

THE RELATIONSHIP BETWEEN STUDENT USE OF CAMPUS GREEN SPACES  
AND THE ARBORETUM AND PERCEPTIONS OF QUALITY OF LIFE

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THE RELATIONSHIP BETWEEN STUDENT USE OF CAMPUS GREEN SPACES  
AND THE ARBORETUM AND PERCEPTIONS OF QUALITY OF LIFE

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## **ABSTRACT**

### **THE RELATIONSHIP BETWEEN STUDENT USE OF CAMPUS GREEN SPACES AND THE ARBORETUM AND PERCEPTIONS OF QUALITY OF LIFE**

by

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Texas State University-San Marcos

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**SUPERVISING PROFESSOR: TINA MARIE CADE**

Researchers have found that students' perception of their overall academic experience and the campus environment is related to academic accomplishment. Additionally, studies showed that the designed environment of the university can influence the degree of stress students may feel. The main objective of this study was to investigate Texas State University-San Marcos student use of campus green spaces and the arboretum and the perceptions of quality of life. Of students enrolled, 2681 (10% of the student body) were randomly selected to receive questionnaires. This selection was stratified to include all classifications: freshmen, sophomores, juniors, seniors, and graduate students. The student sample received e-mails with information regarding the incentive for

participation and instructions on accessing the survey. The online survey included questions that related to student use of campus green spaces and arboretum, overall quality of life statements, an instrument to measure the quality of life of university students, as well as demographic questions. A total of 469 surveys were collected and analyzed to compare levels of quality of life of university students and the level of usage of the campus green spaces and the arboretum. Demographic information collected allowed controlling for student grade classification, age group, gender, ethnicity, marital status, work status, and commuter status. A Pearson's Product-Moment correlation indicated a statistically significantly reverse relationship between student grade classification for undergraduate students and the Green-User scores ( $r=-0.212$ ,  $P=0.000$ ). Additionally, a Pearson's Product-Moment correlation indicated statistically significant relationships between Green-User score and both overall quality of life statements ( $P=0.016$  and  $P=0.001$ ), the overall quality of life of university students score ( $P=0.004$ ), the affective domain ( $P=0.001$ ), the interaction with students dimension of the affective domain ( $P=0.000$ ), the total positive affective dimension of the affective domain ( $P=0.003$ ), and the functional dimension of the cognitive domain ( $P=0.024$ ) for undergraduate students. Statistically significant differences were not found on the cognitive domain, the interaction with professors dimension of the affective domain, or the structural dimension of the cognitive domain. Results help to justify consideration of the added expense in maintaining campus green spaces in meeting the goals of the university.

## CHAPTER I

### INTRODUCTION

What comes to mind when you think about education in Ancient Greece? Perhaps you think of Plato, Aristotle, or Epicurus. The great Academy of Plato was actually a garden and not a physical building as is sometimes the academy of today (IEP, 2005). Epicurus and Aristotle also taught in the gardens of Athens, and not in a physical building (Gager, 1937). Education has, historically, taken place within the natural environment, but today, students learn in buildings specifically designed for education (Connors, 1983). How might this built environment affect students? Connors (1983) argued that the designed environment of the formal school actually increases the degree of stress students may feel. He further argued that no other “designed environment... needs immediate attention more than does the school facility” (p. 15).

A great deal of research recently has looked at “quality of life.” Though difficult to define and even harder to measure, quality of life has been important to Americans since the writing of the Declaration of Independence proclaiming every American had the right to the pursuit of happiness (Waliczek, Zajicek and Lineberger, 2005). However, it was not, perhaps, until Lyndon B. Johnson’s promotion of his Great Society ideology that researchers in the social sciences became interested in measuring quality of life as something other than economic significance (Campbell, 1981). Since then, numerous

studies within social science disciplines have focused on defining and measuring subjective quality of life factors (Schuessler and Fisher, 1985). While research has looked at various factors contributing to quality of life (Bubolz, Eicher, Evers and Sontag, 1980; Campbell, Converse and Rogers, 1976; Milbrath, 1979; Schuessler and Fisher, 1985), and in other fields, looked at the psycho-social effects of natural landscapes (Galindo and Rodriguez, 2000; Parsons, Tassinary, Ulrich, Hebl and Grossman-Alexander, 1998; Russell and Uzzell, 1999; Sheets and Manzer, 1991; Wolf, 1996), few studies have looked at the effects of the natural environment on those subjective quality of life measures. Fewer studies have looked at the effect of the natural environment on students and quality of life within the university context.

#### *Problem Statement*

The intent of this study was to investigate Texas State University-San Marcos student use of campus green spaces and the arboretum and perceptions of quality of life.

#### *Objectives*

The specific objectives of this study were:

1. To compare students' perceptions of quality of life with the number of activities and time spent on-campus in green spaces and the arboretum.
2. To investigate the locations where students used campus green spaces and the arboretum in daily life.
3. To compare students, based on demographics, to observe whether any particular group appeared to use the campus arboretum and green spaces more frequently, and to compare demographic groups on perceptions of quality of life.

### *Definition of Terms*

Green space: “a plot of undeveloped land separating or surrounding areas of intensive residential or industrial use that is maintained for recreational enjoyment” (Kipfer, 2005, ¶ 1).

Developed: “Advanced in industrial capability, technological sophistication, and economic productivity” (American Heritage Dictionary, 2000, ¶ 2).

Campus arboretum: An on-campus “place where an extensive variety of woody plants are cultivated for scientific, educational, and ornamental purposes (American Heritage Dictionary, 2000, ¶ 2).

Quality of life of university students: an indication of the subjective sense of well-being students experience in the specific social context of the university (Roberts and Clifton, 1991).

### *Hypothesis*

The more time students spend participating in activities in and around campus green spaces and arboretum, the greater their perceptions of quality of life of students will be.

### *Limitations*

The limitations of this study included the following:

1. Research conducted on humans have extraneous factors that influenced the outcomes of the study.
2. Non-experimental research based on “real-life” scenarios cannot completely neutralize all controls.
3. The sample population for this study came from one large university in Texas,

and thus was not generalizable to the entirety of university students, but only to those within this specific university.

4. The students responding were those willing to take time to participate in the study for the incentive offered and had access to a computer and the Internet.

*Basic Assumptions*

1. It was assumed that participants answered the survey questionnaire honestly, and were not informed or biased based on the information provided in the survey or from any other outside source.
2. It was assumed that participants responded to the survey only once.
3. It was assumed that the population sample was representative of the target population.

## CHAPTER II

### REVIEW OF LITERATURE

#### *Quality of Life*

Quality of life, as a construct, has frequently been the topic of social science research, though it has been difficult to define. Researchers in the fields of economics, psychology, sociology, political science, and education quality of life have defined quality of life using both objective and subjective terms (Schuessler and Fisher, 1985). Objectively, quality of life has been studied using factors such as economic well-being, educational level, health care access, quality of housing, crime rates, environmental quality, divorce rates and recreational activity (Dillman and Tremblay, 1977). Subjective measures of quality of life have focused on terms such as “happiness, satisfaction, sense of well-being, [and] aspirations” and suggests that “society exists to meet the needs of people in it, and to find out whether those needs are being met we should simply go out and ask them” (Dillman and Tremblay, 1977, p. 119).

#### *Objective Measures of Quality of Life*

Researchers have used objective measures in an attempt easily quantify and define social indicators of quality of life (Diener and Suh, 1997). Though researchers have used a vast array of objective variables to study quality of life, one problem with them was the absence of a commonly accepted value system which was meaningful across nations, or even within a single culture (Liu, 1974).

Dillman and Tremblay (1977) took, for example, divorce rates. While some researchers considered higher divorce rates an indication of family instability (and a decline in quality of life), others considered them an indication of increased freedom, and thus indicated higher quality of life. Another question Dillman and Tremblay (1977) considered is educational level. They asked, “Are more years of schooling necessarily a good thing? Is there not some point beyond which educational attainment becomes superfluous? And if so, what is that point?” (p. 119).

Another example of the fallibility of objective measures was identified considering crime rates. While most individuals considered lower crime rates a sign of higher quality of life, Diener and Suh (1997) directed attention to such issues as the underreporting of rape incidents. The fact that different cultures experienced a different degree of underreporting was an indication that what appeared to be a sign of improved quality of life may have been, in reality, a sign of lower qualities of life.

Dillman and Treblay (1977) explained that objective measures of quality of life “fell short of describing exactly what those measures should be and whether specific changes in indicators reflect improvement or decline” (p. 119). Diener and Suh (1997) also pointed out that even with such objective measures, they were inevitably defined and interpreted in subjective ways.

### *Subjective Measures of Quality of Life*

Research has shown that individuals in economically disadvantaged situations often perceived their quality of life as high (Bubolz et al., 1980; Wilkening and McGranahan, 1978), and that there was actually a low correlation between such objective measures as income or Gross Domestic Product and how people perceived their

conditions (Milbrath, 1979). Milbrath (1979) suggested that measuring an issue objectively versus measuring an individual's perception of that same issue were two distinct criterions. With those findings and the difficulty researchers experienced in describing, defining, and quantifying objective measures, subjective measurements of quality of life have emerged (Dillman and Tremblay, 1977).

Some researchers have defined subjective quality of life using psychological factors. For instance, Campbell et al. (1976) defined quality of life as referring to “a sense of achievement in one's work, an appreciation of beauty in nature and the arts, a feeling of identification with one's community, a sense of fulfillment of one's potential” and a general sense of well-being (p. 1). Michalos (1980) argued that an individual's quality of life was one's perceptions of the value of life in general. Allardt (1976), in contrast, defined quality of life as coming from feelings of self-realization from relationships.

While some researchers tried to account for each aspect that contributed to quality of life, others suggested that Maslow's “hierarchy of needs” (1943, 1954) appropriately reflected quality of life issues. In this hierarchy, physiological needs were the lowest category, which is composed of basic needs such as food and shelter, with the highest level of need being self-actualization needs, or emotional balance and growth. Numerous studies used Maslow's hierarchy as a theoretical basis for quality of life (McCall, 1975; Schuessler and Fisher, 1985; Waliczek, Mattson and Zajicek, 1996; Waliczek et al., 2005). In these studies, as higher level needs were met, the greater a person's perceived quality of life.

Finally, some researchers advocated using a combination of objective and subjective factors to study the most accurate description of quality of life. Milbrath (1979), for example, argued in support of an “ecological” approach that looked at an interaction among a number of factors. However, Schuessler and Fisher (1985) asserted that while objective factors may foster specific qualities of life, they did not comprise or produce them.

### *People/Plant Interactions*

Kaplan (1992) defined nature to include “one plant or many plants, and also the place created by them. It includes a street tree as well as trees in an atrium. We also include in this concept nearby fields, woods and land that have not yet been turned to development” (p. 126). People can interact with plants and nature either actively or passively. Lewis (1994) explained that both types of interactions with natural areas have had positive mental and physical effects on individuals. Kaplan explained that research has found such effects to be global, and not bound by culture, ethnicity, age, place of residence, or occupation (Kaplan, 1992).

### *Active Interactions*

Individuals engaged in active interactions are “intimately involved with the plants being grown and directly responsible for the well-being of the plants” (Lewis, 1992, p. 57). Gardening, for example, is one such active interaction. Research has shown that active interactions with nature were related to improved psychological and physiological health, including increased self-esteem and reduced stress levels (Cammack, Waliczek, and Zajicek, 2002; Kaplan, 1973; Lewis, 1978; Waliczek et al., 2005). Studies on community gardening have also concluded that such active participation influenced

perceptions of quality of life (Waliczek et al., 1996). Additionally, a study found that participants in the Texas Master Gardener program reported statistically significant improvements in perceptions of quality of life, physical activity, social activity, and self-esteem after completing the program when compared to their reports prior to the program (Boyer, Waliczek, and Zajicek, 2002).

### *Passive Interactions*

Alternatively, passive interactions have included those that are visual and more observational in character. MacKay (1990) described passive interactions as when the “user interacts subconsciously with the landscape when using or moving within its masses and spaces” (p. 113). The mere presence of plants have been found to “improve[s] the quality of our lives in many ways: environmentally, economically, socially, culturally and physically through our health and well-being” (Zampini, 1994, p. 185). One study on passive interactions with plants, for example, found that patients in hospitals with window views of natural areas result in lower incidence of reported illness (Ulrich, 1984).

### *The Physical Environment and Quality of Life*

Research has produced a small but interesting set of studies that investigated the relationship between physical environments and various aspects of quality of life. Kaplan and Kaplan (1989) reported, “People with access to nearby natural settings have been found to be healthier overall than other individuals. The longer-term, indirect impacts (of ‘nearby nature’) also included increased levels of satisfaction with one's home, one's job and with life in general” (p. 173). For example, Ulrich (1981) found that when viewing slides of nature as opposed to slides of views of urban areas, participants

experienced more beneficial psychological states such as attentiveness and positive affect, especially when such natural scenes included water. Another study found similar psychological effects on individuals with views of distant mountains (Heerwagen, 1990; White and Heerwagen, 1998). Moore (1981) similarly found that incarcerated criminals with window views of natural areas reported less incidence of illness.

Furthermore, numerous researchers have found that affect improves and pleasure increases when viewing scenes with vegetation. For example, Hull and Harvey (1989) found that participants' pleasure increased with increased tree density when viewing slides of a suburban park.

Additionally, when Thayer and Atwood (1978) asked participants to rate five landscape types, suburban residential, industrial, urban commercial, city park, and strip-highway (in each of these groupings, two slides were used, one with plants and one without) on scales rating the pleasantness of the scene, they found that participants who viewed slides with plants rated the scenes as more pleasing than those who viewed slides without plants in all of the five landscape types.

Similarly, Sheets and Manzer (1991) conducted two studies asking participants to rate scenes on perceived quality of life of the area and then measured their affect after viewing the scenes. The scenes varied only in the amount and size of plant materials. In both studies, groups who viewed the vegetation scenes rated the area as having higher quality of life and expressed higher affective pleasure than groups who rated the non-vegetation scenes.

Finally, Galindo and Rodriguez (2000) found that participants who rated scenes as aesthetically pleasing also rated their affect more positively than those who rated their

scenes with low aesthetic scores. Furthermore, 25% of participants who rated their scene as aesthetically pleasing gave reasons pertaining to the naturalness of the scene.

Additionally, 24% of individuals who rated their scene as aesthetically poor gave reasons pertaining to lack of naturalness.

With findings such as these that indicated a relationship between the physical environment and public affect, researchers have concluded, “These studies demonstrate that human responses to vegetation are not merely aesthetic; they are affective and cognitive as well. Vegetation can make people feel better, and make them view an urban area more positively” (Sheets and Manzer, 1991, p. 302). Similarly, Wolf (1996) explained that research has revealed that urban forests provide a more satisfying quality of life for urban residents.

These findings of the relationship between physical environment and human response have been extended to physiological measures as well. A study conducted by Parsons et al. (1998) found that participants who viewed driving scenes with vegetation along the roadsides rated their stress levels lower and had quicker recovery from stress than those who viewed driving scenes with no vegetation along the highway.

Russell and Uzzell (1999) described another study that investigated physiological effects of plants using subjects in an office space. In this study, subjects were placed in either an office with plants or one without plants and given 10 minutes to get familiar with their surroundings. They performed a math task of adding up a list of numbers without the use of their fingers or counting aloud, and then given another 10-minute rest period. Researchers measured skin conductivity, heart rate, and blood pressure throughout the initial and final rest periods as well as during the math task. Skin

conductivity showed the greatest difference between the two groups. This indicated reduced stress in the group who had planted offices. Furthermore, recovery from stress was faster for the group with planted offices (Russel and Uzzell, 1999).

Furthermore, research has found that stress can inhibit performance of cognitive tasks (Glass and Singer, 1972; Hockey, 1983), including tasks students performed on a daily basis within educational settings. For example, Ulrich (1981) found that unstressed university students in Sweden had increased attention, a more positive emotional state, and experienced increased relaxation (measured with an EEG recording electrical brain activity). Furthermore, Isen (1990) found that scores increased significantly on high-order functioning tests and creativity tests when they were in a positive emotional state.

Furthermore, in a study involving hospital atriums, the mean anxiety measures for subjects who used the waiting area were lower when plants were present than when they were not (Russell and Uzzell, 1999). Ulrich (1984) further found that surgery patients recovered faster when they had windows with views of nature in their rooms than those patients without such views. These findings indicated that human response to the physical environment transcended psychological well-being, and also included physiological well-being.

Several studies have found physiological differences in individuals who worked in areas with plants or natural views when compared to those working in areas without them. For example, Kaplan (1992) found that employees reported fewer incidences of headaches and other illness when having a view of nature at work. Additionally, Lohr, Pearson-Mims, and Goodwin (1996) found that plants in an office-type environment both increased productivity and decreased stress. Finally, Chang and Chen (2005) conducted a

study measuring psychophysiological responses to window views and indoor plants in the workplace. Their findings indicated that participants were less nervous and experienced less anxiety when in a room with interior plants or a view of outside nature.

Furthermore, studies have also shown workers who performed their job functions in offices with windows or interior plants had higher job satisfaction. Randall and Shoemaker (1992) found a positive correlation between job satisfaction and the presence of interior plants in the workspace in an office in northern Virginia. In a study that investigated the quality of job satisfaction for workers in offices with windows or no windows and interior plants or no interior plants, Dravigne (2006) found that live interior plants and window views of green spaces appeared to positively influence employees' perceptions of overall job satisfaction (particularly for males) employees' perceptions of their overall life quality, and employees' perceptions of their physical work environment.

Cotton, Dollard, and de Jonge (2002) theoretically compared what students do at the university to a job to consider connections between the work environment, well-being, and performance. They explained, "like many paid workers, students work in hierarchical structures, with defined job tasks and variable levels of control and support" (p. 148). Thus, they concluded, that results found from studies of individuals in the work force are generalizable to studies involving students within the university.

#### *Quality of Life of University Students*

Researchers are also interested in what some called "domain-specific" quality of life, which include such topics as urban quality of life, family quality of life, and quality of life of students (Schuessler and Fisher, 1985). In a review of the content of published quality of life studies, Michalos (1986) found that only 1% of studies focus on

educational settings. Beck (1990) insisted that quality of life of students should be a prime factor in measuring the worth of educational institution.

Researchers have found that student perception of their academic experience was related to their academic accomplishment. For example, Keys and Fernandes (1993) found that student interest in schoolwork, liking for teachers, internal value of school, as well as several other factors positively contributed to learning. Furthermore, Karatzias, Power, and Swanson (2001) argued that “if schools were able to reliably evaluate their performance, they could also provide valuable information to parents about their effectiveness, and have a valid basis on which to establish their reputation... a [Quality of Life of Students] instrument could facilitate the accomplishment of these specified goals” (p. 267). Although the two arguments presented above refer specifically to studies that investigated quality of life of students in secondary schools, it was reasonable to assume the benefits of studying quality of life of students applied to the university setting as well.

Though limited in quantity, researchers have conducted a subset of studies undertaken to investigate the quality of life of students within the university setting. Positive student perceptions of experiences within the university are important for universities interested in retaining and attracting high ability students (Groen and White, 2003). One study reported that after much research, “there is still little consensus as to what will help students form the most positive assessments of their classes and their instructors” (Filak and Sheldon, 2003, p. 235). Hendershott, Wright, and Henderson (1991) argued that “students, whose own educational agendas comprise only one facet of their daily lives, must also be perceived in relation to the community and to its specific environmental factors” (p. 12). This study found that students who reported greater

satisfaction with their academic lives, social lives, and friendships also reported higher levels of overall well-being.

Roberts and Clifton (1991) argued that two domains, the cognitive and affective, are important in measuring quality of life of students. First, they considered the cognitive domain, or the stimulation and challenge of student intellect. Secondly, they addressed the affective domain, or students' feelings of self-worth. To do so, Roberts and Clifton (1991, 1992a, 1992b) developed two scales, one that measured the cognitive domain and one that measured the affective domain. In a subsequent study, Clifton, Etchevery, Hasinoff, and Roberts (1996) revised the cognitive domain scale in an attempt to extend validity.

*The Importance of Physical Environment in the University to Quality of Life*

Some theorists have argued that universities should be designed to facilitate a certain quality of life (Caws, 1970). Griffith added, "Higher education leaders should reshape their priorities to include the creation of attractive, engaging campuses that are conducive to both activity and tranquility" (1994, p. 645). Furthermore, she stated, "Attractively landscaped formal open spaces or habitats left in their natural form, as woods and gorges, help establish a venerable campus identity, stir alumni sentimentalism, create a strong sense of community, and curb escalating campus densities" (p. 648). She emphasized, "A well laid out campus with sufficient open space will assist in the recruitment of top notch students and faculty. A student's perception of how a campus looks and feels plays a critical role in the choice of a higher education institution" (Griffith, 1994, p. 650). Think (2003) stated that, "A premium should be placed on ensuring that all teaching environments provide the best possible conditions to stimulate

learning” (p. 2). Similarly, Whisnant asked, “how the individual student is likely to respond to the university as a set of spaces, and how that response helps or hinders his getting an education” (1971, p. 547).

Abu-Ghazze (1999) noted that “there is a paucity of research about how individuals use the outdoor environment in a campus setting” (p. 765) although it is those outdoor spaces that determined, both, students’ and faculty members’ perceptions of the campus. Abu-Ghazze explained that “in the mental maps of users, it was these open spaces, rather than the buildings scattered between the spaces, that were most remembered. They were the places where people congregated to walk, talk, study, and relax. It was these places that people used and in which they encountered each other” (p. 795).

Understanding people/plant relationships from the perspective of a university planner could prove useful, as “most colleges and universities... do not place similar emphasis on the quality of the physical environment in which the formal learning process takes place... the quality of the architecture, the topography, the landscaping” (Sturmer, 1972, p. 97) even though research has shown that “the physical environment could be manipulated to achieve obvious physical or behavioral results” (Drew, 1971, p. 447).

In addition to theoretical perspectives, researchers have also found that the physical environment of the university, particularly, affected students, and their academic experiences. One of the earliest studies on students and the environment found that high school students in rooms with windows were generally happier (Karmel, 1965).

