions and decision-making processes about such activities;

3. Interventions should capitalise on the older adults’ strengths and compensate for their weaknesses. It is of prime importance to build feelings of competence, autonomy, and social interaction, and minimise negative experiences from engaging with these programs.

To ensure that older adults achieve full benefits from intervention programs, it is necessary to ensure that activities successfully address the points listed above.

7.9 Additional Evidence: Journal Extracts from the Experimental Group about the Intervention

This section contains excerpts from the private journals which experimental group participants kept during the intervention. This procedure was not discussed in Chapter 5 because the data collection process was not systematic. However, these data provide more detailed insight into what was “happening” within the experimental group during the intervention. The participants individually gave permission for the researcher to read and report on these journals. While these data were not collected in any systematic way, it may provide additional understanding of the effects of the intervention as it outlines the applications, preferences and choices that participants in
the experimental group made when using the computers. However, any conclusions
drawn in this section should be considered highly tentative and requiring confirmatory
research.

The introductory modules of the computer manual provided an explanation of
the purpose and function of various parts of the computer hardware. These included
directions concerning how to turn the computer on/off and how to use the mouse. As the
participants gained a better understanding of these functions, they became more relaxed
in the use of the mouse by initially using it to play various games, especially card
games. A further point of interest was that while there were touch screens at some of the
facilities, most participants preferred not to use these. Instead, they wanted to prove
their ability to use the mouse.

Use of Games

Most participants played some form of card games when they used the
computers. They described how this relieved tedium and relaxed them. For example,
one participant stated that after accessing his email and searching for information on the
Internet, he would spend some of his computer time relaxing by playing various card
games. At some of the facilities, participants played different forms of solitaire for
several hours a day. The participants were also keen to share their successes when they
scored a win against the computer in one of the games. This may have enhanced their
personal self-esteem and their feeling of achievement.

The use of the games by participants who suffered dementia was noteworthy.
While these participants did not recognise the researcher from week to week, they were
able to recognise the card game “solitaire” when it appeared on the screen. These
participants were then able to indicate which cards needed to be moved and to where.
They were keen to play independently and showed delight when completing and/or
winning a game. To test the reactions of these participants, the researcher intentionally made several mistakes in moving cards and on all occasions the participants quickly corrected him. It is not within the scope of this study to draw conclusions from this observation, but it could be the subject of further research.

Most of the participants found using the mouse required a major effort. However, all showed determination to use it, even to the extent of using two hands to hold it. Some participants took considerable time to move a card to its correct place and showed satisfaction at this achievement. Most participants indicated that they preferred to try to move the mouse by themselves rather than be assisted. This simple event appeared to be a significant moment for disabled participants and could be responsible for observed changes in their sense of competency and self-esteem.

For some participants, the importance attributed to the games was paramount. This appeared to be because the games gave them a sense of achievement and enjoyment. As described earlier, one of the key components for an activity to be beneficial is that it facilitates a sense of achievement and enjoyment. One example of this was a participant who seldom ventured out of his room. He had both legs amputated due to diabetes and was restricted to a wheelchair. However, the motivation to play solitaire or other games on the computer resulted in him coming regularly for an afternoon computer session and also using the computer room at free times. In addition, he started to learn how to use the computer to send e-mails to his family in the United Kingdom. For other participants, further progress in the use of computers was limited due to their disabilities, whilst others did not wish to progress further as they found sufficient enjoyment from using the computer to play games. This was assessed as being a successful outcome for these participants.
The Internet

When accessing the Internet, participants were given freedom of choice in using a search engine for various purposes, sending e-mails to family and friends, and in using chat rooms. The value of the search engine was apparently recognised by the participants once it had been properly explained. However, some participants felt initially overwhelmed by the amount of information available and were unsure how to phrase their search in order to limit it. The favourite sites of the participants included local and international news, the weather, recipes, flowers, motor vehicles, travel and maps.

While participants were able to read the information from the Internet on the monitor, some preferred to save it to a file for future reference, while others wished to print a hard copy. The main reason given for requesting the hard copy was the fear of losing the information. Some participants became very adept at using the printer.

E-mail accounts for interested participants were set up under “hotmail.com”. This was the preferred method as it allowed the participants to retain their privacy. Furthermore, they were able to access their e-mails when they were outside the facility. Many participants described the use of e-mails as the most beneficial aspect of using the Internet and learning to use computers. They felt that it helped to overcome their social and geographical isolation as they were able to e-mail their family and friends throughout the world. Some participants received photographs of their family as an attachment and these were shared with their fellow residents at the facility. However, with the establishment of regular contacts with family, some emotional problems resulting from internal family problems were observed.

Most participants attempted to use MS Word. Some used it to write letters to their family and friends, write poetry or other creative pieces, or for business reasons and/or to write up minutes of residents’ committee meetings. The various format
options were shown to participants and the use of borders and pictures became very popular. Several participants designed their own greeting cards. Pride in personal efforts and an achievement was noticeable and, as other studies have indicated (Russell, 2005; Moen, Erikson & Dempster-McLain, 2000), this may contribute to heightened self-efficacy. In two of the facilities, a mentor system was encouraged. Participants with some skill in MS Word would help other participants who needed help in some areas, especially when there was no assistance available from staff.

**Touch Typing**

Another option given to participants was to learn touch-typing. To facilitate this, two software packages were installed on all the computers at all the facilities. The first was the basic touch-typing package “Typequick”. This program has minimal graphics, is self-paced and easy to follow. The second software package was called “Mavis Beacon”, which is a more sophisticated package and used graphics extensively. It concentrates on one hand only until the user develops a good degree of competency, after which it allows the user to move onto the other hand. This feature was found to be too restrictive for some participants. While many of the participants found the graphics entertaining, some also found them confusing and preferred the more simplified approach of “Typequick”. This supported the recommendations of Mayhorn et al., (2002) who argue that graphics should be simple and not overdone.

