EXAMINING THE ENVIRONMENT: THE DEVELOPMENT OF A SURVEY INSTRUMENT TO ASSESS STUDENT PERCEPTIONS OF THE UNIVERSITY OUTDOOR PHYSICAL CAMPUS

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by

Erica Eckert

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A dissertation written by

Erica Eckert

B.S., The University of Akron, 2003

M.Ed., Kent State University, 2004

Ph.D., Kent State University, 2012

Approved by

_______________________________, Director, Doctoral Dissertation Committee
Mark A. Kretovics

_______________________________, Member, Doctoral Dissertation Committee
Stephen B. Thomas

_______________________________, Member, Doctoral Dissertation Committee
Kathryn S. Wilson

Accepted by

_______________________________, Director, School of Foundations, Leadership and Administration
Shawn M. Fitzgerald

_______________________________, Dean, College of Education, Health and Human Services
Daniel F. Mahony

ECKERT, ERICA, Ph.D., May 2012 SCHOOL OF FOUNDATIONS, LEADERSHIP AND ADMINISTRATION

EXAMINING THE ENVIRONMENT: THE DEVELOPMENT OF A SURVEY INSTRUMENT TO ASSESS STUDENT PERCEPTIONS OF THE UNIVERSITY OUTDOOR PHYSICAL CAMPUS (326 pp.)

Director of Dissertation: Mark A. Kretovics, Ph.D.

The purpose of this study was to develop a reliable and valid survey instrument to measure student perceptions of the outdoor physical campus environment. Using campus planning and environments literature and expert consultation, a survey instrument was developed to measure student satisfaction with the outdoor campus environment and the importance they attributed to the outdoor campus environment.

The instrument contained items focused on elements of the outdoor campus environment derived from the literature along with specific items identified by experts in campus planning and consulting. Campus architecture professionals engaged in expert review of the instrument to ensure it satisfied the content standard for validity. Prior to survey deployment, student focus groups and cognitive interviews were utilized to ensure the instrument could be understood and readily answered by the field test sample. Feedback from students provided strong evidence for response process validity.

The survey was deployed between September and November of 2011 to 7,978 students at eight public universities in Ohio. Results of the validity and reliability analysis indicated that the Outdoor Physical Campus Assessment collected valid and reliable student perception data for the field test administration.

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Writing a dissertation can be a lonely process. You become very well-acclimated to your desk chair, addicted to sticky notes, and begin to believe backing up your documents in twelve locations is completely normal. It is, isn't it? My journey to dissertation-completion was aided greatly by a battalion of devoted family members, friends, and colleagues to which I am eternally indebted. I would like to first thank the members of my dissertation committee and my graduate faculty representative, Dr. Jason Schenker. Dr. Stephen Thomas was the first person I met at Kent State University. He recruited me for the Higher Education Administration program and has been a guiding influence ever since; I am grateful to have had the opportunity to work with such a supremely driven and humorous individual. Dr. Kathryn Wilson serves as an exceptional example of what it means to be both student-focused and an incredibly successful academic/administrator; I was fortunate to have such an outstanding individual on my committee. Finally, I'd like to send my sincerest appreciation to my dissertation advisor Dr. Mark Kretovics. He was a tireless supporter of this research from the beginning, reading draft after draft. He served as a sounding board, mentor, motivator, and champion throughout this entire process. The faculty and the Higher Education Administration program and the staff in the College of Education, Health, and Human Services are truly beyond compare.

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CHAPTER I

INTRODUCTION

Traditional brick-and-mortar institutions of higher education are increasingly faced with competing priorities in a time of decreased financial support and rising costs of operation. Between technological and physical infrastructure, instruction and student support services, research, human resources costs, institutional marketing, and community service, institutions struggle to find the appropriate spending mix to best serve their stakeholders (Delta Cost Project, 2009). Many colleges and universities are employing creativity to cut costs in order to survive declining appropriations and endowments—trimming cell phone service, window-washing, orientation programs, athletic budgets, cable channels, and admissions brochures (T. Lewin, 2009).

The foundational source of revenue for most institutions is tuition and fees from enrolled students. The number of students enrolled accounts for between 30% and 90% of revenue (Kinzie et al., 2004). At public institutions, state appropriations comprise a decreasing proportion of revenue as many state governments are reducing their support of higher education as they face their own financial challenges (Barr, 2002; Delta Cost Project, 2009; McPherson, Schapiro, & Winston, 1993; Toutkoushian, 2001). Private institutions rely very heavily on tuition and fees for both revenue and the subsidizing of tuition discounting practices (Breneman, Doti, & Lapovsky, 2001; Delta Cost Project, 2009; McPherson et al., 1993). The number of enrolled students can serve as driver of revenue for an institution, as long as the infrastructure and support services are able to meet their needs (Paulsen, 2001).

College enrollment grew rapidly in the post-World War II era, due in large part to the Servicemen's Readjustment Act of 1944 ("GI Bill") and the enactment of the Higher Education Act of 1965. According to the National Center for Education Statistics (NCES, 2011), between 1949 and 1974, the total number of four-year institutions (public and private, excluding branch campuses) increased from 1,327 to 1,717. Two-year colleges grew at an even faster rate, increasing from 524 institutions to 1,003. After 1974, branch campuses were included in the NCES data, so accurate comparisons are more difficult to make. In a period of 25 years, 869 new degree-granting postsecondary institutions opened in the United States.

Comparing by the percent of expansion, four-year institutions grew by 29.39% in the years 1949-1974 and by 26.63% from 1975 to 2000 (recall this number includes branch campuses while the 1949-1974 data do not). Using the same 25-year time period, two-year institutions grew by 91.41% in the years 1949-1974 and by 51.23% from 1975 to 2000. Between 1940 and 1970, higher education enrollment grew at a rapid pace, as detailed in Table 1: Historical Summary of Approximate Headcount by Decade. The source data prior to 1990 are based on postsecondary institutions regardless of degree-granting status, whereas the data after 1990 only include students enrolled at degree-granting institutions.

Table 1

Historical Summary of Approximate Headcount by Decade

Year	Enrollment	Number Increase from Previous Decade	Percent Increase from Previous Decade
1939-1940	1,494,203	-	-
1949-1950	2,444,900	950,697	64%
1959-1960	3,639,847	1,194,947	49%
1969-1970	8,004,660	4,364,813	120%
1979-1980	11,569,899	3,565,239	45%
1989-1990	13,538,560	1,968,661	17%
1999-2000	14,791,224	1,252,664	9%
2008-2009	19,102,814	4,311,590	29%

Note. Adapted from: "Table 196. Historical summary of faculty, students, degrees, and finances in degree-granting institutions: Selected years, 1869–70 through 2008–09." Digest of Educational Statistics, 2010, p. 290. Copyright 2011 by the National Center of Education Statistics.

To cope with the rapid influx of enrolled students, colleges and universities went on a building spree during the 1960s. To a large extent, the construction that took place during this period did not fit in with the buildings of previous generations (Sensbach, 1991; Turner, 1984). Many of the buildings and other infrastructure items constructed in that era are still present within the higher education landscape today, approaching the end of their useful lives (Rush & Johnson, 1989). During the 1980s, institutions devoted a smaller percentage of institutional budget resources to the maintenance of physical plant and infrastructure than in the previous decades (Blasdell, McPherson, & Schapiro, 1993; Toutkoushian, 2001). Although this decline represented only a few percentage points, the aging infrastructure built during the boom period is still present today, requiring extensive renovation (Rush & Johnson, 1989). More recently, spending on physical plant maintenance decreased between 2008 and 2010, coinciding with the economic downturn (Carlson, 2011).

The Physical Campus

Although a certain amount of serendipity is involved in the creation of a campus setting, a campus architect or planner generally designs the modern outdoor physical campus environment. During the rapid expansion of higher education after World War II, campus planners were increasingly relied upon for expertise and vision (Dober, 1992). In the present, it is commonplace for an office or unit to be charged with leading a campus design philosophy and executing it as opportunities for change through new construction or renovation are presented. While the offices holding this task vary in name and in responsibility, their leaders are often referred to as Campus Architects, Planners, or Designers. The history of planning and designing of a campus environment is covered in greater detail in Chapter 2.

Of the physical campus environment, Greenberg (2007) wrote, “a campus is an edited statement of the institution’s self-image, how it solves problems, and how it wishes to present itself to its students, alumni, faculty members, and the public” (¶1). As true as that may be, college and universities are increasingly being asked to justify their expenditures. Financial pressure generated from shrinking revenue sources is forcing administrators to think very carefully about which expenditures they can make at the institutional level—and this often means choosing between instruction, research, service, support services for students, student aid, and strategic initiatives and infrastructure and the physical plant (Toutkoushian, 2001). Decisions must be made regarding the optimal number of students, and how to best attract them to ensure revenues are maximized (Paulsen, 2001). According to McPherson et al. (1993), the public is more often demanding full disclosure in how monies are spent, and how those funds can be linked to outcomes. Programs and expenditures will continue to be scrutinized until they can be linked to results, whether or not that is actually possible. As a testament to the difficulty involved in linking expenditures to outcomes, the Delta Cost Project reported, "How colleges actually spend their money is barely understood by the general public and even many policy makers" (2009, p. 7). Ultimately, a budget is a reflection of what an institution values. Invariably, when resources are scarce, there will be competition between expenditures (Barr, 2002).

Campus design has been further impacted by both the continual expansion of college campuses and university presidents who wish to make their mark on campus. These factors have created piecemeal design on many campuses, with an emphasis on short-lived construction with higher maintenance costs, rather than high-quality, longer-lived design elements (Van Yahres & Knight, 1995). Deferred maintenance and demands exerted by the increased use of technology or changing needs of physical facilities are forcing campus architects and planners to make difficult decisions on how to best use their budgets (Lenington, 1996; Leslie & Fretwell, 1996).

The physical campus is part of campus ecology literature and makes appearances in literature related to admissions, marketing, and the recruitment of prospects. It is a known factor in enrollment decisions (Cain & Reynolds, 2006a, 2006b; Reynolds, 2007), and many students refer to the physical campus environment when describing why they feel like they fit in at an institution (Boyer, 1987; Reynolds, 2007). McPherson et al. (1993) described the process by which prospective students attempt to judge the quality and desirability of the school: "It is hard for a prospective student to monitor changes in instructional expenditures, but it is easy to tour the campus and admire architecturally striking new buildings devoted to activities whose benefits students can readily grasp" (p. 7). They continued, stating capital improvements or development "signal that the school has the confidence and the wherewithal to put substantial resources behind those aspects of the enterprise that most attract students" (p. 7).

The outdoor physical campus is rarely studied in a direct manner, which may be due to its variety. Architectural style, climate, location, proximity to urban centers, and institutional purpose and philosophy practically guarantee uniqueness of the physical campus. According to two professional organizations (APPA, SCUP), three consulting firms (EBI, Performa HE, and Noel-Levitz), and the Chronicle of Higher Education's architecture writers, there is no tool for assessing the outdoor physical campus environment. The Association of Higher Education Facilities Officers (APPA) identified the role facilities play in a student's decision to enroll (or not enroll) at a particular institution (Cain & Reynolds, 2006a, 2006b; Reynolds, 2007). This survey-based study focused on the buildings on campus rather than the outdoor campus environment as a whole and included over 16,000 students at 46 institutions in the United States and Canada. Cain and Reynolds established a link between facilities, the recruitment process, enrollment decisions, and arguably linked continued satisfaction in a vague way to institutional enthusiasm. Much of their study related to "facilities in my major," which makes the assumption that prospects are clear in their intended major at the time of the campus visit. Outside of this APPA study, measurement of the physical campus' impact on student choice tends to be governed by consultants rather than campus architects or planners.

Statement of the Problem

With limited resources, it is difficult to justify expenditures that fail to yield results. An institution's outdoor physical campus environment is rarely the object of careful assessment, and yet is an area of great expense (Sensbach, 1991). As campus planners prioritize projects, there is value in knowing which improvements would yield the greatest student satisfaction and are of the most importance to current students, which can serve as proxy for prospects. Assessment provides for the investigation of initiatives for their relative success or effectiveness with a specific population.

As institutions are charged with the task of bringing the most qualified prospects to fruition as enrolled students, and at the same time retaining the ones who do enroll, expenditures should be considered as they relate to increasing satisfaction of prospective and current students. Assessing the outdoor physical campus environment will enable administrators to understand the level of satisfaction students have with the physical campus environment and which areas, if improved or left to languish, would have the greatest impact.

Prospective students are carefully considering the campus environment alongside factors such as cost and academic reputation (Boyer, 1987; Cain & Reynolds, 2006a, 2006b; C. Engel, personal communication, October, 30, 2008; T. Gilbert, personal communication, January 15, 2010; Kinzie et al., 2004; Reynolds, 2007; Sensbach, 1991). Students who are already enrolled at an institution experience this same physical campus environment on a daily basis and it becomes a part of their sense of "fit" on campus (Strange & Banning, 2000). The development of an instrument to measure student perceptions of the elements of the outdoor physical campus will allow administrators to see the campus through the eyes of successfully-recruited students.

Purpose of the Study

The purpose of this study is to develop a valid and reliable instrument to evaluate student perceptions of the outdoor campus environment as defined by campus design and campus ecology literature. For this study, a questionnaire was developed. The questionnaire was reviewed by campus architects/planners and current students prior to field testing. Participants were asked to rate their satisfaction with elements of the outdoor physical campus, and then asked to rate the importance they attribute to these same elements. It is hoped that the information collected through this instrument will provide valuable feedback for campus planners and enrollment managers about the physical campus environment from a student perspective, and may be adapted for use as a tool for benchmarking and competitor analysis.

Rationale for the Development of an Instrument

No suitable options were discovered during an exhaustive search for available assessments of the outdoor campus physical environment. At this time, the outdoor campus environment is largely the domain of educational consultants and space management reviews. To determine if any tools were available for measuring the outdoor physical campus, the researcher consulted with the Architectural writers for the *Chronicle of Higher Education*, Lawrence Biemiller and Scott Carlson. The researcher also discussed this project with the Director of Planning and Education for the Society of College and University Planning (SCUP) and the Director of Knowledge Management with the Association of Higher Education Facilities Officers (APPA) to ensure an instrument did not already exist. SCUP and APPA are the two major organizations for campus planners and campus architects. Representatives from Noel-Levitz, Educational Benchmarking, TargetX, and Performa Higher Education were also contacted to confirm that (a) there was not a tool available through their company (or any others they knew of), and (b) they were not currently developing such a tool.

As previously mentioned, the Association of Higher Education Facilities Officers (APPA) Center for Facilities Research (CFaR) study on the Impact of Facilities on Recruitment and Retention (see Cain & Reynolds, 2006a, 2006b; Reynolds, 2007) attempted to establish a clear link between the physical campus environment and student recruitment and retention. Their study focused almost exclusively on facilities for specific purposes (residence halls, recreation facilities, libraries, bookstores, classrooms) or facilities with specific meaning (labs and space specifically designated for the prospective student's major of interest). The goal of this research is to study the outdoor aspects of the physical campus, not specific buildings or items that could also be designated as amenities (see "Amenities matter to some," 2005; Parker, Schaefer, & Matthews, 1996).

Once determining that an instrument was not already available, the researcher contacted the campus architects (of varying titles) at the campuses of three regional public universities, Bowling Green State University, Kent State University, and the University of Akron. The lack of measurement tools available were discussed with each campus architect and each expressed interest in the research. At the time of the interviews, none of the architects were engaged in assessment activities related to students' perceptions of the physical campus. Creating this assessment would provide the architects with the opportunity to obtain a sense of how their office's efforts and initiatives were being received by students. Four campus architects were consulted for the purposes of instrument review, and each indicated interest in being included in the study of their outdoor physical campus environments (Bowling Green State University, Kent State University, Ohio University, and the University of Akron).

Research Questions for Outdoor Physical Campus Environments

The following research questions were addressed:

Research Question 1: Is the Outdoor Physical Campus Assessment tool a valid measure for assessing student perceptions of (a) satisfaction with, and (b) the importance of elements of the physical campus environment?

Research Question 2: Did the Outdoor Physical Campus Assessment collect reliable data during the field test administration?

Research Question 3: Within the Outdoor Physical Campus Assessment, are the importance and satisfaction (attractiveness, amount, and functionality) items collecting internally consistent data?

Delimitations

This study was delimited by the following factors:

1. Participants were drawn from the total degree-seeking population of students at eight public institutions in the state of Ohio. All participants were over the age of 18, studying at the undergraduate or graduate level on the main campus location at each institution, did not opt out of being listed in the student directory, and had an email address on file with the registrar's office. Students attending exclusively at regional or branch campuses, non-degree students, students under the age of 18, students with suppressed directory information, and students who failed to have an email address on file with the university registrar's office were excluded from this study. Because the members of the sample were pulled as of the 15th day of the term, it is possible that students included in the sample had dropped out prior to the launch of the survey. Conversely, in likely few cases, new students may have registered as exceptions after the 15th day and therefore could have been missed in the sampling frame.

2. This study's field test was conducted between September and November 2011. In all but one case, survey invitations were emailed to participants during the approximately 30 days after the beginning of the fall term—for semester schools, this was in mid-to-late September, and for schools using the quarter system, this was the first or third week of October. One institution joined the study after the beginning of the fall semester and, as a result, their survey was sent to students on the 60th day of the term. The survey was available for 30 days based on the initial email invitation date. The potential problem with this timeframe is a climatological one—Ohio is not known for its hospitable winter weather. By sending a survey in the fall, harsh weather conditions and barren landscapes are harder to call to mind. The student satisfaction responses for this study may be more munificent than those received if the survey was administered in January.

3. All institutions in this study are public universities in the state of Ohio with similar Carnegie Classifications (*Research University* with *high research activity* or *very high research activity*). They have been assigned the following aliases: Prarie Creek State University, Ecola State University, Boardman University, Heceta State University, Redwood University, the University of Rockaway, the University of Tillamook, and the University of Yaquina. A majority of the institutions would be considered large, regional institutions. The Fall 2010 total enrollment at main campus locations ranged between 16,884 and 55,014 at the selected institutions, and the estimated cost of attendance for in-state students living on campus was substantially similar, between $21,827 and $29,082. The selected institutions varied in selectivity; this study included institutions

with nearly open admission policies along with institutions that admitted as few as 62% of applicants (IPEDS Data Center, 2011). Although there were approximately five other substantially similar institutions in Ohio, this field test was limited to eight institutions. The institutions included in this study tended to be slightly larger and more highly classified within the Carnegie system (in terms of research activity) than the nonparticipant institutions (Carnegie Foundation, 2011).

4. This study focused on admitted and enrolled students. Focusing exclusively on current students excludes prospective students that chose to enroll elsewhere. However, current students are more engaged in the environment about which they were questioned, and may see this as an opportunity to have their voice heard on an issue they deal with on a daily basis.

5. This study utilized an online survey, which may discourage participants from responding. While online surveys have been found to be no less confusing than paper-based instruments, they are less personal than a face-to-face administration (Fowler, 2002). A majority of the sample was part of the millennial generation, which on the whole is quite computer literate (Jaschik, 2005). Online surveys are much easier to distribute, can be completed at a time of convenience for the participant, and have the ability to require responses to specific questions and generate dynamic content in the form of question-skipping logic. Further, this survey asked for non-controversial feedback from a great number of student participants, which made the online survey a logical choice (Suskie, 1996). Efforts were taken to ensure the instrument clear; the instrument was reviewed by potential participants and campus architects/planners prior to

the launch of the instrument for the full field study. Response bias may be an issue in this study, as participants with strong feelings may be more apt to take the time to respond to the survey. Impersonal surveys are prone to low response rates, and students are known to be oversurveyed (Lipka, 2011).

6. Only perceptions pertaining to the outdoor physical campus were measured. There are several tools for the assessment of buildings and facilities space—and these tools are currently utilized by campus planners and architects for space analysis and benchmarking. The questions were crafted with the intent of being applied across many different types of campuses. The assumption underlying the tool is that there is no singular 'correct' manifestation of a campus design element. As previously mentioned, no tool currently exists for the purpose of measuring students' perceptions of the outdoor environment. Therefore, this assessment tool was completely focused on providing architects and other administrators with a sense of how satisfied participants are with elements of the outdoor physical campus, plus the level of importance participants attribute to those same elements. Students were asked neutral questions about elements of the outdoor physical campus environment so that they could express their satisfaction or dissatisfaction with that element, and then rate its importance to them personally. As such, the campus architect will have to interpret those responses (or take them to a focus group after the instrument has been administered and analyzed) so that they can be acted upon.

Assumptions

Several assumptions underlie this study, but the largest is that an enrolled student may serve as a proxy for a prospect. Given that the importance of a physical campus (beyond being a simple delivery device for education) lies in its ability to impact the attraction of prospects and persistence of matriculated students, this study surveyed successfully-recruited matriculated students. This population has a greater amount of interaction with the campus, and likely resembles the characteristics of a prospect that would be well suited to attend the institution.

A second assumption is that students are cognizant of their environment; that they hold an opinion of whether elements of the physical campus satisfy them, and can indicate the relative importance they attribute to those elements. Students who are not knowledgeable about their campus will have a more difficult time recalling the campus environment for the purposes of assessment and may provide less valid data (Baird, 1988). Further, Astin (1993) noted, "the student's perception of the college environment can be affected both by what the environment is really like and by how the student has been influenced by that environment" (p. 88). Using student perceptions to measure the environment is not a perfect approach, but it is the route often selected for a variety of inventories about campus programs and services.

A third assumption relies on the ecological approach to campus design. The ecological approach assumes that students are impacted by their environment, and they in turn impact the environment. This study rests on the veracity of this approach. Students have a variety of behavioral options; the campus should and can be designed in a way that encourages positive behaviors while discouraging undesirable ones. Students will experience cognizance or dissonance with environments in which they are placed—congruent environments often elicit positive behaviors, while incongruent environments may have a negative influence (J. H. Banning, 1985; Kaiser, 1978; Kuh & Hall, 1993; Strange & Banning, 2000; Tracey & Sherry, 1984; Walsh, 1973). Through this, the researcher assumes that the environment has an impact on the student, making it useful and valuable to measure that environment.

Definition of Terms

Campus Design: Describes the physical campus layout and features that are observed when an individual is on a campus, either as a pedestrian or in a vehicle, from an on- or off-campus position (Dober, 1992; Gaines, 1991). Campus Design is also an activity engaged in by a Campus Architect, Planner, or Designer when attempting to consider the space as observed by others.

Campus Planner: This term was used to describe the person or persons in an executive decision-making role in the campus planning, design, or architecture office. This person is the visionary, manager, and ultimately, the responsible party for executing building renovations, new construction, and outdoor-space improvements. Although this role may vary from institution to institution, generally the title of this individual contains the word *architect*, *planning*, or *facilities*.

Green Space: Refers to areas of campus that are reserved for grass fields (with or without trees) or wooded areas; also may be referred to as open space (Dober, 1992; Griffith, 1994).

Landscaping: Describes areas where an effort to designate the space for decoration has been made. This may include planters, mulch, flowers, ornamental grasses, bushes, rock gardens, specimen trees, or other decorative outdoor elements, singular or in combination (Dober, 1992; Strange & Banning, 2000).

Pathway: A lane designated for traffic either by an organic or inorganic material, such as concrete, gravel, or brick (Dober, 1992; Strange & Banning, 2000).

Physical Campus: The built and cultivated environment; buildings, circulation/walkways, signage, lighting, trees, decorative landscaping, lawns and open space, places for seating or congregation, such as plazas, artistic or architectural details, such as sculptures, water features, and decorative adornments (Strange & Banning, 2000).

Wayfinding: Elements of signage or other visual cues to assist a pedestrian in their navigation of campus. Examples include large, permanent campus maps, signs identifying buildings, signs for directing people toward a destination, and parking lot identification (Dober, 1992; Strange & Banning, 2000).

Organization of the Study

The remainder of this study is organized into four additional chapters, a list of works cited, and appendixes. Chapter 2 presents a review of literature related to validity as it relates to the creation of a survey instrument, enrollment management and college choice, and campus ecology, focusing closely on Strange and Banning's *Educating by Design* (2000) for a definition of the importance of the physical campus in person-environment interaction. The literature review also includes campus design and planning literature from the campus planning discipline, which is produced largely by architecture professionals. Finally, the history of assessment as it pertains to campus environments is reviewed. Chapter 3 explicates the research design and the plan for devising and testing the assessment instrument along with the sample selection and procedures for each step of the process. This chapter also contains a list of the variables the instrument focuses on and supporting literature regarding those elements. Chapter 4 details the results of the steps of analysis and data obtained through the testing of the instrument. Chapter 5 provides conclusions and recommendations based on the results from the preceding chapters, with suggestions for areas of future research.