In another study of university students, Ulrich (1979) found that students felt an increase in positive affect after exposure to nature scenes when compared to those

exposed to urban scenes after experiencing a stressor in the form of a one-hour exam. Immediately following the test, students responded to an affect evaluation, and then viewed 50 nature or urban slides. After viewing slides, participants again responded to the affect evaluation. Statistical analysis found significant differences between the two groups' post-treatment affect, specifically on the measures of anger, sadness, and pleasure/elation, which suggested that stressed individuals felt better after exposure to nature versus urban scenes. Hartig, Mang, and Evans (1991) found similar results that indicated natural as opposed to urban views relieved stress and increased performance of the task of proofreading. Similarly, Tennessen and Cimprich (1995) investigated the effect of views of nature. Participants in this study completed an exam either with or without a view of nature. The researchers compared scores of students who had natural views to those that had did not. They found that those with a view of nature scored higher on the exam when compared to those with non-natural views.

Korpela, Hartig, Kaiser, and Fuhrer (2001) added to the body of research by investigating the favorite places of college students. They found that 48% of students reported natural places, such as the beach, as their favorite areas, and that this was the highest classification. Furthermore, 77% of students indicated that feelings of relaxation, calmness, and comfortableness were associated with those places. The researchers argued that these feelings indicated that natural areas have a restorative effect on college students and improve their emotional well-being (Korpela et al., 2001). Additional research has found that the presence of interior plants in a classroom lead to increased student interest in the subject, student satisfaction with course and instructor, and higher

grades (though the higher grade relationship was found only for students taking the course because it was required) (Doxey, 2006).

Evidence has also suggested that the physical environment of the university was an important concern for students. Boyer (1987) found that the appearance of the campus was the most significant factor for students in deciding which university to attend. Im (1984) found that, vegetation coverage was one of three important predictors for visual preference of a familiar campus area for both undergraduates and graduate students. Furthermore, in a free-response question, the presence of vegetation was the most frequently cited reason for preference of an area. In a study that investigated preferences for various urban scenes, Herzog, Kaplan, and Kaplan (1982) found that college students highly valued nature within the city when rating unfamiliar scenes. Abu-Ghazze (1999) found that the prime factors attracting college students to specific outdoor spaces were the landscape of the area and the ability to socialize in the area. Furthermore, he argued that it is the spaces in between buildings, rather than the buildings themselves, that individuals remembered most.

Research has shown that college students highly value the physical environment of the university, and similarly valued natural settings. These findings coupled with research in other areas that showed adults who live in natural, rural areas rate their quality of life as higher than those who live in urban environments (Bubolz et al., 1980), implied that college students who spent more time in natural areas of the university setting might rate their quality of life of students as higher when compared those who spent less time in such settings. Research was needed to investigate the relationship between students participating in activities in and around on-campus green spaces and arboretums and

perceptions of quality of life. Such research could prove valuable to university administrators in a time when “universities are under considerable pressure to become more accountable to both taxpayers and students” (Clifton et al., 1996, p. 29).

## CHAPTER III

### METHODOLOGY

The intent of this study was to investigate Texas State University-San Marcos student use of campus green spaces and the arboretum and perceptions of quality of life.

#### *Instrumentation*

The assessment tool used in this study was composed of several sections that asked students about their usage of campus green spaces and the arboretum, quality of life of university students, overall life quality statements, and standard demographic questions (Appendix B).

#### *Green-User Instrumentation*

This section of the inventory investigated the types and frequency of activities students spent in and around the campus arboretum and within on-campus green spaces. This inventory asked questions regarding the frequency in which students participated in various activities outdoors on-campus. On the scale were activities including: walking to and from class, exercising, organized sports, socializing with friends, club meetings, studying, eating, relaxing, and working. Possible responses included “One to three times daily”, “One to three times weekly”, “One to three times monthly”, “Rarely” and “Never.” The instrument also asked whether the respondent preferred to perform each activity indoors or outdoors. There was also a question regarding the overall

frequency in which the respondent spent time outdoors on-campus. Possible responses to this question included: “Frequently,” “Sometimes,” “Not very much,” and “Rarely” (Appendix B).

Graduate students, professors, individuals on the university’s master planning committee, and agricultural and horticultural researchers evaluated this section of the survey instrument for face and content validity.

#### *Quality of Life of University Students Instrumentation*

The instrument selected to measure quality of life of students consisted of two separate domains, an affective domain (Roberts and Clifton, 1992b) and a cognitive domain (Clifton et al., 1996). Both of these measures were tested for validity and reliability. The affective domain assessed “students’ feelings about the quality of their university experiences” (Roberts and Clifton, 1992b, p. 115). The cognitive quality of life of university students measured the degree to which students felt that they were experiencing sufficiently “demanding cognitive challenges” (Clifton et al., 1996, p. 30) (Appendix B).

First, Roberts and Clifton (1992b) developed an instrument to measure the affective quality of life of university students. In the affective section of the instrument, four scales were utilized: positive affect dimension ( $\alpha=0.93$ ), interaction with students dimension ( $\alpha=0.75$ ), interaction with professors dimension ( $\alpha=0.90$ ) and negative affect dimension ( $\alpha=0.79$ ). The positive and negative affect dimensions were designed to measure general feelings about students’ experiences within the university context while the interaction with students dimension and the interaction with professor dimension

measured students' feelings with regards to the quality of their relationships with significant others in the university context (Appendix B).

Next, Roberts and Clifton (1992a; Clifton et al., 1996) developed an instrument to measure the cognitive quality of life of university students. After refining the instrument, two scales were used: the functional dimension ( $\alpha=0.85$ ) and the structural dimension ( $\alpha=0.88$ ). The functional dimension was designed to measure complex skills such as analysis and evaluation while the structural dimension measured less cognitive skills such as comprehension (Appendix B).

Additionally, two other questions were included in the survey that asked about overall quality of life. These questions were, "Overall, how would you rank the quality of your life?" and "When all things in your life are considered, how do you feel today?" (Dravigne, 2006) (Appendix B).

Finally, standard demographic questions were asked including student grade classification, age, gender, ethnic group, marital status, work status, and living situation (Appendix B). The demographic section of the instrument was modeled after similar instruments (Dravigne, 2006; Waliczek et al., 1996), and reviewed by other researchers for content validity.

A Cronbach's alpha reliability analysis determined the overall Green-User and quality of life survey instrument to have high reliability ( $\alpha=0.91$ ) (Gall, Borg and Gall, 2006).

### *Sample*

The sample for this study consisted of students at Texas State University-San Marcos. From the population of students, 2681 (approximately 10% of the student

population) were randomly selected to receive questionnaires. This selection was stratified to include all student grade classifications: freshmen (440), sophomores (496), juniors (592), seniors (806), and graduate students (347). The Institutional Research Office assisted in locating and drawing the sample. Of those sampled, 462 (17.2%) responded to the survey.

#### *Data Collection and Analysis*

Data were collected using an on-line survey distributed by the Institutional Research Office. The randomly selected students were contacted by the Institutional Research Office via email requesting their participation in this study with the compensation of being entered into a drawing for a chance to win one of three prizes (Appendix A). One week later, students who had not yet responded were contacted again via email to remind them about the survey. Students accessed the survey from the link in the e-mail and then agreed to privacy and consent information and acknowledged that he/she understood that participation in the study was voluntary. After the survey was available for two weeks, data were automatically downloaded into a Microsoft Excel<sup>TM</sup> file (Seattle, WA) and then analyzed using the Statistical Package for the Social Sciences (SPSS<sup>®</sup>) Version 11.5 (Chicago, IL). Statistical analysis included descriptive statistics, frequencies, correlations, and analysis of variance.

All participants remained anonymous with demographic information being collected for comparative analysis only. All questionnaires remained confidential. Only the faculty and student researcher had access to the responses, and the data were stored in a secure room in the Agriculture building at Texas State University-San Marcos.

## CHAPTER IV

### RESULTS

The main objective of this study was to investigate Texas State University-San Marcos student use of campus green spaces and the arboretum and the perceptions of quality of life. Descriptive statistics and data analysis are contained in this chapter concerning results from surveys completed by 469 students. Demographic information was collected from students for comparisons between those who used the campus green spaces and arboretum frequently and those who did not.

The specific objectives of this study were to:

1. To compare students' perceptions of quality of life with the number of activities and time spent on-campus in green spaces and the arboretum.
2. To investigate the locations where students used the campus green spaces and the arboretum in daily life.
3. To compare students, based on demographics, to observe whether any particular group appeared to use the campus arboretum and green spaces more frequently, and to compare demographic groups on perceptions of quality of life.

#### *Descriptive Statistics*

##### *Demographics*

Of the sample of 2,681 students randomly selected to receive surveys, 469 responded, yielding a response rate of approximately 17.5%. Respondents were

distributed across student grade classification including about 12% (56) freshmen, 16% (72) sophomores, 25% (112) juniors, 29% (133) seniors, and 18% (79) graduate students (Table 1).

Of the respondents, approximately 32% were under the age of 20 (142), 44% were between the ages of 21 and 25 (196), 15% were between the ages of 26 and 30 (68), 4% were between the ages of 31 and 35 (16), 2% were between the ages of 36 and 40 (9), and 4% were over the age of 40 (20). Additionally, approximately 33% (148) of the respondents were male and 67% (302) were female (Table 1).

Approximately 68% (308) of respondents indicated they were Caucasian, 20% (88) indicated Hispanic, 3% (13) indicated African American, 2% (10) indicated Asian American, less than 1% (3) indicated American Indian, and 6% (28) indicated some other ethnic group.

While a majority of respondents were single (almost 76%, or 341), respondents also included approximately 20% (88) married or partnered students and approximately 2% (8) divorced students. Approximately 3% (13) of respondents indicated some other marital status (Table 1).

Additionally, approximately 28% (128) of respondents indicated they did not work, 27% (123) indicated they worked fewer than 20 hours per week, 38% (170) indicated they worked between 20 and 40 hours per week, and 7% (31) indicated working more than 40 hours each week (Table 1).

**Table 1. Demographic analysis of the overall student sample by grade classification, gender, ethnic group, marital status, work status, and where they lived in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Variable	Sample size (no. participants) <sup>z</sup>	Sample size (%)
<b>Classification</b>		
Freshmen	56	11.9
Sophomores	72	15.4
Juniors	112	23.9
Seniors	133	28.4
Graduate students	79	16.8
<b>Age</b>		
Under 20	142	30.3
21-25	196	41.8
26-30	68	14.5
31-35	16	3.4
36-40	9	1.9
Over 40	20	4.3
<b>Gender</b>		
Male	148	31.6
Female	302	64.4
<b>Ethnic Group</b>		
Caucasian	308	65.7
Hispanic	88	18.8
African American	13	2.8
Asian American	10	2.1
American Indian	3	0.6
Other	28	6.0
<b>Marital Status</b>		
Single	341	72.7
Married/Partnered	88	18.8
Divorced	8	1.7
Other	13	2.8
<b>Work Status</b>		
None	128	27.3
Less than 20 hours	123	26.2
20-40 hours	170	36.2
More than 40 hours	31	6.6
<b>Commute</b>		
On-campus	98	20.9
Off Campus: In San Marcos	165	35.2
Off Campus: Outside San Marcos, but less than 15 min commute	22	4.7
Off Campus: Commute 15-30 minutes	67	14.3
Off Campus: Commute 30 minutes to 1 hour	69	14.7
Off Campus: Over 1 hour commute	20	4.3

<sup>z</sup>Number of respondents for each category varied due to non-responses.

Finally, in response to “Where do you live?” approximately 22% (98) of respondents indicated living on campus, while 37% (165) lived off campus but inside the

city limits of San Marcos. Five percent (22) indicated living outside of San Marcos, but with less than a 15 minute commute; 15% (67) lived between 15 and 30 minutes away from campus; 16% (69) indicated having a commute of 30 minutes to one hour, and 5% (20) indicated a commute of over one hour (Table 1).

### *Findings Related to Objective One*

The first objective of this study was to compare students' perceptions of quality of life with the number of activities and time spent on-campus in green spaces and the arboretum. Descriptive statistics were used to tabulate overall results including mean scores on the Green-User scale, the overall quality of life statements, and the quality of life of university students scale for the overall sample and each demographic group.

#### *Instrument Scoring*

##### *Green-User Score*

Respondents were asked questions about their use of the campus green spaces and the arboretum (Green-User scale). The Green-User scale required respondents to indicate the frequency in which they spent time participating in various activities outdoors on-campus (Appendix B). Included on the scale were nine activities such as walking to and from class, exercising, participating in organized sports, as well as other activities (Appendix B). The possible responses were: "One to three times daily," "One to three times weekly," "One to three times monthly," "Rarely," and "Never." Scores related to responses of "One to three times daily" received five points, while responses of "One to three times weekly" received four points," "One to three times monthly" received three points, "Rarely" received two points, and "Never" received one point. Non-responses to any question received no points for that question. Also included was a question

regarding the overall frequency in which the respondent spent time outdoors on-campus. Possible responses and the points allocated for each response included: “Frequently” (four points), “Sometimes” (three points), “Not very much” (two points), and “Rarely” (one point).

Respondents were classified as low, medium, or high users of the green spaces and arboretum based on their responses to the Green-User scale. Individuals with 20 or fewer points (indicating most responses were, on average, scored one or two points) were ranked as “low-users” while individuals with 21 to 29 points (indicating most responses were, on average, scored three points) were “medium-users,” and individuals with 30 or more points (indicating most responses were, on average, scored four or five points) were “high-users.” Respondents included 63 low-users (13%), 117 medium-users (25%), and 289 high-users (61%) (Table 2).

Respondents’ overall Green-User scale scores ranged from eight points to 54 points, with a mean score of 31.3 and a standard deviation of 8.3. This indicates that, on average, more than half the students were ranked as “high-users” of the campus green spaces and arboretum, and that most of those who were not “high-users,” were, at least, “medium-users.”

**Table 2. Descriptive statistics indicating membership in Green-User group based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Classification	Low use <sup>z</sup>		Medium use <sup>y</sup>		High use <sup>x</sup>		Total
	Frequency	Frequency	Frequency	Frequency	Frequency	Frequency	
	(no.)	(%)	(no.)	(%)	(no.)	(%)	
Freshmen	1	1.8	8	14.3	47	83.9	56
Sophomores	6	8.3	13	18.1	53	73.6	72
Juniors	10	8.9	36	32.1	66	58.9	112
Seniors	17	12.8	33	24.8	83	62.4	133
Graduate Students	28	35.4	24	30.4	27	34.1	79
Total	62	13.7	114	25.2	276	61.1	452 <sup>w</sup>

<sup>z</sup>Scored 20 or fewer points on the Green-User scale.

<sup>y</sup>Scored 21 to 29 points on the Green-User scale.

<sup>x</sup>Scored 30 or more points on the Green-User scale.

<sup>w</sup>Number of respondents varied due to non-responses.

#### *Overall Quality of Life Questions*

Another section of the instrument included two questions asking the respondent to indicate their overall quality of life (Table 3). Questions asked how students felt today and how they would rank their overall quality of life. Possible responses to “When all things in your life are considered, how do you feel today?” were “Miserable,” “Not very happy,” “Ok,” “Content,” and “Very happy.” Possible responses to “Overall, how would you rank the quality of your life?” “Dissatisfied,” “Mostly dissatisfied,” “Satisfied,” “Mostly satisfied,” and “Very satisfied.” On these questions, more positive responses scored more points. Therefore, responses of “Miserable” and “Dissatisfied” scored only one point, and responses of “Very happy” and “Very satisfied” scored five points. Mean scores to both questions were greater than 4.0, indicating most students were at least “Content” and “Mostly satisfied” with regards to their overall quality of life.

**Table 3. Descriptive statistics indicating frequency of responses to questions on the overall quality of life questions in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life Question	“Miserable” (1)		“Not very happy” (2)		“Ok” (3)		“Content” (4)		“Very happy” (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
When all things in your life are considered, how do you feel today?	5	1.1	11	2.3	74	15.8	223	47.5	145	30.9	4.1	0.8
Overall, how would you rank the quality of your life?	“Dissatisfied” (1)		“Mostly dissatisfied” (2)		“Satisfied” (3)		“Mostly satisfied” (4)		“Very satisfied” (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Overall, how would you rank the quality of your life?	1	0.2	17	3.7	78	17.1	207	45.5	152	33.4	4.1	0.8

#### *Quality of Life of University Students*

In addition to the Green-User scale, respondents were asked to respond to a series of 46 statements regarding the quality of life of university students (Appendix B). This instrument was based on scales developed by Roberts and Clifton (1991, 1992a, 1992b) and Clifton et al. (1996) and measured both the *affective* and *cognitive* quality of life of university students. Statements were rated on a five point Likert-type scale with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). While most statements were positive in nature, and scoring was equivalent to the responses, some were negative and required reverse coding (questions 37-40). Therefore, a response of one resulted in a score of five points, and a response of five resulted in a score of one point for these questions. Non-response to any statement resulted in zero points for that question.

**Table 4. Descriptive statistics indicating frequency of responses to statements on the affective domain<sup>z</sup> of quality of life of university students<sup>y</sup> in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Statement	Strongly Disagree (1)		Disagree (2)		Undecided / Neutral (3)		Agree (4)		Strongly Agree (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Positive Affective											62.2	12.9
The things I learn are important to me.	4	0.9	1	0.2	8	1.7	147	31.3	296	64.9	4.6	0.6
People look up to me.	2	0.4	10	2.1	121	25.8	257	54.8	67	14.3	3.8	0.7
I really get involved in my work.	3	0.7	10	2.2	64	14.0	232	50.9	147	32.2	4.1	0.8
I like learning.	1	0.2	4	0.9	23	5.1	200	44.0	227	49.9	4.4	0.7
I enjoy being.	1	0.2	3	0.7	39	8.6	183	40.2	229	50.3	4.4	0.7
I am given the chance to do work that really interests me.	6	1.3	34	7.5	84	18.5	181	39.8	150	33.0	4.0	1.0
The things I am taught are worthwhile learning.	2	0.4	14	3.1	59	12.9	218	47.8	163	35.7	4.2	0.8
I really like to go to school each day.	9	2.0	44	9.6	111	24.3	210	46.0	83	18.2	3.7	0.9
The work I do is good preparation for my future.	7	1.5	16	3.5	66	14.5	189	41.4	178	39.0	4.1	0.9
I have learned to work hard.	5	1.1	14	3.1	57	12.5	199	43.6	181	39.7	4.2	0.9
I find that learning is a lot of fun.	2	0.4	33	7.3	106	23.3	201	44.2	113	24.8	3.9	0.9

**Table 4-Continued**

Statement	Strongly Disagree (1)		Disagree (2)		Undecided/ Neutral (3)		Agree (4)		Strongly Agree (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Interaction with Students											18.5	4.4
I find it easy to get to know other people.	15	3.3	50	11.0	94	20.7	187	41.1	109	24.0	3.7	1.0
Mixing with other people helps me understand myself.	8	1.8	40	8.8	114	25.0	194	42.5	100	21.9	3.7	1.0
People think a lot of me.	4	0.9	16	3.5	187	41.0	195	42.8	54	11.8	3.6	0.8
Other students accept me as I am.	3	0.9	14	3.1	80	17.7	269	59.4	87	19.2	3.9	0.7
I get along well with the other students in my class.	1	0.2	7	1.5	49	10.4	276	58.8	121	26.7	4.1	0.7
Interaction with Professors											34.5	8.2
Professors treat me fairly.	6	1.3	6	1.3	34	7.2	268	59.0	140	30.8	4.2	0.7
Professors give me the marks I deserve.	2	0.4	13	2.9	59	13.0	244	53.9	135	29.8	4.1	0.8
I achieve a satisfactory standard in my work.	4	0.9	11	2.4	44	9.7	266	58.7	128	28.3	4.1	0.7
People care about what I think.	5	1.1	14	3.1	133	29.4	240	53.1	60	13.3	3.7	0.8
Professors take a personal interest in helping me with my work.	12	2.7	37	8.2	131	29.0	188	41.6	84	18.6	4.1	0.7
I am treated with respect.	2	0.4	9	2.0	36	7.9	292	64.5	114	25.2	4.1	0.7

**Table 4-Continued**

Statement	Strongly Disagree (1)		Disagree (2)		Undecided/ Neutral (3)		Agree (4)		Strongly Agree (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Professors help me do my best.	4	0.9	19	4.2	106	23.5	225	49.8	98	21.7	3.9	0.8
Professors are fair and just.	6	1.3	13	2.9	76	16.8	264	58.4	93	20.6	3.9	0.8
Professors listen to what I say.	7	1.6	10	2.2	89	19.7	251	55.7	94	20.8	3.9	0.8
(The following questions were reverse coded)	<b>Strongly Agree (1)</b>		<b>Agree (2)</b>		<b>Undecided/ Neutral (3)</b>		<b>Disagree (4)</b>		<b>Strongly Disagree (5)</b>		<b>Mean</b>	<b>SD</b>
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Negative Affect												(see Positive Affect)
I feel depressed.	5	1.1	39	8.6	62	13.7	146	32.2	201	44.4	4.1	1.0
I feel restless.	15	3.3	86	19.0	92	20.3	132	29.1	128	28.3	3.6	1.2
I get upset.	8	1.8	108	23.8	122	26.9	117	25.8	98	21.6	3.4	1.1
I feel worried.	16	3.6	118	26.2	110	24.4	121	26.9	85	18.9	3.3	1.2
Overall Affective											115.1	23.7

<sup>z</sup>The affective domain measures students' feelings of self-worth.

<sup>y</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

#### *Affective Domain of Quality of Life of University Students*

The *affective* domain of quality of life of university students was measured using a series of 30 statements encompassing four dimensions (*positive affective, interaction with students, interaction with professors, and negative affective*). Respondents' scores on the *affective* domain of quality of life of university students ranged from zero to 148, with a mean score of 115.1 and a standard deviation of 23.7. This indicated that most respondents rated statements as between neutral and positive. Therefore, they had fairly positive feelings of self-worth (Roberts and Clifton, 1991) (Table 4).

*Total Positive Affective Dimension of the Affective Domain of Quality of Life of University Students*

The *total positive affective* dimension of the affective domain of quality of life of university students consisted of both the *positive affective* dimension and the *negative affective* dimension (Clifton, 2006). This dimension was measured using a series of 12 positive affective statements and four negative affective statements. The *positive affective* dimension asked students to rate their agreement with statements such as, “The things I learn are important to me,” “I like learning,” “I am given the chance to do work that really interests me,” and others (Roberts and Clifton, 1992b) (Table 4). Responses were on a five point Likert-type scale, with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). Each of these statements were positive in nature, and scoring was equivalent to the responses, where a response of one scored one point and a response of five scored five points. Non-response to any question resulted in zero points for that question.