**Keyboard**

Due to financial constraints, it was only possible to have standard keyboards at all facilities. However, for many of the participants it would have been preferable to have a keyboard with large keys for ease of reading and ease of touch, due to disabilities such as arthritis.
7.10 Limitations of the Study

There were several limitations to the current study which may have had impacts on the findings. As such, any conclusions drawn from the study must be interpreted in light of these limitations and their potential implications.

First, the current study was restricted by a relatively small sample. Although the sample size was as large as could be reasonably expected given the context of residential care facilities in rural Victoria, sampling error may have impacted on the findings and may restrict generalisation to larger groups of older adults. It is clearly necessary that future research replicates these findings with larger samples and different populations.

Second, the allocation of participants between groups (that is, experimental, control) was not random. Given the lack of randomisation, the current study was restricted to a quasi-experimental design. This means that conclusions about causality are limited. In particular, although conclusions about causality were strengthened by the use of a longitudinal methodology, non-experimental designs are unable to completely rule out the presence of problematic “third variables” potentially accounting for observed relationships. However, a quasi-experimental design was a necessary restriction in the current context. One potential problem in conducting an experimental study within residential facilities would be jealousy among residents if some were seen to receive exposure to a program whilst others did not. As such, it would have been impractical to obtain cooperation from residential facilities and staff using a randomised experimental design.

Third, it was not possible in the current study to monitor the training programs given to the comparison group participants. As such, consistency of the training given to the comparison group participants across different residential care facilities could not be ensured. Such consistency was not possible for two reasons: (a) facilities were spread
widely across rural Victoria and resources were not available to travel these distances on a weekly basis; and (b) while all facilities had access to support from VicNet programs, the manner in which the staff actually interpreted this program varied depending on the computer skills of the staff members. Potential implications are that observed outcomes from the computer training demonstrated by the comparison group were likely attenuated to the extent that programs varied. In the worst case scenario, comparisons with the experimental group have little meaning.

Other limitations were concerned with certain segments of the researcher-designed computer manual and program. First, whilst the computer manual was a valuable tool, no manual could fulfil the needs of the participants given: (a) the diversity of their ages, namely 65 to 96; and (b) their range physical disabilities, which included arthritis, amputations, being wheelchair bound, and having Alzheimer’s disease. Second, although effort was made to keep the use of computer jargon to a minimum (and a glossary of terms was provided for the Internet and email modules), no glossary was provided for simpler terms such as “right click”, “cursor”, “pointer”. The need for such a glossary was clear as some participants had difficulties with their short-term memory. Third, no module was included in the manual that explained the use of the touch screen, whilst only minimal discussion was provided on the use of chat rooms. Whilst it may have been useful to have a broader explanation of touch screen and chat rooms, given the very small number of participants who expressed a desire to use these, the likely impacts on the study outcomes were most likely negligible.

Summary

The results of the current study need to be considered in light of limitations to the research design. In particular, conclusions were limited by the small sample size, lack of randomised allocation between study groups, and the inability to monitor the
experiences of the comparison group. Whilst these limitations could not be avoided in the current study, they provide guidance concerning methodological advances that could be made in future research into the use of information technology in residential care facilities.

### 7.11 Future Research

Given the increasing longevity of human life (Finch, 1997; WHO, 2002), further studies researching the quality of life as experienced by older adults are essential. Even though all societies face the inevitability of their members growing old, there is still a paucity of knowledge about the physical, psychological and emotional aspects of ageing. As discussed above, further research is needed to replicate the findings of the current study and these studies should use improved methodologies, including larger samples and experimental designs. However, there are many avenues for further research in the area of quality activities for older adults and information technology.

One potentially important area for future research is the possible benefits of stimulating older adults’ cognitive activity through the use of interactive software and information technology. In this study, participants suffering from Alzheimer’s disease and Dementia appeared to respond positively to the use of interactive games. For instance, while they did not necessarily remember the researcher, they did remember how to play the games. Cohen (1999) and others have found that older adults’ cognitive abilities can regenerate (in part) and a longitudinal intervention outcomes study would be worthwhile to validate and generalise this possibility. Such a study would benefit from studying several groups of older adults such as:

1. those showing no signs of dementia
2. those showing initial signs of dementia
3. those showing advanced symptoms of dementia.

This avenue of research may open up possible avenues of treatment for disorders such as Alzheimer’s disease.

Another area of research which was touched on by Compeau and Higgins (1995b) is the measurement of domain specific constructs for older adults such as computer self-efficacy. This research could be beneficial to companies formulating software programs for older adults and also in retraining programs more generally.

The importance of ILOC for older adults has been documented in the seminal study by Langer and Rodin (1975) and other studies such as Czaja and Lees (2003) and Bauer and Bonnanno (2001). However, the broader impact of ILOC has not been fully examined (especially those living in residential care or retirement facilities). Research of this kind could result in the improvement of the QOL of older adults, both physically and psychologically.

7.12 Conclusion

In recent times, Seligman (1998) and other prominent psychologists have called for greater emphasis in psychology on the positive aspects of human behaviour. They suggest that the history of psychological research to date has placed too much attention on the negative aspects of human behaviour, human character, and human potential. The theory of Quality Ageing concentrates on the positive potentials of human experience, the capabilities of older adults, and how they may embrace new activities.

The theory of Quality Ageing presented in the current study suggests that older adults’ quality of life may be enhanced through participation in an activity that satisfies psychological needs of autonomy, competency and relatedness. One such activity that may satisfy these needs involves facilitating access to computers and the Internet. One
merit of the model of Quality Ageing is the integration of several key theories of ageing that give an insight into successful ageing. These theories are Activity, Lifespan and Development, Socioemotional Selectivity, and Self-determination Theory. The theory of quality ageing draws its theoretical base from each of these theories.