Summary/Significance

Education's growing availability and popularity in the Post World War II era created an enrollment boom along with a flurry of building as students flocked to colleges and universities in the United States. As competition for both students and funding increased in the last three decades, administrators have had to devise creative solutions to protect revenue streams (Kinzie et al., 2004; McPherson et al., 1993; Leslie & Fretwell, 1996).

The Association of Higher Education Facilities Officers (APPA) Center for Facilities Research (CFaR) studied the physical campus by asking students what they felt was important to see when visiting a campus, and then once enrolled, what facilities most interested them. Their focus was mostly on specific buildings (residence halls, recreation facilities, libraries, bookstores, classrooms), or facilities designated for their specific majors (Cain & Reynolds, 2006a, 2006b; Reynolds, 2007). Although this study was important in establishing that students do have feelings about the facilities on campus, it did not ask questions related to the landscaping, wayfinding, circulation, decoration, and overall sense of place, which is discussed in the next chapter.

The goal of this study was to break down the physical campus environment into operational components of which questions can be asked. Participants were given the opportunity to provide feedback regarding their satisfaction with elements of the physical campus environment. These questions focused on the attractiveness, amount, and functionality of elements of the physical campus along with the importance of these elements. Not only did the researcher wish to know if the participant deemed the elements to be satisfactory, but also, were they important to the participant? The answers to these questions will allow campus architects to see their campuses through the eyes of successfully-recruited students. Linking student opinions and values to decision-making regarding physical campus improvements may provide architects and enrollment managers with a sense of which projects would bring the greatest returns on investment.

CHAPTER II

LITERATURE REVIEW

This literature review is split into several sections to provide a foundation of the important concepts and areas of literature related to this study. First, a primary discussion of validity as it relates to creating measures is provided. Second, the history of enrollment management and perspectives on college choice is presented. Third, literature related campus environments from the ecological perspective is discussed. Campus planning is outlined as it relates to the outdoor physical campus primarily through a review of *Campus Design* by Richard Dober (1992) and *Campus: An American Planning Tradition* by Paul Venable Turner (1984). These works, along with the review of Strange and Banning's (2000) concept of the physical campus environment, establishes the elements of the physical campus environments that is the focus of the instrument. Finally, literature related to the assessment of the college campus environment is reviewed.

Validity

Validity is a primary concern in this study. Given that a new instrument was developed specifically for the purpose of measuring student perceptions of the outdoor physical campus, a considerable amount of time is devoted to the assessment of validity. Although the concept of validity is widely accepted as critical, its description in research literature varies. Part of this is due to the inherent differences between measurement literature and research design literature, as noted by Pedhazur and Schmelkin (1991). The authors stressed that validity "refers *not* to a measure in question but to inferences made on the basis of scores obtained on it" (p. 30). Further, they noted, there are no "'types' of validity" (p. 79) at all. In making a determination of validity, one must consider the purpose of the measure, the population on which it will be utilized, and how the results will be used.

Pedhazur and Schmelkin (1991) outlined an often-used classification of validity as: "(a) content, (b) criterion, and (c) construct" (p. 31). This historical view of validity is referred to as "the trinity view of validity" (Gliner, Morgan, & Leech, 2009, p. 165). During the 1980s and 1990s, views on validity underwent a change. The American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education published new standards for using evidence in assessing validity, known simply as the *Standards* (Gliner et al., 2009). This view is more current, but the historical notion of types of validity is also covered here because of its prevalence in the literature. The newer view of validity (the *Standards*) is also discussed at the conclusion of this section.

Content Validity

When one is concerned with *content* validity, they wish to know whether an instrument contains an adequate representation of the concepts it purports to measure (Gliner et al., 2009). Trochim (2006) described content validation as "check[ing] the operationalization against the relevant content domain for the construct" (¶7). Nardi (2003) used a driver's licensure examination as an example; the test should cover all aspects necessary to determine if a person will be a safe driver, including parallel parking. A test lacking a major component of the content it purports to represent would be lacking in content validity.

Developing an instrument with high content validity requires the researcher to develop a solid and comprehensive understanding of the theoretical background and literature related to the concept or area of knowledge they are attempting to measure (Gliner et al., 2009; Trochim, 2006). According to Pedhazur and Schmelkin (1991), the notion of content validity has become more popular in the last 35 years due to the increased use of tests for job selection and certification. Although the concept is popular elsewhere in the literature, Pedhazur and Schmelkin contested the very idea of content validity, believing an instrument is simply a bad instrument if it does not adequately achieve its goals.

Gliner et al. (2009) noted the absence of a statistic that can be used as evidence of content validity and instead suggested: (a) creating a comprehensive and clear definition of the construct, (b) searching the literature to obtain a sense of how it is represented, (c) developing a set of items focused on measuring the construct(s), and if possible, (d) inviting experts to review the instrument (p. 167). All of these steps were taken in the process of developing the Outdoor Physical Campus Assessment as discussed earlier in this chapter; they are reviewed in Chapter 4.

Criterion Validity

Criterion validity refers to a measure's effectiveness at predicting what it intends to predict (Pedhazur & Schmelkin, 1991). Unfortunately, outcomes are often hard to predict, such as the probability of a student doing well in college. Trochim (2006) referred to this specific area as *predictive* validity, a subset of his definition of criterion validity. Stated simply, for an item or scale to have predictive validity, it should have the "ability to predict something it should theoretically be able to predict" (Trochim, 2006, ¶9). In this study, the criterion validity would be focused on whether the instrument is able to actually measure:

1. The importance a student attributes to the outdoor physical campus environment at their current institution,
2. The satisfaction a student has with the attractiveness of outdoor physical campus environment at their current institution,
3. The satisfaction a student has with the amount of outdoor physical campus environment amenities at their current institution, and
4. The satisfaction a student has with the functionality of outdoor physical campus environment amenities at their current institution.

At this time, there is no actual measure of these criteria to which the researcher can compare, which is often a concern in instrument development (Gliner et al., 2009). At best, the research is able to calculate a composite variable for each of the four areas of measurement using the total of the individual question scores to determine which questions are best correlated with the overarching composite score (Gliner et al., 2009; Groves et al., 2004; Pedhazur & Schmelkin, 1991).

Construct Validity

In instrument development, *Construct* validity refers to the concern that an item or subscale actually measures the concept it intends to study or serves as an indicator of that same concept. Pedhazur and Schmelkin (1991) gave the example of measuring voting behavior for its own sake, or using voting behavior as a proxy of another concept, such as socioeconomic status. Construct validity is distinct from criterion validity, because it is focused on measuring a construct rather than predicting an outcome although the distinction is vague in some ways. Construct validity is often subject to interpretation by the culture being measured, the context of measurement, and the location (geographic or temporal) of the measurement. Trochim (2006) split construct validity differently (including criterion-related validity within the realm of construct validity) but echoed similar sentiment using the notion of *face* validity. To judge face validity, one would review how the construct was translated into measurement to determine if the item is measuring what the researcher actually intended to measure. Not surprisingly, Pedhazur and Schmelkin (1991) stated, “Construct validation is a never-ending enterprise” (p. 59) and suggested three methods of investigation: “(a) logical analysis, (b) internal-structure analysis, and (c) cross-structure analysis” (p. 59).

In logical analysis, the researcher scrutinizes the definition of the construct and looks to the measure to ensure it is as focused as possible on the intended content without unintended extra meaning or potential for misunderstanding. It is also important during logical analysis to consider whether the measurement procedure is effective for measuring the construct (question format and wording, response style, deployment method, and scoring procedure). The items on this instrument are direct measurements of the intended concept—(e.g., actual satisfaction with an element) rather than indirect measurements focused on a psychometric construct. This greatly simplified the process of logical analysis, which relied primarily on expert interviews and focus groups.

For internal-structure analysis, the researcher is concerned with validating indicators as proxies for a construct. As an example, in a study focused on measuring depression, there may be measures of suicidal thoughts functioning as indicators of depression. According to Pedhazur and Schmelkin (1991), factor analysis is often used to conduct internal-structure analysis. Factor analysis is "a family of statistical analytic techniques designed to identify factors, or dimensions that underlie the relations among a set of observed variables" (p. 66). Exploratory factor analysis is often used to find latent relationships among items (constructs) and can also be employed as a data reduction technique (Field, 2009; Kachigan, 1991; Pedhazur & Schmelkin, 1991; Stevens, 1996). For this study, the researcher is not attempting to reduce the number of items on the instrument. However, employing a technique known as principal components analysis will provide evidence for internal structures by identifying groups of variables with responses that "hang together" (Stevens, 1996, p. 362). Principal component analysis is not the same technique as exploratory factor analysis; however Field (2009) and Stevens (1996) indicated that they are sufficiently similar to accomplish the same goal and principal component analysis is simpler, mathematically.

Cross-structural analysis, the third technique outlined by Pedhazur and Schmelkin (1991), requires the researcher to investigate connections the measures may have with unintended constructs, or the correlations between constructs. Further, his type of analysis focuses on *convergent* and *discriminant* validity and may employ the multitrate-multimethod matrix (MTMM). Convergent validity is described by Trochim (2006) as, “the degree to which the operationalization is similar to (converges on) other operationalizations that it theoretically should be similar to” (¶12). This is typically measured using correlation coefficients, but there is disagreement on what test statistic needs to be used to support or reject convergent validity. Discriminant validity is the reverse of convergent, meaning that a measure has discriminant validity if it can be shown to measure a distinctly different construct than other measures. Pedhazur and Schmelkin (1991) used the example of an anxiety measure correlating with a measure of introversion—they may have a positive relationship but the relationship “should not be so high as to raise doubt whether distinct constructs are being measured” (p. 74). As in the internal-structures analysis, it is not the purpose of this study to use indicator variables to measure constructs; this type of validity assessment would be inappropriate for the current study.

Validity Reconsidered

In 1999, a new set of validity standards (the *Standards)* were adopted by a three-organization collaboration (American Educational Research Association, American Psychological Association, and the National Council on Measurement of Education) in part to encourage researchers to think of validity as a unified concept (Gliner et al., 2009). The *Standards* stress the importance of validating the interpretations drawn from a measure or measurement, rather than the measurement itself (Gliner et al., 2009). The five standards are categories of evidence that should be collected to substantiate the validity of the inferences drawn from a measurement tool, and are listed in Table 2 with a link to the

Table 2

1999 Validity Standards Compared to Historical Notion of Validity Types

1999 Standards	1985 Standards
Evidence based on content	Content-related evidence
Evidence based on response processes	Construct-related evidence
Evidence based on internal structure	Construct-related evidence
Evidence based on relations to other variables	Criterion-related evidence, construct-related evidence
Evidence based on consequences	None

Adapted from: Gliner, J. A., Morgan, G. A., & Leech, N. L. (2009). *Research methods in applied settings: An integrated approach to design and analysis* (2nd ed.). New York: Taylor and Francis Group. (p. 166)

more historical notion of validity. Actually providing evidence for all five standards may not be appropriate for every developed instrument (American Educational Research Association, 1999).

To establish evidence based on content, Gliner et al. (2009) recommended consulting the literature related to the items or concepts being measured and asking experts to review the instrument as a portion of the development process. For evidence validating the response process, Gliner et al. suggested providing information linking participants' actual responses to actual abilities, feelings, perceptions, and behaviors (depending on the goal of the measure). This also may involve questioning the participants on the evaluative criteria they used to answer the item. Evidence substantiating internal-structures validity typically comes through factor analysis or differential item functioning when an instrument is measuring complex constructs or several constructs at a time (Gliner et al., 2009). Evidence relating to other variables is a complex standard, looking at outside instruments or other indicators related to the construct being measured—either to determine its similarity with measures it should be related to, or its dissimilarity to measures it should diverge from. The last standard, evidence based on consequences of testing, has no equivalent in the historical view of validity; it implores the researcher to consider whether the measurement will have positive or negative effects on the respondents (Gliner et al., 2009)

As previously mentioned, one must consider the purpose of the measure, the population on which it will be utilized, and how the results will be used when determining if an instrument is capable of providing valid data (Pedhazur & Schmelkin, 1991). The purpose of this study is the creation of a survey instrument that provides valid data on the outdoor physical campus environment for campus architects and enrollment managers. Campus planning and design experts, enrollment management consultants, and students drawn from the study population contributed to this study prior to the large-scale field test of the instrument. Detailed evidence in support of the newer view of validity are provided in Chapter 4.

Enrollment Management and the Physical Campus

Coinciding with the enrollment boom, college admissions became a profession in its own right during the period of expansion in higher education after World War II. Admissions offices engage in a variety of recruiting tactics, although these have changed a great deal over time. Prior to the 1940s, students considered colleges primarily on the word of respected family or community members. After World War II, students became more aware of the options for higher education and became more selective in their own searches; as a result, colleges and universities began to more actively campaign for students, hiring counselors who corresponded with prospects via letters (Kinzie et al., 2004).

Admissions viewbooks and brochures began to appear as a method of recruiting students using the data College Board provided on students who took the SAT examination in the 1970s. Subsequently, direct-mail recruiting became a very popular method for the pursuit of potentially high-achieving applicants (Kinzie et al., 2004). In the 1980s, faced with decreasing numbers of new traditional-aged freshmen, colleges and universities began in earnest what is known today as enrollment management.

Enrollment management can be defined several ways, but its core purpose is recruiting prospective students to build a high-yield applicant pool with high proneness for success once enrolled (Kinzie et al., 2004). Traditionally, enrollment management has included student recruiting and admissions functions, financial aid and tuition-setting responsibility, and retention activities. Enrollment management units often work closely with institutional marketing units (or have their own marketing group) to manage the image being depicted to the students they want to most closely target (Hossler, 1984).

In the present day, recruiting applicants to become enrolled students is a major function as universities try to create and maintain a stable tuition revenue stream (Brinkman, 1990). A student who has the potential for continued success at an institution is of great value to a college or university, and institutional marketing departments and admissions offices are engaged in an ongoing struggle to differentiate themselves to attract the best prospects and retain them (Anctil, 2008). Brochures and viewbooks, campus videos, web sites, open houses, regional receptions, and campus tours are common (Kinzie et al., 2004; Yost & Tucker, 1995). Institutional websites are increasingly sophisticated and relied upon by the highly computer-literate millennial generation to form impressions of academic quality, cultural opportunity, athletic prowess, and overall atmosphere (Ramasubramanian, Gyure, & Mursi, 2002).

Complicating the task of attracting students is education's identity crisis: is education a service or a product? Because a college education is abstract, the marketing to students often involves "show[ing] evidence of what a college education experience will look like" (Anctil, 2008, p. 6) rather than the actual outcomes, which vary from person to person. Marketing has become increasingly accepted in higher education as important in communicating the value of a college education and the specific attributes of a given institution (Lewison & Hawes, 2007; McGrath, 2002; Parker et al., 1996). Prospective students, especially those that are inexperienced or first-generation, will have a hard time judging quality, and often must rely on the image crafted by an institution when making their enrollment decisions (McPherson et al., 1993). As such, institutional marketing efforts are a critical component of enrollment management, and the two areas are often intertwined, if not aligned together in an organizational sense (Hossler, 1984).

College Choice and the Physical Campus

The appearance of campus can be an extraordinarily important factor in the choice of a particular institution and is often the reason applicants visit a campus (Gaines, 1991;

Noel-Levitz, 2007; Yost & Tucker, 1995). McPherson and Winston (1993) noted that in absence of concrete indicators of quality, prospective students will pursue sources of "indirect or symbolic indicators of product quality" (p. 81). In a study presented at the 2000 AERA national conference by Cummings, Hayek, Kinzie, and Jacob (2000), a mental image of the ideal college helped high school students as they engaged in the college search process (as cited by Kinzie et al., 2004).

Furthermore, campus ecology literature suggests that the physical campus environment experienced by the prospective student on a campus visit can help to establish a sense of fit on a campus, and once enrolled may encourage them to persist in their studies at that institution (Strange & Banning, 2000). Using the Integrated Postsecondary Education Data Set Quick Stats tool, retention data from the first-time student cohort in 2003 showed two-year retention of approximately 63% at public institutions, 65% at private non-profit institutions, and 34% at private for-profit institutions as of 2009. Based on National Center of Education Statistics (2011) data, the six-year graduation rate for first-time college students who started in 2001 is approximately 57.3% overall, with private non-profit institutions earning degrees at a higher proportion (64.4%) than their public (55%) and private for-profit counterparts (24.4%). Recruitment and persistence are mutually reinforcing, given that enrolled students that are satisfied are more likely to persist, and they communicate this satisfaction with their peers—prospective students, according to Craig Engel, a Senior Vice President for Consulting Services at Noel-Levitz, Inc. A student body that fits well with the institution can strengthen that institution's identity and attract more students with potential for success (C. Engel, personal communication, October 30, 2008).

Much of the student-recruiting process relies upon student perceptions of campus, often gained through university websites, viewbooks, or campus visits. As previously stated, the less complete the information a consumer has, the greater their reliance on images and reputation for decision-making (Anctil, 2008; McPherson & Winston, 1993). University websites have become an increasingly popular source of information, allowing prospective students to obtain information quickly and anonymously. In 1999, 58% of students reported using the Internet in their college search (Ramasubramanian et al., 2002); by 2005, a different source noted 74% of students had used the Internet to gather information about potential colleges (Jaschik, 2005). Ramasubramanian et al. (2002) specifically focused on attitudes formed based on images featured on university websites related to the architectural style and greenery in the photographs. They found that holding the remaining web content equal, traditional-style architecture and greenery coincided with perceptions of higher academic prestige and a sense of welcome on campus. The authors posited the findings are in part due to students' expectations of what college *should* be like. When asked about the images they *expect* to see on a university website, respondents in a study by McKnight and Paugh (1999) indicated that they expected to view outstanding campus features, landscape images, and architectural features. University websites are particularly useful to students who know they wish to consider a college or university, but to reach prospects in a more assertive way, institutions often send viewbooks through the mail.

Admissions Viewbooks

Viewbooks are “the glossy multi-page brochures that colleges and universities send to tens of thousands of prospective students each year” and serve as “an important medium by which institutions of higher learning entice students to matriculate” (Hartley & Morphew, 2008, p. 671). To obtain a sense of how universities would like to be perceived, Hartley and Morphew attempted to improve upon previous studies of campus viewbooks by engaging in qualitative analysis of the content of the images and text within viewbooks using themes. Ultimately, they determined that most viewbooks begin by advertising the scenic features of campus, including location, size, and landmarks. Following a familiar and almost formulaic pattern, viewbooks provide information on available majors and co-curricular life, among other things. Students were often photographed without notebooks, in largely idyllic settings, meeting with faculty who were at times described as similar to “concierges or clowns” (p. 671). Admission requirements were presented in two-thirds of the viewbooks included in the study, and one-half of the total did not list tuition. Overall, Hartley and Morphew concluded viewbooks are provided to give students a sense of the campus, but are constructed so that the environment is optimized, academic rigor is downplayed, and the institution looks very much the same as its counterparts, to avoid questions of its legitimacy.

In a study more focused on the quantitative representation of images, Klassen (2000) analyzed the content of the photographs within 32 college viewbooks as belonging to 42 categories. The categories were not pre-determined; rather, they were adopted based on the content of the photographs. A full listing of the categories employed by

Klassen is provided in Appendix A. The purpose of Klassen's research was to determine if there was a difference in the content of viewbook photographs when contrasting the U.S. News and World Report rankings of the schools within the study. Klassen's findings indicated higher-quality schools (as ranked) tended to contain more photographs demonstrating academic quality and rigor, while lower-tier school viewbooks featured images of social interaction, recreation, and graduation. Both high-tier and low-tier schools tended to feature photographs of campus at the same proportion.

Ohio Colleges and Universities

An aesthetically-pleasing, high-quality outdoor campus environment has value for recruiting practices and college choice. In absence of clear, factual evidence of quality (which is difficult to obtain in college choice decisions), inexperienced consumers are apt to make decisions using subjective evidence, such as photographs and word-of-mouth to determine where they will apply (Anctil, 2008; Cummings, Hayek, Kinzie & Jacob, 2000; Kinzie et al., 2004; McPherson & Winston, 1993). Klassen's (2000) analysis demonstrated the dependence colleges and universities have on images of a beautiful campus environment for their recruiting materials.

Given that this study focuses on institutions in the state of Ohio, it was relevant to determine if the viewbooks from institutions within Ohio were similar in composition to those analyzed by Klassen (2000). Klassen found that *Buildings/Campus* photographs represented approximately 11.6% of the total images featured in campus viewbooks (generic *Outdoor Beauty* images represented an additional 1.6%). To determine if Ohio college and university viewbooks were similar to Klassen's population, the overall representation of Klassen's 42 themes were used. For the review of Ohio viewbooks, two additional variables were created: (a) the sum of *Buildings/Campus* plus *Outdoor Beauty* photos (to be compared to the total number of photos), and (b) a new category—*Physical Campus in Background*. The *Physical Campus in Background* variable was counted after all of the viewbook photos were tallied, to get a sense of the number of photos where the physical campus was part of the photo, but was not the primary focus. Examples include: photos of faculty sitting on a campus bench, students studying outside in a field, individuals walking in a group on the campus commons, and so forth. Photos in this category were first counted in a primary category, and then were counted a second time into the *Physical Campus in Background* category.

To obtain the viewbooks, Admissions representatives at 52 Ohio colleges and universities were contacted. The institutions included public and private controlled schools with non-profit status. Appendix B contains the list of colleges and universities contacted, along with indications of those that supplied viewbooks. Thirty-nine viewbooks were received (33.3% Public, 66.7% Private) and assessed to determine the representation of each image category. The results showed that on a per-viewbook basis, the most frequently represented photographic categories (as a percentage of total photographs) were: (a) *Students* (single students, or groups of students posed for the camera; M = 16.422%, SD = 12.348%), (b) *Buildings/Campus* (M = 9.007%, SD = 6.92%), and (c) *Students Socializing* (defined as students in the act of conversation; M = 7.978%, SD = 6.598%). When taken collectively (all photographs in all viewbooks, summed), *Buildings/Campus* in Ohio viewbooks comprised 9.92% of photographs, whereas *Outdoor Beauty* was featured in 1.64% of photographs, which is on par with Klassen's (2000) findings.

Interestingly, using the *Physical Campus in Background* variable (consisting of photographs grouped into another primary category *other than Buildings/Campus* or *Outdoor Beauty*), 12.5% of viewbook photographs included the outdoor physical campus in the photograph. Therefore, when *Physical Campus in Background* is summed with *Outdoor Beauty* and *Buildings/Campus*, it can be said that 24% of photographs in Ohio college or university viewbooks feature the physical campus as the subject or as a background element.

The Campus Visit

As early as the 1930s, Elliott (1937) noticed a difference in the college enrollment yield of high school students that he attributed to the method of contact used by admission representatives. Students that were merely given a brochure about Indiana University were less likely to enroll than students given a brochure along with an in-person presentation. Elliott concluded that presentations accompanying visual images contained in brochures were more stimulating, and therefore, encouraged greater interest in Indiana University. For the prospective student who wishes to go beyond the university website or viewbook, visiting campus is often the next step.

The campus visit can be a pivotal experience in the mind of a potential student, but they "often seem like careful exercises in sameness, set to a numbing drone of superlatives" (Hoover, 2009, ¶8). Termed the "golden walk," the way a prospective student experiences a campus for the first time is often crucial in forming perceptions about a college or university (Hoover, 2009). According to Kinzie et al. (2004), 37% of high school students submitted applications to four or more colleges or universities. Students are more savvy consumers, and are willing to consider more options in the hopes of being impressed by a college or university. In a study conducted with the support of APPA's (Association of Higher Education Facilities Officers) Center for Facilities Research (CFaR), strong statistical support was found for the importance of the physical campus environment in student recruitment and retention (Cain & Reynolds, 2006a, 2006b; Reynolds, 2007).

Eric Hoover, a writer for the *Chronicle of Higher Education*, wrote of campus tours, "A good impression might not sway a prospective student one way or the other. A bad one probably will" (2010, ¶1). Campus visits can be, much like viewbooks, seen as disingenuous attempts to present an over-sanitized look at college life, aimed at presenting an institution as perfect for every single prospective student regardless of his or her personal preferences and needs (Kingsbury, 2009, ¶2). Admissions tour guides have even been described by Jeff Kallay, a leading expert in campus visits, as, "inauthentic experiences run by PR-spewing tour bots" (Hoover, 2009, ¶7). Most campus tours, he said, are the same: a walk around campus, along with a viewing of feature campus buildings such as the library, student center, and recreation facility. Mr. Kallay, of TargetX (a higher education consulting firm), is paid to visit campuses and conduct experience audits—and he is not the only one (Hoover, 2009).