The *negative affective* dimension had four statements. These statements included: “I feel depressed,” “I feel restless,” “I get upset,” and “I feel worried” (Roberts and Clifton, 1992b) (Table 4). These statements were again responded to on a five point Likert-type scale, with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). However, these questions were negative in nature, and scoring was reversed. Therefore, a response of one resulted in a score of five points, and a response of five resulted in a score of one point for these questions. Again, non-response to any question resulted in zero points for that question.

Respondents' scores on the *total positive affective* dimension of the *affective* domain of quality of life of university students ranged from zero to 80, with a mean score of 62.2 and a standard deviation of 12.9 (Table 4). This indicated that most respondents gave answers that were between neutral and positive (agree for positive affective and disagree for negative affective) and showed students felt positively about their student experiences in the university (Roberts and Clifton, 1992b)

*Interaction with Students Dimension of the Affective Domain of Quality of Life of University Students*

The *interaction with students* dimension of the *affective* domain of quality of life of university students was measured using a series of five statements. This section of the survey included statements such as, "I find it easy to get to know other people," "Mixing with other people helps me understand myself," and others (Roberts and Clifton, 1992b) (Table 4). These statements were also rated on a five point Likert-type scale, with responses of one indicating "strongly disagree" and responses of five indicating "strongly agree" (Likert, 1967). These statements were positive in nature and scoring was equivalent to the responses. Therefore, a response of one scored one point and a response of five scored five points. Non-response to any statement resulted in zero points for that statement.

Respondents' scores on the *interaction with students* dimension of the *affective* domain of quality of life of university students ranged from zero to 25, with a mean score of 18.5 and a standard deviation of 4.4 (Table 4). This indicated that most respondents gave responses that were between neutral and agree, and felt positively about their interactions with other students from the university (Roberts and Clifton, 1992b).

*Interaction with Professors Dimension of the Affective Domain of Quality of Life of University Students*

The *interaction with professors* dimension of the *affective* domain of quality of life of university students was measured using a series of nine statements. These statements included: “Professors treat me fairly,” “Professors give me the marks I deserve,” and others (Roberts and Clifton, 1992b) (Table 4). These statements were also responded to on a five point Likert-type scale, with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). Each of these statements were positive in nature, and scoring was equivalent to the responses, where a response of one scored one point and a response of five scored five points. Non-response to any question resulted in zero points for that question.

Respondents’ scores on the *interaction with professors* dimension of the *affective* domain of quality of life of university students ranged from zero to 45, with a mean score of 34.4 and a standard deviation of 8.2 (Table 4). This indicated that most respondents gave responses that were between neutral and agree and felt positively about their interactions with professors at the university (Roberts and Clifton, 1992b).

*Cognitive Domain of Quality of Life of University Students*

The *cognitive* domain of quality of life of university students was measured using a series of 17 statements encompassing two dimensions (*functional* and *structural*). Each statement was preceded with: “At Texas State University, I have been challenged to...” Respondents’ scores on the *cognitive* domain of quality of life of university students ranged from zero to 85, with a mean score of 62.4 and a standard deviation of 17.0 (Table 5). This indicated that most respondents gave responses that were between neutral and

agree, and felt positively regarding the stimulation and challenge of their intelligence in the university (Roberts and Clifton, 1991).

**Table 5. Descriptive statistics indicating frequency of responses to statements on the cognitive domain<sup>z</sup> of quality of life of university students<sup>y</sup> in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Statement <sup>x</sup>	Strongly Disagree (1)		Disagree (2)		Undecided/Neutral (3)		Agree (4)		Strongly Agree (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Functional											40.0	11.1
Demonstrate how theories are useful in real life.	9	2.0	36	8.0	123	27.4	222	49.4	59	13.1	3.6	0.9
Identify organizing principles in my courses.	5	1.1	20	4.5	83	18.6	270	60.4	69	15.4	3.9	0.8
Use theories to address practical questions.	5	1.1	27	6.0	99	22.1	245	54.7	72	16.1	3.8	0.8
Analyze complex interrelations hips between concepts.	5	1.1	27	6.0	99	22.1	245	54.7	72	16.1	3.9	0.8
Develop new ideas based on theories.	7	1.6	34	7.6	112	25.0	214	47.8	81	18.1	3.6	0.9
Apply theories to new situations.	7	1.6	30	6.7	85	19.0	244	54.5	82	18.3	3.8	0.9
Make original contributions to classroom discussions.	4	0.9	20	4.5	76	16.2	248	52.9	99	21.1	3.9	0.8
Identify the strengths and weaknesses of arguments.	5	1.1	20	4.5	80	18.0	248	55.7	92	20.7	3.9	0.8
Apply theoretical principles in solving problems.	7	1.6	21	4.7	93	20.8	249	53.1	78	17.4	3.8	0.8
Organize ideas in new ways.	7	1.6	22	4.9	87	19.5	247	55.4	83	18.6	3.9	0.8

**Table 5-Continued**

Statement	Strongly Disagree (1)		Disagree (2)		Undecided/ Neutral (3)		Agree (4)		Strongly Agree (5)		Mean	SD
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)		
Identify bias in written material.	8	1.8	37	8.3	98	22.0	210	47.1	93	20.9	3.8	0.9
Structural											22.3	6.4
Remember an extensive number of new concepts.	6	1.3	26	5.8	92	20.6	212	47.4	111	24.8	3.9	0.9
Recall a substantial number of new concepts.	6	1.3	25	5.6	88	19.7	217	48.7	110	24.7	3.9	0.9
Interpret the meaning of new facts and terms.	4	0.9	13	2.9	60	13.4	264	59.1	106	23.7	4.0	0.8
Remember an extensive number of facts.	6	1.3	23	5.1	94	21.0	223	49.9	101	22.6	3.9	0.9
Recall a significant number of facts.	6	1.3	15	3.3	82	18.3	238	53.1	107	23.9	4.0	0.8
Remember complex facts.	6	1.4	21	4.7	96	21.7	228	51.5	92	20.8	3.9	0.9
Overall Cognitive											62.4	17.0

<sup>z</sup>The cognitive domain measures students' perception of the stimulation and challenge of their intellect.

<sup>y</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>x</sup>Each statement was preceded with: "At Texas State University, I have been challenged to..."

### *Functional Dimension of the Cognitive Domain of Quality of Life of University*

#### *Students*

The *functional* dimension of the *cognitive* domain of quality of life of university students was measured using a series of 11 statements. These statements included:

“Demonstrate how theories are useful in real life,” “Identify organizing principles in my courses,” “Use theories to address practical questions,” and others (Clifton et al., 1996) (Table 5). These questions were answered on a five point Likert-type scale, with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). All of these questions were positive in nature, and scoring was equivalent to the responses, where a response of one scored one point and a response of five scored five points. Non-response to any question resulted in zero points for that question. Higher scores on this dimension meant that students felt they were

Respondents’ scores on the *functional* dimension of the *cognitive* domain of quality of life of university students ranged from zero to 55, with a mean score of 40.0 and a standard deviation of 11.1 (Table 5). This indicated that most respondents gave ratings that were between neutral and agree, and that students felt positively about their experience in the university with regards to the complex skills of application, analysis, synthesis, and evaluation (Clifton et al., 1996).

#### *Structural Dimension of the Cognitive Domain of Quality of Life of University Students*

The *structural* dimension of the *cognitive* domain of quality of life of university students was measured using a series of six statements. These statements included: “Remember an extensive number of new concepts,” “Recall a substantial number of new concepts,” “Interpret the meaning of new facts and terms,” and others (Clifton et al., 1996) (Table 5). These statements were also rated on a five point Likert-type scale, with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). Each of these statements were positive in nature, and scoring was

equivalent to the responses, where a response of one scored one point and a response of five scored five points. Non-response to any question resulted in zero points for that question. Higher scores on this dimension meant that students felt they were challenged to “apply and evaluate arguments” in the university environment (Clifton et al., 2004, p. 812).

Respondents’ scores on the *structural* dimension of the *cognitive* domain of quality of life of university students ranged from zero to 30, with a mean score of 22.3 and a standard deviation of 6.4 (Table 5). This indicated that most respondents gave ratings between agree and strongly agree and that students felt positively about their experience in the university with regard to knowledge and comprehension skills (Clifton et al., 1996).

#### *Overall Quality of Life of University Students*

Points from all questions in both domains (*affective* and *cognitive*) were added to result in an overall quality of life of university student score (Clifton, 2006). Overall quality of life of university students’ scores ranged from zero to 231, with a mean score of 177.4 and a standard deviation of 38.2 (Table 5). This indicated that most respondents gave responses that were between neutral and agree, and thus, students felt fairly positive about both their affective and cognitive experiences in the university.

#### *Data Analysis*

A Pearson Product-Moment correlation was run between respondents’ Green-User scores, responses to overall quality of life questions, and their overall student quality of life score, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension,

and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) (Table 6). Statistically significant correlations were found between Green-User scores and responses to both of the overall quality of life questions ( $P=0.026$  and  $P=0.002$ ). Each of these correlations indicated a low relationship between Green-User scores and overall quality of life ( $r=0.104$  and  $r=0.142$ ) (Davis, 1971). The correlation between Green-User scores and overall quality of life of university students was not significant ( $P=0.432$ ) (Table 6).

**Table 6. Correlation matrix indicating the Pearson's Product-Moment correlation between Green-User score<sup>z</sup>, overall quality of life, overall quality of life of university students<sup>y</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension), in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale		Green User Score
Overall Quality of Life		
When all things in your life are considered, how do you feel today? <sup>x</sup>	Pearson Correlation	0.104
	<i>P</i>	0.026*
	<i>N</i>	458
Overall, how would you rank the quality of your life? <sup>w</sup>	Pearson Correlation	0.142
	<i>P</i>	0.002*
	<i>N</i>	458
Quality of Life of University Students		
Overall Quality of Life of University Students <sup>y</sup>	Pearson Correlation	0.036
	<i>P</i>	0.432
	<i>N</i>	469
Affective Domain <sup>u</sup>	Pearson Correlation	0.035
	<i>P</i>	0.447
	<i>N</i>	469
Total Positive Affective Dimension <sup>t</sup>	Pearson Correlation	0.020
	<i>P</i>	0.669
	<i>N</i>	469
Interaction with Students Dimension <sup>s</sup>	Pearson Correlation	0.086
	<i>P</i>	0.063
	<i>N</i>	469

**Table 6-Continued**

Scale		Green User Score
Interaction with Professors Dimension <sup>f</sup>	Pearson Correlation	0.024
	<i>P</i>	0.605
	<i>N</i>	469
Cognitive Domain <sup>q</sup>	Pearson Correlation	0.031
	<i>P</i>	0.508
	<i>N</i>	469
Functional Dimension <sup>p</sup>	Pearson Correlation	0.022
	<i>P</i>	0.639
	<i>N</i>	469
Structural Dimension <sup>o</sup>	Pearson Correlation	0.034
	<i>P</i>	0.460
	<i>N</i>	469

\*Statistically significant at the 0.05 level.

<sup>z</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

<sup>y</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>x</sup>Responses ranged from one to five, with one being less positive and five being more positive.

<sup>w</sup>Responses ranged from one to five, with one being less positive and five being more positive.

<sup>v</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>u</sup>Scores on the affective domain ranged from zero to 148.

<sup>t</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>s</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>r</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>q</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>p</sup>Scores on the functional dimension ranged from zero to 55.

<sup>o</sup>Scores on the structural dimension ranged from zero to 30.

### *Findings Related to Objective Two*

The second objective of this study was to investigate the locations where students used the campus green spaces and the arboretum in daily life. To do this, students were asked to indicate their favorite place for participating in ten outdoor activities on-campus. Activities included walking to and from class, exercising, socializing with friends, as well as other activities (Appendix B).

### *Data Analysis*

Data were coded from the qualitative responses on the questionnaire (Appendix B). Responses were tallied, and frequencies were run to determine the areas where students participated in various activities.

#### *Favorite Outdoor On-campus Places*

##### *Walking To and From Class*

Overall, students seemed to indicate an overwhelming preference (48.6 %) for walking through the Quad to get to and from class. Other areas students enjoyed walking included Sewell Park (7.5%), around the Lyndon B. Johnson Student Center (4.7%), Alkek Library (1.9%) and the ponds around the J.C. Kellam Administration Building (1.9%). Frequency statistics also revealed that almost a third of students (26.7%) had no favorite place for walking to and from class. Approximately 10% of respondents indicated some other favorite place such as around the Evans Language Arts Building and around Old Main (Table 7).

##### *Exercising*

Overall, students indicated a preference for on-campus outdoor exercising around the Student Recreation Center (23.9%). Other areas where students enjoyed exercising included Sewell Park (10.0%), the soccer fields (3.2%), and the Quad (1.3%). However, over half (53.1%) of all students indicated that they did not have a favorite outdoor on-campus place for exercising. Approximately 8% of respondents indicated some other favorite place such as The Aquarena Center or the fields at Bobcat Village to exercise outdoors (Table 7).

**Table 7. Descriptive statistics indicating students' favorite on-campus place for participation in nine activities in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Activity Favorite Place	Walking To and From Class		Exercising		Organized Sports/Intramurals		Socializing with Friends	
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)
Alkek Library	9	1.9	0	0	0	0	4	0.9
Intramural Fields	0	0	1	0.2	12	2.6	0	0
L.B.J. Student Center	16	3.4	2	0.4	0	0	41	8.7
Ponds	9	1.9	0	0	0	0	1	0.2
Quad	228	48.6	6	1.3	0	0	116	24.7
Sewell Park	35	7.5	47	10.0	15	3.2	61	13.0
Soccer Fields	0	0	15	3.2	29	6.2	1	0.2
Student Recreation Center	0	0	112	23.9	26	5.5	2	0.4
The Den	0	0	0	0	0	0	7	1.5
Other	47	10.0	37	7.9	44	9.4	44	9.4
No Favorite Place	125	26.7	249	53.1	343	73.1	192	40.9

Activity Favorite Place	Club Meetings		Studying		Eating		Relaxing		Working	
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)
Alkek Library	3	0.6	106	22.6	3	0.6	16	3.4	10	2.3
Intramural Fields	0	0	0	0	0	0	0	0	0	0
L.B.J. Student Center	49	10.4	37	7.9	117	24.9	32	6.8	39	8.3
Ponds	1	0.2	7	1.5	1	0.2	5	1.1	19	4.1
Quad	9	1.9	15	3.2	14	3.0	37	7.9	61	13.0
Sewell Park	10	2.1	29	6.2	9	1.9	97	20.7	40	8.5
Soccer Fields	0	0	0	0	0	0	0	0	0	0
Student Recreation Center	0	0	0	0	0	0	1	0.2	0	0
The Den	0	0	9	1.9	26	5.5	4	0.9	5	1.1
Other	29	6.2	44	9.4	61	13.0	30	6.4	87	18.6
No Favorite Place	368	78.5	222	47.3	238	50.7	247	52.7	208	44.3

### *Organized/Intramural Sports*

Most students who had a preference indicated the soccer fields (6.2%) as their favorite place for on-campus outdoor organized or intramural sports. Other areas where students enjoyed this activity included the Student Recreation Center (5.5%), Sewell Park (3.2%), and the intramural fields (2.6%). Almost 10% of all students indicated some other place as their favorite place for intramural or organized sports. Other places students selected included the west campus fields, the baseball fields, and Bobcat Village

fields. However, almost three-fourths (73.1%) of students indicated that they did not have a favorite outdoor on-campus place for this type of activity (Table 7).

#### *Socializing with Friends*

Most students indicated a preference for the Quad as a place to socialize with friends (24.7%). Other areas where students enjoyed socializing with friends included Sewell Park (13.0%), the Lyndon B. Johnson Student Center (8.7%), and The Den (1.5%). Almost 10% of students indicated some other place to socialize with friends such as around the Agriculture Building, the Evans Language Arts Building, and the McCoy Building. However, almost half (40.9%) of students indicated that they did not have a favorite outdoor on-campus place for socializing with friends (Table 7).

#### *Club Meetings*

Most students preferred holding club meetings outside at the Lyndon B. Johnson Student Center (10.4%). Other areas where students enjoyed holding outdoor club meetings included Sewell Park (2.1%) and the Quad (1.9%). More than 6% of students indicated some other place they enjoyed holding club meetings such as near the ponds around the J.C. Kellam Building and outside the Agriculture Building. However, over three-fourths (78.5%) of respondents did not have a favorite place outdoors where they would to hold club meetings (Table 7).

#### *Studying*

Most students preferred to study outside near the library (22.6%). Some other major places where students enjoyed studying outside included the Lyndon B. Johnson Student Center (7.9%) and at Sewell Park (6.2%). Almost 10% of students indicated some other place where they could study outside such as the Agriculture Building and

near the ponds at the J.C. Kellam Administration Building. Almost half of all respondents (47.4%), though, did not indicate a favorite outdoor study area (Table 7).

### *Eating*

Most students indicated a preference for outdoor on-campus eating at the Lyndon B. Johnson Student Center (24.9%). Students also enjoyed eating outside at The Den (5.5%), the Quad (3.0%), and Sewell Park (1.9%). Approximately 13% of students indicated other locations as their favorite places for outdoor eating such as the Agriculture Building or the Evans Language Arts Building. However, some students (13.9%) indicated no favorite outdoor on-campus place for eating (Table 7).

### *Relaxing*

Most students seemed to indicate a preference for relaxing on-campus outdoors at Sewell Park (20.7%). Other areas where students seemed to enjoy relaxing outside included the Quad (7.9%) and the Lyndon B. Johnson Student Center (6.8%). Only 6% of students indicated some other location as their favorite place. Such areas included around the Agriculture Building and the Evans Language Arts Building. However, over half (50.7%) of students indicated that they did not have a favorite outdoor on-campus place for relaxing (Table 7).

### *Working*

Most students indicated a preference working outdoors on-campus at the Quad (13%). Other areas students where seemed to enjoy working outside included Sewell Park (8.5%), the Lyndon B. Johnson Student Center (8.3%), and near the ponds by the J.C. Kellam Administration Building (4.1%). Almost one-fifth (18.6%) of students indicated some other place as their favorite place to work outdoors including the

Agriculture Building, the Evans Language Arts Building, and the Centennial Building. However, over half (50.7%) of students indicated that they did not have a favorite place for working outdoors on-campus (Table 7).

### *Findings Related to Objective Three*

The third objective of this study was to compare students, based on demographics, to observe whether any particular group appeared to use the campus arboretum and green spaces more frequently, and to compare demographic groups on perceptions of quality of life.

#### *Student Grade Classification Comparisons*

##### *Data Analysis*

Scores of freshmen, sophomores, juniors, seniors, and graduate students were compared using a Pearson's Product-Moment correlation and analysis of variance (ANOVA) tests to investigate whether or not a specific classification appeared to use and benefit more from use of campus green spaces and the arboretum.

##### *Use of Campus Green Spaces and Arboretum*

A Pearson's Product-Moment correlation indicated a statistically significant reverse relationship between student grade classification and the Green-User scores ( $r=-0.344$ ,  $P=0.000$ ) (Table 8). This showed that as student grade classification moved from freshmen to seniors, Green-User scores tended to decline. Therefore, freshmen and sophomores tended to have higher Green-User scores when compared to juniors and seniors.

**Table 8. Correlation matrix indicating the Pearson’s Product-Moment correlation between Green-User score and student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Green-User Score <sup>z</sup>		Student Grade Classification <sup>y</sup>
	Pearson Correlation	-0.344
	<i>P</i>	0.000*
	<i>N</i>	452

\*Statistically significant at the 0.05 level.

<sup>z</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

<sup>y</sup>Student grade classifications ranged from freshmen, who were coded as “one”, through graduate students who were coded as “five.”

An ANOVA test further compared student grade classification and Green-User scores. Statistically significant differences ( $P=0.000$ ) were found indicating differences in Green-User score based on student grade classification (Table 9).

**Table 9. ANOVA test comparing mean scores on the Green-User scale based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Student Grade Classification	Sample Size (no.)	Mean Score <sup>z</sup>	SD	df	F	<i>P</i>
Freshmen	56	35.5	6.0	4	18.022	0.000*
Sophomores	72	34.4	8.0			
Juniors	112	31.6	7.7			
Seniors	133	31.1	7.9			
Graduate Students	79	25.4	8.7			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Scores ranged from eight through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

Post hoc analysis (Tukey’s HSD) revealed that all student grade classifications were statistically different from graduate students (Table 10). Freshmen students were different from all other grade classifications except for sophomores. Seniors and junior students also had statistically similar scores. Furthermore, freshmen had the highest mean Green-User scores, followed by sophomores, then juniors and seniors, and finally graduate students with the lowest Green-User scores.

**Table 10. Mean differences of scores (Tukey's HSD) on the Green-User scale based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Student Grade Classification	Freshmen <sup>z</sup>	Sophomores	Juniors	Seniors	Graduate Students
Freshmen	-	1.14	3.93*	4.41*	10.10*
Sophomores	-1.14	-	2.79	3.26*	8.96*
Juniors	-3.93*	-2.79	-	0.48	6.17*
Seniors	-4.41*	-3.26*	-0.48	-	5.70*
Graduate Students	-10.10*	-8.96*	-6.17*	-5.70*	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences were calculated as group in the row minus the group in the column.

#### *Overall Quality of Life*

An ANOVA test compared students' responses on the two overall quality of life statements based on student grade classification. Statistically significant differences were found with regards to the question "Overall, how would you rank the quality of your life?" ( $P=0.024$ ). However, no statistically significant differences were found with regards to the question "When all things in your life are considered, how do you feel today?" ( $P=0.480$ ) (Table 11).

**Table 11. ANOVA test comparing responses to overall quality of life statements based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life Statement						
Student Grade Classification	Sample Size (no.)	Mean Score <sup>z</sup>	SD	df	F	P
When all things in your life are considered, how do you feel today?						
Freshmen	56	4.0	0.9	4	0.872	0.480
Sophomores	72	4.2	0.8			
Juniors	112	4.1	0.7			
Seniors	133	4.1	0.8			
Graduate Students	79	4.2	0.9			
Overall, how would you rank the quality of your life?						
Freshmen	56	3.8	0.9	4	2.848	0.024*
Sophomores	71	4.2	0.8			
Juniors	111	4.1	0.7			
Seniors	133	4.1	0.8			
Graduate Students	79	4.3	0.8			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

Post hoc analysis (Tukey's HSD) revealed that the only groups who differed were graduate students when compared to freshmen on the question "Overall, how would you rank the quality of your life?" In this comparison, graduate students had statistically significantly higher scores when compared to freshmen (Table 12). This indicated that graduate students felt more positively about their quality of life when compared to freshmen students.