This theory of quality ageing came from previous research in rural Victoria into quality of life issues for older adults living independently and in residential care (Kiss & De Mello, 1999). Independently living older adults were found to be healthier than those in residential care and initial investigation found that residential care older adults did not appear to have their three psychological needs of competency, autonomy, and relatedness satisfied. The “why” of this finding led to further investigation of possible causes. One of these appeared to be the activities offered to and undertaken by older adults in residential care.

The findings of this current research indicate that the types of activities offered to residents in Aged Care Facilities can dictate older adults QOL outcomes. Not only can these activities “fill in the time”, they can also bring about positive changes, physically and psychologically, in the residents of such facilities. Substantial health benefits appear to accrue from activities with qualities of creativity, meaningfulness, cognitive challenge, social interaction and freedom of choice. Hopefully providers will find in this research empirical data that can be used to justify the implementation of better activities for older residents in Aged Care Facilities. The study of how to support the use of Information Technology by older adults is still in its infancy. Interactive programs of various types could offer a new vision for activity provision.
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Appendices
APPENDIX A

Easy Steps to Learn!

Vince Kiss.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1.</td>
</tr>
<tr>
<td>Getting started</td>
<td>2.</td>
</tr>
<tr>
<td>The Mouse</td>
<td>3.</td>
</tr>
<tr>
<td>Some Basic Understanding</td>
<td>4.</td>
</tr>
<tr>
<td>Desk Top; Task Bar; Start Button; Icon</td>
<td>5.</td>
</tr>
<tr>
<td>Some Basic Understanding 2</td>
<td>6.</td>
</tr>
<tr>
<td>My Computer; A Drive; C Drive; D Drive; Control Panel; Printer</td>
<td>7.</td>
</tr>
<tr>
<td>Trying MSWord 1</td>
<td>8.</td>
</tr>
<tr>
<td>File Menu</td>
<td>9.</td>
</tr>
<tr>
<td>Trying MSWord 2.</td>
<td>10.</td>
</tr>
<tr>
<td>Edit Menu; Cut; Copy; Paste; Highlight.</td>
<td>11.</td>
</tr>
<tr>
<td>Trying MSWord 3.</td>
<td>12.</td>
</tr>
<tr>
<td>Format Menu; Font.</td>
<td>13.</td>
</tr>
<tr>
<td>Paragraph</td>
<td></td>
</tr>
<tr>
<td>Trying MSWord 5.</td>
<td></td>
</tr>
<tr>
<td>Tools Menu; Spelling and grammar.</td>
<td></td>
</tr>
<tr>
<td>Gentle Introduction to Internet</td>
<td></td>
</tr>
<tr>
<td>Steps for Internet 1.</td>
<td></td>
</tr>
<tr>
<td>Steps for Internet 2.</td>
<td></td>
</tr>
<tr>
<td>Topic</td>
<td>Page</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Electronic Mail.</td>
<td>15.</td>
</tr>
<tr>
<td>Outlook Express.</td>
<td></td>
</tr>
<tr>
<td>HotMail.</td>
<td>16.</td>
</tr>
<tr>
<td>Opening.</td>
<td></td>
</tr>
<tr>
<td>Hot Mail.</td>
<td>17.</td>
</tr>
<tr>
<td>Reading and answering</td>
<td></td>
</tr>
<tr>
<td>Chat Rom and Discussion Groups</td>
<td>18.</td>
</tr>
<tr>
<td>The How of Chat Room 1</td>
<td>19.</td>
</tr>
<tr>
<td>The How of Chat Room 2</td>
<td>20.</td>
</tr>
</tbody>
</table>

Looks can be deceiving. Given a chance I can still get up plenty of steam!
INTRODUCTION
OR
WHY?

It may be easier to say what these pages are not, rather than what they are! ☺

They are not a manual, nor even part of a manual. They are not meant to be a complete guide to the Internet or emails in any stretch of the imagination.

They are a few simple instructions gathered together in a readable style. They are endeavouring to show that learning some basics of computers can be fun. They are a stepping-stone to get you started, a bit like first gear in a car!

In anything we do it should be enjoyable for in that enjoyment our spirits can soar and grow. Each of us can draw delight from a variety of things, and sometimes the greatest delight is success in the smallest.

The hope is that you may get as much enjoyment learning from these pages as I had in writing and composing them.

Vince Kiss.
October, 2000
GETTING STARTED

Relax and enjoy yourself. Just remember you cannot break the computer unless you attack it with a hammer.

To Start:
1. Turn the **POWER ON** at the power point (**Try it!**).

2. If there is no response then push the **POWER ON** Buttons for the Computer and the Monitor (the screen).

To Turn off:
1. **LEFT CLICK** on Start on the Task Bar in the left-hand corner (**Try it!**).

2. **LEFT CLICK** on **Shut down** and wait till you see on the screen that it is okay to turn off the Computer. **Turn **POWER OFF** at power point.
THE MOUSE:

1. It is a pointing device to get you where you want to go.

2. It has a small arrow $\rightarrow$ (Mouse Pointer, also known as the cursor).

3. You move the mouse slowly and the arrow moves. (Try it).

4. When it is where you want it you click the LEFT BUTTON with the first finger. (Try it). Sometimes you may have to click ONCE, sometimes TWICE, but you will learn this as you go.

5. If you click the RIGHT BUTTON ONCE, a menu will pop up, which helps you do certain things like copying, or changing your font. (Try it).
SOME BASIC UNDERSTANDING.

**DESKTOP:** The main window that you will see when you look at the screen.

**TASK BAR:** The bar at the bottom of the window. It has the **Start Button** of the left and the **Time** on the right.

**START BUTTON:** IT all begins at the **Start Button. LEFT CLICK** on it & a menu pops up and you choose what you want (**Try It!**). The **Shut Down Button** is on the menu above the Start Button. When finished **LEFT CLICK** on it.