TargetX and other companies, such as Noel-Levitz, Performa Higher Education, the Lawlor Group, and the Art & Science Group, provide institutions with assistance related to recruiting students (including the campus visit). The importance of a campus visit is clear; Yost and Tucker's (1995) study examined the campus visitation tendencies of entering undergraduate students. For their study, Yost and Tucker split the students into two groups—students that were admitted but did not enroll versus students who were admitted and chose to enroll. The campus visitation percentage was markedly different between the groups; 83% of the enrollers had visited campus. Only 52% of the non-enrolling group chose to visit campus during the college selection process. As Yost and Tucker demonstrated, students who were seriously considering the campus are more apt to visit campus. As further evidence, Klein (2004) found 65% of polled students identified their campus visit influenced their enrollment decision greatly (as compared to the university website, cited by 25% of polled students). The point of the campus visit, in many ways, is to simply see the campus, rather than to learn about the majors offered. Of the campus visit, Boyer (1987) stated,

> It was the buildings, the trees, the walkways, the well-kept lawns—that overwhelmingly won out. The appearance of campus is, by far, the most influential characteristic during campus visits, and we gained the distinct impression that when it comes to recruiting students, the director of buildings and grounds may be more important than the academic dean. (p. 17)

The role of an enrollment management unit is to communicate with prospective students, entice them to apply and enroll, and then persist (Hossler, 1984; Kinzie et al., 2004; Lewison & Hawes, 2007; McGrath, 2002; Parker et al., 1996). Regardless of the structure of an organization, marketing and admissions are related and often mutually-reinforcing units on a university campus. "Marketing is not only about new logos, pithy tag lines, and expensive advertising campaigns. Rather, it is a disciplined way for a college to focus on what makes it different from the competition" (Strout, 2006, ¶2). Recruitment often relies upon the efforts of marketing to develop an image of campus that prospects can use to judge institutional quality (Anctil, 2008; McPherson & Winston, 1993). These images are presented to prospective students in the forms of viewbooks, websites, and campus tours (Anctil, 2008; Hartley & Morphew, 2008; Jaschik, 2005; Klassen, 2002; McKnight & Paugh, 1999; Ramasubramanian et al., 2002; Yost & Tucker, 1995). The physical campus is an important component to these recruitment related activities, and once a student is enrolled, is a component to his or her continued satisfaction and sense of fit on campus (Cain & Reynolds, 2006a, 2006b; C. Engel, personal communication, October 30, 2008; Reynolds, 2007; Strange & Banning, 2000).

The Campus Environment: Creating and Retaining Successful Students

Campus environments have a great deal of influence over their inhabitants. Using cues within the environment, administrators are able to manipulate the potential for student achievement and growth (Strange & Banning, 2000). For the successfully-recruited student the challenge becomes providing an educationally-meaningful environment, in which he or she will become engaged as a member of the community and persist to graduation. In *Educating by Design*, Strange and Banning present a case for utilizing campus design attributes to promote student success. This approach is known widely as campus ecology (Kaiser, 1978; Whiston, 1989).

Strange and Banning (2000) defined the environment through four areas of influence, and then discussed how those areas impact the ability of a student to become a member of the educational community. In a previous publication, J. H. Banning (1984) noted the environment's ability to create interaction, manage or suppress behaviors, enrich learning, facilitate development, mitigate stress, and improve accessibility. The college environment is comprised of "physical space, policies, people, and other physical, biological, chemical, or cultural stimuli" (Kuh, 1993, p. 37). To better describe the campus environment, Strange and Banning broke it down into four areas for discussion: physical campus, human aggregate, organizational environment, and the constructed environment. Each of these areas are explained in detail.

Strange and Banning (2000) believed the environment is critical for the establishment of a safe space in which students can learn, grow, and develop. Student growth and development often involves the student taking the risk of failure or embarrassment, which is why creating a safe space is so very important. Their model details a multi-level progression informed by Maslow's hierarchy. The student transitions from having a basic sense of security, to feeling included (level one), to becoming involved and engaged with the environment (level two), and then believing themselves to be a member of a community (level three). New skills are acquired, identity is strengthened, and development occurs throughout the journey toward being a community member.

Featured in the first level are safety and inclusion; while they are related, they are not the same. Using Maslow as a foundation, Strange and Banning (2000) argued that safety is a baseline need that must be satisfied before the student can progress within an environment. It is only after the safety needs of participants are met that they can begin to experience growth and development. Inclusion within an environment requires the student first feel welcome, with an absence of hostility from other groups. Issues of safety and inclusion are often contentious; explained Strange and Banning, “Inclusion for one group often rests on the exclusion of other groups, ultimately challenging their sense of safety and security, physical or psychological” (p. 130).

Strange and Banning (2000) leaned heavily on Astin (1985) for the next level in the progression towards a sense of community: participation and involvement. Cheng (2004) suggested administrators need to take action to prevent students from feeling lonely or alienated in order to encourage their involvement. Being involved on campus means that a student has gone beyond a mere physical presence on campus—they are now actively involved in impacting the environment (Strange & Banning, 2000). Levels and types of involvement may vary over time, as may the methods by which students impact the environment—but learning and development only occurs insofar as they are involved on campus and participate in their education. Involvement lends assistance to developing a sense of fit, while participation in the educational environment promotes learning.

The final level, encouraging optimum student learning and development, is described as a community of scholars. A community has “unifying purposes and values, traditions and symbols of belonging and involvement, and mutuality of care, support, and responsibility encourage a synergy of participation and worth, checking and cross-checking, to create a positive human learning environment" (Strange & Banning, 2000, p. 160). Communities share a common location, purpose, and direction, have a sense of belonging, and are social with one another. A community works together to serve the needs of its members.

Administrators are rarely afforded the opportunity to design new environments; rather, they are given existing designs to manipulate. With proper design (or re-design), a path can be constructed for moving a student from the lower-order level of safety and inclusion toward the goal of creating a sense of community for that student (Strange & Banning, 2000). In order from most ambiguous to most concrete, the four environmental components are: constructed environment, organizational environment, aggregate environment, and the physical environment. A brief review of the first three environments precedes an analysis of the physical campus environment as described by Strange, Banning, and others.

The Constructed Environment

The concept of the "constructed" environment dates back to the social ecology movement and K. Lewin (1936) before that. Strange and Banning (2000) explained the concept of the constructed environment, writing, "environments exert their influence on behavior through the mediated and subjective perceptions, or social constructions, of those who participate in them" (p. 85). The concept of a constructed environment tends to be phenomenological in nature. Although there are many objective elements to an environment (members of specific ages, the physical layout of an environment, or the layers of bureaucracy at any one moment), how those items are viewed and experienced are based in the perceptions of the people observing them. This is the essence of the constructed environment; shared perceptions of the environment become the dominant ideals, creating norms, which shape behavior within the environment.

The constructed environment plays host to a social climate. Citing Moos (1979, 1986), a proponent of the social climate theory, Strange and Banning (2000) outlined the three areas in which an environment's social climate can be assessed: (a) relationship dimensions (personal involvement and helping), (b) personal growth and development dimensions (the occurrence of development), and (c) system maintenance and change dimensions (orderliness of a social group, clarity of rules, and reaction or maintenance of change). Each of these three dimensions, outlined by Moos, must be adequately addressed in order to assess a social climate. Using Moos' University Residential Environment Scales (URES), Tracey and Sherry (1984) studied social climate as an important part of person-environment fit. The researchers found distress resulted for students who had large disparities between actual and ideal social climates, especially when their actual experience was not meeting up with their expected or ideal experience.

A third area of the constructed environment is the campus culture. Largely invisible, Strange and Banning (2000) described the culture as "reflect[ing] the assumptions, beliefs, and values inhabitants construct to interpret and understand the meaning of events and actions" (p. 100). Citing Kuh and Hall, Strange and Banning described culture further, as "the confluence of institutional history, campus traditions, and the values and assumption that shape the character of a given college or university" (Kuh & Hall, 1993, pp. 1-2). Elements of campus culture include artifacts (art, historical objects/buildings, mascots, rituals), perspectives (campus political leanings, dress, norms), values (ideals and procedures), and assumptions (very abstract; truths). Newcomers to an environment may not be conscious of the culture until they violate it. Campus culture may be the least tangible and easily-understood aspect of the constructed environment, but is very important.

The Organizational Environment

Academic institutions are comprised of layers of governance, all with the purpose of contributing to the mission of an institution, however defined. Ranging from a loosely governed collegial atmosphere to a complexly structured bureaucracy, the composition of an institution has environmental implications for the participants. Strange and Banning (2000) detailed seven constructs by which one can analyze an organization: (a) complexity (division of work, composition of operations), (b) centralization (locus of power), (c) formalization (visibility of power, rules), (d) stratification (strong or weak divisions among labor groups, benefits, mobility, and respect), (e) production (emphasis on quality vs. quantity), (f) efficiency (where is money spent, and what emphasis is given to efficiency), and (g) morale (often reflected in turnover levels; pp. 63-71).

Organizations can also be described as dynamic or static. Dynamic environments are flexible and open to change, but may have higher complexity and tend to be less centralized. Static environments are rigid, opposed to change, and have a greater centralization of power with fewer levels of control. These two characteristics are two ends of a continuum, and the inhabitants of a given environment will generally feel more comfortable in the one that fits their personality or needs. Strange and Banning (2000) argued that students will participate in an organized environment more closely resembling their personal preferences.

Students may struggle within an organization that fails to meet their needs or makes it difficult for them to succeed (difficulty navigating the bureaucracy, understand the rules). Organizational size is often an issue for students, and barriers for registration or financial aid due to large crowds are a hindrance for some students (Strange & Banning, 2000). Supporting this idea, Kezar (2006) noted a relationship between organizational size and the types of student engagement using the NSSE (National Survey of Student Engagement). It is important to note that the author did not observe lower levels of engagement—merely engagement utilizing differing methods. Larger institutions appeared to have adopted structured methods for connecting with students, whereas smaller institutions tended to rely on more informal channels of communication. Other examples of organizational environment issues included students failing to be able to understand how to get involved or experiencing confusion in how to obtain institutional assistance (Strange & Banning, 2000). It is clear that organizational barriers or lack of clear communication of the available services and the methods through which students can obtain access can act as an obstacle to involvement and, ultimately, retention.

The Aggregate Environment

Another popular conceptualization of the campus environment is based upon the premise that environments are shaped by the people that they contain. A campus inhabited by artistic, anti-establishment, academically-focused students will exude artistic, anti-establishment values and an academic culture. Although most campuses are not nearly homogenous enough to make that kind of statement, Strange and Banning (2000) posited campuses exude the values and norms of their inhabitants. Therefore, the aggregate characteristics of a college or university can be measured by measuring the students, faculty, and staff who inhabit the campus. Astin and Holland specialize in this type of assessment, which is described later.

Strange and Banning (2000) detailed several theories of student type: Clark and Trow's subcultures (1966), Astin's student types (1968, 1993), Holland's vocational types (1973), the Myers-Briggs personality types (Myers, 1980; Myers & McCaulley, 1985), and Kolb's learning styles (1983). Using any or all of these theories and measuring the inhabitants of an environment can yield important clues about the environment as a whole. In fact, Strange and Banning believed that measuring the inhabitants of an environment is essentially equivalent to measuring the environment.

Environments vary in how strongly they exhibit various types; this variance is directly related to how homogenous their participants are on a given attribute (Strange & Banning, 2000). As inhabitants experience an environment, they become aware of where they fit within the various characteristics. The characteristics one may become aware of include (but are not limited to): age, gender, race/ethnicity, interests, and style. Other ways students may feel a connection to others within an environment are vocational preference, personality, and learning style.

Strange and Banning (2000) asserted individuals are attracted to environments that fit their personality type, and once they join the environment, they are rewarded for behaviors that fit that environment. This process reinforces and strengthens their congruence with the environment. The likelihood that an individual in a congruent environment will be retained is high, and they experience satisfaction and stability within the environment (pp. 52-53). Individuals unlucky enough to end up in an incongruous environment would have a very different experience than their congruous counterparts; they would suffer a cognitive dissonance, and likely engage in withdrawal behaviors. An individual who is not congruent with his or her environment may resolve this conflict by adapting his or her behavior to the present environment, remaking the present environment, or leaving the environment altogether.

Feldman, Smart, and Ethington (2004) studied this idea using Holland's "theory of careers" (p. 528). In an analysis of 2,309 students who were surveyed by the CIRP (Cooperative Institutional Research Program) longitudinally, Feldman et al. found that students who selected majors congruent with their adaptive styles became stronger in those adaptive styles (as measured within Holland's theory), whereas students who chose incongruous majors experienced no change, or a weakening of their dominant adaptive style. This supports Holland's premise—congruence between the academic major (which serves as a subenvironment) and a person's adaptive or personality type reinforces his or her adaptive type. The dissonant participants had static or small negative changes, but they did realize gains in the adaptive area that matched their major, suggesting they assumed at least some of the prevailing adaptive style of their new major. One limitation of this study was that it relied upon longitudinal data that could not be collected from students who left the college environment altogether, creating a potentially large non-response bias.

Person-environment congruence is described simply by Strange and Banning as "the degree of fit between persons and environment" (2000, p. 52). This researcher would argue that Strange and Banning's statement belongs more as a broad concept, not limited to any one aspect of the environment (cultural, organizational, aggregate, or later, physical). Ultimately, all of the previously mentioned areas of the environment (constructed, organizational, and aggregate) could be viewed as "the environment as it is" versus "the environment as I need it to be." Dissonance between the real environment and the ideal environment, if unmitigated, could lead to withdrawal. Utilizing the idea of 'fit' has been popular, if scattered over the past few decades. Providing students with a congruent environment may not always be possible, but providing them ways to cope with that environment may be helpful as they seek a reduction in dissonance due to lack of congruence.

The Physical Environment

Because the physical environment is the focus of this study, it is discussed in detail. Strange and Banning's (2000) synthesis of the physical environment and its capacity to affect students will serve as the basis for much of this study. According to the authors, the physical campus environment has the capacity to make a first impression, influence behavior, communicate, improve the campus image, and assist in learning and development (2000, pp. 12-31). Zimring (1982) and Kaplan and Kaplan (1978) also suggested that the environment can inhibit socialization and create feelings of stress if designed poorly. It is also a clear factor in college choice decisions, according to several higher education consultants contacted for this study along with Gaines (1991), Noel-Levitz (2007), and Yost and Tucker (1995).

Elements of a physical campus that are known to make a first impression are: campus layout, green space, accessibility, cleanliness, color schemes, visible amenities, new facilities, building style, and manicured grounds (Strange & Banning, 2000, p. 12). A quality outdoor campus landscape can create "a venerable campus identity, stir alumni sentimentalism . . . [and establish] a strong sense of community" according to Griffith (1994, p. 648). Of course, the term *physical campus* can be used to describe both indoor and outdoor locations; J. H. Banning (1993) discussed the classroom environment as it aids educational goals, describing spatial layout conditions and the non-verbal cues the space can send, which is outside the scope of this research.

Strange and Banning (2000) supported the idea of *architectural probabilism*, meaning that the physical environment has the ability to encourage certain behaviors while discouraging others. This stance stands in contrast to earlier, more simplistic theories of architectural influence related to behavior, such as architectural determinism and architectural possibilism, both of which posit behaviors are limited by architecture, but not encouraged. Their assumption that the environment not only limits but enhances behaviors allows for a holistic evaluation of the physical campus and greater manipulation of the environment to meet educational objectives. Strange and Banning cited Dober's concept of *placemaking* to support many of their arguments, and his work is discussed in the next section of this review.

The physical campus communicates to members and non-members alike. Onlookers may glean a sense of institutional importance afforded a college, school, or department through observing the building they inhabit, or notice evidence of institutional pride through symbols, artwork, or signage (Strange & Banning, 2000, pp. 15-16). Benches, walkways, statues, art, and graffiti all communicate messages—via word choice, placement, content, or mere presence/absence (Greenberg, 2007; Strange & Banning, 2000; Waite, 2010). In fact, citing Mehrabian (1981), Strange and Banning stated, “nonverbal messages are often seen as more truthful than verbal or written messages” (p. 17). It is through nonverbal communication that the truthfulness of verbal claims are often checked and considered; the emotional elements of communication live in the nonverbal aspects of a message. Other higher education marketing literature has supported this position as well (Anctil, 2008; Jaschik, 2007).

Much like the human aggregate environment, physical cues communicate “choices to be made . . . appropriate emotions, interpretations, behaviors, and transaction by setting up the appropriate situations and contexts” (Rapoport, 1982, as cited in Strange & Banning, 2000, pp. 80-81). The physical campus, or *behavior setting* (a concept taken from Barker, 1968) has a range of spaces from parking lots and outdoor plazas to meeting rooms and common areas on residence hall floors. Physical space should be constructed to encourage socialization between students, staff, and faculty. Zimring (1982) called spaces for informal communication “activity nodes” (p. 156). Activity nodes tend to be on paths (in buildings or in the outdoor environment) or in central locations and are critical for interaction. To best encourage interaction, these spaces need to be open and as free of boundaries or barriers as is possible. The configuration of these behavior settings influences the way socialization occurs—examples provided by the authors included gymnasium graduations (rowdy) and colloquium courses in classrooms with desks bolted to the floor (absence of discussion; Strange & Banning, 2000).

Strange and Banning (2000) suggested walking the campus to get the most accurate view of the environment. Wayfinding (signage clarity, frequency, and legibility) is crucial, especially to persons viewing your campus for the first few times. Kaplan and Kaplan (1978) stressed the importance in preventing pedestrians from feeling lost, warning that it is more than a geographic problem or error. Feeling lost on campus can create feelings of tension and stress, causing people to be quicker to anger (Zimring, 1982). To improve the campus image and corresponding experience, Strange and Banning suggested ensuring that the walkways are direct, wide, logical, and more than just slabs of concrete. Benches, flexible meeting spaces, protection from the elements, and lighting should all work together to make the pedestrian experience more enjoyable. Citing city planning literature, Zimring (1982) suggested planners should concentrate on having landmarks pedestrians can remember, paths that are clear in their destinations, and clear campus boundaries. Furthermore, it sends high-value marketing or branding images to potential students that happen to be on campus.

Two final attributes described by Strange and Banning (2000) are legibility and mystery. These attributes were derived from earlier work by Kaplan and Kaplan (1978). Legibility, coined by Lynch (1960), refers to the ability of a new member to scan the environment. If an environment is highly legible, a new member will be able to perceive (based on past experiences) how to navigate the new environment. This includes the notion of elements being where they best belong, or that an environment simply "make[s] sense" (Kaplan & Kaplan, 1978, p. 148). Having a sense of familiarity with a new environment (via legibility) may lead an individual to develop a preference for it. Citing Weisman (1979), Zimring highlighted legibility as critical to wayfinding efforts. Mystery refers to nearly the opposite—using the environment to raise curiosity in a new member (Kaplan & Kaplan, 1978). Using these two ideas, Strange and Banning believed the physical campus environment can be both welcome and exciting.

The physical campus environment can have both positive and negative effects on new and current participants. A campus entrance can provide a sense of welcome, or induce confusion when it is poorly labeled (or fails to resemble an entrance). Of the four areas (physical campus environment, constructed environment, organizational environment, and human aggregate environment) described by Strange and Banning (2000), the physical campus is probably the least-understood in terms of student development (p. 30). While it is not this researcher's intent to study the capacity for physical campus environs to influence and/or promote development, it is noted at this time that the outdoor physical campus environment has not been studied as it directly relates to promoting development in students. It has, however, been shown to influence matriculation decisions (Kinzie et al., 2004), and provide comfort to the students currently enrolled at a campus. Involving students in the campus design decision-making will increase their sense of involvement (Strange & Banning, 2000).

Outdoor Physical Campus Environment: Components of Campus Design

A History of the American College Campus

The American college campus evolved as a distinct entity from its British and European ancestors, a phenomenon described in *Campus: An American Planning Tradition* by Paul Turner (1984). According to Turner, the word *campus* (which is Latin in origin) was first associated with college grounds by Americans, having been coined at Princeton University in the 1770s as evidenced in a letter from a student describing green surrounding Nassau Hall. Early British and European colleges relied heavily on compressed quadrangles and fortress-like design aimed at defending the university's students and faculty from hostile townspeople. In contrast, American colleges and universities were often built in rural or wilderness locations. The early American campus often had to function as a self-sustaining village, given its often remote location, and was characterized by wide tracts of land and generous space between facilities. Turner pointed out that the American campus is "a kind of city in microcosm . . . shaped by the desire to create an ideal community, and has often been a vehicle for expressing the utopian social values of the American imagination" (p. 305).

The buildings erected by early American colleges often held the distinction of being the largest building in the country upon completion, each new college outdoing the last. Harvard, Princeton, and other early colleges tended to construct a single structure to house all functions until they outgrew them, adding additional facilities arranged in a variety of patterns (Turner, 1984). During the colonial period, postsecondary education was vastly different than education in the modern era; students focused on a few classic works (libraries required little space) and pedagogy focused on recitation, which did not demand large classrooms. The instructional focus of the early American colleges centered on the classics or on divinity. This changed radically once the Morrill Act of 1862 was enacted, creating land-grant institutions focused on agricultural and technical education. The advent of land-grant institutions required new building types, such as laboratory and observatory space for agricultural and scientific research and also increased the popularity and presence of intervarsity athletics, requiring gymnasia and other athletic facilities (Turner, 1984).

A variety of layout configurations rose and fell in popularity during the 350 years of history described by Turner (1984). Harvard initially attempted to emulate the quadrangle (similar to Oxford and Cambridge), whereas Yale preferred a single-row design. The College of William and Mary instead opted for a three-sided design, with main buildings forming a sort of triangle, which has been repeated often in American college design (at small colleges, or within sets of related buildings). As more facilities were added to the American campus, placement became a larger, more complex concern. The University of Virginia adopted a single-axis design, where buildings were placed on either side of a long, terraced mall, connected by colonnades (covered walkways). Positioned at the head of the mall was the rotunda, used as a library. Other colleges attempted to emulate the older quadrangle design using placement of buildings in a rectangular shape, creating a courtyard, or instead employed three buildings for a more open plaza to the surrounding community. In the late 19th and early 20th century, the Beaux-Arts system of planning became popular, in part due to the Chicago World's Fair in 1893. Many campuses combined attributes of multiple planning schemes, or chose to ignore them completely, placing buildings in irregular patterns, occasionally keeping geographic or landscape features in mind (Turner, 1984). As trends in planning changed, campus designs were altered with little or no attention paid to historical preservation or appreciation.

Similar to the meandering history of layout configuration, a wealth of architectural styles have waxed and waned in popularity on American campuses in the past few centuries (Turner, 1984). As different styles drifted in and out of favor, campus designers employed a variety of styles, creating campuses with disparate architecture. Turner suggested that the selection of the classical styles (Gothic, Greek Revival, and Romanesque, for example) was aimed at providing a sense of age and prestige to the college campus. Architecture allowed many American colleges and universities to emulate a sense of timeless elegance and venerability that they lacked in operational history. However, this hodgepodge of styles also had interesting consequences. At Harvard and Yale, in particular, the variety in architectural styles created such an annoyance that author A. D. F. Hamilton suggested that ivy be planted along walls, to mask differences in the style and age of campus buildings (Gaines, 1991; Turner, 1984, p. 204). An unfortunate side effect of the stylistic inconsistency between buildings was the demolition of landmark structures, simply because they did not fit in with the current fad in design. This left future architectural enthusiasts with only drawings and descriptions of a majority of the earliest American campus architecture (Turner, 1984).

Campus planning appears to have been an ongoing concern even in the earliest American colleges, although the scope was vastly different. John Trumbull of Yale is the first American campus planner on record (1792) as having concerns for the overall visual aesthetic of campus. Trumbull intended for his single-row design to be an experience for the pedestrian, including trees, lawns, planting beds, and paths in his master design, which was never fulfilled. The University of North Carolina (during the 1790s) appears to be the first institution conceived and built in accordance with its initial master plan. The University of Virginia, the South Carolina College (now the University of South Carolina), and Union College are also exceptional examples of early campus planning efforts with memorable results. Campus planning became more formally recognized in the mid-19th centuries by professional architects who specialized in the design of campuses and facilities for education. As the 20th century approached, architects were paying more and more attention to the developmental capacity of well-designed space. At the same time, the German model of research and graduate education was taking hold in the United States, further diversifying the facility needs of American colleges and universities (Turner, 1984).