**Table 12. Mean differences of scores (Tukey's HSD) on the overall quality of life statement "Overall, how would you rank the quality of your life?" based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life Statement					
Student Grade Classification	Freshmen <sup>z</sup>	Sophomores	Juniors	Seniors	Graduate Students
Overall, how would you rank the quality of your life?					
Freshmen	-	-0.39	-0.21	-0.21	-0.41*
Sophomores	0.39	-	0.18	0.17	-0.03
Juniors	0.21	-0.18	-	-0.01	-0.21
Seniors	0.21	-0.17	0.01	-	-0.20
Graduate Students	0.41*	0.03	0.21	0.20	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences were calculated as group in the row minus the group in the column.

#### *Quality of Life of University Students*

An ANOVA test compared students' perception of quality of life of university students based on student grade classification. Statistically significant differences were found in mean quality of life of university students' scores on the overall scale ( $P=0.000$ ). Statistically significant differences were also found in the affective domain ( $P=0.000$ ), specifically within the total positive affect dimension ( $P=0.000$ ) and the interaction with professors dimension ( $P=0.000$ ). No significant differences were found within the cognitive domain as a whole ( $P=0.053$ ). However, within the functional dimension of the cognitive domain, statistically significant differences were found ( $P=0.004$ ) (Table 13).

**Table 13. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Student Grade Classification	Sample Size (no.)	Mean Score	SD	df	F	P
Overall Quality of Life of University Students <sup>y</sup>							
	Freshmen	56	174.0	18.5	4	6.419	0.000*
	Sophomores	72	179.6	19.0			
	Juniors	112	182.5	18.8			
	Seniors	133	184.1	27.3			
	Graduate Students	79	192.5	22.1			
Affective Domain <sup>x</sup>							
	Freshmen	56	113.1	11.1	4	8.551	0.000*
	Sophomores	72	115.3	12.5			
	Juniors	112	117.7	11.9			
	Seniors	133	119.5	15.9			
	Graduate Students	79	125.2	13.2			
Total Positive Affective Dimension <sup>w</sup>							
	Freshmen	56	60.3	6.2	4	10.001	0.000*
	Sophomores	72	62.8	7.3			
	Juniors	112	63.3	7.4			
	Seniors	133	64.3	8.8			
	Graduate Students	79	68.2	7.4			
Interaction with Students Dimension <sup>v</sup>							
	Freshmen	56	18.7	3.0	4	1.605	0.172
	Sophomores	72	18.9	3.2			
	Juniors	112	18.8	2.9			
	Seniors	133	19.4	3.2			
	Graduate Students	79	19.6	3.0			
Interaction with Professors Dimension <sup>u</sup>							
	Freshmen	56	34.1	4.8	4	5.526	0.000*
	Sophomores	72	33.8	5.2			
	Juniors	112	35.7	4.6			
	Seniors	133	35.9	6.3			
	Graduate Students	79	37.4	5.2			
Cognitive Domain <sup>t</sup>							
	Freshmen	56	60.9	10.5	4	2.354	0.053
	Sophomores	72	64.2	9.5			
	Juniors	112	65.1	10.4			
	Seniors	133	64.6	14.9			
	Graduate Students	79	67.3	11.7			
Functional Dimension <sup>s</sup>							
	Freshmen	56	38.9	6.7	4	3.912	0.004*
	Sophomores	72	41.2	6.8			
	Juniors	112	41.6	6.9			

**Table 13-Continued**

Scale	Student Grade Classification	Sample Size (no.)	Mean Score	SD	df	F	P
Functional Dimension							
	Seniors	133	41.1	9.8			
	Graduate Students	79	44.2	7.9			
Structural Dimension <sup>f</sup>							
	Freshmen	56	22.0	4.6	4	1.154	0.330
	Sophomores	72	23.0	3.8			
	Juniors	112	23.6	4.5			
	Seniors	133	23.5	5.7			
	Graduate Students	79	23.0	4.8			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>r</sup>Scores on the structural dimension ranged from zero to 30.

Post hoc analysis (Tukey's HSD) revealed that in most cases, it was graduate students who were different from the other student grade classifications (Table 14). Graduate students had statistically significantly higher mean scores on the overall scale, as well as on both the affective and cognitive domains indicating they had a higher sense of self-worth as well as felt they had been stimulated and challenged intellectually in the university when compared to other students (Roberts and Clifton, 1991). Furthermore, graduate students had statistically significantly higher mean scores when compared to all other groups on the total affective dimension within the affective domain indicating graduate students felt they experienced a more positive sense of their experiences within the university (Roberts and Clifton, 1992b). Graduate students also had higher mean scores when compared to freshmen and sophomores on the interaction with professors

dimension, which indicated they felt more positively regarding the quality of these interactions (Table 14) (Roberts and Clifton, 1992b).

Additionally, graduate students had significantly higher scores when compared to freshmen and seniors on the functional dimension within the cognitive domain. This finding meant that graduate students felt more positively about utilizing more complex skills such as application, analysis, synthesis, and evaluation within the university when compared to freshmen or seniors (Table 14) (Clifton et al., 1996).

However, within the interaction with students dimension of the affective domain and the structural dimension of the cognitive domain, all groups had similar mean scores (Table 14). This meant that students felt similarly about their relationships with other students at the university regardless of their student grade classification.

Overall, graduate students appeared to have higher scores on the quality of life of university students instrument when compared to other student grade classifications. This indicated that graduate students, in general, felt more positively about these types of experiences within the university setting.

**Table 14. Mean differences of scores (Tukey's HSD) on the quality of life of university students instrument<sup>z</sup> based on student grade classification in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Student Grade Classification	Freshmen <sup>y</sup>	Sophomores	Juniors	Seniors	Graduate Students
Overall Quality of Life of University Students						
	Freshmen	-	-5.58	-8.49	-10.07*	-18.49*
	Sophomores	5.58	-	-2.91	-4.48	-12.91*
	Juniors	8.49	2.91	-	-1.58	-10.00*
	Seniors	10.07*	4.48	1.58	-	-8.43
	Graduate Students	18.48*	12.91*	10.00*	8.43	-
Affective Domain						
	Freshmen	-	-2.19	-4.61	-6.41*	-12.14*
	Sophomores	2.19	-	-2.41	-4.22	-9.95*
	Juniors	4.61	2.41	-	-1.80	-7.54*
	Seniors	6.41*	4.22	1.80	-	-5.73*
	Graduate Students	12.14*	9.95*	7.54*	5.73*	-
Total Positive Affective Dimension						
	Freshmen	-	-2.44	-2.94	-3.96*	-7.92*
	Sophomores	2.44	-	-0.50	-1.02	-3.96*
	Juniors	2.94	0.50	-	-1.02	-4.98*
	Seniors	3.96*	1.51	1.02	-	-3.96*
	Graduate Students	7.92*	5.48*	4.98*	3.96*	-
Interaction with Professors Dimension						
	Freshmen	-	0.30	-1.61	-1.80	-3.31*
	Sophomores	-0.30	-	-1.91	-2.10	-3.62*
	Juniors	1.61	-1.91	-	-2.10	-1.71
	Seniors	1.80	2.10	0.19	-	-1.52
	Graduate Students	3.31*	3.62*	1.71	1.52	-
Functional Dimension						
	Freshmen	-	-2.27	-2.66	-2.23	-5.35*
	Sophomores	2.27	-	-0.39	0.04	-3.07
	Juniors	2.66	0.39	-	0.43	-2.69

**Table 14-Continued**

Scale	Student Grade Classification	Freshmen <sup>y</sup>	Sophomores	Juniors	Seniors	Graduate Students
Functional Dimension	Seniors	2.23	-0.04	-0.43	-	-3.11*
	Graduate Students	5.35*	3.07	2.69	3.11*	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Mean differences were calculated as group in the row minus the group in the column.

### *Undergraduate Students*

Graduate students tended to have statistically significantly higher quality of life scores on the overall quality of life statements as well as on the quality of life of university students instrument when compared to other student grade classifications. Alternatively, they tended to have statistically significantly lower Green-User scores when compared to other student grade classifications. Since graduate students tended to be different from students of other grade classifications, additional analyses were run with only undergraduate student responses to investigate any changes in results.

### *Data Analysis*

Scores of freshmen, sophomores, juniors, and seniors were compared using a Pearson's Product-Moment correlation to investigate relationships between Green-User scores and quality of life scores.

#### *Use of Campus Green Spaces and Arboretum*

A Pearson's Product-Moment correlation indicated a statistically significantly reverse relationship between student grade classification for undergraduate students and the Green-User scores ( $r=-0.212$ ,  $P=0.000$ ) (Table 15). Result were similar to those

found including graduate students in the analysis (Table 8), though the correlation was weaker without the graduate students. Again, results indicated that as student grade classification moved from freshmen to seniors, Green-User scores tended to decline, but less so than when graduate students were included in the analysis.

**Table 15. Correlation matrix indicating the Pearson’s Product-Moment correlation between Green-User score<sup>z</sup> and student grade classification for undergraduate students in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

		Student Grade Classification <sup>y</sup>
Green-User Score	Pearson Correlation	-0.212
	<i>P</i>	0.000*
	<i>N</i>	373

\*Statistically significant at the 0.05 level.

<sup>z</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

<sup>y</sup>Student grade classifications ranged from freshmen, who were coded as “one”, through seniors who were coded as “four.”

#### *Relationship Between Green-User Score and Quality of Life*

Additionally, a Pearson’s Product-Moment correlation indicated statistically significant relationships between Green-User score and both overall quality of life statements ( $P=0.016$  and  $P=0.001$ ), the overall quality of life of university students score ( $P=0.004$ ), the affective domain ( $P=0.001$ ), the interaction with students dimension of the affective domain ( $P=0.000$ ), the total positive affective dimension of the affective domain ( $P=0.003$ ), and the functional dimension of the cognitive domain ( $P=0.024$ ) for undergraduate students. Statistically significant correlations were not found on the cognitive domain ( $P=0.064$ ), the interaction with professors dimension of the affective domain ( $P=0.059$ ), or the structural dimension of the cognitive domain ( $P=0.377$ ) (Table 16).

These findings showed that undergraduate students who used campus green spaces and the arboretum more frequently tended to feel more positively about their feelings of self-worth within the university setting (Roberts and Clifton 1991, 1992a, 1992b). Furthermore, students who used the campus green spaces and the arboretum more frequently felt more positively about their interactions with other students within the university. Finally, the correlation found on the functional dimension of the cognitive domain indicated that students who used campus green spaces and the arboretum more frequently felt more positively regarding their ability to utilize complex skills such as application, analysis, synthesis, and evaluation (Clifton et al., 1996).

**Table 16. Correlation matrix indicating the Pearson's Product-Moment correlation between Green-User score<sup>z</sup>, overall quality of life, overall quality of life of university students<sup>y</sup>, both affective and cognitive domains, and the inclusive dimensions of undergraduate students in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale		Green User Score
Overall Quality of Life		
When all things in your life are considered, how do you feel today? <sup>x</sup>	Pearson Correlation	0.125
	<i>P</i>	0.016*
	<i>N</i>	373
Overall, how would you rank the quality of your life? <sup>w</sup>	Pearson Correlation	0.174
	<i>P</i>	0.001*
	<i>N</i>	371
Quality of Life of University Students		
Overall quality of life of university students score <sup>v</sup>	Pearson Correlation	0.147
	<i>P</i>	0.004
	<i>N</i>	373
Affective Domain <sup>u</sup>	Pearson Correlation	0.178
	<i>P</i>	0.001*
	<i>N</i>	373
Total Positive Affective Dimension <sup>t</sup>	Pearson Correlation	0.151
	<i>P</i>	0.003*
	<i>N</i>	373
Interaction with Students Dimension <sup>s</sup>	Pearson Correlation	0.224
	<i>P</i>	0.000*
	<i>N</i>	373

**Table 16-Continued**

Scale		Green User Score
Quality of Life of University Students		
Interaction with Professors Dimension <sup>f</sup>	Pearson Correlation	0.098
	<i>P</i>	0.059
	<i>N</i>	373
Cognitive Domain <sup>g</sup>	Pearson Correlation	0.096
	<i>P</i>	0.064
	<i>N</i>	373
Functional Dimension <sup>p</sup>	Pearson Correlation	0.117
	<i>P</i>	0.024*
	<i>N</i>	373
Structural Dimension <sup>o</sup>	Pearson Correlation	0.046
	<i>P</i>	0.377
	<i>N</i>	373

<sup>z</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

<sup>y</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>x</sup>Responses ranged from one to five, with one being less positive and five being more positive.

<sup>w</sup>Responses ranged from one to five, with one being less positive and five being more positive.

<sup>v</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>u</sup>Scores on the affective domain ranged from zero to 148.

<sup>t</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>s</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>r</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>q</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>p</sup>Scores on the functional dimension ranged from zero to 55.

<sup>o</sup>Scores on the structural dimension ranged from zero to 30.

### *Age Group Comparisons*

#### *Data Analysis*

Scores of the different age group categories (under 20 years, 21 to 25 years, 26 to 30 years, 31 to 35 years, 36 to 40 years, and over 40years) were compared using a Pearson Product-Moment correlation and ANOVA tests to investigate whether or not a

specific age group appeared to use and benefit more from campus green spaces and the arboretum.

*Use of Campus Green Spaces and Arboretum*

A Pearson's Product-Moment correlation indicated a statistically significant moderate reverse relationship (Davis, 1971) between age group classification and the Green-User scores ( $r=-0.389$ ,  $P=0.000$ ) (Table 17). This correlation showed that as age group membership increased, Green-User scores tended to decline. This finding supported the previous finding of the reverse correlation between student grade classification and Green-User score where Green-User scores tended to decline as student grade classification moved from freshmen to seniors, since student grade classification and age are frequently related.

**Table 17. Correlation matrix indicating the Pearson's Product-Moment correlation between Green-User score and age group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

		<b>Age Group<sup>z</sup></b>
Green-User Score <sup>y</sup>	Pearson Correlation	-0.389
	<i>P</i>	0.000*
	<i>N</i>	451

\*Statistically significant at the 0.05 level.

<sup>z</sup>Age groups ranged from one to six, where one indicated less than 20 years old, two indicated 21 to 25 years, three indicated 26 to 30 years, four indicated 31 to 35 years, five indicated 36 to 40 years, and six indicated over 40 years

<sup>y</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

An ANOVA test further compared age classification and Green-User scores.

Statistically significant differences ( $P=0.000$ ) were found indicating differences in Green-User scores based on age category (Table 18). Post hoc analysis (Tukey's HSD) revealed that the less than 20 years old age category was statistically significantly different from each of the other categories. In general, the other age categories were statistically similar

to each other, with only a couple of exceptions (Table 19). This result further reinforced that students varied on Green-User scores based on their age.

**Table 18. ANOVA test comparing mean scores on the Green-User scale<sup>z</sup> based on age group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Age Group	Sample Size (no.)	Mean Score <sup>y</sup>	SD	df	F	P
Under 20 years	142	35.4	6.3	5	18.787	0.000*
20 to 25 years	196	31.2	7.9			
26 to 30 years	68	26.9	9.2			
31 to 35 years	16	29.1	7.1			
35 to 40 years	9	25.2	10.3			
Over 40 years	20	22.9	7.8			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Scores ranged from 8 through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

**Table 19. Mean differences of scores (Tukey's HSD) on the Green-User scale based on age group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Age Group	Under 20 years old <sup>z</sup>	21-25 years old	26-30 years old	31-35 years old	36-40 years old	40+ years old
Under 20 years old	-	4.20*	8.52*	6.28*	10.18*	12.55*
21-25 years old	-4.20*	-	4.32*	2.07	5.98	8.35*
26-30 years old	-8.52	-4.32*	-	-2.24	1.66	4.03
31-35 years old	-6.28*	-2.07	2.24	-	3.90	6.27
36-40 years old	-10.18*	-5.98	-1.66	-3.90	-	2.37
40+ years old	-12.55*	-8.35*	-4.03	-6.27	-2.37	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences are calculated as group in the row minus the group in the column.

### *Overall Quality of Life*

An ANOVA test compared students' responses on the two overall quality of life statements based on age group. No statistically significant differences were found with regards to either overall quality of life statement (Table 20). This result indicated that students of all age groups tended to have similar responses to the overall quality of life statements.

**Table 20. ANOVA test comparing responses to overall quality of life statements based on age group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life						
Statement	Sample Size	Mean				
Age Group	(no.)	Score <sup>z</sup>	SD	df	F	P
When all things in your life are considered, how do you feel today?						
Under 20 years old	142	4.1	0.8	5	0.100	0.992
21-25 years old	196	4.1	0.8			
26-30 years old	68	4.1	0.7			
31-35 years old	16	4.1	0.9			
36-40 years old	9	4.1	0.8			
40+ years old	20	4.2	0.7			
Overall, how would you rank the quality of your life?						
Under 20 years old	140	4.1	0.8	5	1.055	0.385
21-25 years old	196	4.1	0.8			
26-30 years old	68	4.0	0.9			
31-35 years old	16	4.4	0.8			
36-40 years old	9	4.1	1.1			
40+ years old	20	4.3	0.8			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

#### *Quality of Life of University Students*

An ANOVA test compared students' perception of quality of life of university students' scores based on student age group. Statistically significant differences were found indicating a difference in mean scores on the overall quality of life of university students scale ( $P=0.002$ ). Statistically significant differences were also found in the affective domain scores ( $P=0.000$ ), specifically within the total positive affect dimension scores ( $P=0.000$ ) and the interaction with professors dimension scores ( $P=0.005$ ). However, no statistically significant differences were found within the cognitive domain scores ( $P=0.150$ ) (Table 21).

**Table 21. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension), based on age group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Age Group	Sample Size (no.)	Mean Score <sup>y</sup>	SD	df	F	P
Overall Quality of Life of University Students <sup>y</sup>							
	Under 20 years old	142	177.0	20.0	5	3.816	0.002*
	21-25 years old	196	184.7	21.1			
	26-30 years old	68	186.5	27.0			
	31-35 years old	16	187.1	16.1			
	36-40 years old	9	196.3	21.0			
	40+ years old	20	190.9	34.5			
Affective Domain <sup>x</sup>							
	Under 20 years old	142	114.5	12.2	5	4.958	0.000*
	21-25 years old	196	119.3	13.0			
	26-30 years old	68	120.6	16.6			
	31-35 years old	16	123.8	9.6			
	36-40 years old	9	125.6	13.2			
	40+ years old	20	125.5	18.5			
Total Positive Affective Dimension <sup>w</sup>							
	Under 20 years old	142	61.7	7.1	5	6.900	0.000*
	21-25 years old	196	63.9	7.7			
	26-30 years old	68	65.8	9.1			
	31-35 years old	16	67.9	5.9			
	36-40 years old	9	68.4	5.9			
	40+ years old	20	69.6	8.5			
Interaction with Students Dimension <sup>v</sup>							
	Under 20 years old	142	18.9	3.2	5	0.707	0.618
	21-25 years old	196	19.4	2.9			
	26-30 years old	68	18.7	3.3			
	31-35 years old	16	19.0	3.1			
	36-40 years old	9	19.3	3.0			
	40+ years old	20	19.1	3.4			
Interaction with Professors Dimension <sup>u</sup>							
	Under 20 years old	142	34.0	4.9	5	3.440	0.005*
	21-25 years old	196	36.0	5.2			
	26-30 years old	68	36.1	6.0			
	31-35 years old	16	36.9	3.6			
	36-40 years old	9	37.8	5.1			
	40+ years old	20	36.8	8.2			
Cognitive Domain <sup>t</sup>							
	Under 20 years old	142	62.6	11.4	5	1.633	0.150
	21-25 years old	196	65.5	12.0			
	26-30 years old	68	65.8	12.8			
	31-35 years old	16	63.4	8.8			

**Table 21-Continued**

Scale	Age Group	Sample Size (no.)	Mean Score <sup>y</sup>	SD	df	F	P
Cognitive Domain							
	36-40 years old	9	70.8	9.7			
	40+ years old	20	65.4	17.3			
Functional Dimension <sup>s</sup>							
	Under 20 years old	142	40.1	7.5		1.739	0.124
	21-25 years old	196	41.7	7.9			
	26-30 years old	68	42.7	8.9			
	31-35 years old	16	42.2	6.0			
	36-40 years old	9	45.7	6.2			
	40+ years old	20	42.6	11.6			
Structural Dimension <sup>r</sup>							
	Under 20 years old	142	22.5	4.7	5	2.083	0.066
	21-25 years old	196	23.8	4.8			
	26-30 years old	68	23.1	4.7			
	31-35 years old	16	21.2	5.0			
	36-40 years old	9	25.1	3.8			
	40+ years old	20	22.8	6.2			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>r</sup>Scores on the structural dimension ranged from zero to 30.

Post hoc analysis (Tukey's HSD) revealed that in most cases a statistically significant difference existed. Results showed that students who were younger than 20 were different from the other age groups (Table 22). Students who were younger than 20 tended to have lower mean scores on the overall quality of life of university students scale, the affective domain, and the total affective dimension when they were compared to students of other age groups.

Furthermore, students who were younger than 20 had statistically significantly lower mean scores on the affective domain than students who indicated they were

between 21 and 25, between 26 and 30, and over 40. They also had lower mean scores than on the total affective dimension within the affective domain when compared to students who were between 26 and 30, between 31 and 35, and over 40. This indicated that younger students had a less positive feeling of their experiences in the university context when compared to older students (Roberts and Clifton, 1992b). No statistically significant differences were found with regards to age group on the cognitive domain, or either the structural or functional dimensions of the cognitive domain (Table 22).

Therefore, students felt similarly about their intellectual experiences in the university regardless of their age group.