**ICON:** This is an image command. (**Usually click twice on it**)
My Computer.

This icon tells you all that you have on the computer.

(A:) 3½ Floppy:  This is the disk drive where you place the small disk to save or open a file.

(C:)  This is the main hard disk drive within the computer.

(D:)  This is the CD-ROM Drive.

Control Panel:  This panel will offer a variety of choices that control such things as the Date, Time & Mouse.

Printer:  This icon is the printer that is installed on the computer.

😊 Computers are meant to be fun! Who says?
Let’s learn a bit

TRYING MSWord.

1. After turning on your computer the screen have something like this

2. Place the mouse pointer on WORD & left click TWICE.

3. The page below will open. Let’s have a look at it.

VARIABLES COMMANDS WHICH HAVE A MENU ATTACHED WHEN YOU CLICK ON IT.

FILE NAME

FONT COLOUR

CURSOR POSITION.

THIS BLINKS TO SHOW YOU IT IS ACTIVE.

TRY TYPING AND SEE WHAT HAPPENS!

THE NEXT PAGE SHOWS YOU HOW SOME OF THESE WORK.

Let’s go!
TRYING MSWord 2.

THE FILE MENU.

We are going to learn about the File Menu. So LEFT CLICK ON FILE AND PRESTO!

- Open = a file you saved before.
- Close = the file you are using now.
- Save = the file you are using. It is wise to save often.
- Save as = if you want to save the file in another name or place.
- Print = the file you have typed.
- Exit = if you want to leave MSWord.

To remove the menu = left click the mouse once.

New Menu: If you left CLICK once on "NEW" then this menu will appear. This will give you a new page (or document) where you can write your letter.

You left CLICK once on “Blank document” and then on “OK”.

Fun with Computers
TRYING MSWord 3.

THE EDIT MENU.

We are going to learn about the Edit Menu.
(This will just take a little practice).

LEFT CLICK ON EDIT AND PRESTO!

At the Top by touching 
CTRL + Z you can undo what ever you do and CTRL + Y repeats it.

CUT = takes away the text you have typed and you can put it somewhere else. 
CTRL + X. But if you want to take away the text altogether then touch the “DELETE” key on the keyboard.

COPY = copies the text you have highlighted (see below) to wherever you want it. CTRL + C

PASTE = you place your cursor where you want to put the text and touch CTRL + V.

HIGHLIGHTING: Before you use any of these commands you have to highlight the text. You place your cursor at the start of the text to be copied and hold down the left side of the mouse – move the cursor along – and it looks like below on the screen.

The BLACK AREA is the highlighted text.

We COPY this =CTRL+C

MOVE the cursor to where you want to PASTE the text. CTRL + V.

Try it a few times. 😊.
TRYING MSWord 4.

THE FORMAT MENU.

We are going to have a look at the drop down menu for FORMAT.

LEFT CLICK ON FORMAT AND PRESTO!
On this page we will only be dealing with one item:

- THE FONT
There are 4 items in font:
1. The Font
2. The style
3. The size
4. The colour

There are other items on the font menu and you may like to learn these later. 😊

LEFT CLICK ON
FONT AND PRESTO!

1. The Font is type of printing. e.g. Times New Roman, Arial
   Bookman style. You left click on the side arrow to move the list up and down. You left click on the style you want (TRY IT).

2. The Style and there are choices REGULAR, BOLD, ITALIC BOLD ITALIC. You left click on the style you want (TRY IT).

3. The Size of the type: ten. Twelve. Fourteen. You left click on the style you want (TRY IT).

4. The colour. You left click on the colour you want (TRY IT).
TRYING MSWord 5.

THE FORMAT MENU.

Let’s learn about paragraph formatting.

LEFT CLICK ON PARAGRAPH AND PRESTO!

Like Font there are options. We are going to look at three.

1. Alignment. The computer is set at left alignment, i.e. the lines always start of the left of the page, and there are other options. Left Click on arrow and you will see:
   a. Centre. Text in centre of page
   b. Right. Text starts on right hand side of page
   c. Justify. If you want all the lines to be even on both sides of page.

(Type something on the page and try the four options). 😊

2. Indentation: This is simply where you want the line to start from at the edge of the page or further in. If you left click on the arrow you will see the options you can make the choice. Mostly we just leave this set at the end.

3. Line Spacing: If you left click on the arrow you will see the options. You may want the usual, which is single spacing or you may want to have a double space. To select just left click on your choice.

Line and Breaks: This is the other tab at the top. If you left click on it you will see the options for this section. You can try these and learn about them as you progress.

Hey! I am flying!!
We are going to **LEFT CLICK** on **TOOLS**. There is a LOT of options on this menu.

MSWord sets these and you may not need to change them.

**Spelling and Grammar:**

This checks the spelling and grammar of anything you type.

If you **LEFT CLICK** on Spelling and Grammar the screen below will appear.

Notice there are two screens. The **Top** screen highlights the mispelt word “spelle”. The **bottom** screen gives you options to make a correction.

On the right side of the screen are options:
- **Ignore** = no change.
- **Ignore all** = no change at all
- **Add** = add to dictionary.
- **Change** = accept suggestion. **Autocorrect** = make changes without asking.

Try typing something, do a spell check and see how it runs.
World Wide Web

So when you see www.origin.net.au this means this is the page on the Internet where
information about the firm Origin can be located.

Bulletin Board

A computer system that allows users to post messages and corresponds with other
users.

Chat Room

Like a meeting room where computer users can communicate with each other in
real time. People from all over the world can come together in a chat room to
discuss topics of mutual interest.

Domain Name

An Internet domain name is an individual's or organization's unique name, which
points to a specific Internet address. The domain name is the part of the Internet
address that usually follows the www. For example, in the Web address
http://www.aarp.org, the domain name is aarp.org.