Until the late 19th century, colleges and universities did not resemble the institutions found in modern America. Demand for research, elective courses, and alternative areas of study in the late 1800s along with the advent of student services changed postsecondary education in the United States. Campus planners were challenged to provide more space for classrooms, meeting space, and residence halls than ever before. Trends in architectural style were progressing from classical to modern in the early 20th century, with an increased reliance on concrete as a building material. The more progressive architects were planning new campuses for growth and change, abandoning axial campus layouts, but many architects had to cope with campuses already densely constructed with a variety of architectural styles and building placement schemes. The challenges faced by architects in the 20th century were multiplied by the influx of returning students, attending school on the G.I. Bill in the late 1940s and early 1950s (Turner, 1984).

While much of the 1950s and 1960s were consumed with a frantic race to build the facilities necessary to provide education to World War II veterans and later, their children, campus architects struggled with balancing large institutional needs with a smaller campus feel. Vehicular traffic became a logistical challenge, and many institutions opted to re-route traffic to the periphery of campus. Concerns about circulation and accessibility led to innovation and increased attention to campus spaces used by pedestrians. After this period of upheaval, architects manifested “a new attitude . . . concerned with identifying and preserving the spatial and formal character of a historically significant campus to which additions are being made” (Turner, 1984, p. 301). Finally appreciating the architectural history of their campuses, architects were more apt to integrate pre-existing historical elements to create a more cohesive campus, rather than ordering the dispatch of non-conformist structures. This appreciation came just in time, according to Turner, as appropriations and enrollment in higher education began to dwindle in the 1970s. Although the temptation to build individually-stunning, mismatched architecture with the addition of each new structure is an ongoing concern, there is now a discourse encouraging architects and planners to honor institutional history and renovate older structures instead of ordering their demolition (Turner, 1984). In summary, Turner believed, "The campus serves the institution not only by satisfying physical needs, but by expressing and reinforcing those ideas or goals" (p. 304).

Campus Design

As evidenced by Turner (1984) and Gaines (1991), the present-day campus architect is rarely given a blank canvas. Most campus planners or campus architects are destined to contend with aging physical plant, a hodgepodge of formerly-stylish architecture, and artifacts of previous administrations driven to make a mark on the campus (Dober, 1992). Richard Dober's *Campus Design* outlined a simple and effective framework for the understanding, appreciation, and ultimately, assessment of campus planning elements. Dober's notions of *placemaking* and *placemarking* prove instrumental in this study, and are the focus of this section.

In short, placemaking and placemarking are two parts of a holistic approach to campus design. According to Dober, "Campus design is the art of campus planning, the culminating act of those processes and procedures that give form, content, meaning, and delight to the physical environment serving higher education" (1992, p. 3). Despite the semantic similarity in Dober's constructs, they referred to separate aspects of design, both of which are important. Dober's notion of placemaking is literally the skeleton of the institution. Placemaking refers to the infrastructures that configure a campus: open space, routes for vehicles and pedestrians, building locations, and parking lots. Placemarking, on the other hand, stresses the features of a campus that make it unique or distinguishes it (as a place) from other campuses. Gaines (1991) deemed establishing a *sense of place* as essential in creating a successful campus environment in his book, *The Campus as a Work of Art*. Elements of placemarking include but are certainly not limited to: landscaping, architecture, building materials and style, and landmarks (Dober, 1992).

Placemaking. The challenge of the campus planner/designer is to take the existing campus design and extend it as it currently stands, or to revise it over time toward a future vision. Some campus plans are a scattered collection of buildings related only by requisite infrastructure, while others are spaced deliberately based upon past plans of varying quality (Dober, 1992). Turner (1984) described the evolution of architectural style while also detailing changing notions of "educational and social principles" (p. 7). To create a balance between style and principles, some institutions have chosen to enact *sector plans* which are used to bring groups or areas of internal consistency based on anything from building age to materials used to architectural style (Dober, 1992, pp. 229-237). Overall site planning is critical, and involves maintaining a balance between buildings and the outdoor space surrounding them (Griffith, 1994, p. 651).

An issue of great importance to the campus planner is flexibility. Institutions are only as viable as they are adaptable (Dober, 1992). A building constructed to house students may later be utilized as classroom space, a gymnasium, then an auditorium, and finally offices—in a span of over 70 years. As an institution evolves and changes over time, different needs will emerge for the physical plant (p. 229). Between 1950 to 1990, "American higher education grew sixfold . . . from approximately 500 million to about 3 billion gross square feet" (p. 251). In assessing the cost of that physical plant, Dober stated:

> In 1990 the capital value (replacement costs) for higher education was estimated to be 300 billion. A prudent annual funding rate for repairs, renovations, and replacement of that which was wornout was estimated to be two to four percent of total replacement value. At the time *Campus Design* was published, funding has been approximately one percent annually. (p. 251)

As such, many campuses have adopted regeneration plans to address the needs of their crumbling physical plant. Although Dober's concept of placemaking is important, this review focuses on items that are more malleable and within the campus planner/designer's control—elements of placemarking. Placemarking is often dependent on the pre-existing placemaking elements, or can be considered alongside new placemaking elements when new construction is undertaken.

Placemarking. The phrase "sense of place" is often used casually by campus planners and higher education administrators, although its origins are unclear. As a colloquialism, it was often used to describe settings that are particularly memorable. In higher education literature, the phrase appears in a 1972 article by William Sturner in an appeal to campuses to engage in a more authentic planning process for better campus design. His eloquent presentation of *sense of place* implored campuses to develop flexible spaces that bring a strong sentiment and stir the senses of the inhabitants. Sturner, who served as assistant president for planning at Oakland University, borrowed the notion of an environmental code from Safdie's 1970 work, *Beyond Habitat.* He proposed colleges and universities should strive to develop authentic places through the use of a six-point environmental code which focuses on including the environment's inhabitants in the creation of a homegrown and unique physical campus environment that emulates the values, goals, and culture of the institution.

Dober (1992) outlined four elements of placemarking: style, materials, landscaping, and landmarks. Each are discussed in turn, but it is important to note that each may be present in varying degrees, and diverse manifestations. According to Gaines (1991), "A good campus consists of a group of harmonious buildings related by various means (such as arches and landscaping) that create well-proportioned and diverse urban spaces containing appropriate furnishings—benches, pools, fountains, gazebos, and walkways" (p. 1). What is landscaping to one campus may be the absence of landscaping at another, and this is true of the other elements of placemarking. Adaptation of buildings and flexibility in design is achieved not only through elements of placemaking (for example, the design of hallways in a building), but also through elements of placemarking—the visual function of a space, for example, can be altered through the use placemarking elements such as materials or landscaping (Dober, 1992).

Style. *Style* is "status, taste, emotion, symbol, philosophy, and perception" (Dober, 1992, p. 39). When characterized in campus design, style is a term that transcends interior design and fashion—it is referring here to exterior elements, such as building architectural style, colors, and even signage. Style can provide hints of the institution's (or building's) age, the mission of the institution, or how the campus wishes to portray itself, a finding confirmed in Turner's (1984) historical account of the development of the American campuses. Dober continued to define style as:

> The recognizable, special, or definitive way in which building parts are shaped into a vocabulary of forms; the forms assembled into distinctive and repeatable patterns; an outer fabric selected with materials that become associated with those forms and patterns; and the whole organized and sited to serve function, to appeal visually, and to signify client attitudes and values. (p. 39)

There are two important characterizations of style: architectural and design. Architectural style refers to building shape and selection. Two examples of an architectural style are Collegiate Gothic (Kenyon College, Duke University's West Campus) and Collegiate Georgian (Johns Hopkins University, Southern Methodist University). Collegiate Gothic architecture is large, dark, ornate, and dramatic, whereas Collegiate Georgian style is characterized by red brick, porticos, and white detail around windows and entrances. Dober (1992) recognized nearly 50 different styles, grouped into "American College and University Styles" or "Oxford/Cambridge Styles" (p. 40). It is rare that a campus is completely within one style or another, but elements can be carried through buildings to establish a sense of consistency, if not conformity. Other popular styles cited by Dober are "20th Century" (most construction in the past 40 years falls into this largely unimaginative and blocky category) and "Late 20th Century Style" (pp. 88-90) both of which attempt to involve context into architecture by using elements of purpose or the surrounding environs in the design.

Design style refers to the visual impression imparted by a given design. Most campuses (or sections of campus) can be categorized as having elements of one or more of these three design styles: monoform, metamorphic, or mosaic. *Monoform* design styles have a single unifying style, and are often achieved by single-period construction. *Metamorphic* design is characterized by buildings that change over time but are unified in *some* way, such as materials or landscaping. Finally, *mosaic* designs are typified by a collection of buildings without a common thread. The only consistent element among buildings is variety. Each of these design styles can be utilized with great success (Dober, 1992, pp. 44-46). Gaines (1991) also provided a discussion of regional style, noting the regional differences in colleges constructed in New England, the Midwest, the South, and the Western United States (especially Southwestern). These differences may be due to aesthetics or material constraints resulting from the climate and topography of the area. Turner (1984) and Gaines (1991) posited the success of a given style is a product of many elements working together in harmony. That harmony in style can be achieved using the other elements of placemarking with success (Dober, 1992).

Materials. Dober's (1992) discussion of materials as a placemarking element is focused on outdoor elements. According to Dober, a particular building material can enhance a design or style in a number of ways. Materials may be used to unify, to support, or to contrast buildings or landscape elements in a design. Louisiana State University, for example, enacted a rule that all buildings constructed must feature the Italian Renaissance style using aggregate stucco material as a unifying element. The campus has an overall look that is described by Gaines (1991) as "deliciously tactile" (p.

148). Rochester Institute of Technology was constructed using “10 million Belden iron-spot bricks” (Gaines, p. 144) to provide a sense of continuity. Building materials also have the ability to establish a sense of place; Dober described them as the fabric of a design. Campus planners have many material options at their disposal; examples include (but are not limited to) brick, stone, adobe, concrete, and wood for exteriors, and a range of walkway and indoor material options.

Building materials are often used to communicate messages. Because materials are “an invented tradition,” interpretation will vary by institution and mission (Dober, 1992, p. 149). Brick became a popular building material in the 1600s, and is still popular in modern construction, evoking a sense of tradition and history. Brick and the Collegiate Georgian style became the hallmark of American Higher Education, but other styles have found success as well. For example, Stanford University chose to use native stone and red-tile roofs, befitting the area. Virginia Polytechnic Institute and State University selected a regionally-available material, dolomite limestone (“Hokie Stone”), to create a consistent look (Dober, 1992) as did Charles Klauder when constructing a section of campus at the University of Colorado, Boulder (Gaines, 1991; Turner, 1984). The University of New Mexico wished to make a bold statement to the population it wished to serve, and chose to have adobe buildings with Native American names (Dober, 1992).

Although style and materials are distinct concepts within the larger placemarking idea, they can work in tandem to establish the design style of a place (monoform, metamorphic, or mosaic). An architectural style concept is strengthened by the materials used, along with the materials used to compliment the architecture by way of walkways and decorative elements. Landscaping, a third element of placemarking, can be used to tie the previous two elements together.

Landscapes. When considering a landscape, Dober (1992) suggested thinking of it as a sequence of visual experiences that yield an overall impression. "Landscape can serve as the skeleton for the overall campus plan, the interior circulation systems such as walks and roads as well as provide a background for subtle and finer grain landscape motifs" (p. 167). Campus landscape designs encompass "campus edges, gateways, gardens, arboretums, memorials, bell towers, fountains, outdoor sitting areas, signs, site furniture and natural features . . . including ponds, woodlands, and rock formations" (p. 167). Landscape placemarking can take many forms, but is critical within campus design. In reference to the landscape, Van Yahres and Knight (1995) surmised, "It's the first thing people see when they enter a school, and it's the image they carry in their minds when they leave" (p. 20). Griffith (2004) stated, "A campus should convey visually a sense of place, purpose, order, and quality" (p. 645). Among the benefits of engaging the landscape, Dober listed noise control, dust reduction, traffic direction, enhanced privacy, and boundary markers.

Landscape elements can be grouped into aesthetic, functional, and climatological categories. Dober (1992) explained that elements may serve aesthetic purposes (sculptural elements, ceremonial or symbolic elements, or textural/tactile elements—things that add color), functional purposes (erosion, acoustic, or privacy control), or climate purposes (protection from sun or rain, or increase air circulation; p. 170).

Additionally, the use of landscaping (or use of flat, green grass) can become a component of institutional identity when used consistently and with significant quality. Griffith (1994) highlighted the value of a landscape:

> Higher education institutions that properly design and preserve campus open spaces reap immeasurable benefits. 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, help establish a venerable campus identity, and curb escalating campus densities. Properly designed open spaces can be used to accentuate landmark buildings so as to create a focal point of beauty or interest. (p. 648)

Dober (1992) cautioned the reader to consider the available plant species carefully when instituting landscape designs; for example, the Dutch Elm was used pervasively on several campuses as the single species of tree (to provide unity) but Dutch Elm Disease largely decimated the species, rendering those campuses treeless in a short time period. Dober characterized the landscape as an outdoor living space, and suggested it should be used to increase socialization and vitality on campus.

Clearly the largest category of placemarking elements, Dober's discussion of landscapes transcends green spaces and trees—other elements of landscaping can include artwork (sculptures, archways, fountains) through the "outdoor museum" approach or the "environmental sculpture" approach (1992, p. 201). Outdoor museums are places where studio art can be placed, whereas environmental sculpture is more earth-based, using natural or synthetic elements in tandem with the topography of an area. Circulation systems (pathways, sidewalks, streets, and parking) are also discussed within the context of landscaping. Dober was generally opposed to parking lots and streets within the campus center (a five-minute radius at the center of an institution). Further, entrances to the campus (pedestrian or vehicle-based) have the capacity to communicate large messages about how welcome newcomers are. Dober explained, “Strong image campuses are marked by circulation concepts that are tenacious and enduring” (p. 211).

Campus paths are an essential component of placemarking, because they guide pedestrians on the visual experience of a campus. Griffith (2004) strongly advised using visual cues and circulation in tandem to tie outlying parts of campus to the more central whole. Dober (1992) suggested that a campus planner consider the following elements when designing a walkway (p. 212):

- Width to accommodate peak period traffic without deviation; and
- Paths must be safe, accessible, fit in with the environment, and have bike lanes; and
- Hierarchy of use should be considered; central nerve paths should be as efficient as possible for short distances, while secondary or tertiary paths can be more winding, less wide; and
- Pedestrians should be shielded in some way from vehicular traffic; and
- Intersections of paths should be as encouraging of socialization and participation as possible.

Additionally, Dober suggested the following elements of pathways can be manipulated to engender a sense of place: “paved surfaces, lighting, signs, display boards, bicycle racks, information kiosks, trash receptacles, fencing and billiards, benches and seats" (p. 216). Climate should always be considered as an important factor when selecting materials or landscape elements. Dober provided a "landscape taxonomy" which provides assistance in the assessment of outdoor campus environments. This taxonomy is detailed in Appendix C.

Dober's (1992) concept of placemarking includes four elements: style, materials, landscaping, and landmarks. Style, materials, and landscaping have been discussed and their use in establishing a sense of place is essential. While materials are the fabric of designs for an architectural style, landscapes can be regarded as the fabric of a master plan design. Open space, according to Griffith (2004), provides not only circulation in a functional sense, but socialization opportunity as well. When planners set out to execute a truly memorable design, they should use the previous three elements and bring them together with the fourth and final element of placemarking—landmarks. Style, materials, and landscape can help create landmarks just as they can compliment an existing landmark. Landmarks are the final concept in placemarking, and are, quite literally, "prominent features that identify a locale" (Dober, 1992, p. 17).

Landmarks. Elements of design are not always created with the intent of becoming a landmark. A landmark can be large, formal, or elaborate, or a space can simply become a landmark for *not* being large, formal, or elaborate. Landmark buildings are often self-evident in function, serve as navigational points (especially for newcomers asking for directions) and evoke a sense of place. Although a landmark is a somewhat nebulously described, examples of landmarks are easy to generate. Examples include

University of Pittsburgh's 42-story "Tower of Learning" (Dober, 1992; Turner, 1984), Nassau Hall at Princeton University, and the Wren Building at the College of William and Mary. Ohio examples cited by Turner (1984) and Dober (1992) include Antioch Hall at Antioch College, in the mid-19th century, Cutler Hall at Ohio University, and the University Center at Cleveland State University. Another example is present at the University of Akron; the Goodyear Polymer Center is 12 stories tall (one of the tallest structures in the city of Akron) with a slanted roof and clad in mirrored glass. It is visible from any point on campus, and houses one of the most prominent academic units at the University of Akron (University of Akron Goodyear Polymer Center, n.d.).

To create a landmark, the campus planner must bear in mind that the architecture does not need to be classically impressive—just distinctive or well-crafted and associated with the members or the environment or geographic area. Colleges and universities are excellent at flattening landmarks in favor of newer, cheap construction, and the whims of current administration. Fortunately this trend is changing as campus planners begin to fight for the preservation of history and tradition (Dober, 1992).

Not all landmarks are buildings. Towers, arches, spires, domes, statues, greenery, and monuments can all serve as landmarks. Examples include Iowa State University's campanile, the clock tower at the University of Texas, Mary Lyon's grave at Mount Holyoke, the amphitheater at the University of Illinois at Chicago, the Old Well at the University of North Carolina at Chapel Hill (Gaines, 1991), and the Golden Dome at the University of Notre Dame. Designers may also use landscaping or materials to transform an area into a landmark (Dober, 1992, p. 31). Because of this, Dober suggested that designers consider existing landmarks be considered as the foundations of a campus plan due to their value in crafting a visual experience (p. 26).

At the introduction of this section, the concepts of style, materials, landscaping, and landmarks were outlined with an important caveat: Each element is present in varying degrees and in a variety of manifestations at every campus. There is no single 'correct' style, material, landscape type, or landmark use. All ideas must be used in a context specific, flexible way, paying attention to each as it affects the other. Before leaving the concept of placemarking, it is important to mention one final concept—referential campus design. Dober (1992) defined referential campus design as "all powerful images of place which once experienced are not easily forgotten" (p. 111). Essential to this concept is the understanding that a design pattern is not necessarily the same as the design's inflection. A design pattern is quite literally the plan of the three dimensions of space, whereas the design inflection is the metaphorical meaning imparted by the space (p. 111). On a college campus, referential design might take the form of fitting facilities or environments to the purpose of a space—not just to accommodate it, but to represent it. The higher order goal of a campus plan is to establish some sense of place, and when executed well, referential design helps an institution reach that goal.

Assessment of the Campus Environment: A History

The idea that people are affected by, and in turn, effect their surrounding environment is an important tenet within the field of student affairs. Because the environment comprises such a broad range of stimuli (essentially everything a student comes in contact with), it has not been assessed sufficiently (Schuetz, 2005). The topic has been described as "extremely complex and slippery" (Baird, 1988, p. 1) in part due to its simple, yet infinitely describable nature. Of the environment, Astin (1993) said,

> Environmental assessment presents by far the most difficult and complex challenge in the field of assessment. It is also the most neglected topic. In its broadest sense, the environment encompasses everything that happens to a student during the course of an educational program that might conceivably influence the outcomes under consideration. (p. 81)

Environments have been studied by many researchers as a product of person-environment interaction, and many researchers have offered theories describing how the environment acts on its members. The theories tend to cluster around five views of person-environment interaction. Huebner (1980) and Walsh (1973) provided detailed and comprehensive accounts of the more popular theories of person-environment interaction.

Person-environment interaction theory rests first on the concept of interaction. The interactionist perspective appears to have originated with Lewin (1936) and assumes that context influences behavior. Others have expanded upon Lewin's theory, focusing more on the internal perceptions of the individual experiencing the environment (Bronfenbrenner, 1979). How a person acts in an environment is determined by both their personal experiences and the cues from the external situation they are experiencing. Huebner (1980) wrote, "remember that environments impinge on *people*—people with widely differing abilities, goals, expectations, and attitudes. . . . The impact of any environment is always mediated by person attributes" (p. 119). The elements within an environment will have varying levels of impact, and are objective (measurable events, physical characteristics, or behaviors) or subjective (impressions or cues) in nature.

In a comprehensive review of literature on the college environment compiled in 1960, Pace and McFee (1960) noted that the interactionist perspective relied upon psychology for an understanding of environmental stimuli, and anthropology for an understanding of culture. Pace and McFee provided descriptions of numerous environmental studies focused on institutional atmosphere, faculty subculture, student subcultures, and organizational structure. In this study, Pace recommended researchers study the objective elements of the college environment.

Moos (1976), cited by Huebner (1980), described the two basic sources of environmental impact affecting behavior: the physical environment and the social/psychological environment. The physical environment consists of the "manmade and the natural environment—the architectural environment, weather, and geography" (p. 120). The social and psychological environment is comprised of "behavior settings, social climate, organizational structure and functioning, and characteristics of milieu inhabitants" (p. 121). The sources of environmental impact, as outlined by Moos, are merely clarifications and an extension of Lewin's basic premise. All of the following environmental assessment techniques largely rest on the assumption that behavior is a function of the person and the environment (often consisting of physical and social/psychological elements), but use different approaches of measurement. For a more detailed and comprehensive historical summary of instruments created to assess the environment, see Baird and Hartnett (1980) and Huebner (1980).

Historically, the environment has been studied through describing its "demographic, perceptual, or behavioral" (Baird, 1988, p. 2). Studies reporting the effects of person-environment interaction began to appear with more regularity in the mid-1970s (Evans, 1983). Early studies were largely descriptive in nature, providing demographic data for the members of environments, an account of how participants report perceiving the environment, actual observations of behaviors present in the environment, or in a combination of all three approaches. Prospective students use these institutional characteristic data to make enrollment decisions, taking into account institutional size, academic offerings, institutional prestige, and other basic information in an effort to determine where they best fit (Kuh, 1993).

Pace and Stern were the first researchers known for measuring the college environment, in 1958 (Baird, 1988; Evans, 1983; Huebner, 1980). According to Baird, their position was simple: "a student's behavior depends not only on personality but also the demands of the college and the interaction between the student's personality and the college" (1988, p. 2). The student's personality was characterized as *needs*, and the college's environment or demands were characterized as *press.* Personality refers to the student's habitual behaviors and aspirations, and interaction with the demands of the college were assumed to be both direct (objective) and indirect (as interpreted by the student). Pace and Stern developed the College Characteristics Index (CCI) to measure the press as perceived by the student as he or she attempted to his or her needs met satisfactorily in the environment.

In the 1960s, Astin and Holland worked together using Holland's previous research on personality types (related to vocation) to measure the environment as a product of the people who inhabited it (Baird, 1988). The underlying assumption of the Environmental Assessment Technique is "characteristics of the student body have a considerable influence on the total environment" (Baird, 1988, p. 17). This research differed from Pace and Stern's initial approach, which consisted of measuring the student perceptions of the environment, rather than the students themselves. Results from the CCI and Astin and Holland's Environmental Assessment Technique were actually correlated, even though the approaches were sharply different.

Pace grew dissatisfied with the CCI in the late 1960s, and developed a new instrument, the College and University Environment Scales (CUES; Baird, 1988). Although the CUES contained many of the same measures as the CCI, it dropped the needs-press paradigm and instead sought to measure the environment through the perceptions of students and alumni on five dimensions: pragmatism (prestige-seeking, entertainment), community (friendliness), awareness (cultural and intellectual), propriety (traditional, conservative), and scholarship (rigor). Essentially, the instrument was measuring what participants valued on campus, and allowed Pace to differentiate a number of campuses in the United States on these dimensions. The CUES instrument was used widely in research by Pace and many others to obtain aggregate information about the college environment through the perceptions of its members, and many used CUES to assess differences between subgroups on campus.

In the same time period Stern (co-developer of the CCI) also recognized the limitations of the CCI and tried to improve it, still using the student as the basis of measurement rather than trying to compare colleges to other colleges (Baird, 1988). Stern added additional scales to the CCI and compared student responses to the total responses within a college environment to identify dissonance. Stern also developed measures focused on culture; however Baird (1988) noted, "Stern does not provide a satisfactory definition of college 'culture' or give a convincing rationale for his analysis, [but] the idea of simultaneously analyzing average individual characteristics and aggregate perceptions of the environment appears to have merit" (p. 7). The notion of measuring the individual versus the aggregate was emulated by many others in the coming years.