**Table 22. Mean differences of scores (Tukey's HSD) on the overall quality of life of university students<sup>z</sup>, the affective domain, the total affective dimension, and the interaction with professors dimension based on age group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale Age Group	Under 20 years old <sup>y</sup>	21-25 years old	26-30 years old	31-35 years old	36-40 years old	40+ years old
Overall Quality of Life of University Students						
Under 20 years old	-	-7.64*	-9.46*	-10.11	-19.32	-13.84
21-25 years old	7.64*	-	-1.82	-2.47	-11.68	-13.84
26-30 years old	9.46*	1.82	-	-2.47	-9.86	-4.38
31-35 years old	10.11	2.47	0.65	-	-9.21	-3.72
36-40 years old	19.32	11.68	9.86	9.21	-	5.48
40+ years old	13.84	6.20	4.38	3.72	-5.48	-
Affective Domain						
Under 20 years old	-	-4.77*	-6.14*	-9.26	-11.06	-10.96*
21-25 years old	4.77*	-	-1.37	-4.48	-6.29	-6.18
26-30 years old	6.14*	1.37	-	-3.12	-4.92	-4.82
31-35 years old	9.26	4.48	3.12	-	-1.81	-1.70
36-40 years old	11.06	6.29	4.92	1.81	-	0.11
40+ years old	10.96*	6.18	4.82	1.70	-0.11	-
Total Affective Dimension						
Under 20 years old	-	-2.24	-4.18*	-6.23*	-6.80	-7.95*
21-25 years old	2.24	-	-1.93	-3.98	-4.55	-5.71*

**Table 22-Continued**

Scale Age Group	Under 20 years old <sup>y</sup>	21-25 years old	26-30 years old	31-35 years old	36-40 years old	40+ years old
Total Affective Dimension						
26-30 years old	4.18*	1.93	-	-2.05	-2.62	-3.78
31-35 years old	6.23*	3.98	2.05	-	-0.57	-1.72
36-40 years old	6.80	4.55	2.62	0.57	-	-1.16
40+ years old	7.95*	5.71*	3.78	1.72	1.16	-
Interaction with Professors Dimension						
Under 20 years old	-	-2.01*	-2.06	-2.86	-3.76	-2.74
21-25 years old	2.01*	-	-0.05	-0.85	-1.76	-0.73
26-30 years old	2.06	0.05	-	-0.80	-1.70	-0.68
31-35 years old	2.86	0.85	0.80	-	-0.90	0.13
36-40 years old	3.76	1.76	1.70	0.90	-	1.03
Interaction with Professors Dimension						
40+ years old	2.74	0.73	0.68	-0.13	-1.03	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Mean differences are calculated as group in the row minus the group in the column.

### *Gender Comparisons*

#### *Data Analysis*

Scores of males and females were compared using a Pearson's Product-Moment correlation and ANOVA tests to investigate whether or not a specific gender appeared to use and benefit more from campus green spaces and arboretum.

#### *Use of Campus Green Spaces and Arboretum*

A Pearson's Product-Moment correlation was run comparing gender with males coded as "one" and females coded as "two" and Green-User scores. This analysis indicated a statistically significant relationship between gender and Green-User scores

( $r=-0.122$ ,  $P=0.009$ ) (Table 23). Males tended to have higher Green-User scores than females.

**Table 23. Correlation matrix indicating the Pearson’s Product-Moment correlation between Green-User score and gender in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

		Gender <sup>z</sup>
Green-User Score <sup>y</sup>	Pearson Correlation	-0.122
	<i>P</i>	0.009*
	<i>N</i>	450

\*Statistically significant at the 0.05 level.

<sup>z</sup>Males were coded as “one” and females were coded as “two.”

<sup>y</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

An ANOVA test further compared gender and Green-User scores. Again, statistically significant differences were found between the mean Green-User scores for males and females ( $P=0.009$ ). Descriptive statistics revealed that males tended to have higher Green-User scores than females (Table 24). These statistics reinforce the finding from the previously run Pearson Product-Moment correlation.

**Table 24. ANOVA test comparing mean scores on the Green-User scale based on gender in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Gender	Sample size (no.)	Mean Score <sup>z</sup>	Standard Deviation	df	F	<i>P</i>
Males	148	32.8	8.2	1	6.814	0.009*
Females	302	30.6	8.4			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Scores ranged from 8 through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

#### *Overall Quality of Life*

An ANOVA test compared students’ perception of their overall quality of life based on gender. No statistically significant differences were found with regards to either

overall quality of life statement (Table 25). This indicated that males and females tended to respond similarly to the overall quality of life statements.

**Table 25. ANOVA test comparing responses to overall quality of life statements based on gender in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life Statement	Sample Size (no.)	Mean Score <sup>z</sup>	SD	df	F	P
When all things in your life are considered, how do you feel today?						
Males	148	4.1	0.7	1	0.000	0.983
Females	302	4.1	0.8			
Overall, how would you rank the quality of your life?						
Males	146	4.0	0.9	1	2.920	0.088
Females	302	4.1	0.8			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

#### *Quality of Life of University Students*

An ANOVA test compared students' perception of quality of life of university students based on gender. No statistically significant differences were in mean scores on the overall scale ( $P=0.982$ ). Additionally, no significant differences were found in the affective domain ( $P=0.939$ ) or the cognitive domain ( $P=0.950$ ). Descriptive statistics further revealed the similarity of scores across all domains and dimensions of the quality of life of university students between males and females (Table 26). This result indicated that males and females tended to have similar perceptions of their quality of life within the university setting.

**Table 26. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension), based on gender in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Gender	Sample Size (no.)	Mean Score	SD	df	F	P
Overall Quality of Life of University Students <sup>y</sup>							
	Males	148	183.1	21.2	1	0.000	0.982
	Females	302	183.2	23.5			
Affective Domain <sup>x</sup>							
	Males	148	118.5	13.6	1	0.006	0.939
	Females	302	118.6	14.0			
Total Positive Affective Dimension <sup>w</sup>							
	Males	148	63.8	7.7	1	0.096	0.756
	Females	302	64.1	8.2			
Interaction with Students Dimension <sup>v</sup>							
	Males	148	19.2	3.0	1	0.340	0.560
	Females	302	19.1	3.1			
Interaction with Professors Dimension <sup>u</sup>							
	Males	148	35.4	5.3	1	0.034	0.854
	Females	302	35.5	5.5			
Cognitive Domain <sup>t</sup>							
	Males	148	64.7	10.8	1	0.004	0.950
	Females	302	118.6	14.0			
Functional Dimension <sup>s</sup>							
	Males	148	41.6	7.6	1	0.012	0.912
	Females	302	41.5	8.4			
Structural Dimension <sup>f</sup>							
	Males	148	23.2	4.3	1	0.001	0.978
	Females	302	23.2	5.1			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>f</sup>Scores on the structural dimension ranged from zero to 30.

### *Ethnic Group Comparisons*

#### *Data Analysis*

Scores of various ethnic groups (“Caucasian,” “Hispanic,” “African American,” “Asian American,” “American Indian,” and “Other”) were compared using ANOVAs to investigate whether or not a specific ethnic group appeared to use and benefit more from the campus green spaces and arboretum.

#### *Use of Campus Green Spaces and Arboretum*

An ANOVA test compared ethnic groups and Green-User scores. There were no statistically significant differences between groups ( $P=0.389$ ) indicating that no group appeared to use the campus green spaces and arboretum more than another (Table 27).

**Table 27. ANOVA test comparing mean scores on the Green-User scale based on ethnic group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

<b>Ethnic Group</b>	<b>Sample size (no.)</b>	<b>Mean Score<sup>z</sup></b>	<b>SD</b>	<b>df</b>	<b>F</b>	<b>P</b>
Caucasian	308	31.0	8.4	5	1.048	0.389
Hispanic	88	31.9	8.7			
African American	13	29.0	8.7			
Asian American	10	31.5	8.2			
American Indian	3	34.7	4.5			
Other	28	34.0	7.1			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Scores ranged from 8 through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

#### *Overall Quality of Life*

An ANOVA test compared students’ perception of their overall quality of life based on ethnic group. No statistically significant differences were found with regards to either overall quality of life statement (Table 28). Thus, all ethnic groups responded similarly to both overall quality of life statements.

**Table 28. ANOVA test comparing responses to overall quality of life statements based on ethnic group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life						
Statement	Sample Size	Mean				
Ethnic Group	(no.)	Score <sup>z</sup>	SD	df	F	P
When all things in your life are considered, how do you feel today?						
Caucasian	308	4.0	0.8	5	0.258	0.936
Hispanic	88	4.1	0.9			
African American	13	4.3	0.8			
Asian American	10	4.1	0.7			
American Indian	3	4.0	1.7			
Other	28	4.1	0.8			
Overall, how would you rank the quality of your life?						
Caucasian	308	4.1	0.8	5	0.595	0.704
Hispanic	88	4.1	0.8			
African American	13	4.3	0.9			
Asian American	10	3.8	0.8			
American Indian	3	4.3	1.2			
Other	28	4.2	0.9			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

#### *Quality of Life of University Students*

An ANOVA test compared students' perception of quality of life of university students based on ethnic group. No statistically significant differences were found, indicating that there were no differences among ethnic groups ( $P=0.093$ ). Additionally, there were no statistically significant differences found on either the affective domain ( $P=0.204$ ) or within the cognitive domain ( $P=0.112$ ) (Table 29). Furthermore, no statistically significant differences were found within any dimension of either the affective or cognitive domains (Table 29). Therefore, all ethnic groups appeared to rate their quality of life of university students similarly.

**Table 29. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) based on ethnic group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Ethnic Group	Sample Size (no.)	Mean Score <sup>y</sup>	SD	df	F	P
Overall Quality of Life of University Students <sup>y</sup>							
	Caucasian	308	181.3	23.6	5	1.960	0.083
	Hispanic	88	185.1	20.2			
	African American	13	194.5	17.6			
	Asian American	10	189.4	22.0			
	American Indian	3	197.0	19.3			
	Other	28	188.9	20.3			
Affective Domain <sup>x</sup>							
	Caucasian	308	117.6	13.9	5	1.452	0.204
	Hispanic	88	119.8	13.4			
	African American	13	124.9	13.0			
	Asian American	10	123.4	14.6			
	American Indian	3	123.3	10.8			
	Other	28	120.6	13.7			
Total Positive Affective Dimension <sup>w</sup>							
	Caucasian	308	63.3	8.1	5	2.178	0.056
	Hispanic	88	65.1	7.6			
	African American	13	68.4	7.4			
	Asian American	10	65.5	8.7			
	American Indian	3	71.0	1.7			
	Other	28	64.6	7.0			
Interaction with Students Dimension <sup>v</sup>							
	Caucasian	308	19.1	3.0	5	1.283	0.270
	Hispanic	88	18.8	3.3			
	African American	13	20.3	2.9			
	Asian American	10	20.0	2.9			
	American Indian	3	16.7	4.0			
	Other	28	19.6	3.7			
Interaction with Professors Dimension <sup>u</sup>							
	Caucasian	308	35.2	5.3	5	0.873	0.499
	Hispanic	88	35.9	5.0			
	African American	13	36.2	7.5			
	Asian American	10	37.9	5.6			
	American Indian	3	35.7	5.8			
	Other	28	36.4	6.9			
Cognitive Domain <sup>t</sup>							
	Caucasian	308	63.8	12.5	5	1.797	0.112
	Hispanic	88	65.3	11.4			
	African American	13	69.7	7.7			
	Asian American	10	66.0	11.9			

**Table 29-Continued**

Scale	Sample Size (no.)	Mean Score <sup>y</sup>	SD	df	F	P
<b>Ethnic Group</b>						
American Indian	3	73.7	9.0			
Other	28	68.7	9.7			
<b>Functional Dimension<sup>s</sup></b>						
Caucasian	308	40.9	8.3	5	2.193	0.054
Hispanic	88	41.8	7.8			
African American	13	45.8	6.4			
Asian American	10	42.0	8.3			
American Indian	3	46.7	5.5			
Other	28	44.6	6.2			
<b>Structural Dimension<sup>f</sup></b>						
Caucasian	308	22.9	5.0	5	0.946	0.451
Hispanic	88	23.5	4.6			
African American	13	23.9	3.7			
Asian American	10	24.0	4.4			
American Indian	3	27.0	5.2			
Other	28	24.1	4.2			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>f</sup>Scores on the structural dimension ranged from zero to 30.

### *Marital Status Comparisons*

#### *Data Analysis*

Scores of the various marital status groups (“Single,” “Married/Partnered,” “Divorced,” and “Other”) were compared using ANOVA tests to investigate whether or not a specific marital status group appeared to use and benefit more from campus green spaces and the arboretum.

#### *Use of Campus Green Spaces and Arboretum*

An ANOVA test compared marital status and Green-User scores. Statistically significant differences were found ( $P=0.000$ ) indicating that there was a difference in Green-User score based on marital status (Table 30).

**Table 30. ANOVA test comparing mean scores on the Green-User scale based on marital status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Marital Status	Sample size (no.)	Mean Score <sup>z</sup>	Standard Deviation	df	F	P
Single	341	32.9	7.8	3	22.004	0.000*
Married/Partnered	88	25.6	8.2			
Divorced	8	24.5	8.6			
Other	13	32.4	7.4			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Scores ranged from 8 through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

Post hoc analysis (Tukey's HSD) revealed that the married/partnered group and the divorced group tended to have lower Green-User scores when compared to single students and those who selected "other" as their marital status (Table 31). This indicated that students who were married, partnered, or divorced used campus green spaces and the arboretum less frequently when compared to single students.

**Table 31. Mean differences of scores (Tukey's HSD) on the Green-User scale based on marital status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Marital Status	Single <sup>z</sup>	Married/Partnered	Divorced	Other
Single	-	7.28*	8.40*	0.52
Married/Partnered	-7.28*	-	1.13	-6.76*
Divorced	-8.40*	-1.13	-	-7.88
Other	-0.52	6.76*	7.88	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences are calculated as group in the row minus the group in the column.

**Table 32. ANOVA test comparing responses to overall quality of life statements based on marital status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

<b>Overall Quality of Life Statement</b>	<b>Sample Size (no.)</b>	<b>Mean Score<sup>z</sup></b>	<b>SD</b>	<b>df</b>	<b>F</b>	<b>P</b>
<b>Marital Status</b>						
When all things in your life are considered, how do you feel today?						
Single	341	4.1	0.8	3	2.415	0.066
Married/Partnered	88	4.3	0.6			
Divorced	8	3.6	1.1			
Other	13	4.1	1.0			
Overall, how would you rank the quality of your life?						
Single	341	4.0	0.8	3	2.589	0.052
Married/Partnered	88	4.3	0.8			
Divorced	8	4.0	1.1			
Other	13	3.9	0.9			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

#### *Overall Quality of Life*

An ANOVA test compared students' perception of their overall quality of life based on marital status. No statistically significant differences were found with regards to either overall quality of life statement (Table 32). Therefore, all marital groups rated the two overall quality of life statements similarly.

#### *Quality of Life of University Students*

An ANOVA test compared students' perception of quality of life of university students based on marital status. Statistically significant differences were found on the overall quality of life of university students scale ( $P=0.006$ ), the affective domain ( $P=0.002$ ), and the total positive affective dimension within the affective domain ( $P=0.000$ ) (Table 33).

**Table 33. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) based on marital status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Sample Size					
Marital Status	(no.)	Mean Score <sup>y</sup>	SD	df	F	P
Overall Quality of Life of University Students <sup>y</sup>						
Single	341	181.4	21.8	3	4.195	0.006*
Married/Partnered	88	190.6	25.5			
Divorced	8	185.8	20.7			
Other	13	177.9	21.5			
Affective Domain <sup>x</sup>						
Single	341	117.3	13.3	3	4.355	0.005*
Married/Partnered	88	123.1	15.4			
Divorced	8	122.4	13.4			
Other	13	117.3	13.4			
Total Positive Affective Dimension <sup>w</sup>						
Single	341	63.0	7.7	3	7.629	0.000*
Married/Partnered	88	67.5	8.2			
Divorced	8	65.3	8.5			
Other	13	63.5	7.7			
Interaction with Students Dimension <sup>v</sup>						
Single	341	19.1	3.2	3	0.778	0.507
Married/Partnered	88	19.3	2.7			
Divorced	8	18.3	3.3			
Other	13	18.1	2.6			
Interaction with Professors Dimension <sup>u</sup>						
Single	341	35.2	5.2	3	2.022	0.110
Married/Partnered	88	36.3	6.5			
Divorced	8	38.9	4.0			
Other	13	35.7	5.7			
Cognitive Domain <sup>t</sup>						
Single	341	64.1	12.1	3	2.381	0.069
Married/Partnered	88	67.5	12.3			
Divorced	8	63.4	7.7			
Other	13	60.5	11.9			
Functional Dimension <sup>s</sup>						
Single	341	41.1	8.0	3	2.566	0.054
Married/Partnered	88	43.6	8.7			
Divorced	8	41.1	7.2			
Other	13	39.2	7.2			

**Table 33-Continued**

Scale	Sample Size	Mean Score <sup>y</sup>	SD	df	F	P
Marital Status	(no.)					
Structural Dimension <sup>f</sup>						
Single	341	23.1	4.9	3	1.554	0.200
Married/Partnered	88	24.0	4.7			
Divorced	8	22.3	2.2			
Other	13	21.3	5.1			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>r</sup>Scores on the structural dimension ranged from zero to 30.

Post hoc analysis (Tukey's HSD) revealed that in most cases, it was the married/partnered group who differed from the group of single respondents (Table 34). Married or partnered students tended to have higher mean scores on the various qualities of life of university students measures when compared to students who were single. Specifically, on the overall quality of life of university students scale, students who were married had statistically significantly higher scores than those who were single. Additionally, students who were married/partnered had statistically significantly higher mean scores than did students who indicated they were single on the affective domain as well the total affective dimension within the affective domain which indicated that they had a more positive feeling of their experiences in the university context (Roberts and Clifton, 1992b). No statistically significant differences were found with regards to marital status on the cognitive domain, or either the structural or functional dimensions of the cognitive domain (Table 34).

**Table 34. Mean differences of scores (Tukey's HSD) on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students, and the total affective dimension, based on marital status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale		Single <sup>y</sup>	Married/Partnered	Divorced	Other
Overall Quality of Life of University Students	Ethnic Group				
	Single	-	-9.23*	-4.39	3.51
	Married/Partnered	9.23*	-	4.84	12.74
	Divorced	4.39	-4.84	-	7.90
	Other	-3.51	-12.74	-7.90	-
Affective Domain	Single	-	-5.76*	-5.06	0.01
	Married/Partnered	5.76*	-	0.70	5.77
	Divorced	5.06	0.70	-	5.07
	Other	-0.01	-5.77	-5.07	-
	Total Affective Dimension	Single	-	-4.44*	-2.21
Married/Partnered		4.44*	-	2.23	3.94
Divorced		2.21	-2.23	-	1.71
Other		0.50	-3.94	-1.71	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Mean differences are calculated as group in the row minus the group in the column.

### *Work Status Comparisons*

#### *Data Analysis*

Scores of various work status groups ("None," "Less than 20 hours per week," "20 to 40 hours per week," and "More than 40 hours per week") were compared using a Pearson Product-Moment correlation and an ANOVA to investigate whether or not any differences between Green-User scores existed based on work status.

#### *Use of Campus Green Spaces and Arboretum*

A Pearson's Product-Moment correlation indicated a statistically significant relationship between work status and the Green-User scores ( $r=-0.175$ ,  $P=0.000$ ) (Table 35).

Respondents who indicated working more hours per week tended to have lower Green-User scores when compared to respondents who indicated working fewer hours per week.

**Table 35. Correlation matrix indicating the Pearson's Product-Moment correlation between Green-User score and work status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

		Work Status <sup>z</sup>
Green-User Score <sup>y</sup>	Pearson Correlation	-0.175
	<i>P</i>	0.000*
	<i>N</i>	452

\*Statistically significant at the 0.05 level.

<sup>z</sup>Lower scores indicated working fewer hours per week, whereas higher scores indicated working more hours per week.

<sup>y</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

An ANOVA test further compared work status and Green-User scores. Again, statistically significant differences were found on the mean Green-User score among the various work status groups ( $P=0.000$ ) (Table 36). This indicated that usage of campus green spaces and the arboretum varied depending on how many hours the student worked.

**Table 36. ANOVA test comparing mean scores on the Green-User scale based on work status group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Work Status	Sample size (no.)	Mean Score <sup>z</sup>	SD	df	F	<i>P</i>
None	128	31.5	8.0	3	15.025	0.000*
Less than 20 hours	123	34.1	7.3			
20 to 40 hours	170	30.6	8.5			
More than 40 hours	31	23.5	8.7			

\*Statistically significant at the 0.05 level

<sup>z</sup>Scores ranged from 8 through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

Post hoc analysis (Tukey's HSD) revealed that across all work status groups, the group who indicated working more than 40 hours per week had statistically significantly

lower Green-User scores when compared to all other groups. Furthermore, the group who indicated working fewer than 20 hours per week had the highest Green-User score, and the score was significantly higher when compared to all other groups except the group who indicated working no hours per week (Table 37).

**Table 37. Mean differences of scores (Tukey's HSD) on the Green-User scale based on work status group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Work Status	None <sup>z</sup>	Less than 20 hours	20 to 40 hours	More than 40 hours
None	-	-2.60	0.85	7.98*
Less than 20 hours	2.60	-	3.45*	10.57*
20 to 40 hours	-0.85	-3.45*	-	7.13*
More than 40 hours	-7.98*	-10.57*	-7.13*	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences are calculated as group in the row minus the group in the column.

#### *Overall Quality of Life*

An ANOVA test compared students' perception of their overall quality of life based on work status. No statistically significant differences were found with regards to either overall quality of life statement (Table 38). Therefore, all students rated their overall quality of life similarly regardless of the number of hours they worked weekly.

**Table 38. ANOVA test comparing responses to overall quality of life statements based on work status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Overall Quality of Life						
Statement	Sample Size (no.)	Mean Score <sup>z</sup>	SD	df	F	P
Work Status						
When all things in your life are considered, how do you feel today?						
None	128	4.1	0.8	3	0.349	0.790
Less than 20 hours	123	4.0	0.9			
20 to 40 hours	170	4.1	0.7			
More than 40 hours	31	4.1	0.8			
Overall, how would you rank the quality of your life?						
None	128	4.1	0.8	3	0.242	0.867
Less than 20 hours	123	4.1	0.8			
20 to 40 hours	170	4.1	0.8			
More than 40 hours	31	4.2	0.9			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

#### *Quality of Life of University Students*

An ANOVA test compared students' perception of quality of life of university students based on work status. Statistically significant differences were found in the affective domain ( $P=0.024$ ), specifically within the total positive affect dimension ( $P=0.002$ ). However, no statistically significant results were found on mean scores on the overall quality of life of university students scale ( $P=0.070$ ). Additionally, no significant differences were found within the cognitive domain ( $P=0.467$ ) of quality of life of university students (Table 39).