Download

To move or copy a document, program or other data from the Internet or other
computer to your computer. The opposite of upload.

Genealogy Program

A program that helps you to trace your family tree and keep track of all historical
familial information
**HTML** (Hypertext Markup Language)

The language that is used to create graphic documents for publication on the Web. Documents that are produced with HTML are like text documents that have tags embedded in them. The tags contain coding for attaching graphics, formatting and hypertext links.

**HTTP** (Hypertext Transfer Protocol)

The protocol used by the World Wide Web that defines how messages are formatted and transmitted.

**Internet**

A global web of computers that allows individuals to communicate with each other.

**ISP** (Internet Service Provider)

A company that lets you dial into their computers in order to connect to the Internet for a fee.

**Netiquette**

Rules for maintaining etiquette while using the Internet.

**Newsgroup**

An on-line discussion group generally geared to a specific topic or group of people.

**Off-line**

Not connected and therefore unable to communicate.

**On-line**

Connected and able to communicate.

**Web Page**


**World Wide Web**

STEPS FOR THE INTERNET.1.

GOLDEN RULE. PRIVACY IS THE KEY.
PLEASE DO NOT GIVE ANYONE PERSONAL INFORMATION ABOUT YOURSELF UNLESS YOU KNOW THEM.

1. Turn the Computer ON.

2. When the desktop is displayed twice. LEFT CLICK the icon Internet Explorer

3. Be patient 😊 and the phone will dial and connect you to the Internet and the homepage will open. Below is an example of the Origin homepage.

4. TO SEARCH: Type in the words of what you want to look for (e.g. you want to know more about cedar trees...so type in the Search area "cedar trees"). Make it as definite as possible as the Internet is worldwide and you will get many options.

(Whew! I'm off!)
Okay, I have searched and got a HUGE list! (or nothing!). Now what?

AFTER SEARCH:

You can now start to look at the list to see what you have found on “cedar trees”. (If nothing then you may have to change your search words).

1. **Read** down the list until you see something that may answer your question.

2. **Left Click** on top line of the file you would like to read more. This is called “**downloading**”. You will see fuller details of that file.

**EXAMPLE.**

```
<table>
<thead>
<tr>
<th>Search Web Sites:</th>
</tr>
</thead>
<tbody>
<tr>
<td>cedar trees</td>
</tr>
</tbody>
</table>

- **American Forests' Famous & Historic Trees - Home**
  
  URL: http://www.oldtrees.org/
  Find info about and buy famous & historic trees! Check for redbud, sequoia, spruce, cedar, palmtrees, peach, bonsai, coniferous, crabapple, fir, sourwood, arborvitae and much more!

- **Cedar Pencil Pine 10 Foot - Christmas: Christmas Trees Custom - Custom...**
  
  URL: http://www.holidaytree.com/christmas/4610cpp.html
```

3. **When finished you may save this file if it is what you want or left click** on the **back** button that will take you back to your list and you may continue your search. 😊
ELECTRONIC MAIL
using Outlook Express.

E-mail: It is quick, it is easy and like writing a letter. How?
1. Type in address of person to whom you are sending e-mail, and subject of message.
2. Type in message and ending.
3. Click send...and it is gone! No stamp!
4. Message received by person instantly.

Address: E-mail address = person @place.extension.au
- Person = to whom you are sending email,
- @ = separates name from rest of address,
- Place = network person is using, then fullstop.
- Extension = com is commercial; edu is education, net is network, gov is government.
- au = located in Australia Other countries have different endings.

Checking: The in-box is where the new mail is stored.
- To open place arrow on mail, click once. After reading you can store it, delete it or reply.

- To reply place arrow on “reply to and click once. The address is there! Type your heading then message and send! It’s gone! 😊.
USING YOUR E-MAIL.
YOUR HOTMAIL.

OPENING YOUR HOTMAIL.

1. Get the HOMEPAGE of Hotmail by typing in address line:
   http://www.hotmail.com

2. Then follow three steps.....

   - **Step 1.** Type sign in name
   - **Step 2.** Type your password
   - **Step 3.** Click once or hit "Enter" key.

This will bring up your homepage & messages, which will look like this.

To read your mail left click on the “from” column. This will open the email & allow you to read it.
READING & ANSWERING HOT-MAIL.
(Mistakes are good! You will learn from them.)

If you want to return to other messages after reading left click on inbox

Who sent it? ➔

The message! ➔

To reply
Left Click on reply, and then type your response.

Reply Page

Address of message.

Message

😊 Follow directions slowly and you will learn as you try!

To send message left click "SEND".
CHAT ROOMS
AND
DISCUSSION GROUPS.

The Internet also allows you to make new friendships “online” with other people in CHAT ROOMS, or join a “DISCUSSION GROUP” of people with whom you may have an interest like gardening!

CHAT ROOM.
You type in your message and as soon as you press the Send button, everyone in the chat room can see your message. The others respond immediately by typing in their comments and pressing Send. You can read their message.

In a crowded chat room the interaction can be very fast moving, often somewhat chaotic.

ANONYMITY.
One of the attractions of chat rooms is that no one knows you.

You can be whoever you may wish to be.

This also shows that you must be careful, as the person you are chatting with may not be all they say they are!

JOINING THE CHAT.
Although there are many different kinds of chat rooms, most have the same basic components.
1. There will usually be a box where you can see peoples’ comments as they type them. This is called the conversation box. In some cases, there will be two parts to the conversation box.

2. The top part is for the host, and the bottom box is for the visitors.

3. To join in the conversation, just type what you want to say in the message field, and then click on the Send button. Your message will appear in the conversation box.

4. Fuller details on next two pages.....Enjoy it you can make a lot of new friends!

😊 Try It!
1. Open your **HOTMAIL ACCOUNT** and on the left side you will see the word **CHAT**.