Several other environmental assessments were developed to obtain a sense of the environment from a variety of perspectives (Baird, 1988). The College Student Questionnaire (CSQ) was developed to measure student characteristics that were thought to be susceptible to change during the college experience. The CSQ was utilized by many researchers (Clark and Trow, most notably) to study student subgroups over time. An instrument developed for community college environments, the Student Reactions to College (SRC) measured both the educational concerns of students and their satisfaction with the institution's ability to meet their needs (Baird & Hartnett, 1980). This instrument was later adapted to be used at four-year institutions.

The Institutional Functioning Inventory (IFI) asked students, faculty, and administrators to provide feedback on 11 attributes of the environment related largely to culture and vitality of the institution. More related to organizational theory and less person-environment interaction, the Institutional Goals Inventory (IGI) was developed in the mid-1970s. The IGI was focused on identifying the differences between what the members (students, faculty, administrators) of a college or university believe the goals are currently versus what the goals “should be” (Baird, 1988, p. 11). The IGI did not measure the environment directly, but it was an important development in its use of goal measurement for obtaining a sense of what the campus community valued. All of the previously mentioned assessments (CCI, CUES, CSQ, IFI, and IGI) were general measures of the environment as a whole, either at the student or institutional level by varying actors. In the 1970s, Astin and Holland’s position that measuring student attributes would be illustrative of the overall environment was merged with existing environmental assessment techniques.

The Questionnaire on Student and College Characteristics (QSCC), developed by Centra in the early 1970s, focused not only on student perceptions of their institutions, but also asked students to provide information about themselves (Baird, 1988). This allowed institutions to investigate differences in perceptions as they related to the biographic characteristics of the students responding to the survey. In the same period, Warren and Roelfs created the Student Reactions to College questionnaire based upon interviews with students, faculty, and administrators to determine the constructs important to include on the instrument. This instrument contained over 150 items related to points of service on campus, along with biographic questions, and 20 institution-specific questions to determine if students were satisfied with the institution’s ability to meet their needs. Student satisfaction, rather than environment *per se*, was the focus of Betz, Klingensmith, and Menne's College Student Satisfaction Questionnaire, which was developed in 1970 to assess specific areas of student satisfaction.

Richards, Seligman, and Jones modified Astin and Holland's Environmental Assessment Technique (EAT) by measuring courses, faculty, and degrees conferred to portray the campus' balance of Holland's six vocational types (Baird, 1988). Again, the underlying assumption was that measuring the environment by its vocational preferences (a population characteristic) would provide a sense of what the environment values. Unsatisfied with the EAT, Astin spent much of the 1960s finding more ways to hone usage of the EAT with other institutional data. Finally, in the 1970s he abandoned it altogether, deciding measures of student characteristics were inferior to measures of student behavior (Baird, 1988). This led to the development of the Inventory of College Activities (ICA), which measured actual student and faculty behaviors as "stimuli" (Baird, 1988, p. 19) provoking perceptions about the environment and new behaviors. The ICA was a tool with limited use and application based on how it was constructed according to Baird, who advocated for a more directed, specific approach in environmental assessment.

Because the environment is such a large construct, more recent researchers have found success in measuring "subenvironments" (Baird, 1988, p. 21). The practice of measuring subenvironments did not originate in the late 1970s; researchers were already focusing attitudes and perceptions of various groups on campus in the 1950s (Pace & McFee, 1960). As Pace and McFee outlined, researchers had focused on understanding student sub-cultures, faculty culture, organizational culture, and student attitudes before environmental assessment became popular, but they were less focused on measuring it in a quantitative sense. Kuh (1993) suggested the subenvironmental approach is superior, as student culture may be entirely different from faculty culture or institutional culture.

Moos created the University Residential Environment Scales (URES) in the late 1970s to measure residence hall environments, along with the College Experiences Questionnaire (Baird, 1988). The URES was created based on Moos' "three domains of social climate" (Baird, 1988, p. 21), relationships, personal growth, and system maintenance and change. Moos' URES measured students' perceptions of the environment on 10 dimensions, each related to one of the three domains. The URES was tested through many studies, and found to be a relatively valid measure in a variety of residential education settings. The URES was also used to help match students with the best residence hall to meet their needs (Daher, Corazzini, & McKinnon, 1977). The College Experiences Questionnaire was developed by Moos and deployed using groups derived by first administering the URES. The goal of the College Experiences Questionnaire was to determine whether students changed in four areas based upon college attendance, by having participants take the survey at the beginning and end of their freshman year. Moos and others found evidence to support that peer group membership (specifically being a member in a group that valued campus involvement) had a positive impact on student involvement. Baird (1988) noted that this research was a logical extension of Astin and Holland's work supporting the idea that the environment was influenced by the aspirations of its members.

Pace created yet another environmental assessment measure when he created the College Student Experiences Questionnaire (CSEQ) in the 1980s, measuring student behaviors related to 14 areas of college life (Baird, 1988). He sought to learn how students were spending their time looking at in and out of class activities, both academic and social. Given that the environmental assessment techniques described earlier were focused on demographics, perceptions, or behaviors, the CSEQ was not entirely unrelated to previous attempts to measure the environment at the aggregate level using student behavior. By comparing CSEQ results between institutions by type (doctoral, comprehensive, selective and general liberal arts, community colleges, etc.), Baird (1990) was able to report observable differences in academic engagement (characteristics such as library usage and professor interaction, for example) and social engagement (spending time at the student union, making friends with other students) between institution types.

Once the ecological perspective gained in popularity, practitioners were more apt to consider the impact of the college environment on students, which had been linked through years of research by Pace, Stern, Moos, Holland, Astin, and others. More recently, Salter, Junco, and Irvin (2004) described efforts to use the Salter Environment Type Assessment (SETA) to measure the campus environment from the social climate point of view. To create the SETA, Salter (2000) adapted Myers-Briggs Type Indicators (MBTI) to describe campus environments (for example, an extraverted campus "requires attention and participation of the people in it" [p. 745] much like an extraverted person would seek attention and interaction) to create the SETA. Members of the environment were asked to rate the environment based on its demands of participants, and the values members perceive the environment to exude. The SETA measure has enjoyed success in terms of internal consistency and validity support (Salter et al., 2004).

C. S. Banning and Banning (1983), Baird and Hartnett (1980), and Baird (2005) listed several recently-developed or updated instruments used for environmental assessment at the time of publication: ACT Student Opinion Survey by the American College Testing Program; Student Outcomes Information Service (now defunct) by the National Center for Higher Education Management Systems; plus the CEQ, CUES (second edition), IFI, and IGI. Using Banning and Banning's definition, many instruments fit this category of assessment. Examples include the Cooperative Institutional Research Program (CIRP) developed by the Higher Education Research Institute at UCLA, the National Survey of Student Learning (NSSL), the National Survey of Student Engagement (NSSE) from the Center for Postsecondary Research (CPR) at Indiana University, along with a plethora of instruments developed by private firms, such as Noel-Levitz, Inc., Educational Benchmarking, ACT, and the College Board. The CSEQ and NSSE were the most popular instruments for assessing student perceptions (at the time of publication), but these tools have very few items related to the campus environment (Baird, 2005).

Baird (1980a, 1980b, 1988) provided the most salient criticisms of environmental research at the time of publication. First, environments are a vague concept, and perceptions will vary (as one would expect) between perceivers. This is both positive and negative. A student's perception of the environment will vary from that of a university administrator, faculty member, and so on. Membership in a subenvironment will further affect perception, although Baird presented research demonstrating

> Environmental scores for subgroups are seldom different from the scores of the majority. Evans (1983) expressed similar concerns with the focus of assessment; available assessment tools may cast too wide a net to get direct and useful information. Although subgroups may have different college experiences, they seem to describe the total environment in the same way. (p. 26)

Sampling is of the utmost importance. The sample size needs to be sufficiently large to ensure it is representative (Baird, 1980b).

Second, knowledge of the environment will affect the accuracy of perceptions, and assessment efforts are limited to the assessment methods employed in measuring the environment, said Baird. Instrumentation tends to be general and "without precise referents" (Baird, 1988, p. 27). Further, Baird stated,

> Since many of the important aspects of the atmosphere of a college tend to be elusive and can be captured only by items that ask for the respondent's overall impressions, even the most skillfully prepared items will appear vague or ambiguous. (p. 27)

The validity of questions focused on the environment can suffer as a result of this ambiguity, as the items developed may fail to adequately describe the intended element.

With concerns similar to Baird, Astin (1993) described a final challenge to measuring the environment by utilizing the perceptions of its inhabitants; "the student's perception of the college environment can be affected both by what the environment is really like and by how the student has been influenced by that environment" (p. 88). Because environments are shaped by the inhabitants, and the inhabitants are shaped by the environment, it is hard to extricate effects or relationships once a member has joined an environment. Evans (1983) also urged caution when utilizing only student perception data for environmental assessment. However, it is not suggested that researchers abandon measures relying on subjective judgments or perceptions; objective information has its own limitations (Astin, 1993). Baird (1988) noted the danger in using objective information, such as institutional size or endowment, given that they are simply characteristics making up what could be a small amount of the institution's overall identity. Perception data is highly valuable for monitoring the campus, recognizing problems, and evaluating the results or consequences of new policies or campus changes (Baird, 1980a).

In summation, there have historically been two lines of thought in measuring the campus environment as a whole: (a) describe the environment "in accurate terms," or (b) assess "college effects" (Baird, 2005, p. 507). Studies in the first framework were focused on measuring the attitudes, behavior, personality, or vocational preferences of students. Studies guided by the second framework more often employed measures focused on student perceptions of the environment or the self-reported intentions for goal attainment (Baird, 2005). Formal environmental assessment may focus on college aggregate measures (comparing institutions across factors) and/or on subenvironments, or smaller-scale environments, such as residence halls or activity-based groups (such as fraternities and sororities). The limitations to environmental assessment have been due in part to the abstract nature of the environment, but also rooted in the methods of assessment. In the present era, many assessment instruments have been created for the purposes of assessing student opinions and perceptions of the environment, focusing on the academic, social, or campus climate and the services available to students.

The assessments detailed here have focused mainly on measuring the cultural or social atmosphere of the college environment, or on linking objective data (e.g., institutional size, library holdings, number of students) to the campus atmosphere. Whiston (1989) noted the importance of assessing student perceptions of the environment. In a study of student and faculty perceptions of the campus atmosphere, she found that students shared a similar view of the environment, which was greatly different from the views of the faculty at the same institution. Much of the complexity found in assessing the environment, as suggested by Baird (1988), is due to the many ways the environment can be conceptualized, and the sheer volume of measurements that could potentially be taken.

This study focuses on the outdoor physical campus subenvironment with the hopes of measuring it with less vagueness. Although there are numerous suggestions on how to engage in environmental assessment, most are related to forming committees and apply to the whole campus environment rather than the physical campus. Aulepp and Delworth (1978), Banning (1989), Evans (1983), and Kuh (1993) made recommendations for assessment committee development, and the activities that should be included in planning for a whole-campus ecological assessment. The primary guidance taken from the preceding work is: include stakeholders—both content experts, and members of the environment for making an effective assessment.

Schuh (1980) recommended the following process for engaging in environmental assessment: (a) establish the scope of assessment based upon resources and time available, (b) select a method of assessment (telephone, mail, in-person, etc.), and (c) consider standardized instruments, such as the CUES, URES. This study followed Schuh's directive. The scope of the project is delimited to the outdoor physical campus environment. The method selected for the assessment is a survey, delivered electronically. Standardized instruments were not available for this type of assessment, so a survey was developed to measure student perceptions of the physical campus environment.

Summary

The outdoor campus environment is incredibly complex, comprised of organizational, human, and physical elements. The ecological approach considers each actor for its potential in creating stimuli to influence the other actors in concert, which creates a complicated environment for assessment. Campus environments communicate institutional priorities, values, and cues to members and non-members alike. Researchers over several decades have spent countless hours measuring member perceptions of the environment to better understand its social, cultural, and organizational aspects. This study is focused on measuring one subenvironment of the campus environment—the outdoor physical campus environment. "Attractive campuses do not just happen"

(Griffith, 1994, p. 650). The outdoor physical campus environment has been linked to recruitment and retention, and yet is not the subject of formal quantitative assessment.

CHAPTER III

METHODS

Because this study focuses on developing an instrument to obtain student perceptions of the outdoor campus environment on a large scale, a survey is the most appropriate method of obtaining data (Salant & Dillman, 1994). This chapter provides a description of the process used to develop and test an assessment instrument measuring student perceptions of the outdoor physical campus environment. Efforts to determine whether an instrument with this purpose already exists are reviewed. This chapter also includes the process for creating and refining the assessment instrument, fielding the instrument, and analyzing the instrument for reliability and validity. Ultimately this study follows a survey methodology, with a quantitative analysis process to investigate the reliability of the observed results and a largely qualitative component for assessing the validity of the instrument. Several works were consulted in the construction of this study: Creswell (2003); Field (2009); Fowler (2002); Groves et al. (2004); Kachigan (1991); Nardi (2003); Newman, Benz, Weis, and McNeil (1997); Roberts (2004); Salant and Dillman (1994); and Suskie (1996).

Instrument Development

Exploration and Identification of Need

The first step in this study was determining if a suitable instrument existed to measure students' perceptions of the outdoor physical campus environment. This required an exhaustive literature search and consultation with the professional organizations focused on campus planning, specifically the Society for College and

University Planning (SCUP) and the Association of Higher Education Facilities Officers (APPA). Both organizations provided assistance through the provision of documents related to their efforts in assessment. SCUP conducts the Campus Facilities Inventory (CFI) periodically to collect information on interior facility space available (by type, including library, laboratory, and classroom space) at colleges and universities. SCUP does not have an assessment for the outdoor physical campus environment, but expressed interest in such a tool, if it were found to be reliable, valid, and of practical use (P. Grummon, personal communication, October 9, 2008). APPA hosts the Facilities Performance Indicators (FPI) Survey, which is "an annual collection and reporting of data creating a baseline for performance evaluation" for facilities, and is primarily concerned with "operating costs, staffing levels and expenses, building and space costs and usage, and strategic financial measures" for benchmarking (APPA, 2011). APPA also provides consulting services in their Facilities Management Evaluation Program, which provides expert advice on campus improvements to achieve strategic goals.

The researcher also contacted consulting firms working in the realm of student recruitment and student satisfaction (Noel-Levitz, Inc., Educational Benchmarking, Performa Higher Education, and TargetX) and campus architects at three regional public institutions in Ohio. All parties contacted indicated they were unaware of any available tools for the measurement of the outdoor physical campus. Further, several members of the organizations contacted indicated their surprise that tools were not available or under development, because of the importance the outdoor physical campus plays in attracting students to enroll and persist. Many cited anecdotal evidence of a relationship between campus attractiveness and recruiting success. Two architectural writers for the *Chronicle of Higher Education,* Lawrence Biemiller and Scott Carlson, were also contacted. Both indicated that they were unaware of any survey instrument available for the measurement of perceptions of the outdoor physical campus.

Campus Architects and Higher Education Consultant Discussions

To obtain a sense of how active professionals view outdoor physical campus environments along with their importance (and current assessment efforts), the following individuals were consulted: Craig Engel (Senior Vice President of Consulting Services at Noel-Levitz), Carolyn Glime (Vice President and Director of Campus Master Planning) and Dean Rodeheaver (Vice President and Senior Campus Planner) of Performa Higher Education, and Trent Gilbert (Chief Experience Officer) of TargetX. Each professional was contacted for his or her thoughts on the importance of the outdoor physical campus environment, and to confirm that they were not engaged in quantitative assessment efforts focused on measuring the outdoor physical campus environment.

The campus planning consultants provided a wealth of anecdotal evidence for the importance of the physical campus environment. Each firm consulted was in the business of helping campuses understand the value of the physical campus environment—especially TargetX and Performa Higher Education. Performa Higher Education provides consultation for smaller schools focusing on atmosphere assessment, “specifically, the campus welcome, admissions office, guided tour, and supporting environment . . . and its ability to support the recruitment and retention of students” (C. Glime, personal communication, November 4, 2008). Another leading firm in the area of environmental assessment, TargetX, conducts "experience audits" which are focused on the perspective of a prospective student. They strive to see the environment as a new prospect would view the campus for the first time, from the walk in from the parking lot to the admissions office location and lobby, to the path of a campus tour, always looking for clues that may turn the prospect on or off to a particular school (T. Gilbert, personal communication, January 15, 2010). Noel-Levitz, an industry leader in enrollment consulting, provides a wide array of services related to student recruitment, retention, and satisfaction for colleges and universities, and they appreciate the role the campus environment plays in those outcomes (C. Engel, personal communication, October 30, 2008).

Each consultant was asked to talk about how he or she perceives the outdoor campus' role in attracting students. Dean Rodeheaver of Performa Higher Education explained that Performa Higher Education focuses on five areas: (a) the first impression (which may be online, but is often a campus visit), (b) the "welcome experience" the student receives on his or her first visit, (c) the teaching and learning environment, (d) student life opportunities in the residence halls and student gathering spaces, and (e) finding environments in which transformation can occur (personal communication, November 11, 2008). This mission, entrenched in environmental evaluation, is not far from the base functionality of this study, according to Rodeheaver. The outdoor physical campus environment plays a role in all five of the "storylines" Performa Higher Education evaluates. When asked about the utility of creating an assessment instrument for the outdoor physical campus, Rodeheaver said,

> I think it could be useful for any campus . . . to start looking at that question, "Yeah, something's wrong but we're not sure exactly what it is . . . and what are the pieces that stand out?" And it may not tell them exactly what to do about it, but it will tell them "Okay, here's the areas we think we need to have some help with."

A purely-quantitative assessment in an inventory format that can be compared across institutions would neglect the institutional identity piece that Performa Higher Education specializes in, but it could deliver other meaningful information (personal communication, November 11, 2008).

Trent Gilbert of TargetX visits campuses all over the country to evaluate their campus tour experience and overall campus feel. During the full audit process, TargetX looks to provide campuses with suggestions that allow them to showcase themselves better and more uniquely. "While the facilities are important, the facilities aren't the whole enchilada. The facilities are a key player . . . but I've been to campuses that have everything that's brand new . . . but they [can be] most inauthentic, un-genuine campuses" (personal communication, January 15, 2010). In his experience, deferred maintenance is a major detractor to campus cleanliness and a problem he sees consistently. Gilbert noted that during the recent economic crunch, maintenance, housekeeping, and landscaping functions were often given reduced hours, which created a campus-wide struggle to keep spaces clean and well maintained. The value of a campus visit, said Gilbert, is that "you're getting a chance to see firsthand what admissions doesn't want you to see." Any campus can have green grass, but what makes them authentic as an institution? According to Gilbert, the physical campus is critical to enrollment decisions because it inspires notions of what it would like to be there. It helps people envision themselves in the environment, causing the elaboration necessary for decision-making. Upon completing the audit, Gilbert often advises campuses represent their price point. He used a metaphor to explain this: if you're an expensive school, don't use folding chairs. Always make sure spaces are clean, welcoming, and authentic. However, this type of analysis does not necessarily translate to an instrument, said Gilbert—he described the focal points of TargetX's audit as very subjective. TargetX's goal, in part, is making sure colleges and universities have places on campus for students to slow down, engage, and have intellectual conversations; much of that is based on subjective environmental cues.

Craig Engel of Noel-Levitz also believes in the value of the campus visit. Of the visit and outdoor environment, he said, "You are taking something that is abstract, even if you have looked at and read on the web or in viewbooks, and make it less so abstract . . . it makes it more concrete" (personal communication, October 30, 2008). Further, the quality of the outdoor environment matters. Engel mentioned both the level of maintenance of the outdoor environment for overall cleanliness and aesthetics and the presence of construction ("If there's nothing going on on-campus, no building projects, then you kind of wonder how [the institution is] doing financially."). Noel-Levitz is in the business of assessment and consulting, specializing in measurement of student dropout proneness and student satisfaction, and providing marketing, recruitment, and retention consulting services. Engel noted that the Noel-Levitz Student Satisfaction

Inventory (SSI) has a question or two about the physical campus environment for satisfaction purposes, but it is general in nature. The SSI shares a trait with this study in that it asks students to provide a measure of how important an element is, so that the administration will be able to not only view satisfaction, but also to assess how much an element matters to students. Overall, Engel was interested in the prospect of having a quantitative instrument to measure student satisfaction and attributions of importance with the physical campus, and believed it might make evaluation of environments "more of a science."

In summary, each of the consultants contacted were engaged in assisting campuses make themselves more attractive to prospective students and current students. Performa Higher Education and TargetX focus in on the campus environment and its potential for positively impacting the campus visit experience using observations and image judgments. Carolyn Glime of Performa Higher Education stated, "There is not a significant amount of supporting research that indicated that designing spaces in a certain manner improved recruitment and retention." Despite the lack of concrete evidence, all consultants were able to offer anecdotal evidence on the value of a well-maintained, sparkling, and thoughtfully-designed campus environment. The consultants have years of valuable experience working with campuses to help them manage their image and attract the best students possible. However much of their assessment relies upon subjective analysis, given that image consulting is highly individualized and abstract in nature. Literature on environmental assessment certainly supports the difficulty associated with the measurement of campus environments (physical, climatological, organizational, and aggregate). Furthermore, the consulting services offered are not limited to lawn care and seating quotas—Performa Higher Education, TargetX, and Noel-Levitz provide a comprehensive set of services to the institutions they serve. Their recommendations are often paired with market position and publication advice, and often include facilities evaluation as well. To simply measure the outdoor physical campus environment, in their estimation, would be a small part of the whole campus experience, although still quite valuable.

After discussing the outdoor campus environment with the higher education consultants, the researcher met with campus architects at three regional public universities. The following planning professionals (each the most senior member in the planning unit, of varying titles) were contacted: Theodore Curtis (Vice President, Capital Planning & Facilities Management) at the University of Akron, Thomas Euclide (Associate Vice President, Facility Planning & Operations) at Kent State University, and James McArthur (Director/University Architect) at Bowling Green State University. Each architect provided an account of the current funding situation and planning process as it was carried through on his campus. Interestingly, each campus planner saw himself as a problem solver in some respect. The problems the architects are tasked with solving are presented from a variety of stakeholders, and they are charged with determining amenable solutions in the form of design, re-design, or re-apportionment of spaces.

The role of the campus planner is one who leads development, according to Thomas Euclide (personal communication, November 5, 2008). Unlike architects of the past, planners in the current environment are tasked more with spearheading the development of the environment and less with the design of individual buildings or spaces. Theodore Curtis of the University of Akron echoed that sentiment when describing his collaboration with Sasaki and Associates for the redesign of his campus in the early 2000s (personal communication, October 25, 2008). Utilization of planning and design firms frees campus planners to focus on operations; however it can also foster a campus full of disparate building styles and disconnected places (J. McArthur, personal communication, November 17, 2008).

The campus planners interviewed were each tasked with creating a cohesive campus environment with buildings from a number of eras. Located in a metropolitan environment, the University of Akron is striking a balance between the city feel and an insulated, botanic environment is an ongoing battle. For the past several years, they have been working to create a cohesive environment through some of the detail-elements on their buildings and the addition of greenery and outdoor "rooms" on campus (T. Curtis, personal communication, October 25, 2008). Kent State University has renovated buildings and embraced its variety of building styles by connecting the academic landscape with a scenic walkway with embossed concrete emulating brick. This scenic walkway is used for central navigation, described as "more of an event, rather than just a pathway" (T. Euclide, personal communication, November 5, 2008). Bowling Green State University, according to James McArthur, is striving to bring cohesiveness to its eclectic campus environment by maintaining a balance of green spaces and built spaces along with mature trees (personal communication, November 17, 2008).

Each of the three campus planning professionals was managing a large operation with myriad ongoing projects. The projects originate from all areas of the institution; the president or board of trustees, administrative or academic units, or through student needs dictating an immediate solution. They manage multiple projects, establish priorities, and manage schedules and resources constantly. The prioritization of tasks was often based on immediate physical plant concerns or new programs supported by executive administration. When asked about assessment efforts, they all had similar replies—assessment is nice, but there was little time for it. Generally campus architects/planners were aware of other ongoing assessment efforts on campus, usually in the area of student affairs, but they were not involved in spearheading assessment projects within their own units. When provided with the goal of this research, each planner expressed an interest in hearing more. The planners were genuinely curious as to how the outdoor campus environment they spent so much time developing was being perceived by students.