**Table 39. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) based on work status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Sample Size					
Work Status	(no.)	Mean Score	SD	df	F	P
<b>Overall Quality of Life of University Students<sup>y</sup></b>						
None	128	182.0	20.5	3	2.364	0.070
Less than 20 hours	123	181.3	25.2			
20 to 40 hours	170	183.7	22.2			
More than 40 hours	31	192.9	22.7			
<b>Affective Domain<sup>x</sup></b>						
None	128	117.1	13.0	3	3.180	0.024*
Less than 20 hours	123	117.8	14.8			
20 to 40 hours	170	119.0	13.8			
More than 40 hours	31	125.4	11.9			
<b>Total Positive Affective Dimension<sup>w</sup></b>						
None	128	63.4	7.7	3	4.985	0.002*
Less than 20 hours	123	63.3	8.5			
20 to 40 hours	170	64.0	7.6			
More than 40 hours	31	69.1	7.2			
<b>Interaction with Students Dimension<sup>v</sup></b>						
None	128	19.1	2.9	3	0.080	0.971
Less than 20 hours	123	19.1	3.3			
20 to 40 hours	170	19.2	3.1			
More than 40 hours	31	19.0	2.7			
<b>Interaction with Professors Dimension<sup>u</sup></b>						
None	128	34.7	5.4	3	2.092	0.101
Less than 20 hours	123	35.5	5.4			
20 to 40 hours	170	35.8	5.6			
More than 40 hours	31	37.2	4.7			
<b>Cognitive Domain<sup>t</sup></b>						
None	128	64.7	10.4	3	0.851	0.467
Less than 20 hours	123	63.7	14.6			
20 to 40 hours	170	64.8	11.3			
More than 40 hours	31	67.6	12.3			
<b>Functional Dimension<sup>s</sup></b>						
None	128	41.3	7.0	3	1.846	0.138
Less than 20 hours	123	40.5	9.6			
20 to 40 hours	170	42.0	7.8			
More than 40 hours	31	44.0	8.4			

**Table 39-Continued**

<b>Scale</b>						
<b>Work Status</b>						
<b>Structural Dimension<sup>f</sup></b>						
None	128	23.5	4.4	3	0.413	0.744
Less than 20 hours	123	23.2	5.7			
20 to 40 hours	170	22.9	4.7			
More than 40 hours	31	23.5	4.3			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>r</sup>Scores on the structural dimension ranged from zero to 30.

Post hoc analysis (Tukey's HSD) revealed that, in most cases, it was those students who indicated that they worked more than 40 hours per week who differed when compared to the other work status groups (Table 40). On the affective domain, students who worked more than 40 hours per week had statistically significantly higher scores when compared to all other work status groups except for the group who indicated working 20-40 hours per week. Additionally, on the total affective dimension within the affective domain, students who worked more than 40 hours per week had statistically significantly higher scores when compared to all other work status groups. Therefore, those students who worked longer hours appeared to feel more positively about their general experiences in the university context (Roberts and Clifton, 1992b) (Table 40).

**Table 40. Mean differences of scores (Tukey’s HSD) on the affective domain and the total positive affective dimension based on work status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale		Less than 20	20 to 40	More than 40
Work Status	None <sup>z</sup>	hours	hours	hours
Affective Domain				
None	-	-0.63	-1.84	-8.25*
Less than 20 hours	0.63	-	-1.21	-7.61*
20 to 40 hours	1.84	1.21	-	-6.40
More than 40 hours	8.25*	7.51*	6.40	-
Total Positive Affective Dimension				
None	-	0.16	-0.60	-5.71*
Less than 20 hours	-0.16	-	-0.76	-5.88*
20 to 40 hours	0.60	0.76	-	-5.12*
More than 40 hours	5.71*	5.88*	5.12*	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences are calculated as group in the row minus the group in the column.

### *Commuter Group Comparisons*

#### *Data Analysis*

Scores of various commuter groups (“On-campus,” “Off Campus: In San Marcos,” “Off Campus: Outside San Marcos, less than 15 minute commute,” “Off Campus: Outside San Marcos, commute between 15 and 30 minutes,” “Off Campus: Outside San Marcos, commute between 30 minutes to 1 hour,” and “Off Campus: Over 1 hour commute”) were compared using a Pearson Product-Moment correlation and an ANOVA test to investigate whether or not a specific commuter group appeared to use and benefit more from campus green spaces and arboretum.

#### *Use of Campus Green Spaces and Arboretum*

A Pearson’s Product-Moment correlation indicated a significant relationship between commuter group (lower scores indicated less time commuting to school, and higher scores indicated more time commuting to school) and the Green-User scores ( $r=-0.490$ ,  $P=0.000$ ) (Table 41). Results showed a moderate, statistically significant reverse relationship. Therefore, respondents who indicated a longer commute to school tended to

have lower Green-User scores when compared to respondents who indicated a shorter commute to school.

**Table 41. Correlation matrix indicating the Pearson’s Product-Moment correlation between Green-User score and work status in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

		<b>Commuter Group<sup>z</sup></b>
Green-User Score <sup>y</sup>	Pearson Correlation	-0.490
	<i>P</i>	0.000*
	<i>N</i>	441

\*Statistically significant at the 0.05 level.

<sup>z</sup>Lower scores indicated less time commuting to school, and higher scores indicated more time commuting to school

<sup>y</sup>Green-User scale scores ranged from eight points to 54 points. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

An ANOVA test further compared commuter group and Green-User scores.

Again, statistically significant differences were found between the mean Green-User score among the various commuter groups ( $P=0.000$ ) (Table 42). Post hoc analysis (Tukey’s HSD) revealed that most all groups were statistically significantly different from each other group (Table 43), with the group who lived on-campus having the highest Green-User scores, and the group who commuted longer than one hour having the lowest Green-User scores when compared to other commuter groups. This indicated that commuter group is an important factor in Green-Use.

**Table 42. ANOVA test comparing mean scores on the Green-User scale based on commuter group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Commuter Group	Sample size (no.)	Mean Score <sup>z</sup>	SD	df	F	P
On-campus	98	36.6	6.2	5	2.232	0.050*
Off Campus: In San Marcos	165	32.6	7.1			
Off Campus: Outside San Marcos, less than 15 minute commute	22	33.1	6.0			
Off Campus: Commute 15 to 30 minutes	67	28.4	7.9			
Off Campus: Commute 30 minutes to 1 hour	69	25.2	8.5			
Off Campus: Over 1 hour commute	20	22.4	9.6			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Scores ranged from 8 through 47. Higher Green-User scores indicated more use of campus green spaces and arboretum and lower Green-User scores indicated less use.

**Table 43. Mean differences of scores (Tukey's HSD) on the Green-User scale based on commuter group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Commuter Group	On-campus <sup>z</sup>	Off Campus: In San Marcos	Off Campus: than 15 minute commute	Off Campus: Commute 15 to 30 minutes	Off Campus: Commute 30 minutes to 1 hour	Off Campus: Over 1 hour commute
On-campus	-	4.00*	3.51	8.19*	11.35*	14.15*
Off Campus: In San Marcos	-4.00*	-	-0.49	4.19*	7.35*	10.15*
Off campus: Outside San Marcos, less than 15 minute commute	-3.51	0.49	-	4.69	7.84*	10.65*
Off Campus: Commute 15 to 30 minutes	-8.19*	-4.19*	-4.69	-	3.16	5.96*
Off Campus: Commute 30 minutes to 1 hour	-11.35*	-7.35*	-7.84*	-3.16	-	2.80
Off Campus: Over 1 hour commute	-14.15*	-10.15*	-10.65*	-5.96*	-2.80	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Mean differences are calculated as group in the row minus the group in the column.

### *Overall Quality of Life*

An ANOVA test compared students' perception of their overall quality of life based on commuter group. No statistically significant differences were found with regards to either overall quality of life statement (Table 44). Therefore, no commuter group appeared to perceive a higher overall quality of life when compared to other commuter groups.

**Table 44. ANOVA test comparing responses to overall quality of life statements based on commuter group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

<b>Overall Quality of Life Statement</b>	<b>Sample Size (no.)</b>	<b>Mean Score<sup>z</sup></b>	<b>SD</b>	<b>df</b>	<b>F</b>	<b>P</b>
<b>Commuter Group</b>						
When all things in your life are considered, how do you feel today?						
On-campus	98	4.0	0.8	5	0.067	0.997
Off Campus: In San Marcos	165	4.1	0.8			
Off Campus: Outside San Marcos, less than 15 minute commute	22	4.1	1.0			
Off Campus: Commute 15 to 30 minutes	67	4.1	0.7			
Off Campus: Commute 30 minutes to 1 hour	69	4.1	0.7			
Off Campus: Over 1 hour commute	20	4.1	0.9			
Overall, how would you rank the quality of your life?						
On-campus	97	4.1	0.9	5	0.449	0.814
Off Campus: In San Marcos	165	4.0	0.8			
Off Campus: Outside San Marcos, less than 15 minute commute	22	4.3	0.8			
Off Campus: Commute 15 to 30 minutes	67	4.1	0.7			
Off Campus: Commute 30 minutes to 1 hour	69	4.1	0.8			
Off Campus: Over 1 hour commute	20	4.1	0.9			

\*Statistically significant at the 0.05 level.

<sup>z</sup>Possible responses ranged from one to five, with one being least positive and five being most positive.

*Quality of Life of University Students*

Another ANOVA test compared students' perception of quality of life of university students based on commuter group. Statistically significant differences were found on the overall quality of life of university students ( $P=0.050$ ) and the total positive affective dimension ( $P=0.007$ ) (Table 45).

Post hoc analysis (Tukey's HSD) revealed on the total positive affective dimension of the affective domain, students who commuted between 30 minutes to one hour had statistically significantly higher scores when compared to those who lived on-campus or those who lived off campus but inside the city limits of San Marcos (Table 46). Therefore, the results indicated that the group who commuted between 30 minutes to one hour felt more positively about their experiences in the university context when compared to other commuter groups (Roberts and Clifton, 1992b) (Table 46).

**Table 45. ANOVA test comparing mean scores on the overall quality of life of university students scale<sup>z</sup>, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), and the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) based on commuter group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

<b>Scale</b>	<b>Sample Size (no.)</b>	<b>Mean Score<sup>y</sup></b>	<b>SD</b>	<b>df</b>	<b>F</b>	<b>P</b>
Overall Quality of Life of University Students <sup>y</sup>						
On-campus	98	177.7	20.1	5	2.232	0.050*
Off Campus: In San Marcos	165	183.9	21.7			
Off Campus: Outside San Marcos, less than 15 minute commute	22	188.8	22.0			
Off Campus: Commute 15 to 30 minutes	67	181.6	25.4			
Off Campus: Commute 30 minutes to 1 hour	69	187.6	25.5			
Off Campus: Over 1 hour commute	20	188.2	24.6			

**Table 45-Continued**

Scale	Scale					
Affective Domain <sup>x</sup>						
On-campus	98	115.5	12.6	5	2.000	0.078
Off Campus: In San Marcos	165	118.4	14.4			
Off Campus: Outside San Marcos, less than 15 minute commute	22	120.1	14.1			
Off Campus: Commute 15 to 30 minutes	67	118.4	13.1			
Off Campus: Commute 30 minutes to 1 hour	69	121.8	15.0			
Off Campus: Over 1 hour commute	20	122.3	13.3			
Total Positive Affective Dimension <sup>w</sup>						
On-campus	98	62.7	7.0	5	3.208	0.007*
Off Campus: In San Marcos	165	63.5	8.1			
Off Campus: Outside San Marcos, less than 15 minute commute	22	65.3	8.6			
Off Campus: Commute 15 to 30 minutes	67	63.2	8.3			
Off Campus: Commute 30 minutes to 1 hour	69	66.9	7.9			
Off Campus: Over 1 hour commute	20	66.4	8.0			
Interaction with Students Dimension <sup>y</sup>						
On-campus	98	19.0	3.3	5	0.663	0.651
Off Campus: In San Marcos	165	19.4	3.2			
Off Campus: Outside San Marcos, less than 15 minute commute	22	19.1	2.8			
Off Campus: Commute 15 to 30 minutes	67	18.9	2.7			
Off Campus: Commute 30 minutes to 1 hour	69	18.6	3.1			
Off Campus: Over 1 hour commute	20	19.5	2.4			
Interaction with Professors Dimension <sup>u</sup>						
On-campus	98	34.0	5.4	5	2.193	0.054
Off Campus: In San Marcos	165	35.7	5.3			
Off Campus: Outside San Marcos, less than 15 minute commute	22	35.6	4.9			
Off Campus: Commute 15 to 30 minutes	67	36.3	5.0			
Off Campus: Commute 30 minutes to 1 hour	69	36.2	6.5			
Off Campus: Over 1 hour commute	20	36.5	4.8			

**Table 45-Continued**

<b>Scale</b>						
<b>Cognitive Domain<sup>t</sup></b>						
On-campus	98	62.1	10.8	5	1.936	0.087
Off Campus: In San Marcos	165	65.6	11.3			
Off Campus: Outside San Marcos, less than 15 minute commute	22	68.7	10.7			
Off Campus: Commute 15 to 30 minutes	67	63.3	15.4			
Off Campus: Commute 30 minutes to 1 hour	69	65.9	12.6			
Off Campus: Over 1 hour commute	20	65.9	13.0			
<b>Functional Dimension<sup>s</sup></b>						
On-campus	98	39.8	7.2	5	2.058	0.070
Off Campus: In San Marcos	165	41.9	7.6			
Off Campus: Outside San Marcos, less than 15 minute commute	22	44.1	7.5			
Off Campus: Commute 15 to 30 minutes	67	40.5	10.1			
Off Campus: Commute 30 minutes to 1 hour	69	42.7	8.5			
Off Campus: Over 1 hour commute	20	42.8	8.6			
<b>Structural Dimension<sup>f</sup></b>						
On-campus	98	22.3	4.4	5	1.476	0.196
Off Campus: In San Marcos	165	23.7	4.5			
Off Campus: Outside San Marcos, less than 15 minute commute	22	24.6	4.5			
Off Campus: Commute 15 to 30 minutes	67	22.9	6.0			
Off Campus: Commute 30 minutes to 1 hour	69	23.1	5.0			
Off Campus: Over 1 hour commute	20	23.2	5.2			

\*Statistically significant at the 0.05 level.

<sup>2</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Scores on the overall quality of life of university students scale ranged from zero to 231.

<sup>x</sup>Scores on the affective domain ranged from zero to 148.

<sup>w</sup>Scores on the total positive affective dimension ranged from zero to 80.

<sup>v</sup>Scores on the interaction with students dimension ranged from zero to 25.

<sup>u</sup>Scores on the interaction with professors dimension ranged from zero to 45.

<sup>t</sup>Scores on the cognitive domain ranged from zero to 85.

<sup>s</sup>Scores on the functional dimension ranged from zero to 55.

<sup>f</sup>Scores on the structural dimension ranged from zero to 30.

Due to the borderline statistical significance of the difference in mean scores on the overall quality of life of university students scale based on commuter group, post hoc

analysis (Tukey's HSD) did not reveal which groups differed from each other. However, when comparing descriptive statistics on the mean scores, it appeared that students who lived on-campus and inside the city limits of San Marcos had lower mean scores on the overall quality of life of university students scale when compared to students who commuted longer than 30 minutes. Additionally, students who commuted between 15 minutes to 30 minutes had lower overall quality of life of university students when compared to students who lived outside the city limits of San Marcos but had less than a 15 minute commute to campus, and students who commuted longer than 30 minutes.

**Table 46. Mean differences of scores (Tukey's HSD) on the overall quality of life of university students<sup>z</sup> based on commuter group in the study of the relationship between student use of campus green spaces and the arboretum and perceptions of quality of life.**

Scale	Commuter Group	On-campus <sup>y</sup>	Off Campus: In San Marcos	Off Campus: Outside San Marcos, less than 15 minute commute	Off Campus: Commute 15 to 30 minutes	Off Campus: Commute 30 minutes to 1 hour	Off Campus: Over 1 hour commute
Total Positive Affective Dimension							
	On-campus	-	-0.81	-2.62	-0.51	-4.25*	-3.70
	Off Campus: In San Marcos	0.81	-	-1.81	0.30	-3.44*	-2.89
	Off Campus: Outside San Marcos, less than 15 minute commute	2.62	1.81	-	2.11	-1.63	-1.08
	Off Campus: Commute 15 to 30 minutes	0.51	-0.30	-2.11	-	-3.73	-3.19
	Off Campus: Commute 30 minutes to 1 hour	4.25*	3.44*	1.63	3.73	-	0.55
	Off Campus: Over 1 hour commute	3.70	2.89	1.08	3.19	-0.55	-

\*Statistically significant at the 0.05 level.

<sup>z</sup>Roberts, L.W. and R.A. Clifton. 1991. Measuring the quality of university student life. Winnipeg: University of Manitoba, Centre for Higher Education Research and Development.

<sup>y</sup>Mean differences are calculated as group in the row minus the group in the column.

### *Summary of Results*

#### *Green-Users*

For the overall sample, more than half the students were ranked as “high-users” of the campus green spaces and the arboretum, indicating that most students at this university used the campus green spaces and the arboretum frequently (Table 2).

However, results from this study did indicate that Green-User scores varied based on specific demographics. For instance, results indicated that younger students tended to use campus green spaces and the arboretum more frequently than older students. This result was found using both student grade classification (Table 8; Table 9; Table 10) and age group (Table 17; Table 18; Table 19) for analyses. Specifically, undergraduate students tended to have higher Green-User scores when compared to graduate students (Table 9). Within the undergraduate student demographic, freshmen and sophomores tended to have higher Green-User scores when compared to juniors and seniors (Table 9).

Further analysis showed that as age group membership increased, Green-User scores tended to decline. Students who were younger than 20 years old had the highest Green-User scores when compared to students of other age groups (Table 18). Furthermore, male respondents tended to have higher Green-User scores than females (Table 23; Table 24). Results also indicated that students who were married, partnered, or divorced used campus green spaces and the arboretum less frequently when compared to single students (Table 30). Across all work status groups, the group who indicated working more than 40 hours per week had statistically significantly lower Green-User

scores when compared to all other groups (Table 36). Furthermore, the group who indicated working fewer than 20 hours per week had the highest Green-User score (Table 36). Finally, the respondents who lived on-campus had the highest Green-User scores, and the group who commuted longer than one hour having the lowest Green-User scores when compared to other commuter groups (Table 42). Students of all ethnic groups had similar Green-User scores (Table 27).

#### *Overall Quality of Life*

Additionally, results from this study showed that for the whole sample, mean scores to both overall quality of life questions were greater than 4.0, indicating most students were at least “Content” and “Mostly satisfied” with regards to their overall quality of life (Table 3). Most demographic comparisons revealed similar responses to the overall quality of life questions. Students of all age groups tended to have similar responses to the overall quality of life statements (Table 20). Males and females tended to respond similarly to the overall quality of life statements (Table 25). All ethnic (Table 28) and marital status groups (Table 32) responded similarly to both overall quality of life statements. All students rated their overall quality of life similarly regardless of the number of hours they worked weekly (Table 38), and no commuter group appeared to perceive a higher overall quality of life when compared to other commuter groups (Table 44). However, results did indicate that graduate students had statistically significantly higher scores when compared to freshmen on the question “Overall, how would you rank the quality of your life?” (Table 11).

#### *Quality of Life of University Students*

On the quality of life of university students instrument, most respondents gave answers that were between “Neutral” and “Agree” (Table 4; Table 5). Thus, students, in general, felt fairly well about both their affective and cognitive experiences in the university. On the affective domain, which measured students’ feelings of self-worth (Roberts and Clifton, 1991), most respondents agreed with the statements, indicating overall feelings of self-worth were high (Table 4). Furthermore, on the total positive affective dimension, most respondents again gave answers that were on the positive side of the scale (“Agree” or “Strongly Agree” for positive affective and “Disagree” or “Strongly Disagree” for negative affective) and showed students highly regarded their student experiences in the university (Table 4).

On the interaction with students and the interactions with professors dimensions, which measured how students felt about their experiences with other students and professors in the university context (Roberts and Clifton, 1991), respondents again gave responses that were between “Neutral” and “Agree,” and indicated that they felt positively about both of these interactions (Table 4).

Students’ responses on the cognitive domain, which measured how students felt about the stimulation and challenge of their intelligence in the university, were similarly positive in general (Table 5). Specifically, on the functional dimension, which measured how students felt about the challenge of their higher order thinking skills such as analysis and synthesis (Roberts and Clifton, 1991), most respondents gave ratings that were between “Neutral” and “Agree,” indicating they felt positively about their challenge to utilize these skills in the university (Table 5). Additionally, students rated statements that measured the structural dimension of the cognitive domain. On this dimension, most

respondents gave ratings between “Agree” and “Strongly Agree,” and this indicated that students felt positively about their experience in the university to use knowledge and comprehension skills (Table 5).

The above data showed that most students gave positive responses to questions on the quality of life of university students scale. However, some demographic groups did respond statistically significantly differently from others.

Graduate students, in general, scored different from the other student grade classifications. They had had statistically significantly higher mean scores on the overall quality of life of university students scale, as well as on both the affective and cognitive domains indicating they had a higher sense of self-worth as well as felt they had been stimulated and challenged intellectually in the university when compared to other students (Roberts and Clifton, 1991) (Table 13).

Furthermore, graduate students had statistically significantly higher mean scores when compared to all other groups on the total affective dimension within the affective domain indicating graduate students felt they experienced a more positive sense of their experiences within the university (Roberts and Clifton, 1992b) (Table 13). Graduate students also had higher mean scores when compared to freshmen and sophomores on the interaction with professors dimension, which indicated they felt more positively regarding the quality of these interactions (Roberts and Clifton, 1992b) (Table 13).

Additionally, graduate students had significantly higher scores when compared to freshmen and seniors on the functional dimension within the cognitive domain (Table 13). This finding meant that graduate students felt more positively about utilizing more

complex skills such as application, analysis, synthesis, and evaluation within the university when compared to freshmen or seniors (Clifton et al., 1996).

However, within the interaction with students dimension of the affective domain and the structural dimension of the cognitive domain, all groups had similar mean scores (Table 13). This meant that students felt similarly about their relationships with other students at the university regardless of their student grade classification.

Furthermore, students who were younger than 20 years old tended to have lower mean scores on the overall quality of life of university students scale, the affective domain, and the total affective dimension when they were compared to students of other age groups. They also had statistically significantly lower mean scores on the affective domain than students who indicated they were between 21 and 25 years old, between 26 and 30 years old, and over 40 years old. Additionally, students who were younger than 20 had lower mean scores than on the total affective dimension within the affective domain when compared to students who were between 26 and 30 years old, between 31 and 35 years old, and over 40 years old. This indicated that younger students had a less positive feeling of their experiences in the university context when compared to older students (Roberts and Clifton, 1992b). No statistically significant differences were found with regards to age group on the cognitive domain, or either the structural or functional dimensions of the cognitive domain (Table 21). Therefore, students felt similarly about their intellectual experiences in the university regardless of their age group.