2. **LEFT CLICK** your mouse pointer on it!

3. The screen will appear.

4. **CHOOSE** the chat room you wish to enter and place the mouse pointer on it and **LEFT CLICK** (example we chose Lounge)

5. **AND FIRST YOU SEE THIS!** Every chat room has this disclaimer to cover themselves legally. To enter the Chat room you have to agree to their rules. Place the mouse pointer on it and **LEFT CLICK**

―

**Over to next page.**
6. After you have clicked BE PATIENT WHILE THE CHAT ROOM DOWNLOADS (this means "opens up") (Could take a minute or so).

Then you will see these two screens.

7. When you enter the chat you have to enter a name! You can use any name you like.
   (Example...SAMBO)

8. Place the mouse pointer on JOIN CHAT & LEFT CLICK. All other directions are given in small boxes below. 😊 have fun!

Chats that other people are having

To join chat type your comment here and press enter on keyboard

To finish or exit point here and click

Names of other people in room

Life can be so wonderful with friends. 😊

It just takes practice!
How about a game of solitaire?

We are going to learn how to use the computer to play Solitaire. Can be fun and fills in time.

1. Turn the Computer ON. When the desk top is displayed click on Start.

2. Follow the steps by left clicking on the Mouse:-
   Step 1. Click on Start & presto you have the pop up menu! 😊
   Step 2. Move mouse arrow to Programs & presto! Another pop up menu!
   Step 3. Move mouse arrow to Games & presto! Another pop up menu with Solitaire.

Information technology as a tool for empowerment of older adults.
1. Left click the mouse on SOLITAIRE you will see this!

2. To move a card you place the mouse arrow on the card and move it to the place you want it to be.

3. The first thing is to sort the cards! So you move

A. Black 8 on the red 9;
B. The red 7 on the black 8;
C. The black 6 on the red 7.

Then you have this!

4. Next left click once on the pack of cards and the black 2 clubs is shown!

5. No where to place this, so left click again.

6. Remember if you have an ACE you move it to the top 4 squares.
7. I clicked on the pack and got Ace of Hearts and moved it to the vacant top square & move the 2 of Hearts on top of the Ace.
8. I also got Ace of Spades and 2 of Spades and moved the Ace first to the top square and then the 2.
9. No where for the Jack of Spades so click on the pack again.

10. This time we have the 3 of Spades & we will move this onto 2 of Spades.

And so the game goes on. It is just practice and you will get the idea.

I can be stubborn when I need to be and I will get this okay. Give me time eh!

Information technology as a tool for empowerment of older adults.
APPENDIX B

ATTITUDES TOWARDS COMPUTERS QUESTIONNAIRE

Please circle the number that agrees with how you have felt over the past week.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think that learning to use a computer is a valuable experience</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>I think that it is difficult to learn to use a computer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>I think there are a lot of useful things I can do by using a computer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>When I use a computer I am frightened I might break it</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Using a computer is a waste of time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>I believe I can overcome my fears in using a computer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>The challenge of using a computer is exciting</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Life will be more interesting using a computer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX C

SHORT PROFILE OF MOODS QUESTIONNAIRE

Below is a list of words that describe feelings people have. Please read each carefully. Then circle a number, which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The Numbers refer to these phrases: 0 = Not at all; 1 = A little; 2 = Moderately; 3 = Quite a bit; 4 = Extremely.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TENSE</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. ANGRY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. WORN OUT</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. LIVELY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. CONFUSED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. SHAKY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. SAD</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. ACTIVE</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. GROUCHY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. ENERGETIC</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11. UNWORTHY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12. UNEASY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13. FATIGUED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14. ANNOYED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15. DISCOURAGED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16. NERVOUS</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17. LONELY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18. MUDDLED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19. EXHAUSTED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20. ANXIOUS</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21. GLOOMY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22. SLUGGLISH</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23. WEARY</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24. BEWILDERED</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25. FURIOUS</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>EFFICIENT</td>
<td></td>
<td>FULL OF PEP</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------</td>
<td>---</td>
<td>-------------</td>
<td>---</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
APPENDIX D

LOCUS OF CONTROL QUESTIONNAIRE

Please read each statement carefully. Then indicate your agreement or disagreement by circling the number following the statement, which is nearest to your opinion.

First impressions are usually the best.

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Disagree strongly</th>
<th>Disagree slightly</th>
<th>Agree Slightly</th>
<th>Agree</th>
<th>Agree strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Whether I get to be a leader depends mostly on my ability</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>To a great extent my life is controlled by accidental happenings</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>I feel like what happens in my life is mostly determined by powerful people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Whether or not I get into a car accident depends mostly on how good a driver I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>When I make plans, I am almost certain to make them work</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Often there is no chance of protecting my personal interests from bad luck happenings</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>When I get what I want, it is usually because I am lucky</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Although I might have good ability, I will not be given leadership responsibility without appealing to those in positions of power</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>How many friends I have depends on how nice a person I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>I have often found that what is going to happen, will happen</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
11  My life is chiefly controlled by powerful others