Development of the Survey

Because there were no suitable instruments available for measuring student satisfaction with elements of the outdoor physical campus environment and the perceived importance students attribute to those same elements, this study is focused on the design and field-testing of an instrument that will fill this knowledge gap. The survey was developed using literature on campus planning and development, campus environment research, consultant interviews, expert interviews, and student focus groups and read-alouds (also known as cognitive interviews). The survey's design was generated based on recommendations by Fowler (2002), Groves et al. (2004), Gillham (2000), Nardi (2003), Salant and Dillman (1994), and Suskie (1996). The instrument's validity and reliability were investigated using both qualitative and quantitative tools.

Contents

The instrument contained measures focused on elements identified in the literature on campus planning design, and ecology, along with items identified by campus architects and higher education consultants contacted for this study. The individual items developed for the instrument were written with the intent of meeting Groves et al.'s (2004) three standards for survey question evaluation:

1) Content standards (e.g., are the questions asking the right things?)

2) Cognitive standards (e.g., do respondents understand the questions consistently; do they have the information required to answer them; are they willing and able to formulate answers to the questions?)

3) Usability standards (e.g., can respondents and interviewers, if they are used, complete the questionnaire easily and as they were intended to?). (p. 241)

Groves et al. (2004) suggested employing a variety of tactics to determine the success of the item development phase: expert interviews, focus groups, read-alouds (cognitive interviews), and field pre-tests. The Outdoor Physical Campus Assessment contains several sections; its contents are briefly detailed in the following paragraphs. To view a copy of the instrument, see Appendix D.

The biographic items included in the Outdoor Physical Campus Assessment provide campus architects the opportunity to determine if there are group-based differences (gender, age, class or attendance-status, GPA, distance from home, etc.) in subsequent analysis following this research. After the biographic questions, a small number of campus-based behavior questions were included, asking respondents to indicate if they visited the campus prior to enrolling, how many hours a week they spend on campus, how they get around campus, and if the campus was their first, second, or third choice to attend. To determine the specific elements participants associate with an attractive campus, respondents were asked to select elements from a list (as many as they agree with) that contribute to an attractive campus environment. These questions are outside of the scope of the present study, but will be analyzed in subsequent research.

The next portion of the instrument asked the participants to indicate their level of satisfaction with element-based prompts. This portion of the instrument is split into four sections—one devoted to determining the importance a student attributes to the elements of the outdoor campus environment and three devoted to their level of satisfaction with those elements. The satisfaction questions are split in three ways (three sections): satisfaction with the attractiveness of elements, satisfaction with the amount of elements, and satisfaction with the functionality of elements. Accessibility, overall aesthetics, art (sculpture, statues), building style, campus cleanliness, entranceways, formal meeting space (outdoor plazas, amphitheaters), informal meeting space (benches and picnic areas), fountains and water features, green space, landscaping and trees, layout of the campus, lighting, maintenance, seating, signage, trash, recycling, and cigarette disposal receptacles, and walkways were considered by participants in terms of both satisfaction and importance.

During focus group analysis (discussed later), participants indicated a sense of discomfort with providing indications of satisfaction regarding the *amount* of an element. Although they understood the goal was to understand their level of satisfaction with the amount of a given element, they were concerned that satisfaction judgments painted an incomplete picture of their perceptions. Instead, they suggested, why not ask questions about if there is too much or too little of something? Initially, the researcher wanted to balance the survey with consistent question types—but this feedback was too important to disregard. As a compromise for the field test, an additional bank of questions was added; the same element prompts were employed, but instead of asking about satisfaction, the participants were asked to indicate if the campus had too much or too little (on a 5-point scale) of a given element. This allowed the participants to signal both their satisfaction (on the original question) and their specific opinion of the amount of an element.

After participants were asked about physical elements of the outdoor campus, the next section of the survey contained questions related to how familiar a participant was with his or her current college campus. In addition, participants were also asked whether or not they agreed with outcome-related prompts, asking them about their first impression of campus, the legibility of the campus environment, whether the campus has a sense of mystery and personality, whether the campus meets their needs, and if they feel safe and comfortable on campus. These items were developed based on items identified in campus environments literature and through discussions with enrollment management consultants, but are not considered to be of primary importance for the current study.

The remaining section of the survey contained additional and largely optional biographic questions to be used for future research. Approximate distance from home, home population density, and general academic information were requested in this section. Following these questions, six of the eight participating institutions had an additional set of campus-specific questions. As a gesture of appreciation to the participating campuses, the researcher offered to add a section of questions that were on specific areas of interest of each individual participating institution. These campus-specific questions were not analyzed for the purposes of this study, but the results were provided to the campus architects at each institution. Most of the questions focused on on-campus biking programs or bike path availability. Others focused on campus community business development, on-campus athletics attendance, and safety.

Physical Campus Elements: Questionnaire Elements

The items listed below are the focus of the survey instrument developed to measure student perceptions of the outdoor physical campus environment. Each element was selected because it was represented in the literature on outdoor campus environments or was a recurring theme in discussions with campus architects or consultants. These elements range from conceptual (aesthetics, building style cohesiveness, cleanliness, and maintenance) to concrete (landscaping, trees, formal meeting space, etc.) to abstract (legibility, mystery, sense of place) in nature.

Aesthetics: This concept refers to the overall visual appeal of the outdoor campus landscape. Aesthetics were mentioned anecdotally by all higher education consultants and campus planners, and discussed in the research as a subjective ideal (T. Curtis, personal communication, October 25, 2008; C. Engel, personal communication, October 30, 2008; T. Euclide, personal communication, November 5, 2008; Gaines, 1991; T. Gilbert, personal communication, January 15, 2010; Halsband, 2006; J. McArthur, personal communication, November 17, 2008; D. Rodeheaver, personal communication, November 7, 2008; Sensbach, 1991; Turner, 1984; Van Yahres & Knight, 1995). Operationally, this is referred to as *attractiveness*.

Building style cohesiveness: Dober (1992) described three types of styles for campus design: (a) monoform (one unifying style per full campus or sector of campus, such as Collegiate Gothic, or Georgian), (b) metamorphic (disparate styles united by one or more unifying characteristic), and (c) mosaic (no unifying characteristics) as options for campus design. Although there is no correct style, it is an area of focus in architectural writing and a source of curiosity for campus planners (Biemiller, 2008; Greenburg, 2007; Elfland, Kanter, Kenney, & Kroloff, 2006; Petroski, 2006; Sensbach, 1991; Zimring, 1982).

Cleanliness: Overall campus cleanliness has been discussed by several consultants as crucial to forming positive impressions of the campus environment (C. Engel, personal communication, October 30, 2008; T. Gilbert, personal communication, January 15, 2010; T. Curtis, personal communication, October 25, 2008). This refers to the lack of debris or other foreign materials in campus spaces. Furthermore, clean and well-maintained spaces (see next element as well) discourage vandalism and encourage people to spend time in an environment (Waite, 2010).

Maintenance: The condition of outdoor campus spaces was a concern to the campus planners and consultants. Dober (1992) lamented the condition of physical plant assets; however he did not speak as specifically to maintenance of walkways or flower beds. Waite (2010) cited maintenance as a fundamental source of cues in the environment, signaling institutional priorities and a sense of welcome to visitors. Campus planners, often in charge of the physical plant maintenance themselves, exhibit a great deal of interest in student perceptions of the upkeep of the outdoor physical environment (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; T. Gilbert, personal communication, January 15, 2010).

Green Space: Provision of adequate and attractive green space is critical to forming perceptions of campus venerability, according to Gaines (1991). Dober (1992) valued green space for its ability to provide dimension on campus. Griffith (1994) referred to green space as open space, and extolled the virtue of providing this space to prevent the campus environment from becoming too densely populated. Campus planners viewed open or green space as fertile ground for interaction of both an academic and recreational nature (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; J. McArthur, personal communication, November 17, 2008).

Trees: Trees are an often-mentioned element of the campus landscape (Dober, 1992; Gaines, 1991; Turner, 1984). Although not all campuses will have trees on par with the Auburn University Live Oaks, they are an important and ubiquitous component of the campus landscape.

Landscaping (flowers and shrubs): Considered decorative elements by Dober (1992) and Gaines (1991), they are an important part of a campus landscape master plan and help make an environment more visually impressive (Waite, 2010).

Statues and artwork: Cited by both Dober (1992) and Gaines (1991), inclusion of artwork on campus helps to impart a sense of place and an artistic identity. It is often present on campuses with highly-successful designs. Dober listed "statues, archways, sundials, carillons" (p. 201) as examples, along with manipulation of the ground as sculpture.

Water features or fountains: Dober (1992) mentioned the value of water features as an aesthetic showpiece. They have both artistic and noise-control value, along with serving as a campus landmark. Strange and Banning (2000), citing Ulrich (1983), mentioned campuses that have water features are more visually appealing.

Formal meeting spaces: Providing formal outdoor space for interaction is an important component to campus design (Dober, 1992; Gaines, 1991; Turner, 1984). This type of space includes the outdoor portion of a student center plaza, transportation hub, outdoor amphitheaters, or campus commons. Improving the designs of these areas will encourage greater utilization of this type of space (Amsden, 2005).

Informal meeting spaces: Different from formal meeting spaces, informal meeting spaces include seating walls, picnic tables, overhangs, small greens, or other spaces not specifically built for masses to gather. Although Dober (1992) did not suggest the separation of formal from informal meeting spaces, upon consultation with campus planners (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; J. McArthur, personal communication, November 17, 2008), the construct of 'meeting space' was split to provide more accurate feedback.

Seating: Quality and availability of outdoor seating space (within a formal, informal, or other environment) was listed as important for placemarking (Dober, 1992). Further, having available seating encourages students to socialize more freely (Strange & Banning, 2000).

Layout: Turner (1994), Gaines (1991), Strange and Banning (2000), and Dober (1992) all listed the organization of the campus environment as an important area of focus. This could be accomplished by grouping all academic buildings together, all residential areas together, and all recreation facilities together—or intertwining the zones completely. Interestingly, this would be one of the hardest things to change should students find it dissatisfactory.

Wayfinding: Consisting of signage clarity, frequency, and legibility, wayfinding is a crucial component of the outdoor environment, especially to new members of the environment (Dober, 1992; Strange & Banning, 2000; Zimring, 1982). Each of the campus architects consulted felt assessment of the signage and information kiosks available was critical for understanding student perceptions of the outdoor environment.

Trash: Adequacy and placement of trash receptacles was mentioned in a cursory way by Dober (1992). Having a satisfactory number of attractive and well-placed trash receptacles encourages participants to keep the campus environment free of debris, which in turn makes it more attractive for the members of the environment (T. Gilbert, personal communication, January 15, 2010).

Recycling: The availability and adequacy of recycling receptacles was mentioned during discussions with the campus architects when presented with the trash receptacles construct (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; J. McArthur, personal communication, November 17, 2008). Students are increasingly aware of sustainability options, and this construct was added as a direct result of conversations with the campus architects.

Lighting: The attractiveness and amount of outdoor campus lighting was mentioned as both a design detail and a design element by Dober (1992). Campus lighting helps with both the marking of a place and also with the safety of the environment.

Cigarette Disposal: Availability and attractiveness of cigarette disposal options were mentioned during discussions with the campus architects (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008). Recent changes to non-smoking rules in Ohio allowed the universities in this study to require smokers to stand a university-specified distance from doors and windows, but many had not moved the cigarette disposal receptacles to accommodate this law. The campus architects were interested in ascertaining the opinions students held about the cigarette disposal containers on campus.

Campus entrances: The gateways to campus can impart a sense of welcome (Strange & Banning, 2000) and serve as an important demarcation from the surrounding environment. Dober (1992) listed these as an important component to placemarking.

Walkways: Circulation is an important part of campus design (Dober, 1992; Zimring, 1982). Safety and stability of walkways, along with placement, can be critical for effective circulation on campus. Dober mentioned that paths need to be wide, need to be accessible, need to be away from vehicular traffic, and need to host bike traffic in a marked fashion. Campus planners consulted for this research also expressed a high degree of interest in determining how the walkways on campus were perceived by students (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; J. McArthur, personal communication, November 17, 2008).

Parking: Given limited attention by Dober (1992), parking availability was an issue raised by several campus architects. A selection of the architects expressed interest in student perceptions of parking while also acknowledging that the responses would not be pleasant to read. Dober advised campus planners to push parking to the edges and require members to walk the majority of campus, so long as they can traverse the campus in approximately 10 minutes. However it is generally understood by the campus planners that students want plentiful and convenient parking. Items on parking availability and placement were added to the instrument at the request of several campus planners (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; J. McArthur, personal communication, November 17, 2008).

Accessibility: Although this was not specifically addressed by Dober (1992), accessibility is an important area of focus for the outdoor physical campus. Campus planners consulted for this research were very interested in the level of satisfaction students had with the accessibility of the outdoor physical campus (T. Curtis, personal communication, October 25, 2008; T. Euclide, personal communication, November 5, 2008; J. McArthur, personal communication, November 17, 2008). Campus accessibility provides important cues to visiting students and community members (Waite, 2010), and has implications for establishing an inclusive environment (Strange & Banning, 2000).

Legibility: This is an abstract concept cited by Strange and Banning (2000) originating with Kaplan and Kaplan (1978). Legibility refers to the ability of a new member to scan the environment, and be able to perceive (from past experiences) how to navigate the environment. Legibility is not entirely unrelated to wayfinding, but it is a distinct concept.

Mystery: A second abstract concept originating with Kaplan and Kaplan (1978) cited by Strange and Banning (2000) refers to the environment's ability to raise curiosity in a new onlooker. Campuses with mystery have participants that want to find out what else is contained in the campus environment.

Personality: Gaines (1991) described campus efforts to develop a personality or clear identity as critical for recruitment and the development of a dedicated alumni base. Greenburg (2007) lamented the loss of symbolic and interesting architecture. Dober's (1992) entire work is about helping campuses consider their environment as a canvas for placemarking—establishing a sense of identity. Although this is a terribly difficult concept to pick apart, it is an important and often-cited construct by private consultants (C. Engle, personal communication, October 30, 2008; T. Gilbert, personal communication, January 15, 2010; D. Rodeheaver, personal communication, November 7, 2008).

Response Style

For a majority of the biographic items, static-response questions were used. Respondents provided feedback in the form of drop-down answer selections, or by check-box type answer selections. Suskie (1996) suggested using a variety of question formats to prevent respondents from becoming bored, but not so many that the survey becomes difficult to complete. Likert scale responses were utilized to maximize consistency and ease of administration for the satisfaction and perceived-importance items. The sections devoted to satisfaction were scaled with seven possible responses: *very satisfied*, *satisfied*, *somewhat satisfied*, *neutral*, *somewhat dissatisfied*, *dissatisfied*, and *very dissatisfied*. These responses were used for questions such as "Please indicate your level of satisfaction with the attractiveness of campus landscaping," "Please indicate your level of satisfaction with the amount of trees on campus," and "Please indicate your level of satisfaction with the safety and stability of walkways." The neutral category was included in the satisfaction measures because it is accepted that students may not have a clear sense of whether they are satisfied with a given element, as they may not have spent time consciously considering the outdoor campus environment. To view a copy of the instrument, see Appendix D.

Given that all elements of the physical campus environment were present on the campuses included in this study, there was no need to provide a *not applicable* response option. Importance questions were scaled with a similar seven-point response scale: *very important*, *important*, *somewhat important*, *neutral*, *somewhat unimportant*, *unimportant*, and *very unimportant*. The responses were used for questions such as “Please indicate how important the presence of campus landscaping (flowers and shrub gardens) is to you.” For the newly-added modified amount question bank, the responses were scaled in five points: *much more*, *more*, *no change is necessary*, *less*, *much less*. The questions in this section (referred to as *directional amount*) were analyzed for reliability only, as they were not part of the four primary sections of interest for this research.

The attitude questions at the end of the instrument were in a Likert scale format with seven available responses: *strongly agree*, *agree*, *somewhat agree*, *neither agree nor disagree*, *somewhat disagree*, *disagree*, and *strongly disagree*. Fowler (2002) argued for an avoidance of the agree-disagree question format (p. 95). His argument against utilizing the agree-disagree format is based more in the questions than the ambiguity of the answers. This is especially true if the prompt is asking the respondent to react to more than one phenomenon. Each of the agree-disagree questions was worded carefully to avoid unintended bias, with the hopes of mitigating Fowler’s concerns.

Format

To elicit information on specific constructs, a questionnaire method was selected. Given that the point of this research was to gather an inventory of student perceptions of the environment, the questionnaire format was most reasonable both for the number of participants and the amount of surface-level information desired. Participants were asked to respond to an online survey of structured questions. The questions were written using Fowler (2002), Gillham (2000), Salant and Dillman (1994), and Suskie (1996) for specific guidance on clarity, structure, bias, and style. Care was taken to avoid questions with multiple parts, negative wording, or ambiguous concepts wherever possible.

The instrument was created within the SurveyMonkey™ survey tool and was delivered completely online with responses tracked within SurveyMonkey's™ interface. The email inviting participants to join the study indicated that the research was focused on the outdoor campus environment at public universities in Ohio and that they were randomly selected to participate as a member of their current institution. Invited participants were able to choose to participate by opening the unique link in the email they received soliciting their participation. Participants were also instructed they were eligible to opt-out of any future communication regarding this study by clicking on a link at the end of the message. Follow-up emails (up to two messages to non-responders) were generated using the SurveyMonkey™ email tool for a majority of participating institutions. The first reminder was sent to individuals who had not clicked the survey participation link on the seventh day of the survey window. A second (final) reminder was sent to individuals who had not clicked the survey link after 27 days. Participants were given 30 days in which to respond to the request for participation. At the conclusion of the survey, the link was closed.

Measurement Error

A common concern in survey development is measurement error. Measurement error refers to the inaccuracy in collected responses due to random or systematic sources (Trochim, 2006). Measurement error is "derivations from answers given to a survey question and the underlying attribute being measured" (Groves et al., 2004, p. 40). In essence, this error is the difference between the response and the true value. Random sources include the individual respondent's mood, his or her level of attentiveness, or any number of factors that could impact the participant as he or she completes the survey (Trochim, 2006). Systematic error, on the other hand, is inaccuracy generally rooted in the method of deployment problems (such as a noisy test environment) or the actual survey items (clarity, response style). Trochim also referred to systematic error as *bias.* The researcher used student focus groups, cognitive interviews, and interviews with campus architects in an attempt to prevent or reduce systematic measurement error as suggested by Trochim. Reliability analysis was used to determine the variability in the data attributable to random error. These techniques are detailed in Chapter 4 during the discussion of validity and reliability.

Refinement of the Survey

To properly refine the survey, prior to the full-scale field test, two processes were used to substantiate and increase the validity of data collected by the instrument and reliability of the results. The first attempt to refine the survey relied upon the expertise of four campus architect consultants who agreed to review this research. After this review, the instrument was adjusted based on the usable feedback regarding the survey's contents and wording. The second level of review for instrument refinement relied upon the assistance of student employees at two regional public universities in Ohio. The feedback from the students was again used to refine and improve the survey instrument.

Campus Architects at four institutions were asked to perform an in-depth review of the assessment instrument. The participating architects/planners were: Theodore Curtis (Vice President, Capital Planning & Facilities Management) at the University of Akron, Thomas Euclide (Associate Vice President, Facility Planning & Operations) at Kent State University, Richard Planisek (Director of Facilities Planning & Space Management) at Ohio University, and James McArthur (Director/University Architect) at Bowling Green State University. There were two goals for this review: first, increase the validity of the survey, and second, make sure the instrument is useful to campus architects and planners.

The architects were asked if they felt that the instrument was adequately measuring the major elements of the outdoor physical campus based upon their experience in design, planning, and practice. The language in the questionnaire may not in every case resemble the jargon used by architects; this review was aimed at ensuring the instrument had not deviated so far as to sacrifice the intent of the questions. The architects were also given the opportunity to discuss additional subjects or elements they would like to see included, along with concerns over the sample and timeframe of deployment.

Excellent instrument feedback was obtained through consulting with the campus architects. Each had positive impressions of the instrument, with valid concerns and suggestions for improving clarity. Thomas Euclide of Kent State University suggested including a focus on feelings of safety and comfort on campus, which were logical and positive extensions on existing themes from the existing literature. Theodore Curtis of the University of Akron suggested adding safety and maintenance questions in addition to the ones already in existence. Both argued these points in light of the current state of their efforts, and the concerns they have in obtaining a sense of whether student needs are being met. Several alterations to the survey were made as a direct consequence of the exceptional feedback obtained by the campus architects.

The second level of review, again focused on increasing validity and overall survey quality for reliability, was conducted between April and May of 2011. A focus group test was conducted using a group of participants from Kent State University to provide feedback on the clarity of the survey instructions and item wording, and to identify constructs that were ill-conceived or explained poorly. This focus group included elements of a technique known as cognitive interviewing (Groves et al., 2004), which allowed the participants to talk through the instrument together, question by question. Generally, focus groups are charged with analyzing the questions and constructs rather than the answers, but for this review all portions of the survey were discussed. Participants were given the sample selection procedures, the method of delivery, and instructions, and then asked to talk through all questions and answers to ensure the questions were clear and the responses provided were adequate in covering the range of possible answers.

Nine undergraduate resident assistants (students who live in the residence halls on campus providing assistance and oversight of the student residents) participated in the focus group. As student employees, the participants were drawn roughly from the same population as the full-scale field testing group, degree-seeking students. The students for the focus groups were colleagues with a close working relationship, which established a very collaborative atmosphere. The students appeared to be competing to find new and interesting ways the instrument could be understood, much to the entertainment of the researcher. While completing the instrument, the participants were asked to provide a narrative about what they believe each question was asking them in specific terms. This allowed the researcher to determine if the students perceived the questions to be asking about the same elements the researcher intended when writing the questions.

In most cases, the wording was deemed relatively clear, although changes were made based on the feedback. The individuals in the field test group were also asked if the instrument was comprehensive, if it contained redundant items, and if the survey was excessive in length. The focus group participants indicated they felt that the sections (importance and satisfaction-based prompts) were successful in eliciting feedback on the overall outdoor campus environment as they perceived it to be in a total sense. Modifications to the wording of survey questions, the order of the questions, and the static answer options were made as a result of this focus group session.

Once modifications were made to the instrument, the researcher conducted individual cognitive interviews with students from another regional public university. Initially, these interviews were to be conducted in the format of focus groups (similar to the previous group), but scheduling conflicts prevented this from occurring as planned. Two students consented to review the instrument in a cognitive interview format. One student was an undergraduate student assistant and the other was a graduate assistant, both employed by the Office of Admissions. Although the instrument was much improved from the earlier focus group comments and modifications, the two interviews yielded additional benefit. Overall, both groups of students indicated that the survey questions were easy to understand and the answers covered the range of responses they wished to make. Further, although the survey was very long, they could not identify any part that, if eliminated, would improve the survey without significantly decreasing its ability to cover the subject adequately.

Prior to deployment of the survey for the large-scale field test, a very small and highly un-scientific test was conducted in September 2011. The researcher solicited participants among acquaintances for a small pilot test to ensure the survey was in proper working condition and to check the data format of responses through the SurveyMonkey™ tool. The volunteers for the small pilot test included participants with a range of education levels (high-school through doctorate), ages (early 20s through mid-60s), and experience levels with the college environment. Feedback received through this final test led to the addition of items, modification of items, and deletion of items. It also confirmed the functionality of the survey and provided an average time required for the completion of the items.

Participants and Sampling Procedures

The institutions included in this study were large, regional public universities in the state of Ohio with similar Carnegie Classifications (*Research University* with *high research activity* or *very high research activity*). The Fall 2010 total enrollment at main campus locations ranged between 16,884 and 55,014 at the participating institutions, and the estimated cost of attendance for in-state students living on campus was substantially similar, between $21,827 and $29,082. The selected institutions varied in selectivity; this study included institutions with nearly open admission policies along with institutions that admitted as few as 62% of applicants. The admissions yield of the selected institutions ranged between 27% and 40% (when reported). The actual first-year retention rates were comparable (71-90%) among the institutions, although the institutions with more selective admissions processes tended to have higher retention rates. The six-year bachelor's degree graduation rates of the selected institutions varied widely, between 37% and 81% (IPEDS Data Center, 2011).