Married/partnered students also differed when compared to the group of single respondents on the quality of life of university students scale. Married or partnered students tended to have higher mean scores on the various qualities of life of university

students measures when compared to students who were single. Specifically, on the overall quality of life of university students scale, students who were married had statistically significantly higher scores than those who were single. Additionally, students who were married/partnered had statistically significantly higher mean scores when compared to students who indicated they were single on the affective domain, as well the total affective dimension within the affective domain which indicated that they had a more positive feeling of their experiences in the university context (Roberts and Clifton, 1992b). No statistically significant differences were found with regards to marital status on the cognitive domain, or either the structural or functional dimensions of the cognitive domain (Table 33).

Furthermore, students who indicated that they worked more than 40 hours per week differed when compared to the other work status groups on the quality of life of university students scale. On the affective domain, students who worked more than 40 hours per week had statistically significantly higher scores when compared to all other work status groups except for the group who indicated working 20-40 hours per week. Additionally, on the total affective dimension within the affective domain, students who worked more than 40 hours per week had statistically significantly higher scores when compared to all other work status groups (Table 39). Therefore, those students who worked longer hours appeared to feel more positively about their general experiences in the university context (Roberts and Clifton, 1992b).

Statistically significant differences on the quality of life of university students scale also existed for different commuter groups. It appeared that students who lived on-campus and inside the city limits of San Marcos had lower mean scores on the overall

quality of life of university students scale when compared to students who commuted longer than 30 minutes. Additionally, students who commuted between 15 minutes to 30 minutes had lower overall quality of life of university students when compared to students who lived outside the city limits of San Marcos but had less than a 15 minute commute to campus, and students who commuted longer than 30 minutes. On the total positive affective dimension, students who commuted between 30 minutes to one hour had statistically significantly higher scores when compared to those who lived on-campus or those who lived off campus but inside the city limits of San Marcos (Table 42). Therefore, the results indicated that the group who commuted between 30 minutes to one hour felt more positively about their experiences in the university context when compared to other commuter groups (Roberts and Clifton, 1992b).

Students of different genders (Table 26) and ethnic groups (Table 29) responded similarly to statements on the quality of life of university students scales.

#### *Relationship Between Green-User Scores and Quality of Life*

In analyzing the entire sample, statistically significant correlations were found between Green-User scores and responses to both of the overall quality of life questions. Neither the correlation between Green-User scores and overall quality of life of university students, nor the correlations between Green-User scores and the affective or cognitive domain, was statistically significant (Table 6).

Graduate students tended to have statistically significantly higher quality of life scores on the overall quality of life statements as well as on the quality of life of university students instrument when compared to other student grade classifications (Table 13). Alternatively, they tended to have statistically significantly lower Green-

User scores when compared to other student grade classifications (Table 9). Since graduate students tended to be different from students of other grade classifications, additional analyses were run with only undergraduate student responses to investigate any changes in results.

A Pearson's Product-Moment correlation indicated a statistically significantly reverse relationship between student grade classification for undergraduate students and the Green-User (Table 15). This correlation was similar to that found when graduate students were included in the analysis (Table 8), but it was stronger when excluding graduate students. Again, results indicated that as student grade classification moved from freshmen to seniors, Green-User scores tended to decline, but less so than when graduate students were included in the analysis.

Additionally, a Pearson's Product-Moment correlation indicated statistically significant relationships between Green-User score and both overall quality of life statements, the overall quality of life of university students score, the affective domain, the interaction with students dimension of the affective domain, the total positive affective dimension of the affective domain, and the functional dimension of the cognitive domain for undergraduate students. Statistically significant correlations were not found on the cognitive domain, the interaction with professors dimension of the affective domain, or the structural dimension of the cognitive domain (Table 16).

These findings showed that undergraduate students who used campus green spaces and the arboretum more frequently tended to feel more positively about their feelings of self-worth within the university setting (Roberts and Clifton 1991, 1992a, 1992b). Furthermore, students who used the campus green spaces and the arboretum

more frequently felt more positively about their interactions with other students within the university. Finally, the correlation found on the functional dimension of the cognitive domain indicated that students who used campus green spaces and the arboretum more frequently felt more positively regarding their ability to utilize complex skills such as application, analysis, synthesis, and evaluation (Clifton et al., 1996).

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### *Purpose of the Study*

The main objective of this study was to investigate Texas State University-San Marcos student use of campus green spaces and the arboretum and the perceptions of quality of life. Specific objectives of this study were to:

1. To compare students' perceptions of quality of life with the number of activities and time spent on-campus in green spaces and the arboretum.
2. To investigate the locations where students used the campus green spaces and the arboretum in daily life.
3. To compare students, based on demographics, to observe whether any particular group appeared to use the campus arboretum and green spaces more frequently, and to compare demographic groups on perceptions of quality of life.

#### *Summary of the Literature Review*

Of interest across the fields of economics, psychology, sociology, political science, and education quality of life has been, across time, defined using both objective and subjective terms (Schuessler and Fisher, 1985). Objectively, quality of life has been studied using factors such as economic well-being, educational level, health care access,

quality of housing, crime rates, environmental quality, divorce rates and recreational activity (Dillman and Tremblay, 1977).

Dillman and Treblay (1977) explained that objective measures of quality of life “fell short of describing exactly what those measures should be and whether specific changes in indicators reflect improvement or decline” (p. 119). Diener and Suh (1997) pointed out that even with such objective measures, they are inevitably defined and interpreted in subjective ways. Furthermore, research has shown that individuals in economically disadvantaged situations often perceived their quality of life as high (Bubolz et al., 1980; Wilkening and McGranahan, 1978), and that there was actually a low correlation between such objective measures as income or Gross Domestic Product and how people perceived their conditions (Milbrath, 1979).

With these findings and the difficulty researchers experienced in describing, defining, and quantifying objective measures, subjective measurements of quality of life have emerged (Dillman and Tremblay, 1977). Subjective measures of quality of life have focused on terms such as “happiness, satisfaction, sense of well-being, [and] aspirations” and suggests that “society exists to meet the needs of people in it, and to find out whether those needs are being met we should simply go out and ask them” (Dillman and Tremblay, 1977, p. 119).

Other researchers suggested that Maslow’s “hierarchy of needs” (1943, 1954) appropriately reflected quality of life issues. In this hierarchy, physiological needs are the lowest category, which is composed of basic needs such as food and shelter, with the highest level of need being self-actualization needs, or emotional balance and growth. Numerous studies have used Maslow’s hierarchy as a theoretical basis for quality of life

(McCall, 1975; Schuessler and Fisher, 1985; Waliczek et al., 1996; Waliczek et al., 2005). In these studies, as higher level needs are met, the greater a person's perceived quality of life.

Also of interest is what some researchers have called "domain-specific" quality of life, which included such topics as urban quality of life, family quality of life, and quality of life of students (Schuessler and Fisher, 1985). Beck (1990) insisted that quality of life of students should be a prime factor in measuring the worth of educational institution.

Researchers have found that student perception of their academic experience is related to their academic accomplishment. For example, Keys and Fernandes (1993) found that student interest in school work, liking for teachers, internal value of school, as well as several other factors positively contributed to learning. Furthermore, Karatzias et al. (2001) argued that "if schools were able to reliably evaluate their performance, they could also provide valuable information to parents about their effectiveness, and have a valid basis on which to establish their reputation... a [Quality of Life of Students] instrument could facilitate the accomplishment of these specified goals" (p. 267). Furthermore, Hendershott et al. (1991) argued that "students, whose own educational agendas comprise only one facet of their daily lives, must also be perceived in relation to the community and to its specific environmental factors" (p. 12).

There is a small but interesting set of studies investigating the relationship between physical environments and various aspects of quality of life. Kaplan and Kaplan (1989) reported, "People with access to nearby natural settings have been found to be healthier overall than other individuals. The longer-term, indirect impacts (of 'nearby nature') also included increased levels of satisfaction with one's home, one's job and with

life in general” (p. 173). Such positive results have been found with views of vegetation, water, or nearby mountains (Heerwagen, 1990; Moore, 1981; White and Heerwagen, 1998; Ulrich, 1981).

People can interact with plants and nature either actively or passively. Lewis (1994) explained that both types of interactions with natural areas have positive mental and physical effects on individuals. Individuals engaged in active interactions are “intimately involved with the plants being grown and directly responsible for the well-being of the plants” (Lewis, 1992, p. 57). Research has shown that active interactions with nature are related to improved psychological and physiological health, including increased self-esteem and reduced stress levels (Cammack et al., 2002; Kaplan, 1973; Lewis, 1978; Waliczek et al., 2005). Alternatively, passive interactions have included those that are visual and more observational in character. The mere presence of plants has been found to “improve[s] the quality of our lives in many ways: environmentally, economically, socially, culturally and physically through our health and well-being” (Zampini, 1994, p. 185).

Some theorists have argued that universities should be designed to facilitate a certain quality of life (Caws, 1970). Griffith added, “Higher education leaders should reshape their priorities to include the creation of attractive, engaging campuses that are conducive to both activity and tranquility” (1994, p. 645). Furthermore, she stated, “Attractively landscaped formal open spaces or habitats left in their natural form, as woods and gorges, help establish a venerable campus identity, stir alumni sentimentalism, create a strong sense of community, and curb escalating campus densities” (p. 648).

Understanding people/plant relationships from the perspective of a university planner could prove useful, as “most colleges and universities... do not place similar emphasis on the quality of the physical environment in which the formal learning process takes place... the quality of the architecture, the topography, the landscaping” (Sturmer, 1972, p. 97) even though research has shown that “the physical environment could be manipulated to achieve obvious physical or behavioral results” (Drew, 1971, p. 447). The main objective of this study was to investigate Texas State University-San Marcos student use of campus green spaces and the arboretum and the perceptions of quality of life.

### *Methodology*

#### *Sample Group*

The sample used in this study was a random selection of students at Texas State University-San Marcos. From the overall population of students, 2681 (approximately 10%) were randomly selected to receive questionnaires via email. This selection was stratified to include students from all grade classifications. Of those sampled, 462 (17.2%) responded to the survey.

Data were collected using an on-line survey distributed by the Institutional Research Office. The randomly selected students were contacted by the Institutional Research Office via email requesting their participation in this study with the compensation of being entered into a drawing for a chance to win one of three prizes (Appendix A). A second email was sent out one week later to students who had not yet responded to remind them of the opportunity to participate. Students accessed the survey from the link in the e-mail and then agreed to privacy and consent information and

acknowledged that he/she understood that participation in the study was voluntary. After the survey was available for two weeks, data were automatically downloaded into a Microsoft Excel<sup>TM</sup> file (Seattle, WA) and then analyzed using the Statistical Package for the Social Sciences (SPSS<sup>®</sup>) Version 11.5 (Chicago, IL). Statistical analysis included descriptive statistics, frequencies, correlations, and analysis of variance.

### *Instrumentation*

The assessment tool used in this study was composed of several sections. The survey included a section asking about student use of campus green spaces and the arboretum. Students also responded to a series of statements designed to measure the quality of life of university students, overall life quality statements. Standard demographic questions were also included.

The demographic section of the instrument was modeled after similar instruments (Dravigne, 2006; Waliczek et al., 1996), and reviewed by other researchers for content validity (Appendix B). The demographic section of the instrument contained questions that asked for student grade classification, age, gender, marital status, and ethnic identity. Additionally, questions regarding how many hours per week the respondent worked was asked, as well as how far they commute to school.

The Green-User section of the questionnaire was developed and validated by researchers of the horticultural and agricultural sciences and asked the participants to rate the frequency in which they participated in various activities outdoors on-campus such as walking to and from class, exercising, socializing with friends, and others (Appendix B). On these questions, responses ranged from one to five. Lower scores indicated less frequent use of campus green spaces and the arboretum and higher scores indicated more

frequent use for the specified activity. Also, one question asked generally, “How frequently do you spend time outdoors on-campus?” This question was scored on a four-point scale. Again, higher scores indicated more frequent use of the campus green spaces and the arboretum and lower scores indicated less frequent use.

The instrument selected to measure quality of life of students consisted of two separate domains: an affective domain (Roberts and Clifton, 1992b) and a cognitive domain (Clifton et al., 1996). The *affective* domain assessed “students’ feelings about the quality of their university experiences” (Roberts and Clifton, 1992b, p. 115). The *affective* domain of quality of life of university students was measured using a series of 30 statements encompassing four dimensions (*positive affective, interaction with students, interaction with professors, and negative affective*). The *positive affective* dimension asked students to rate their agreement with statements such as, “The things I learn are important to me,” “I like learning,” “I am given the chance to do work that really interests me,” and others (Roberts and Clifton, 1992b) (Appendix B). The *negative affective* dimension had four negative statements that included: “I feel depressed,” “I feel restless,” “I get upset,” and “I feel worried” (Roberts and Clifton, 1992b). The positive affective and negative affective dimensions were combined to form the *total positive affective* dimension (Clifton, 2006). The *interaction with students* dimension included statements such as, “I find it easy to get to know other people,” “Mixing with other people helps me understand myself,” and others (Roberts and Clifton, 1992b) (Appendix B). The *interaction with professors* dimension included: “Professors treat me fairly,” “Professors give me the marks I deserve,” and others (Roberts and Clifton, 1992b) (Appendix B).

The cognitive quality of life of university students measured the degree to which students felt that they were experiencing sufficiently “demanding cognitive challenges” (Clifton et al., 1996, p. 30) (Appendix B). This domain was measured using a series of 17 statements encompassing two dimensions (*functional* and *structural*). Each statement was preceded with: “At Texas State University, I have been challenged to...” The *functional* dimension of the *cognitive* domain of quality of life of university students included statements like: “Demonstrate how theories are useful in real life,” “Identify organizing principles in my courses,” “Use theories to address practical questions,” and others (Clifton et al., 1996) (Table 5). This dimension measured how students felt about “being challenged more often to comprehend and interpret new information” (Clifton, Perry, Stubbs and Roberts, 2004, p. 812). The *structural* dimension included statements such as: “Remember an extensive number of new concepts,” “Recall a substantial number of new concepts,” “Interpret the meaning of new facts and terms,” and others (Clifton et al., 1996) (Appendix B).

The statements on both the affective and cognitive domains were all rated on a five point Likert-type scale, with responses of one indicating “strongly disagree” and responses of five indicating “strongly agree” (Likert, 1967). Except for the statements on the negative affective dimension, the statements were positive in nature, and scoring was equivalent to the responses, where a response of one scored one point and a response of five scored five points. On the negative affective dimension, responses were reverse coded so that responses of one scored five points and responses of five scored only one point. Non-response to any question resulted in zero points for that question. The scores

were summed for each dimension, both the affective and cognitive domains, and the overall quality of life of university students.

Additionally, two other questions asked about overall quality of life. These questions were “Overall, how would you rank the quality of your life?” and “When all things in your life are considered, how do you feel today?” (Dravigne, 2006) (Appendix B). Possible responses to “When all things in your life are considered, how do you feel today?” were “Miserable,” “Not very happy,” “Ok,” “Content,” and “Very happy.” Possible responses to “Overall, how would you rank the quality of your life?” “Dissatisfied,” “Mostly dissatisfied,” “Satisfied,” “Mostly satisfied,” and “Very satisfied.” On these questions, more positive responses scored more points. Therefore, responses of “Miserable” and “Dissatisfied” scored only one point, and responses of “Very happy” and “Very satisfied” scored five points.

A Cronbach’s alpha reliability analysis determined the overall Green-User and quality of life survey instrument to have high reliability ( $\alpha=0.91$ ) (Gall, Borg and Gall, 2006).

### *Conclusions*

This study found that on average, more than half the students were ranked as “high-users” of the campus green spaces and arboretum, and that most of those who were not “high-users,” were, at least, “medium-users.” Very few “low-users” of the campus green spaces and the arboretum were identified through this study. Furthermore, this study found that most students had positive perceptions of their quality of life, overall, as well as within the university.

Additionally, this study showed that student use of campus green spaces and the arboretum and perceptions of quality of life were related to each other, particularly for undergraduate students. Statistically significant Pearson's Product-Moment correlations were found between Green-User scores and various measures of quality of life and quality of life of university students, and these effects were strengthened with the removal of graduate students from the study sample. Positive student perceptions of experiences within the university are important for universities interested in retaining and attracting high ability students (Groen and White, 2003).

Conclusions in support of research and results presented in previous chapters are summarized as follows:

*Objective One*

The first objective of this study was to compare students' perceptions of quality of life with the number of activities and time spent on-campus in green spaces and the arboretum.

A Pearson Product-Moment correlation was run between respondents' Green-User score, responses to overall quality of life questions, and their overall student quality of life score (Table 6). Statistically significant correlations were found between Green-User scores and responses to both of the overall quality of life questions ( $P=0.026$  and  $P=0.002$ ). The correlation between Green-User scores and overall quality of life of university students was not significant ( $P=0.432$ ).

These findings indicated that within the overall sample of graduate and undergraduate students, those who used the campus green spaces and the arboretum more frequently rated their overall quality of life higher when compared to students who used

the campus green spaces and the arboretum less frequently. However, this finding did not hold true for the ratings of overall quality of life of university students. Students seemed to rate their quality of life of university students similarly regardless of their Green-User scores.

### *Objective Two*

The second objective of this study was to investigate the locations where students used the campus green spaces and the arboretum in daily life.

Descriptive statistics revealed that students enjoyed participating in various activities outdoors at several locations throughout campus. Most frequently cited locations included the Quad, Sewell Park, and the Lyndon B. Johnson Student Center. Other areas students enjoyed for various activities included around the Agriculture Building and around the Evans Liberal Arts Building. Over three-fourths (76.8%) of students indicated having some favorite place to spend time out-doors on-campus.

### *Objective Three*

The third objective of this study was to compare students, based on demographics, to observe whether any particular group appeared to use the campus arboretum and green spaces more frequently, and to compare demographic groups on perceptions of quality of life.

### *Student Grade Classification*

Results from a Pearson's Product-Moment correlation indicated a statistically significant relationship between student grade classification and Green-User scores ( $r=0.344$ ,  $P=0.000$ ). Furthermore, an analysis of variance (ANOVA) indicated statistically significant differences between student grade classification and Green-User

scores ( $P=0.000$ ). Freshmen had the highest mean Green-User scores, followed by sophomores, then juniors and seniors, and finally graduate students with the lowest Green-User scores.

Although graduate students tended to have the lowest Green-User scores, they also tended to have the highest quality of life scores. Specifically, they had higher scores on the question, “Overall, how would you rank your quality of life?” when compared to freshmen students ( $P=0.024$ ). They also had higher scores on the overall quality of life of university students scale ( $P=0.000$ ), as well as the affective domain ( $P=0.000$ ), the total positive affect dimension ( $P=0.000$ ) and the interaction with professors dimension ( $P=0.000$ ). Additionally, graduate students had significantly higher scores on the functional dimension within the cognitive domain ( $P=0.004$ ). These differences in mean scores were statistically significant when compared to freshmen students on each of these scales. However, on the affective domain and total affective dimension, graduate students had significantly higher mean scores when compared to all other grade classifications. Statistically significant differences were not found on the other scales (interaction with students dimension, cognitive domain, and structural dimension). Although graduate students tended to have the highest scores on the various measures of quality of life used in this study, it is important to note that across the board, mean scores on the various quality of life measures were on the positive end of each scale.

This indicated that graduate students, in general, felt more positively about their experiences within the university setting. Alternatively, they tended to have statistically significantly lower Green-User scores when compared to other student grade

classifications. As such, additional analyses were run with only undergraduate student responses to investigate any changes in results.

### *Undergraduate Students*

Scores of freshmen, sophomores, juniors, and seniors were compared using a Pearson's Product-Moment correlation to investigate any relationship between Green-User score and Quality of Life. This correlation indicated a statistically significantly reverse relationship between student grade classification for undergraduate students and the Green-User scores ( $r=-0.212$ ,  $P=0.000$ ). Thus, as student grade classification moved from freshmen to seniors, Green-User scores tended to decline, but less so than with graduate students included in the analysis. Overall, undergraduate students tended to enjoy campus outdoor spaces.

Additionally, a Pearson's Product-Moment correlation indicated statistically significant relationships between Green-User score and both overall quality of life statements ( $P=0.016$  and  $P=0.001$ ), the overall quality of life of university students score ( $P=0.004$ ), the affective domain ( $P=0.001$ ), the interaction with students dimension of the affective domain ( $P=0.000$ ), the total positive affective dimension of the affective domain ( $P=0.003$ ), and the functional dimension of the cognitive domain ( $P=0.024$ ) for undergraduate students. Statistically significant differences were not found on the cognitive domain, the interaction with professors dimension of the affective domain, or the structural dimension of the cognitive domain.

It is interesting to note that student use of campus green spaces and the arboretum are positively correlated to the interaction with students dimension. This may be indicative of a situation in which students use the campus green spaces and the arboretum

to socialize with friends. Abu-Ghazze (1999) found that “the activities engaged in at the campus outdoor spaces were essential to alleviate stress among students and university employees” (p. 795). Furthermore, he found that when participants were asked what attracted them to specific areas, an overwhelming pattern of response was social interaction (Abu-Ghazze, 1999).

The intensification of the relationship between Green-User scores and the various quality of life scales indicated that something was different about graduate students when compared to undergraduate students. Researchers have suggested that graduate students experience greater “hedonistic enjoyment” when compared to undergraduate students on activities of importance to them. Hedonic enjoyment is explained to be felt when “pleasant affect accompanies the satisfaction of needs, whether physically, intellectually, or socially based” (Waterman, 1993, p. 679).

Furthermore, some studies suggest that higher levels of achievement are related to higher stages of ego development (Vaillant and McCullough, 1987). In describing the theory of personality development by Loevinger (1976), Pfaffenberger (2005) explained that the highest level of ego development, the autonomous stage, is often equated with Maslow’s (1954) definition of self-actualization, or emotional balance and growth. In her review of studies on ego development, Pfaffenberger (2005) explained that “across the board, it has been noted that higher levels of education shows a significant correlation with ego development” (p. 286). Thus, graduate students may be reaching self-actualization, or the autonomous stage of ego development, through their advanced and challenging educational pursuits.

### *Age Group*

A Pearson's Product-Moment correlation indicated a statistically significant moderate reverse relationship between age group classification and the Green-User scores ( $r=-0.389$ ,  $P=0.000$ ). This correlation showed that as age group membership increased, Green-User scores tended to decline.