12  Whether I get into a car accident is mostly a matter of luck

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Disagree</th>
<th>Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>People like myself have little chance of protecting our personal interests when they conflict with those of strong pressure groups.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>It is not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>Getting what I want requires pleasing those people above me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>16</td>
<td>Whether I get to be a leader depends on whether I am lucky enough to be in the right place at the right time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>17</td>
<td>If important people were to decide they do not like me, I would probably not make many friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>I can pretty much determine what will happen in my life</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>19</td>
<td>I am usually able to protect my personal interests</td>
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<td>20</td>
<td>Whether or not I get into a car accident depends mostly on the</td>
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<td>21</td>
<td>When I get what I want, it’s usually because I have worked hard for it</td>
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<td>22</td>
<td>In order to have my plans work, I make sure that they fit in with the desires of people who have power over me</td>
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<tr>
<td>23</td>
<td>My life is determined by my own actions</td>
<td>1</td>
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<tr>
<td>24</td>
<td>It’s chiefly a matter of fate whether or not I have few friends or many friends</td>
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<td>Excellent</td>
<td>Good</td>
<td>Not so Good</td>
<td>Bad</td>
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<td>1 How is your physical health?</td>
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<td>1</td>
<td>2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2 Are you able to get &amp; down stairs without help?</td>
<td>Without Diff</td>
<td>With Diff</td>
<td>With help</td>
<td>Not at all</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3 Are you able to dress yourself?</td>
<td>Without Diff</td>
<td>With Diff</td>
<td>With help</td>
<td>Not at all</td>
<td></td>
<td></td>
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<tr>
<td>4 Are you able to feed yourself</td>
<td>Without Diff</td>
<td>With Diff</td>
<td>With help</td>
<td>Not at all</td>
<td></td>
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<td>5 Are you able to bathe or take a shower by yourself</td>
<td>Without Diff</td>
<td>With Diff</td>
<td>With help</td>
<td>Not at all</td>
<td></td>
<td></td>
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<tr>
<td>6 Do you have trouble sleeping?</td>
<td>Not at all</td>
<td>Minor</td>
<td>Moderate</td>
<td>Very severe</td>
<td></td>
<td></td>
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<tr>
<td>7 Do you feel tired, without energy?</td>
<td>Never</td>
<td>Sometime</td>
<td>Rather often</td>
<td>Very often</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Do you have trouble concentrating?</td>
<td>Never</td>
<td>Sometime</td>
<td>Rather often</td>
<td>Very often</td>
<td></td>
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<tr>
<td>9 Are you able to do your usual tasks at home or elsewhere?</td>
<td>Yes Fully</td>
<td>Greater Pr</td>
<td>Only some</td>
<td>None</td>
<td></td>
<td></td>
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<tr>
<td>10 Are you able to shop unaided?</td>
<td>Without Diff</td>
<td>With Diff</td>
<td>With help</td>
<td>Not at all</td>
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<td>11 Can you travel by public transport?</td>
<td>Without Diff</td>
<td>With Diff</td>
<td>With help</td>
<td>Not at all</td>
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<td>12 How much do you physical problems prevent you doing the things you want to do?</td>
<td>Not at all</td>
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<td>Rather much</td>
<td>Much</td>
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<td>13 Are you always ready to help another?</td>
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<td>Rarely</td>
<td>Often</td>
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<td>Rather much</td>
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<td>How much do your problems with thinking stop you from doing things?</td>
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<td>How good is your memory</td>
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<td>How much do your memory problems (if any) stop you doing what you</td>
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<td>Rather much</td>
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<td>Taking all things into consideration, how anxious do you feel?</td>
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<td>Rather much</td>
<td>Much</td>
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<td>Rather much</td>
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<td>I get into arguments with others</td>
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<td>I tend to be resentful</td>
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<td>Taking all into consideration, how depressed do you feel?</td>
<td>Not at all</td>
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<td>Depressed</td>
<td>Very</td>
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<td>How much do your depressed feelings (if any) stand in the way of</td>
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<td>Rather much</td>
<td>Much</td>
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<td>Do you like to gossip at times</td>
<td>False</td>
<td>True</td>
<td></td>
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<td>27</td>
<td>Taking everything into consideration, do you feel inferior to others?</td>
<td>False</td>
<td>True</td>
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<td>Is the statement true or false “I”</td>
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<tr>
<td>29 I tend to have a negative opinion of myself.</td>
<td>False</td>
<td>True</td>
<td></td>
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<tr>
<td>30 How satisfied are you with your social ties or relationships?</td>
<td>Satisfied</td>
<td>Dissatisfied</td>
<td>Very Dissatisfied</td>
<td></td>
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<tr>
<td>31 Do you feel emotionally satisfied in your relationship with others?</td>
<td>Not at all</td>
<td>A little</td>
<td>Quite a bit</td>
<td>Very much</td>
<td></td>
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<tr>
<td>32 Is there someone to talk to about personal affairs when you want?</td>
<td>Nearly</td>
<td>Fairly</td>
<td>Occasionally</td>
<td>Not at all</td>
<td></td>
<td></td>
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<tr>
<td>33 “You feel that most people cannot be trusted”?</td>
<td>False</td>
<td>True</td>
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<tr>
<td>34 How satisfied are you with your ability to manage your hobbies or activities?</td>
<td>Satisfied</td>
<td>Dissatisfied</td>
<td>Very Dissatisfied</td>
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<tr>
<td>35 How satisfied are you with your financial situation?</td>
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<td>Dissatisfied</td>
<td>Very Dissatisfied</td>
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<tr>
<td>36 Do you feel you cannot afford the standard of living you would like?</td>
<td>Not at all</td>
<td>A little</td>
<td>Quite a bit</td>
<td>Very much</td>
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<tr>
<td>37 Is the following statement true or false “ There have been times when I was quite jealous of the good fortune of others”</td>
<td>False</td>
<td>True</td>
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<td>38 How satisfied are you in general with your life at present when compared to the past?</td>
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<td>Dissatisfied</td>
<td>Very Dissatisfied</td>
<td></td>
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<tr>
<td>39 Taking all into consideration,</td>
<td>Much better</td>
<td>Better</td>
<td>Worse</td>
<td>Much</td>
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<td><strong>How would you expect thing to go in the future?</strong></td>
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<td><strong>How much do your expectations of the future stand in the way of doing or initiating things you want to do?</strong></td>
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<td>40 “Over the past few years, I am often troubled by the difficulties I have dealing with others.”</td>
<td>False</td>
<td>True</td>
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<td>41 “Over the past few years I am bothered by the kind of person I am.”</td>
<td>False</td>
<td>True</td>
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<tr>
<td>42 “Over the past few years, the way I behave often gets me in trouble, either at home or elsewhere.”</td>
<td>False</td>
<td>True</td>
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<tr>
<td>43 “I haven’t got as far in life as I’d like to because of the kind of person I am.”</td>
<td>False</td>
<td>True</td>
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<td>44 Do you believe in God or some Superior Being?</td>
<td>No</td>
<td>Yes</td>
<td></td>
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<td>45 Do you find comfort or support in such a belief?</td>
<td>No</td>
<td>Yes</td>
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# APPENDIX F