The sample for the field test consisted of undergraduate and graduate students at eight institutions (alias names given): Prarie Creek State University, Ecola State University, Boardman University, Heceta State University, Redwood University, the University of Rockaway, the University of Tillamook, and the University of Yaquina. To be included in the sample, a student was required to have: (a) current enrollment at their home institution for the fall 2011 term, (b) degree-seeking status (graduate or undergraduate), (c) attained the age of 18 or older, (d) an email address on file with the registrar's office, and (e) not opted out of listing in the student directory (via FERPA records suppression request). The sample included students who resided on and off campus, had full-time or part-time attendance, and had a range of class standings, GPAs, and majors.

Upon consultation with several institutional research professionals, the number of student names and email addresses requested was 1,000 per institution. Survey response rates for student surveys are notoriously low, though none of the individuals consulted would estimate what the researcher should expect. One article cited 20% as "decent" although this was mentioned in contrast to surveys administered 20 years ago, where a 70% response rate was not uncommon (Lipka, 2011). Survey response rates may vary for several reasons: Survey length, layout, subject, when the survey is deployed, and format (paper, online, phone, in-person) can have an impact (Fowler, 2002; Gillham, 2000; Suskie, 1996). Gillham (2000) put the rate of response for impersonal surveys (ones given by a person the participant does not know personally) at 30%, although that number is not specific to student populations.

In a study of student survey response rates, Porter and Umbach (2006) reported response rates on the National Survey of Student Engagement (NSSE) ranging between 14 and 70%; by 2011, the same survey reported response rates between 92 and 4% (Lipka, 2011). According to Lipka, response rates lower than 30% were observed at over one third of institutions using the NSSE. High-ability students were more likely to respond to the NSSE than low-ability students, and minority students were less likely to respond than majority students (Porter & Umbach, 2006). Web administration also negatively impacted response rates, although that was thought to vary based on the number of computers available on campus. Interest in the subject matter was also listed as a potential reason for non-response.

The request for student names and email addresses was sent to the appropriate office at each institution between April and September 2011. The letter requested a random sample of approximately 1,000 students from the entire student body that met the requirements for inclusion. At most institutions, this was the Office of Legal Counsel, although at others it was the university registrar's office or the institutional research office. The process for requesting the data varied by institution and in some cases resulted in a denial of request for one of two reasons: (a) they do not share this information with outside constituents, or (b) they do not share this data at all. Two institutions opted to send the survey on my behalf so that they could be included in the study without sharing student names or email addresses.

The requested data were obtained using student data systems and provided for use in this study in a spreadsheet or similar-format file. Respondents were selected randomly from the sampling frame by institutional research, records and registration, or office of legal counsel personnel at each participating institution. One institution opted to send the entire data set so the researcher could perform the random selection on their behalf. Once the student records were obtained, they were imported into the SurveyMonkey™ tool. Invitations to participate were sent to every student included in the sample provided by institutional research personnel. Several students included in the sample had opted-out of SurveyMonkey™ email invitations in the past, so they were excluded from the sample at the point their email addresses were uploaded.

Research Questions

The following research questions were addressed:

Research Question 1: Is the Outdoor Physical Campus Assessment tool a valid measure for assessing student perceptions of (a) satisfaction with, and (b) the importance of elements of the physical campus environment?

Research Question 2: Did the Outdoor Physical Campus Assessment collect reliable data during the field test administration?

Research Question 3: Within the Outdoor Physical Campus Assessment, are the importance and satisfaction (attractiveness, amount, and functionality) items collecting internally consistent data?

Data Collection Procedures

Data collection took place between September and November 2011 at each institution. The participation invitation email was sent to students approximately 30 days after the first day of classes for the Fall 2011 term, which varied by institution. This held true at seven of the eight institutions; one late addition received their survey 60 days after the beginning of the term. Respondents were instructed through the email that the survey tool does not store personal information—only their demographic data, major, and selected attributes covered by the instrument. Respondents were asked to complete the survey within 30 days.

Given that the survey was administered online, responses were stored in electronic format. The SurveyMonkey™ tool stores the data in a largely SPSS-ready format, with responses stored as text or in a numbered format for Likert-scaled items (satisfaction, importance, agreement measures). Because the SurveyMonkey™ tool allows the creation of surveys with truly static responses and required questions, missing or nonconforming data were avoided by utilizing both of these features. All participants were provided the same survey, and nearly all items were worded positively, reducing the need to rescale questions prior to analysis. After the data collection window ended, the results were downloaded from SurveyMonkey™ to be analyzed using SPSS 19.0.

Incomplete survey responses were included in the data set to the extent that they answered the questions under consideration by the research questions. It was assumed that the response rate would be an issue for this study, as students often cite feeling over-surveyed and regularly ignore survey requests (This, 2011). Generally, it is assumed that to avoid nonresponse error, a survey should have a 60% response rate (Salant & Dillman, 1994). The response rate for this survey was approximately 21% which is far below the standard. It is possible that many of the selected students did not even open the email due to inbox spam filters (Lipka, 2011). SurveyMonkey™ does not allow for the tracking of which respondents opened the email before deleting it. However, of the 1,710 individuals who chose to open the survey, 88.7% completed the instrument while a full 89% completed the portions that are the focus of this study.

Once the data collection period closed, the responses were compiled in a single dataset, with the institution of attendance as a new variable. This allowed for analyzing the data set as a whole. Extensive recoding occurred for the myriad seven-point Likert-scaled items, with the positive responses being coded as the higher side of the scale. The responses of *very important*, *strongly agree*, or *very satisfied* were re-coded with the value of 7, while the other end of the scale, *very unimportant*, *strongly disagree*, and *very dissatisfied*, were re-coded with the value of 1. The value 4 represented *neutral* for the satisfaction and importance scales, and *neither agree nor disagree* in the agree/disagree type questions. One agree/disagree item was reversed to orient the responses on the same positive scale as the other questions.

To allow for investigation of inter-correlation within the sections (importance, attractiveness, amount, and functionality), new variables were computed using the individual responses to each section. All questions on importance were summed in a new composite variable known as "Total Importance." The same procedure was calculated to create "Total Attractiveness," "Total Amount," and "Total Functionality" scores. These new, continuous variables also provide basic information about the overall perceptions of a campus environment on a macro level (Trochim, 2006).

Validation Procedures

In 1999, a new set of validity standards were adopted in part to encourage researchers to think of validity as a unified concept (Gliner et al., 2009). This study focused on providing evidence for the first three standards: content, response processes, and internal structures. Evidence related to the content standard included a comprehensive literature review, creating definitions for elements, and asking experts to review the instrument to determine its coverage of the outdoor physical campus. To provide evidence based on response process, the researcher relied upon expert reviews to determine if the items matched their impression of the element (translating it from their expert-based view to the less-esoteric measure for students). Further, the researcher employed focus groups and cognitive interviews to investigate the available responses and overall clarity of the items.

As previously mentioned, two methods were employed for the investigation of internal structures validity. First, principal components analysis was utilized to explore underlying relationships among the individual items in the four primary sections of the instrument as directed by Field (2009). Direct oblimin rotation was selected because the researcher anticipated that the final factors would be related based upon campus ecology literature. In addition, item-total correlation was employed as suggested by Gliner et al. (2009), citing Cohen (1988). Individual items were compared with a composite measure using a correlation coefficient. Correlations greater than $r = .5$ were considered to be evidence of a strong relationship between the individual item and the composite scale item as suggested by Gliner et al.

This instrument was validated primarily by consultation with campus architects at four regional public universities and students at two regional public universities. The feedback provided by consulting campus architects helped to refine the biographic and element-based questions and confirmed the importance of the included measures. Additional measures were added based upon the campus architect feedback received. Student feedback was solicited to ensure the constructs were understood as intended by the researcher. Participants in both the focus groups and the cognitive interviews were asked to tell the researcher what they believed each question was asking, and to talk through prompts that were unclear or repetitive so that they could be improved. This feedback was instrumental in assisting the researcher to ensure the measures were obtaining valid information from the participants. Because instrument validity is a research question, the actual consideration of validity is discussed the final chapters.

Statistical Treatment/Data Analysis

The analysis of the instrument's questions included inspection for validity, reliability assessment, and descriptive analysis. Evidence for content and response processes were inspected prior to the formal launch of the survey, and were based largely upon the feedback of campus architecture and planning professionals and students at two of the institutions included in the study. Further analysis was conducted to inspect validity, which is discussed in the next chapter. Although it does not prove validity, reliability analysis is also presented; Thompson (2003) noted, "Score reliability clearly is a *necessary but not sufficient* condition for score validity" (p. 6).

Measures of reliability are focused on measuring the reliability of the results obtained from an instrument, not the instrument itself (Thompson, 2003). Although there are several methods by which reliability could be assessed for this instrument, Cronbach's alpha was selected as a measure of internal consistency. This decision was made considering two methodological choices as suggested by Gliner et al. (2009): (a) there was only one item per element and question type (which would rule out split-half reliability) and (b) the questions were scaled in Likert format (which prevented use of the Kuder-Richardson method). Other assessment methods for reliability (test-retest, parallel forms, and inter-rater methods) were also deemed inappropriate due to the survey deployment style and method.

Reliability analysis was conducted to determine whether the survey instrument succeeded in eliciting consistent and repeatable responses from the participants as a whole. The instrument was assessed for reliability using Cronbach's alpha, the most commonly utilized measure of internal consistency in education research (Gliner et al., 2009). Typically, this coefficient of reliability is used when a researcher wants to assess the overall reliability of the scores obtained using an instrument by investigating their internal consistency. The statistic may be used to make assertions of overall reliability, but is stronger when calculated on one construct at a time (Thompson, 2003). Following this advice, the measures related to attractiveness, amount, functionality, and importance of outdoor campus elements were further analyzed in individual groups for internal consistency, as suggested by Gliner et al.

Thompson (2003) warned that the participants themselves are a factor in the reliability of the scores obtained using an instrument; the homogeneity or heterogeneity of the group on a variety of characteristics will affect coefficients of reliability. Because of this, he advised all researchers employing measurement instruments to calculate reliability coefficients—even if the instrument has been assessed in previous studies—as the current participants may yield an unexpected result. For this study, the reliability of scores obtained are presented both in the aggregate and by individual institution to allow for investigation of the reliability of scores by campus.

Cronbach's alpha values generally range between 0 and 1, although negative results are possible (George & Mallery, 2003; Gliem & Gliem, 2003; Thompson, 2003). Gliner et al. (2009) explained that reliability coefficients greater than .70 are considered to be sufficient, and coefficient alpha above .90 “probably means that the items are somewhat repetitious or that there may be more items in the scale than are really necessary for a reliable measure of the concept for research purposes” (p. 220). This statement is generally supported throughout the literature on reliability analysis; however George and Mallery (2003) viewed coefficient alpha values above .90 as “excellent” (p. 231).

Methods Related to Research Question 1

Is the Outdoor Physical Campus Assessment tool a valid measure for assessing student perceptions of (a) satisfaction with, and (b) the importance of elements of the physical campus environment? To substantiate the validity of the scores obtained using this instrument, the techniques utilized to provide evidence based on content and response processes will be reviewed. To demonstrate evidence of validity related to internal structures, principal components analysis and item-total correlation were used to demonstrate there are relationships between individual and grouped measures on the Outdoor Physical Campus Assessment as suggested by Field (2009), Gliner et al. (2009), Groves et al. (2004), and Pedhazur and Schmelkin (1991).

Methods Related to Research Question 2

Did the Outdoor Physical Campus Assessment collect reliable data during the field test administration? Cronbach’s alpha was employed to determine if individual measures of satisfaction and agreement were answered reliably by respondents, both in the aggregate and separated by institution of attendance. Questions found to be of suspect reliability were excluded from analysis based on the *item-total correlation* listed per item and the *Cronbach's alpha if item deleted* calculation as suggested by Gliner et al. (2009). The scores obtained using this instrument were judged to be internally consistent if the coefficient alpha is .70 or greater. All measures except for the biographic/demographic, familiarity with campus, and check-all-that-apply were included in this analysis.

Methods Related to Research Question 3

Within the Outdoor Physical Campus Assessment, are the importance and satisfaction (attractiveness, amount, and functionality) items collecting internally consistent data? Cronbach's alpha was again utilized to determine if the section measures were yielding internally consistent data. This approach is supported by Gliner et al. (2009) as a method for investigating the reliability of subscales within an instrument. The authors suggested examining the item-total correlation ("the correlation of each specific item with the sum/total of the *other* items in the scale" [p. 219]) and the *Cronbach's alpha if item deleted* calculation to determine if the measures increase the internal consistency of the section.

Limitations

This study was limited by the following factors:

1. Survey deployment method was not consistent among all institutions. Students at six of the eight institutions were invited to participate in the study with the exact same invitation text. However, because institutional policy forbade the sharing of student email address and name information with outside researchers not affiliated with a company contracted for survey deployment, two institutions opted to send the survey

email invitations on the researcher's behalf. The University of Rockaway created their own SurveyMonkey™ account and used the same process, general instructions, and method to send the survey as the six institutions that allowed the researcher direct access to the student sample data. Reminders were sent in accordance with the normal plan; the only differences between this institution and the others was the original ("from") email address and a slight change in the email text explaining that the institution was partnering with the researcher for this project. The University of Tillamook had software by which they chose to send the survey on the researcher's behalf, using similar text with an indication the institution was sending the survey to the student sample on the researcher's behalf.

2. Follow up reminder messages were sent to only seven of eight participating institutions. Because the University of Tillamook used a different product (and static links) to send the survey invitation, it was not possible to track the responses to send follow-up communication to non-responders. At all but this one institution, reminders were sent on the seventh day of administration and the 27th day of the survey deployment period. The responses at the University of Tillamook were substantially lower than those at the seven institutions that were sent reminder emails.

3. Dates of deployment were inconsistent among institutions. The student sample at seven of eight institutions received their survey invitations on the 30th or 31st day of the fall term. This difference was in part due to the researcher's desire to send the survey invitation on a Wednesday or Thursday with the hopes it would be more likely to be read. Students at one institution, the University of Yaquina, received their survey invitation on

the 60^{th} day of the term because the institution was added to the study after the start of the fall term. Although it is unlikely that this had an impact on the observed scores on the instrument, this timeframe difference is substantial enough to be mentioned.

4. Survey response rate was low for the field test administration. Only 21.43% of the students who were sent the survey completed any part of it. Many of the students in the sample may have never received the message due to inbox spam filters. Others may have not been actively checking the email addresses provided by the institution (at most institutions, this was the university-supplied email address). The response rate for the field test is discussed further in the results and discussion chapters.

Summary

The preceding discussion highlights the process used to determine the need for a survey instrument, the process used to consult with professionals who could provide information relevant to the development of a survey instrument, and the process of creating the survey instrument. Data collection occurred via SurveyMonkey™, and the results were analyzed as detailed in this chapter. Results are provided in the subsequent chapter.

CHAPTER IV

RESULTS

As stated in Chapter 1, the goal of this study was to develop an instrument measuring student perceptions of the outdoor physical campus environment. From these efforts, an instrument with items focused on student satisfaction with attractiveness, amount, and functionality of elements of the physical campus along with the importance of these same elements was created. A comprehensive literature search was conducted along with interviews of experts both within the realm of campus planning and campus consulting for enrollment management. The previous chapters outlined the process of developing and testing survey items based on the literature, expert consultation, and interaction with student focus groups and cognitive interviews. The current chapter provides greater detail about the process used to explore the results of the Outdoor Physical Campus Assessment for reliability and validity.

Field Test Deployment and Response

Survey Deployment

Using SurveyMonkey™, the surveys were sent via email to students at each of the eight participating institutions. The deployment was largely consistent across institutions with three substantial exceptions. Two of the participating institutions were unwilling to provide the researcher with the names and email addresses as requested due to established policy, so separate accommodations were made. The University of Rockaway opted to create its own SurveyMonkey™ account and deploy the survey on my behalf. The text for the invitation varied slightly from the other institutions, but the deployment of the survey and contents were virtually identical to the survey contents and plan at the other participating institutions. Reminders were sent on the same schedule—the messages simply originated from the institution, rather than the researcher. At the University of Tillamook, the University Registrar sent the emails on the researcher's behalf to students. The email contained a static link, rather than the dynamic link utilized by SurveyMonkey™. As with the other institution, the email invitation contents deviated slightly from the six institutions that allowed the researcher to send the survey directly to students. As a result, no follow-up email could be sent to the invited participants at this institution. The results demonstrate a substantially reduced response rate from this institution. The third deviation was one of timeframe; students at the University of Yaquina did not receive their survey invitations (sent directly from the researcher) until the 60th day of the term. The researcher decided to include the University of Yaquina in the study after their fall term began, which created a delay in submitting the data request.

Except at the University of Tillamook, the surveys were delivered using the SurveyMonkey™ email tool, which allowed the researcher to upload the selected sample's first name, last name, and email address. This tool allows for the tracking of who has responded to the survey (partially or completely) and also provides a means to send reminder emails to participants who have not begun the survey. The email invitations were substantially similar at all institutions, regardless of whether they were sent directly by the researcher or on the researcher's behalf. In the text of the email, survey incentives were offered; individuals who completed the survey were entered in a random drawing for two $25 gift cards (per participating institutions) to one of three restaurants. Prize winners were contacted and allowed to choose among the three restaurants. Individuals who received the invitation were directed to open the survey to complete the informed consent process. If an individual wished to be removed from the reminder process, the invitation email (and reminders) also contained an opt-out link which notified SurveyMonkey™ to exclude that person from subsequent contact.

Several individuals in the random sample had already opted out of contact from SurveyMonkey™, so the actual sample was actually 7,978, rather than the 8,000 anticipated. Appendix E contains the invitation and reminder emails sent to participants; there are three separate copies of the invitation (one for the six institutions that allowed the researcher to email students directly, and two others for the institutions who emailed the students on the researcher's behalf).

The invitation to participate in the survey was sent on the 30th or 31st day of the term at each institution, with the exception of the University of Yaquina. The three institutions with the earliest start dates were sent surveys on September 21, 2011. Survey invitations were sent on September 28, October 5, and October 20 to accommodate the later-starting institutions (and University of Yaquina). Individuals who did not open the survey were sent a reminder seven days after the initial email, asking them to consider participating. On the 27th day of the survey deployment at each school, non-responders were sent a final invitation to participate with a survey close date in the subject and text. Appendix F contains a graph illustrating patterns for the total responses received. Individuals who started but did not complete the survey did not receive any follow-up email messages. Participants at the University of Tillamook were not sent any participation reminders pursuant to the agreement the researcher made with the University Registrar.

Response Rate

As previously mentioned, surveys were sent to 7,978 students rather than the 8,000 selected students due to several participants having opted-out of SurveyMonkey™ communications prior to this study. Table 3 provides the response rates by institution and total for the field test.

The response rates are largely consistent across institutions, with the exception of University of Tillamook. The University of Tillamook deployed the survey on the researcher's behalf and did not have a mechanism for determining which respondents had opened the survey, so no reminder emails could be sent. The majority of this study focuses on the four primary sections of the instrument: importance (n = 1,524), attractiveness (n = 1,643), amount (n = 1,612), and functionality measures (n = 1,552). The response rate was slightly higher for these questions, as they were in the middle of the instrument.

Biographic and Demographic Information

Respondents that completed all or parts of the Outdoor Physical Campus Assessment were largely under the age of 24, as indicated by Table 4. More females (66.1%) responded to the Outdoor Physical Campus Assessment tool than males (33.8%), and were spread rather evenly among class levels as demonstrated by Table 5.

Table 3

Response Rates by Institution

Institution	Sent Survey	First Reminder	Final Reminder	Opted-Out of Survey (After Invitation)
U. Rockaway	998	889	828	2
PCSU	999	881	840	6
Boardman U.	999	828	759	15
ESU	993	826	758	6
Redwood U.	996	833	782	10
U. Yaquina	999	868	800	11
HSU	994	840	786	11
U. Tillamook	1,000	N/A	N/A	N/A
Total	7,978	5,965	5,553	55

Institution	Partially Complete	Survey Completed	Partial Response Rate*	Complete Response Rate
U. Rockaway	22	184	20.64%	18.44%
PCSU	24	159	18.31%	15.92%
Boardman U.	30	236	26.63%	23.62%
ESU	24	243	26.89%	24.74%
Redwood U.	30	208	23.90%	20.89%
U. Yaquina	24	193	21.72%	19.32%
HSU	22	215	25.11%	21.63%
U. Tillamook	16	80	9.60%	8.00%
Total	192	1,518	21.43%	19.03%

* Partial response rate is calculated using partial plus completed responses divided by invited participants by institution (total 7,978).

Table 4

Age of Respondents

Age (Group)	Frequency	Percent	Cumulative Percent
16	2	.1	.1
17	1	.1	.2
18	183	10.7	10.9
19	252	14.7	25.6
20	249	14.6	40.2
21-24	655	38.3	78.5
25-29	177	10.4	88.8
30-39	94	5.5	94.3
40-54	81	4.7	99.1
55 or older	16	.9	100.0
Total	1710	100.0	

Table 5

Class Standing of Respondents

Class Standing	Frequency	Percent	Cumulative Percent
Freshman	338	19.8	19.8
Sophomore	259	15.1	34.9
Junior	334	19.5	54.4
Senior	382	22.3	76.8
Graduate (Master's or Doctoral)	397	23.2	100.0
Total	1710	100.0	

A majority of respondents reported full time (90.5%) enrollment and high academic achievement. Of the respondents that provided grade point average (GPA) data, 45.8% claimed to have GPAs of 3.6 or higher; an additional 33.8% indicated GPAs between 3.0 and 3.5.

The respondents provided information indicating their current major; a variety of disciplines were represented, as demonstrated by Table 6.

Many respondents chose not to provide information about their ethnic background (n = 215). The question was worded similarly to the Integrated Postsecondary Data Set requirement for applications for admission, which provides for multiple responses per applicant. Of respondents that provided ethnicity information, 82.5% were Caucasian, 4.9% were International Non-US Citizens (any additional information was disregarded), 4.4% were Black or African American, 2.6% were Asian American, 1.3% were Hispanic

Table 6

Reported Current Majors of Respondents

Reported Current Major	Frequency	Percent	Cumulative Percent
Missing Data	191	11.2	11.2
Biological Science (includes biology, life sciences, environmental science)	127	7.4	18.6
Business (includes accounting, finance, marketing, management, international business)	236	13.8	32.4
Communication (includes journalism, public relations, visual communication/design, interpersonal/organizational)	85	5.0	37.4
Computer Science (includes data systems, drafting, programming)	23	1.3	38.7
Creative Arts (includes fine and applied arts)	47	2.7	41.5
Education (includes pre-K through grade 12, educational administration, health education, art and music education, higher education administration)	189	11.1	52.5
Engineering (includes civil, mechanical, electrical, chemical, computer, etc.)	118	6.9	59.4
Health and Human Services (includes counseling, nursing, medical administration)	185	10.8	70.2
Humanities (includes languages, philosophy, religion)	50	2.9	73.2
Other Majors	88	5.1	78.3
Performing Arts (includes music and theater/dance)	24	1.4	79.7
Physical Science (includes physics, chemistry, mathematics, astronomy)	43	2.5	82.2
Professional (medicine, law, dentistry, veterinarian, physical/occupational therapy, architecture)	81	4.7	87.0
Social Sciences (includes anthropology, sociology, political science, psychology)	163	9.5	96.5
Undecided	60	3.5	100.0
Total	1710	100.0	

or Latino/a, 0.3% were American Indian or Alaska Natives, 0.1% were Hawaiian or Other Pacific Islander, and 2.9% reported two or more ethnicity values.

As a means to determine how aware students were of the campus layout at their current institution, respondents were asked, “How would you rate your familiarity with the layout (where buildings are located; how to get from one location to another) on campus?” A majority (68.3%) reported having “excellent” or “very good” knowledge of campus, whereas 21.6% of respondents reported “good” awareness. An additional 8.2% reported “fair” knowledge, and 2% rated their familiarity as “poor.” Given that this assessment instrument is dependent on students’ ability to recall their campus environment, the reported confidence of respondents bodes positively for future analysis.

Analysis of Data

Results Related to Research Question 1

Is the Outdoor Physical Campus Assessment tool a valid measure for assessing student perceptions of (a) satisfaction with, and (b) the importance of elements of the physical campus environment?