An ANOVA test further compared age classification and Green-User scores. Statistically significant differences ( $P=0.000$ ) were found indicating differences in Green-User scores based on age category. In this test, the less than 20 years old age category had statistically significantly higher Green-User scores when compared to students of other age groups.

Another ANOVA test compared students' perception of quality of life of university students' scores based on student age group. Statistically significant differences were found indicating a difference in mean scores on the overall quality of life of university students scale ( $P=0.002$ ). Statistically significant differences were also found in the affective domain scores ( $P=0.000$ ), specifically within the total positive affect dimension scores ( $P=0.000$ ) and the interaction with professors dimension scores ( $P=0.005$ ). However, no statistically significant differences were found within the cognitive domain scores ( $P=0.150$ ).

Students who were younger than 20 years old tended to have lower mean scores on the overall quality of life of university students scale, the affective domain, and the total affective dimension when they were compared to students of other age groups. This indicated that younger students had a less positive feeling of their experiences in the university context than older students (Roberts and Clifton, 1992b). These results supported the previous findings with regards to differences based on student grade

classification, since student grade classification and age are often related. Furthermore, additional analysis revealed that 60% of students who were over 40 years old were also graduate students.

### *Gender*

A Pearson's Product-Moment correlation was run comparing gender and Green-User scores. This analysis indicated a statistically significant relationship between gender and Green-User scores ( $r=-0.122$ ,  $P=0.009$ ) where males tended to have higher scores than females. Furthermore, an ANOVA test also compared gender and Green-User scores. Again, statistically significant differences were found between the mean Green-User scores for males and females ( $P=0.009$ ). Descriptive statistics revealed that males tended to have higher Green-User scores than females.

Although males tended to have higher Green-User scores than females, there were no statistically significant differences found with regards to either overall quality of life statement, the overall quality of life of university students, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), or the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension).

### *Ethnic Group*

An ANOVA test compared ethnic groups and Green-User scores. There were no statistically significant differences between groups ( $P=0.389$ ) indicating that no specific ethnic group appeared to use the campus green spaces or the arboretum more than any other ethnic group.

Furthermore, ANOVA tests comparing ethnic groups on the various quality of life measures also revealed no statistically significant differences on either overall quality of life statement, the overall quality of life of university students, the affective domain of quality of life of university students (which included the total positive affective dimension, the interaction with students dimension, and the interaction with professors dimension), or the cognitive domain of quality of life of university students (which included the functional dimension and structural dimension) when compared using ANOVA tests.

### *Marital Status*

An ANOVA test compared marital status and Green-User scores. Statistically significant differences were found ( $P=0.000$ ) indicating that there was a difference in Green-User score based on marital status. The married/partnered group and the divorced group tended to have lower Green-User scores when compared to single students and those who selected “other” as their marital status, indicating that students who were married, partnered, or divorced used campus green spaces and the arboretum less frequently than did single students.

An ANOVA test comparing students’ perception of their overall quality of life based on marital status revealed no statistically significant differences with regards to either overall quality of life statement. However, an ANOVA test comparing students’ perception of quality of life of university students based on marital status did reveal statistically significant differences on the overall quality of life of university students scale ( $P=0.006$ ), the affective domain ( $P=0.002$ ), and the total positive affective dimension within the affective domain ( $P=0.000$ ). Married or partnered students tended

to have higher mean scores on the various quality of life of university students measures when compared to students who were single. Specifically, on the overall quality of life of university students scale, students who were married had statistically significantly higher scores when compared to those who were single and those who were between 26 and 30. Additionally, students who were married/partnered had statistically significantly higher mean scores than students who indicated they were single on the affective domain as well the total affective dimension within the affective domain which indicated that they had a more positive feeling of their experiences in the university context (Roberts and Clifton, 1992b). No statistically significant differences were found with regards to marital status on the cognitive domain, or either the structural or functional dimensions of the cognitive domain. This indicates that with regard to the educational experiences within the university, students felt similarly regardless of marital status.

While married students had lower Green-User scores, they tended have higher quality of life scores. After additional analysis, it was determined that, although graduate students made up less than 17% of the sample, almost half of students who were married were also graduate students. Thus, the sample of students who were both married and classified as a graduate student was disproportionate to students who were married and in other grade classifications. Additionally, past research has shown that marriage is an important factor contributing to positive evaluations of quality of life (Bubolz et al., 1980). In contrast, however, Astin (1999) suggests that marriage should lead to lower quality of life of university students as family involvement lessens the amount of time students have to devote to collegiate involvement.

### *Work Status*

A Pearson's Product-Moment correlation indicated a statistically significant relationship between work status and the Green-User scores ( $r=-0.175$ ,  $P=0.000$ ) (Table 35). Respondents who indicated working more hours per week tended to have lower Green-User scores when compared to respondents who indicated working fewer hours per week. An ANOVA test further compared work status and Green-User scores. Again, statistically significant differences were found on the mean Green-User score among the various work status groups ( $P=0.000$ ). This indicated that usage of campus green spaces and the arboretum varied depending on how many hours the student worked.

The group who indicated working more than 40 hours per week had significantly lower Green-User scores when compared to all other groups. Furthermore, the group who indicated working some number of hours fewer than 20 per week had the highest Green-User score, and the score was significantly higher when compared to all other groups except the group who indicated working no hours per week. This seemed logical since students who were both working many hours and attending classes would have had less time available to spend recreationally.

ANOVA tests compared students' perception of their overall quality of life as well as the various measures of quality of life of university students based on work status. No statistically significant differences were found with regards to either overall quality of life statement. No statistically significant results were found on mean scores on the overall quality of life of university students scale ( $P=0.070$ ). Additionally, no significant differences were found within the cognitive domain ( $P=0.467$ ). However, statistically

significant differences were found in the affective domain ( $P=0.024$ ), specifically within the total positive affect dimension ( $P=0.002$ ).

In most cases, it was those students who indicated that they worked more than 40 hours per week who differed when compared to the other work status groups. On the affective domain, students who worked more than 40 hours per week had statistically significantly higher scores when compared to all other work status groups except for the group who indicated working 20-40 hours per week. Additionally, on the total affective dimension within the affective domain, students who worked more than 40 hours per week had statistically significantly higher scores when compared to all other work status groups. Therefore, those students who worked longer hours appeared to feel more positively about their general experiences in the university context.

This finding, however, seems counter-intuitive and in contrast to past research. Working 40 hours per week in addition to pursuing a degree is traditionally seen as stressful and a hindrance to educational pursuits. Astin (1982) explained that “full time-work off campus decreases the time and energy that the student can devote to studies and other campus activities” (p. 522) and working full-time off campus has been shown to increase the chance the student will drop-out (Astin, 1993; Astin, Tsui, and Avalos, 1996). Furthermore, research has shown that a nonlinear relationship exists between hours worked and both academic achievement and satisfaction with college (Hood, Craig, Ferguson, 1992; Pennington, Zvonkovic, and Wilson, 1989), where students who did not work or students with heavy work schedules reported lower Grade Point Averages as well as less satisfaction when compared to students who worked moderate hours. Astin (1993) reported that “working a full-time job has been shown negatively associated

with... almost every area of satisfaction with the university environment” (Furr and Elling, 2000, p. 455).

However, further analysis revealed that over three-fourths of students who worked more than 40 hours per week were also graduate students, although graduate students only made up less than 17% of the total sample. Thus, the sample of students who were worked more than 40 hours per week and who were also graduate students was disproportionate to those students who worked more than 40 hours per week and in other grade classifications. Since graduate students tended to have higher quality of life scores, as explained earlier, this may explain why students who worked so much had higher quality of life scores than students who worked fewer hours.

#### *Commuter Group*

A Pearson’s Product-Moment correlation indicated a significant relationship between commuter group (lower scores indicated less time commuting to school, and higher scores indicated more time commuting to school) and the Green-User scores ( $r=-0.490, P=0.000$ ). Results showed a moderate, statistically significant reverse relationship. Therefore, respondents who indicated a longer commute to school tended to have lower Green-User scores when compared to respondents who indicated a shorter commute to school. Furthermore, an ANOVA test compared commuter group and Green-User scores. Again, statistically significant differences were found between the mean Green-User score among the various commuter groups ( $P=0.000$ ). Almost all groups were statistically significantly different from each other group. This indicated that commuter group is an important factor in Green-Use since most all groups were different from each other.

An ANOVA test compared students' perception of overall quality of life based on commuter group. No statistically significant differences were found with regards to either overall quality of life statement. However, another ANOVA test compared students' perception of quality of life of university students based on commuter group. Statistically significant differences were found on the overall quality of life of university students ( $P=0.050$ ) and the total positive affective dimension ( $P=0.007$ ).

On the total positive affective dimension of the affective domain, students who commuted between 30 minutes to one hour had statistically significantly higher scores when compared to those who lived on-campus or those who lived off campus but inside the city limits of San Marcos. Therefore, the results indicated that the group who commuted between 30 minutes to one hour felt more positively about their experiences in the university context when compared to other commuter groups (Roberts and Clifton, 1992b).

This finding is different from previous findings by Astin (1999) who found that students who lived on-campus were more involved in campus activities, and thus had higher satisfaction with their university experiences. Furthermore, students who live on-campus had lower drop-out rates (Astin, 1973, 1977, 1982; Chickering, 1974). Astin (1999) explained that "students who live in residence halls have more time and opportunity to get involved in all aspects of campus life.... residential students have a better chance than do commuter students of developing a strong identification and attachment to undergraduate life" (p. 523). Thus, students who lived on-campus developed stronger attachments to the university setting, and therefore, perceived their

quality of life within the university as higher when compared to those students who lived off-campus.

However, further analysis determined that students who commuted more than 30 minutes largely overlapped with graduate students. Students who commuted more than 30 minutes consisted of 43.8% graduate students, whereas graduate students comprised less than 17% of the total sample. Since graduate students tended to have higher quality of life scores as explained earlier, the demographic composition of these students may explain a portion of this finding.

### *Conclusions*

1. The overall results from this study indicated that, in general, students who used the campus green spaces and the arboretum more frequently perceived their quality of life as higher when compared to those students who used it less frequently.
2. Of respondents in this study, 61% of students were ranked as high-users of campus green spaces and the arboretum.
3. Results from this study indicated that undergraduate student use of campus green spaces and the arboretum was correlated with the individual areas of overall quality of life, the affective domain of quality of life of university students, and specifically the total positive affective dimension and the interaction with students dimension.
4. Results from this study demonstrated that undergraduate students used campus green spaces and the arboretum more frequently than did graduate students.
5. Student use of campus green spaces and the arboretum do not appear to benefit any particular gender or ethnic group more than others.

6. Results from this study demonstrated that use of campus green spaces and the arboretum could potentially be a contributing factor in student retention through encouraging student involvement in the university, particularly among students new to the university (freshmen students).
7. Results from this study demonstrated that graduate students, older students, married students, and commuter students rate their quality of life as higher when compared to other students.

#### *Recommendations for Additional Research*

1. It is recommended that more studies be conducted using students from different institutions, to see if results of this study may be replicated.
2. It is recommended that more studies be conducted comparing student use of campus green spaces and the arboretum with other activities which indicate significant student involvement in the university, to see if results are specific to student use of campus green spaces and the arboretum.
3. It is recommended that more studies be conducted to further explore effects of student use of campus green spaces and the arboretum on individual grade levels of freshmen, sophomores, juniors, seniors, and graduate students.
4. It is recommended that more studies be conducted to further explore the factors contributing to high quality of life ratings by graduate students, older students, married students, and commuter students, and to explore if these high quality of life ratings are generalizable to students at other institutions.

5. It is recommended that additional analysis with the graduate student group be conducted to investigate any relationships between Green-User scores and quality of life of graduate students.
6. It is recommended that more studies be conducted to further explore effects of student use of campus green spaces and the arboretum on first year transfer students.
7. It is recommended that more studies be conducted to explore the effects of student use of campus green spaces and the arboretum on students with less university involvement (e.g. students who have worked long hours, commuted long distances).
8. It is recommended that research investigating and recording physical features associated with frequently cited favorite places be conducted to further explore how students are using campus green spaces and the arboretum.
9. It is recommended that additional research be conducted to explore the relationship between faculty and staff use of campus green spaces and the arboretum and perceptions of work quality of life.

## **APPENDIX A**

### **EMAILED REQUEST FOR PARTICIPATION**

This appendix includes a copy of the email to students requesting participation in this study.

From: IR\_CGI@txstate.edu Sent: Fri 9/15/2006 1:18 PM  
[IR\_CGI@txstate.edu]  
To: McFarland, Amy L  
Cc:  
Subject: Win great prizes with Campus Environment Survey!  
Attachments:

Dear Ms McFarland,

Please take a few minutes to answer questions about your campus experiences. In appreciation for your participation in the survey, each student completing the survey will be placed in a drawing for an eight inch Kawasaki portable DVD player, a 2 hour pass for two people plus rentals to Texas Ski Ranch, or a gift certificate to Sundance Records.

To complete the form, click here: <http://www.txstate.edu/ir/cgi/Student-Enviro-Survey-200606.pl?uid=AM1432>

The above link contains an identification code (UID) we use to tally who has already responded to our survey. By doing this, we can send reminders to only the people who have not yet taken a survey. This keeps us from sending you too many e-mails. To protect your confidentiality, we delete all of the UID codes after a survey is completed.

Sincerely,

Bruce Lockhart, Research Analyst  
Office of Institutional Research  
Texas State University-San Marcos

If you have questions or comments, please contact BL05@txstate.edu or call 512-245-2386.

## **APPENDIX B**

### **GREEN USER AND QUALITY OF LIFE SURVEY INSTRUMENT**

This appendix includes a copy of the Green-User and quality of life survey instrument used in this study.

## Student Environment Survey

You have been selected to participate in a study being conducted at Texas State University-San Marcos. This survey will be used to determine how students feel about the campus environment. This short questionnaire will require approximately 20 minutes of your time to complete. Participation in filling out this questionnaire is completely voluntary and there is no penalty for non-participation. Your identity will remain anonymous and all answers are confidential. If you have any questions about participation please e-mail Dr. Tina Marie Cade at tc10@txstate.edu.

Please type in your name below to give your informed consent to participate in the study.

I have read and understand the explanation provided to me.

I have had all questions answered to my satisfaction, and

I voluntarily agree to participate in this study.

Thank you for assisting us in our research.

### **SURVEY QUESTIONS**

Please respond to the following questions. All questions relate to your Texas State University on-campus experience only.

1. Please rank the following with regards to the degree to which each played in your decision to attend Texas State. Please use a scale of 1-4, with 1 being the most important factor, and 4 being least important.

- \_\_\_\_\_ Academic quality
- \_\_\_\_\_ Social reputation of school
- \_\_\_\_\_ Physical environment
- \_\_\_\_\_ Geographical location

2. How frequently do you spend time outdoors on-campus? (Circle One)
  - Frequently
  - Sometimes
  - Not very much
  - Rarely
  
3. Please indicate how often you **ACTUALLY** spend time in each of the following activities **OUTDOORS** on-campus:
  - a. Walking to and from class
    - 1-3 times daily
    - 1-3 times weekly
    - 1-3 times monthly
    - Rarely
    - Never
  
  - b. Exercise (jogging, walking, etc)
    - 1-3 times daily
    - 1-3 times weekly
    - 1-3 times monthly
    - Rarely
    - Never
  
  - c. Organized Sports (including intramurals)
    - 1-3 times daily
    - 1-3 times weekly
    - 1-3 times monthly
    - Rarely
    - Never
  
  - d. Socializing with friends
    - 1-3 times daily
    - 1-3 times weekly
    - 1-3 times monthly
    - Rarely
    - Never
  
  - e. Club meetings
    - 1-3 times daily
    - 1-3 times weekly
    - 1-3 times monthly
    - Rarely
    - Never

## f. Studying

- 1-3 times daily
- 1-3 times weekly
- 1-3 times monthly
- Rarely
- Never

## g. Eating

- 1-3 times daily
- 1-3 times weekly
- 1-3 times monthly
- Rarely
- Never

## h. Relaxing

- 1-3 times daily
- 1-3 times weekly
- 1-3 times monthly
- Rarely
- Never

## i. Working (work study, other on-campus job or volunteer work)

- 1-3 times daily
- 1-3 times weekly
- 1-3 times monthly
- Rarely
- Never

4. Please indicate whether you **PREFER** to do each of the following activities indoors or outdoors on-campus, assuming good weather (Circle One).

<b>Walking to and from class</b>	Indoors	Outdoors
<b>Exercise</b>	Indoors	Outdoors
<b>Organized Sports/Intramurals</b>	Indoors	Outdoors
<b>Socializing with friends</b>	Indoors	Outdoors
<b>Club meetings</b>	Indoors	Outdoors
<b>Studying</b>	Indoors	Outdoors
<b>Eating</b>	Indoors	Outdoors
<b>Relaxing</b>	Indoors	Outdoors
<b>Working</b>	Indoors	Outdoors

5. Please fill in the blank with the name of your favorite outdoor on-campus place (Student Center Patio, Sewell Park, Quad, Soccer Fields, etc) for each of the following activities, write N/A if you do not perform the activity outside on-campus, or do not have a favorite place.

<b>Walking to and from class</b>	_____
<b>Exercise</b>	_____
<b>Organized Sports/Intramurals</b>	_____
<b>Socializing with friends</b>	_____
<b>Club meetings</b>	_____
<b>Studying</b>	_____
<b>Eating</b>	_____
<b>Relaxing</b>	_____
<b>Working</b>	_____

6. Do you have a favorite outdoor sitting area on campus? If yes, where?
7. What other activities do you do outside around the campus environment?
8. Do you wish there were more opportunities and places to spend time outdoors on-campus? Please explain where you would like these places and how you would use them.
9. When all things in your life are considered, how do you feel today? (circle one)
- Very happy  
Content  
OK  
Not very happy  
Miserable
10. Overall, how would you rank the quality of your life?
- Very satisfied  
Mostly satisfied  
Satisfied  
Mostly dissatisfied  
Dissatisfied

Please indicate how each statement applies to you by marking whether you:

Strongly Disagree = 1; Disagree = 2; Undecided/Neutral = 3; Agree = 4; Strongly Agree = 5

11. The things I learn are important to me.
- 1                      2                      3                      4                      5

12. People look up to me.  
1                    2                    3                    4                    5
13. I really get involved in my work.  
1                    2                    3                    4                    5
14. I like learning.  
1                    2                    3                    4                    5
15. I enjoy being.  
1                    2                    3                    4                    5
16. I have acquired skills that will be of use to me.  
1                    2                    3                    4                    5
17. I am given the chance to do work that really interests me.  
1                    2                    3                    4                    5
18. The things I am taught are worthwhile learning.  
1                    2                    3                    4                    5
19. I really like to go to school each day.  
1                    2                    3                    4                    5
20. The work I do is good preparation for my future.  
1                    2                    3                    4                    5
21. I have learned to work hard.  
1                    2                    3                    4                    5
22. I find that learning is a lot of fun.  
1                    2                    3                    4                    5
23. I find it easy to get to know other people.  
1                    2                    3                    4                    5
24. Mixing with other people helps me to understand myself.  
1                    2                    3                    4                    5
25. People think a lot of me.  
1                    2                    3                    4                    5
26. Other students accept me as I am.  
1                    2                    3                    4                    5

27. I get along well with the other students in my class.  
1                    2                    3                    4                    5
28. Professors treat me fairly.  
1                    2                    3                    4                    5
29. Professors give me the marks I deserve.  
1                    2                    3                    4                    5
30. I achieve a satisfactory standard in my work.  
1                    2                    3                    4                    5
31. People care about what I think.  
1                    2                    3                    4                    5
32. Professors take a personal interest in helping me with my work.  
1                    2                    3                    4                    5
33. I am treated with respect.  
1                    2                    3                    4                    5
34. Professors help me to do my best.  
1                    2                    3                    4                    5
35. Professors are fair and just.  
1                    2                    3                    4                    5
36. Professors listen to what I say.  
1                    2                    3                    4                    5
37. I feel depressed.  
1                    2                    3                    4                    5
38. I feel restless  
1                    2                    3                    4                    5
39. I get upset.  
1                    2                    3                    4                    5
40. I feel worried.  
1                    2                    3                    4                    4

The following questions are preceded with “At Texas State University, I have been challenged to...”

- |     |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|
| 41. | Demonstrate how theories are useful in real life.     | 1 | 2 | 3 | 4 | 5 |
| 42. | Identify organizing principles in my courses.         | 1 | 2 | 3 | 4 | 5 |
| 43. | Use theories to address practical questions.          | 1 | 2 | 3 | 4 | 5 |
| 44. | Analyze complex interrelationships between concepts.  | 1 | 2 | 3 | 4 | 5 |
| 45. | Develop new ideas based on theories.                  | 1 | 2 | 3 | 4 | 5 |
| 46. | Apply theories to new situations.                     | 1 | 2 | 3 | 4 | 5 |
| 47. | Make original contributions to classroom discussions. | 1 | 2 | 3 | 4 | 5 |
| 48. | Identify the strengths and weaknesses of arguments.   | 1 | 2 | 3 | 4 | 5 |
| 49. | Apply theoretical principles in solving problems.     | 1 | 2 | 3 | 4 | 5 |
| 50. | Organize ideas in new ways.                           | 1 | 2 | 3 | 4 | 5 |
| 51. | Identify bias in written material.                    | 1 | 2 | 3 | 4 | 5 |
| 52. | Remember an extensive number of new terms.            | 1 | 2 | 3 | 4 | 5 |
| 53. | Recall a substantial number of new concepts.          | 1 | 2 | 3 | 4 | 5 |
| 54. | Interpret the meaning of new facts and terms.         | 1 | 2 | 3 | 4 | 5 |
| 55. | Remember an extensive number of facts.                | 1 | 2 | 3 | 4 | 5 |

56. Recall a significant number of facts.  
1                      2                      3                      4                      5
57. Remember complex facts.  
1                      2                      3                      4                      5

Please answer the following demographic questions about yourself. This data is collected for analytic purposes only.

58. What is your classification?  
Freshman  
Sophomore  
Junior  
Senior  
Grad student  
Unclassified
59. What is your age?  
Under 20  
Between 21 and 25  
Between 25 and 30  
Between 30 and 35  
Between 35 and 40  
Over 40
60. What is your gender?  
Male  
Female
61. What is your current marital status?  
Single  
Married/Partnered  
Widowed  
Divorced  
Other
62. What is your ethnic group (select all that apply)?  
Caucasian  
African American  
American Indian  
Hispanic  
Asian American  
Other (please specify)



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