## FRIEDMAN WELL-BEING SCALE

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<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Guilt ridden</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Envious</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Timid</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Meek</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Anti social</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Unneighbourly</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Distant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

- Calm
- Relaxed
- At ease
- Contented
- Secure
- Self-confident
- Jovial
- Humorous
- Enthusiastic
- Happy
- Steady
- Stable
- Unemotional
- Guilt free
- Unenvious
- Assertive
- Self-assured
- Social
- Neighbourly
- Outgoing
APPENDIX G

GENERAL PERCEIVED SELF-EFFICACY QUESTIONNAIRE

Please answer the statements by circling the number that expresses **how you feel at the present time.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Not at all</th>
<th>Hardly True</th>
<th>Moderately True</th>
<th>Exactly True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I can always manage to solve difficult problems if I try hard enough</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>If someone opposes me, I can find the means and ways to get what I want</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>I am certain I can accomplish my goals</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>I am confident that I could deal efficiently with unexpected events</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Thanks to my resourcefulness, I can handle unforeseen situations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>I can solve most problems if I invest the necessary effort</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>I can remain calm when facing difficulties because I can rely on my coping abilities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>When I am confronted with a problem, I can find several solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>If I am in trouble, I can think of a food solution</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>I can handle whatever comes my way</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX H

SOCIABILITY QUESTIONNAIRE

Please answer the statements by circling the number that expresses how you have felt during the past week.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I feel in tune with people about me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>I do not feel alone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>I feel part of a group of friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>I have a lot in common with the people about me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>There are people here that I feel close to</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>I am an outgoing person</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>I can find companionship here when I wish to</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>There are people about me who really understand me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>There are people about me with whom I can converse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>There are people here who I can turn to in times of trouble</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
APPENDIX I

DEMOGRAPHICS QUESTIONNAIRE

1. AGE ........................................

2. GENDER ........................................

3. GENERAL HEALTH  Good  fair  poor
(Please circle one)

4. SOCIAL CONTACTS
(Please circle one)
1. I have visits from family  Never  sometimes  frequently
2. I have visits from friends  Never  sometimes  frequently

5. COMPUTER USAGE
(Please circle one)
I have used a computer  Never  sometimes  frequently
APPENDIX J

SUBJECTIVE PAIN QUESTIONNAIRE

There are two questions below concerning the pain you may have felt. Circle a number, which best describes pain that you have felt.

The Numbers refer to these phrases: 1 = None; 2 = Very Mild; 3 = Mild; 4 = Severe; 5 = Very Severe.

1. Have you had pain during the Past two weeks? 1. 2. 3. 4. 5.

2. How much has pain interfered with your normal activities 1. 2 3 4 5
APPENDIX K

STAFF ASSESSMENT QUESTIONNAIRE

PARTICIPANT ID ………………

(Your assessment of the participant is important to the research and we appreciate your time in completing this.)

The numbers refer to the statements. Please circle the one you feel is relevant.

The participant is:

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physically active</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Content</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Relaxed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Agreeable</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Happy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Sociable with others</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Mentally confused</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Mentally alert</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Special Comments: ..........................................................................................................

........................................................................................................................................
APPENDIX L

CONFIRMATORY ANALYSIS OF MEASUREMENT SCALES

Attitudes at Baseline

Attitudes

\[ \text{Att. to Comp 1} \quad \text{z1} \]
\[ \text{Att. to Comp 5} \quad \text{z2} \]
\[ \text{Att. to Comp 8} \quad \text{z3} \]

Internal LOC Baseline

Internal LOC Time 1

\[ \text{ILOC 1} \quad \text{z1} \]
\[ \text{ILOC 9} \quad \text{z8} \]
\[ \text{ILOC 4} \quad \text{z1} \]
\[ \text{ILOC 5} \quad \text{z2} \]
\[ \text{ILOC 18} \quad \text{z3} \]
\[ \text{ILOC 19} \quad \text{z4} \]
\[ \text{ILOC 21} \quad \text{z5} \]
\[ \text{ILOC 23} \quad \text{z6} \]
POMS Baseline

Leipad Psychological Functioning Baseline.

Friedman Wellbeing Baseline
Human Research Ethics Committee
Outcome of Meeting No 00/EM08 Held on Thursday, 6 July 2000

Ethics clearance for the recently submitted application is as follows:

Project N 00/84
Project Type RP - Category B: Research Project
Title Information technology as a tool for empowerment of the elderly in rural Victoria
Associate Researcher(s) V Kiss
Principal Researcher(s) L DeMello
School Behavioural & Social Sciences & Humanities

HREC Decision With Provisions, Approved
HREC Comment Approved with the following provisions:
∗ Are the Maryborough School students doing this as a voluntary community project? If not, written permission from the school principal would be required.
∗ Has a strategy been considered of hostility arises between the “haves” and “have nots”? Staff should be asked to watch for this.
∗ Staff should also watch for any stress felt by those who can’t cope easily with the new technology.
∗ Before beginning with this project [lease provide Executive Officer with details of how the above issues have been addressed.

Resub Comment

Project Start 03/08/2000
Project end 03/08/2003

Yours Sincerely

S.O. Boyle

Sally Boyle
Executive Officer
Human Research Ethics Committee.