Evidence related to the content standard. Much of the effort to provide evidence of content validity rested on the literature exploration and consultation with experts and professionals in the higher education planning realm. Prior to the development of the Outdoor Physical Campus Assessment, research from a wide array of sources was assembled to determine the contents of the instrument. The researcher consulted higher education planning literature, campus ecology literature, and campus environment assessment research. The items identified as important components of the outdoor campus environment were noted and incorporated into the instrument. These items included campus entrances, landscaping, open space, wayfinding, lighting, benches and other seating, formal and informal meeting space, water features and outdoor artwork, exterior architectural style, and cohesiveness of building exteriors.

Several campus architects provided guidance to establish the boundaries of the survey, along with the focus of individual measures. In one-on-one interviews, the architects provided several items for the survey that were grounded in day-to-day operations of a campus, such as parking location and sufficiency, recycling and trash receptacles, cigarette disposal locations, ramps and accessibility aids, cleanliness, and overall maintenance. Professional consultants were also involved in the instrument consideration, providing logistical advice and experience from the field in conducting audits of the environment. They helped the researcher determine how this tool could potentially be utilized by campus architects. Although the campus architects very much wanted to add items to the survey related to interior-building conditions (such as satisfaction with the student recreation and wellness facilities, student union facilities, and academic buildings), it was deemed out of scope for this research. Further, other instruments can be utilized to explore that area of knowledge.

The literature search and interviews with the campus architects helped the researcher create specific definitions of the elements to be included in the study. As suggested by Gliner et al. (2009), once the definitions were created, items were developed to address the intended element. Those items were then reviewed again by the campus architects to ensure they adequately represented their concept of the outdoor campus environment. Content validity analysis seeks to determine "whether a measure is doing what it's supposed to be doing" (Nardi, 2003, p. 49). The campus architects provided feedback indicating the Outdoor Physical Campus Assessment met that goal.

Evidence based on response process. Once the items were developed for the Outdoor Physical Campus Assessment, the next area of concern was whether the intended participants would be able to properly decipher the questions and have the appropriate responses provided to allow them to give feedback. For a majority of the items, participants were asked to provide their opinions in the form of Likert-scaled responses for element importance questions (from *very important* to *very unimportant*) and element satisfaction questions (from *very satisfied* to *very dissatisfied*). Although this practice is common for assessment, it was not clear that this format would be appropriate for assessing the outdoor campus environment. Further, it was not guaranteed that the students would be able to decipher what the researcher had intended in the question prompts (e.g., Indicate your level of satisfaction with the attractiveness of the campus green spaces) because these terms may not have been a part of their vernacular.

As a result, the researcher utilized expert reviews (with campus architects) to determine if the items matched their impression of the element (translating it from their expert-based view to the less-esoteric measure for students) as suggested by Gliner et al. (2009). After this review, the instrument was modified using several suggestions made by the architects. Several response options were added or modified; for example, one of the architects suggested that the home population density question be modified—the initial wording had included “urban” as a category, which he felt had negative connotation—“metropolitan” was determined to be an adequate substitute. One architect noted that ‘architecture’ had been left out of the current major options. The architects were very helpful in formulating the functionality questions; the constructs were taken largely from the literature, but the phrasing was simplified using their advice. At the conclusion of this review, the architects were satisfied that the items adequately and accurately represented the elements of interest.

After modifying the instrument based on the advice of campus architects, the researcher employed focus groups and cognitive interviews to investigate the available responses and overall clarity of the items. The researcher met with a group of nine students on April 6, 2011, to conduct a focus group. The students were resident assistants at Kent State University, and all members of the same hall team. The group members were very comfortable voicing opinions in front of one another. The participants were extremely vocal about any question or concern they had regarding the content of the questions, the wording, or the goal of the instrument. The researcher asked the group to go through the questionnaire one item at a time and discuss their thoughts on the prompt, and in the case of the element-based questions, what they believed the researcher was really trying to ask. Although many of the questions were deemed self-evident, it was critical that the students express their mental images of what the question represented, to ensure that the item was being interpreted as intended.

Both the items and the provided responses were explored; several questions were modified as a direct result of this discussion. As previously mentioned, participants in this focus group expressed frustration with their lack of ability to indicate if they wanted more or less of an element. Their feedback suggested the creation of a new bank of questions (referred to as *directional amount*) be added to the instrument. The group was also adept at providing feedback on the static responses provided, pointing out gaps in the sets provided (e.g., in the 'miles from home' question, there was no response for "more than 1,000 miles"). The focus group participants engaged in a lively debate on the elements included (and a few elements they thought might be interesting to add), the agree-disagree statements, and the demographic questions. Several questions were made non-mandatory based upon their suggestions, and others were stricken entirely.

Once the suggestions from the focus group were incorporated (with the exception of the directional amount section; that was added later), a new and improved survey instrument was presented to more students for analysis. Initially this was intended to be a second focus group using students at a different university, but scheduling conflicts caused this plan to be abandoned. Instead, cognitive interviews were held with two individuals, one graduate student and one undergraduate student. The cognitive interviews took place in May 2011. Each student was asked to read the questions out loud and provide a verbal answer with the intent of ensuring the response could be accommodated by the static options provided in the instrument. Through this process, additional small-scale changes were made to the instrument.

The cognitive interviewees echoed the focus group's frustration with the lack of information yielded by the satisfaction-based amount questions; they recommended an additional set of questions where they could provide directional feedback on whether or not they wanted more or less of an element. The biographic questions were split in half and separated to avoid fatiguing participants, and several questions were modified based on the interviewees' feedback. At the conclusion of the cognitive interviews, the instrument was revised again, at which point the directional amount section was added. When presented with the element-based satisfaction and importance questions (and agree-disagree statements), the participants of the focus group and the cognitive interviews were able to articulate a substantially similar vision to the one intended by the researcher. Further the feedback received indicated that the response options were adequate to allow the participants to express their perceptions of the campus environment.

Evidence of internal structures. As previously discussed, this instrument was created upon the completion of an exhaustive literature review focused on understanding the elements of the outdoor physical campus environment. The resulting instrument contained four primary sections—one containing measures of the campus environment's importance, and three sections devoted to satisfaction with the attractiveness, amount, and functionality of elements of the campus environment. These are of principal concern for this study, and are analyzed for internal structures. Two other sections were generated from the exploratory research; attitude measures focusing on student perceptions of the effects or impact of the campus environment (with a variety of items) and a final section aimed at determining if students would like more or less of a given element. Neither of the final two sections are analyzed for internal structures; the statement-based questions are not related in any meaningful way, and the directional amount questions are purely descriptive in nature.

For the internal structures analysis, two techniques were utilized: principal components analysis and item-total correlation. Principal components analysis allows a researcher to explore data with the intention of identifying common variance. In practice, this technique is often utilized to reduce the number of items on a scale, or to allow for data summarization (Field, 2009; Kachigan, 1991; Stevens, 1996). For the present study, the researcher was interested in determining whether the responses to items in the four primary sections had underlying statistical similarities. Because the researcher anticipated any resulting components would be related (based on campus ecology literature), direct oblimin, an oblique rotation technique, was selected (Field, 2009; Stevens 1996). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated the sample was more than sufficiently large for this analysis (KMO = .943). On an individual basis, the KMO values for each item were above the suggested .5 threshold (Field, 2009). Bartlett's test of sphericity indicated that the correlation between items did not preclude using principal component analysis ($_x^2$ [2080] = 74846.68, p <.001). Because the sample size was far in excess of 200, as suggested by Field and Stevens, a two-component solution was requested based upon the scree plot for the sample. Values below .25 were suppressed in the results.

The rotated solution resulted in two components, with the importance items comprising one component, and the satisfaction items accounting for the other. Table 7 demonstrates the pattern matrix for this two-component solution.

Table 7

Pattern Matrix for Four Primary Section Items

	Component	
	1 (Satisfaction)	2 (Importance)
Amount: Benches/Seating	.736	
Amount: Formal Meeting Space	.734	
Amount: Informal Meeting Space	.732	
Attractive: Informal Meeting Space	.727	
Amount: Lighting	.720	
Amount: Trash	.719	
Functionality: Layout	.717	
Attractive: Lighting	.716	
Amount: Signage	.710	
Attractive: Trash	.710	
Attractive: Benches/Seating	.708	
Attractive: Formal Meeting Space	.700	
Attractive: Walkways	.696	
Attractive: Recycling	.692	
Amount: Landscaping	.690	
Amount: Green Space	.684	
Functionality: Sign Legibility	.680	
Amount: Walkways	.677	
Amount: Water Features	.677	
Amount: Statues and Artwork	.676	
Functionality: Sign Placement	.674	
Functionality: Campus Design Plan	.672	
Amount: Recycling	.664	
Attractive: Landscaping	.660	
Attractive: Statues and Artwork	.651	
Functionality: Maintenance	.648	
Attractive: Cigarette Disposal	.633	
Attractive: Water Features	.632	
Functionality: Lighting	.624	
Attractive: Green Space	.623	
Amount: Trees	.621	
Attractive: Campus Entrances	.616	
Amount: Cigarette Disposal	.612	
Attractive: Trees	.608	
Functionality: Getting Around Outside	.600	
Functionality: Cleanliness	.594	
Attractive: Building Exteriors	.592	
Functionality: Entering Buildings	.586	
Functionality: Walkways	.576	
Functionality: Cohesiveness	.569	
Functionality: Campus Entrances	.550	

(*table continues*)

Table 7 (continued)

Pattern Matrix for Four Primary Section Items

	Component 1 (Satisfaction)	Component 2 (Importance)
Amount: Parking	.535	
Functionality: Parking Placement	.533	
Importance: Maintenance		.784
Importance: Cleanliness		.777
Importance: Planned Design		.735
Importance: Green Space		.719
Importance: Landscaping		.706
Importance: Benches/Seating		.703
Importance: Trash		.686
Importance: Walkways		.684
Importance: Informal Meeting Space		.672
Importance: Trees		.670
Importance: Lighting		.655
Importance: Building Exteriors		.642
Importance: Formal Meeting Space		.639
Importance: Recycling		.630
Importance: Signage		.596
Importance: Campus Entrances		.539
Importance: Ramps		.538
Importance: Water Features		.503
Importance: Statues and Artwork		.496
Importance: Parking		.417
Importance: Cohesiveness		.389
Importance: Cigarette Disposal		.297

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 3 iterations.

The principal components analysis revealed that while the responses to the items in the four primary sections could be described with a two-component solution (items related to importance, items related to satisfaction), the two components were interrelated (r = .350). This relationship is clarified in the structure matrix (Table 8) which displays the correlation coefficients for each of the individual items and the component as listed.

Table 8

Structure Matrix for Four Primary Section Items

	Component	
	1 (Satisfaction)	2 (Importance)
Functionality: Layout	.742	.323
Attractive: Informal Meeting Space	.725	.251
Amount: Benches/Seating	.725	
Amount: Informal Meeting Space	.723	
Amount: Formal Meeting Space	.719	
Attractive: Benches/Seating	.715	.270
Attractive: Walkways	.713	.292
Attractive: Formal Meeting Space	.709	.269
Amount: Green Space	.708	.308
Amount: Landscaping	.703	.277
Attractive: Lighting	.701	
Functionality: Campus Design Plan	.701	.317
Amount: Signage	.700	
Amount: Walkways	.699	.300
Amount: Lighting	.699	
Attractive: Trash	.697	
Amount: Trash	.697	
Functionality: Maintenance	.687	.338
Attractive: Landscaping	.687	.306
Functionality: Sign Legibility	.684	.250
Attractive: Recycling	.682	
Functionality: Sign Placement	.674	
Amount: Statues and Artwork	.662	
Attractive: Statues and Artwork	.657	
Attractive: Green Space	.656	.313
Amount: Trees	.653	.310
Amount: Water Features	.650	
Attractive: Trees	.649	.331
Amount: Recycling	.633	
Attractive: Campus Entrances	.631	.259
Attractive: Water Features	.628	
Functionality: Getting Around Outside	.624	.279
Functionality: Cleanliness	.624	.294
Attractive: Cigarette Disposal	.618	
Functionality: Lighting	.617	
Functionality: Entering Buildings	.608	.269
Attractive: Building Exteriors	.607	.251
Functionality: Cohesiveness	.592	.264
Amount: Cigarette Disposal	.586	
Functionality: Walkways	.585	
Functionality: Campus Entrances	.564	

(*table continues*)

Table 8 (continued)

Structure Matrix for Four Primary Section Items

	Component	
	1 (Satisfaction)	2 (Importance)
Functionality: Parking Placement	.503	
Amount: Parking	.494	
Importance: Maintenance		.763
Importance: Cleanliness		.749
Importance: Planned Design		.731
Importance: Green Space		.710
Importance: Landscaping		.702
Importance: Benches/Seating		.697
Importance: Informal Meeting Space	.273	.685
Importance: Trash		.678
Importance: Walkways		.668
Importance: Building Exteriors	.290	.665
Importance: Formal Meeting Space	.294	.664
Importance: Trees		.663
Importance: Lighting		.637
Importance: Recycling		.614
Importance: Signage		.595
Importance: Campus Entrances	.323	.586
Importance: Ramps		.539
Importance: Statues and Artwork	.268	.529
Importance: Water Features		.527
Importance: Cohesiveness		.428
Importance: Parking		.396
Importance: Cigarette Disposal		.332

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

Although the items were satisfactorily grouped into two components through the principal components analysis, it was clear from the interviews conducted in the early stages of this research that the campus architects considered student satisfaction to be a three-part concept. Students could find an element satisfactory when considering its attractiveness, but also find that it was not useful, or perhaps there was not enough of the element. The architects were very concerned with knowing if students were satisfied with not only the attractiveness of elements, but also the amount and functionality of those same elements. Regardless of the results of the principal component analysis, in practice, the three sections of satisfaction questions function as separate concepts. Therefore, the four primary sections (importance, attractiveness, amount, and functionality) were assessed further for evidence of internal structures as separate entities. Individual items were compared with a composite measure using a correlation coefficient. Correlations greater than $r = .5$ are considered as evidence of a strong relationship between the individual item and the composite section item as suggested by Gliner et al. (2009), citing Cohen (1988).

The number of responses varied slightly by section because some respondents failed to complete all sections of the survey. In the field test, the sections were displayed to respondents in a different order than they are analyzed here; the attractiveness section was first, followed by the amount, functionality, and finally the importance section. The number of responses by section are provided with the analysis for each section.

The Outdoor Physical Campus Assessment contained 22 items ($n = 1{,}524$) focused on the level of importance a student attributed to specific elements of the campus environment. Table 9 shows the correlation between the individual items within the importance section of the instrument and a total composite importance item created by summing all individual importance items. Most correlation coefficients were greater than .5, the level suggested by Gliner et al. (2009) as being strongly related, with three exceptions: parking, cigarette disposal, and cohesiveness of architectural styles.

Table 9

Item-Total Correlations of Individual Importance Items

Item	Total Importance Score Correlation
Importance: Campus Entrances	.618
Importance: Building Exteriors	.659
Importance: Cohesiveness	.492
Importance: Landscaping	.674
Importance: Trees	.603
Importance: Green Space	.641
Importance: Statues and Artwork	.583
Importance: Water Features	.572
Importance: Formal Meeting Space	.665
Importance: Informal Meeting Space	.663
Importance: Benches/Seating	.663
Importance: Walkways	.604
Importance: Lighting	.587
Importance: Trash	.652
Importance: Recycling	.595
Importance: Cigarette Disposal	.434
Importance: Signage	.609
Importance: Ramps	.583
Importance: Parking	.419
Importance: Maintenance	.700
Importance: Cleanliness	.678
Importance: Planned Design	.690

The first satisfaction section of the instrument focused on the student's satisfaction with the attractiveness of elements of the outdoor physical campus. This section contained 15 items and asked each student to indicate his or her level of satisfaction with the attractiveness of a given element on his or her current college campus. Table 10 provides the correlation between the individual item results and the composite item created from all of the attractiveness items, summed (n = 1,643). All correlations were above r = .5 for the attractiveness item sections.

After the respondents were asked to indicate their level of satisfaction with the attractiveness of elements, they were then asked in the next section to indicate their level of satisfaction with the amount of elements of the outdoor campus environment. The amount section contained 15 items as demonstrated by Table 11. Correlation coefficients were again calculated, providing a measure of the strength of the relationship between the individual amount items and a composite amount measure created by summing all of the amount items. With the exception of the parking item, all correlations were above r = .5 (n = 1,612).

The final section of questions focused on satisfaction with the outdoor campus environment focused on the functionality of certain elements. This section asked participants to indicate their level of satisfaction with the utility or ease of using campus elements. Examples of prompts in this section include: "Safety and stability of walkways and sidewalks on campus," "Usefulness of campus lighting (examples: walkway and street lighting)," and "Placement of campus signs (examples: building signs, direction pointing signs)." The section contained 13 items (n = 1,552), and the correlation

Table 10

Item-Total Correlations of Individual Attractiveness Items

Item	Total Attractive Score Correlation
Attractive: Campus Entrances	.667
Attractive: Building Exteriors	.636
Attractive: Landscaping	.710
Attractive: Trees	.672
Attractive: Green Space	.684
Attractive: Statues and Artwork	.702
Attractive: Water Features	.682
Attractive: Formal Meeting Space	.764
Attractive: Informal Meeting Space	.773
Attractive: Benches/Seating	.753
Attractive: Lighting	.719
Attractive: Trash	.725
Attractive: Recycling	.706
Attractive: Cigarette Disposal	.652
Attractive: Walkways	.717

Table 11

Item-Total Correlations of Individual Amount Items

Item	Total Amount Score Correlation
Amount: Landscaping	.699
Amount: Trees	.657
Amount: Green Space	.704
Amount: Statues and Artwork	.697
Amount: Water Features	.702
Amount: Formal Meeting Space	.769
Amount: Informal Meeting Space	.773
Amount: Benches/Seating	.761
Amount: Lighting	.721
Amount: Trash	.740
Amount: Recycling	.697
Amount: Cigarette Disposal	.657
Amount: Signage	.718
Amount: Walkways	.702
Amount: Parking	.564

coefficients were calculated by comparing the individual functionality items to a composite functionality score. Table 12 provides the results of this analysis; with the exception of parking, each item exhibited a strong relationship with the composite functionality score ($r > .5$).

Table 12

Item-Total Correlations of Individual Functionality Items

Item	Total Functionality Score Correlation
Functionality: Campus Entrances	.678
Functionality: Entering Buildings	.736
Functionality: Getting Around Outside	.755
Functionality: Walkways	.707
Functionality: Lighting	.691
Functionality: Layout	.815
Functionality: Maintenance	.761
Functionality: Cleanliness	.695
Functionality: Campus Design Plan	.761
Functionality: Cohesiveness	.651
Functionality: Sign Legibility	.769
Functionality: Sign Placement	.748
Functionality: Parking Placement	.589

For the four primary sections (importance, attractiveness, amount, and functionality), nearly all items exhibited strong relationships with the calculated composite scores. Only 3 of the 65 items in the four primary sections had correlation coefficients lower than .5, the level suggested by Gliner et al. (2009) as indicative of a strong internal structural relationship (Importance: Cohesiveness [$r = .492$], Importance: Cigarette Disposal [$r = .434$], and Importance: Parking [$r = .419$]). Based on the correlation coefficients derived for this analysis, the data collected demonstrated a strong relationship between the individual items and the composite scores created for the importance and satisfaction measures.

Results Related to Research Question 2

Did the Outdoor Physical Campus Assessment collect reliable data during the field test administration? The scores obtained using this instrument were judged to be internally consistent when the observed coefficient alpha was .7 or greater as suggested by Gliner et al. (2009) and Kline (1999). The .7 threshold for accepting scores obtained in a field test administration was also supported as "acceptable" by George and Mallery (2006, p. 231) and by Field (2009). The importance, satisfaction, statement-based agree-disagree items, and directional amount questions were included in the analysis.

Overall reliability of scores observed. Cronbach's alpha was utilized to determine whether the scores obtained during the field test were sufficiently reliable as dictated by social science and education research literature. Thompson (2003) noted that researchers frequently misuse Cronbach's alpha by employing it to assess an entire instrument, rather than its individual sections. To use Cronbach's alpha as Thompson would suggest, the individual content areas (element importance, and the three element satisfaction areas), Cronbach's alpha values were calculated. In addition, both the statement-based agree-disagree and directional amount questions were analyzed and are included here. Their results are reported in Table 13.

Table 13

Cronbach's Alpha Results for Instrument by Section

Instrument Section	Valid N	Cronbach's Alpha	N of Items
Importance of Elements	1524	.912	22
Attractiveness of Elements	1643	.926	15
Amount of Elements	1612	.923	15
Functionality of Elements	1552	.915	13
(Combined) Importance, Attractiveness, Amount, and Functionality	1524	.963	65
Agree-Disagree Statements	1522	.912	12
More or Less of Elements (Directional)	1588	.813	16

Reliability by institution. Reliability analysis was conducted on a per-institution basis to explore whether the reliability coefficients were consistent across institutions; the results are reflected in Table 14. All observed reliability coefficients were above .7 as suggested by Gliner et al. (2009).

Results Related to Research Question 3

Within the Outdoor Physical Campus Assessment, are the importance and satisfaction (attractiveness, amount, and functionality) items collecting internally consistent data? As part of the internal structures analysis dictated by the first research question, it was determined that the individual items on the Outdoor Physical Campus

Table 14

Cronbach's Alpha Results for Instrument by Section and Institution

Institution	Instrument Section	Valid N	Cronbach's Alpha	N of Items
U. Rockaway	Importance of Elements	185	.924	22
PCSU	Importance of Elements	159	.925	22
Boardman U.	Importance of Elements	236	.904	22
ESU	Importance of Elements	243	.903	22
Redwood U.	Importance of Elements	209	.937	22
U. Yaquina	Importance of Elements	196	.918	22
HSU	Importance of Elements	215	.873	22
U. Tillamook	Importance of Elements	81	.898	22
U. Rockaway	Attractiveness of Elements	196	.947	15
PCSU	Attractiveness of Elements	175	.919	15
Boardman U.	Attractiveness of Elements	257	.914	15
ESU	Attractiveness of Elements	259	.925	15
Redwood U.	Attractiveness of Elements	229	.903	15
U. Yaquina	Attractiveness of Elements	208	.918	15
HSU	Attractiveness of Elements	230	.924	15
U. Tillamook	Attractiveness of Elements	89	.897	15
U. Rockaway	Amount of Elements	193	.934	15
PCSU	Amount of Elements	172	.907	15
Boardman U.	Amount of Elements	249	.925	15
ESU	Amount of Elements	255	.923	15
Redwood U.	Amount of Elements	226	.903	15
U. Yaquina	Amount of Elements	207	.927	15
HSU	Amount of Elements	223	.919	15
U. Tillamook	Amount of Elements	87	.906	15
U. Rockaway	Functionality of Elements	189	.916	13
PCSU	Functionality of Elements	165	.908	13
Boardman U.	Functionality of Elements	239	.904	13
ESU	Functionality of Elements	247	.915	13
Redwood U.	Functionality of Elements	214	.905	13
U. Yaquina	Functionality of Elements	198	.922	13
HSU	Functionality of Elements	217	.915	13
U. Tillamook	Functionality of Elements	83	.911	13
U. Rockaway	(Combined) Importance, Attractiveness, Amount, and Functionality	185	.965	65
PCSU	(Combined) Importance, Attractiveness, Amount, and Functionality	159	.961	65

(*table continues*)

Table 14 (continued)

Cronbach's Alpha Results for Instrument by Section and Institution

Institution	Instrument Section	Valid N	Cronbach's Alpha	N of Items
Boardman U.	(Combined) Importance, Attractiveness, Amount, and Functionality	236	.961	65
ESU	(Combined) Importance, Attractiveness, Amount, and Functionality	243	.961	65
Redwood U.	(Combined) Importance, Attractiveness, Amount, and Functionality	209	.957	65
U. Yaquina	(Combined) Importance, Attractiveness, Amount, and Functionality	196	.966	65
HSU	(Combined) Importance, Attractiveness, Amount, and Functionality	215	.960	65
U. Tillamook	(Combined) Importance, Attractiveness, Amount, and Functionality	81	.958	65
U. Rockaway	Agree-Disagree Statements	185	.909	12
PCSU	Agree-Disagree Statements	159	.890	12
Boardman U.	Agree-Disagree Statements	236	.894	12
ESU	Agree-Disagree Statements	243	.898	12
Redwood U.	Agree-Disagree Statements	208	.892	12
U. Yaquina	Agree-Disagree Statements	195	.917	12
HSU	Agree-Disagree Statements	215	.900	12
U. Tillamook	Agree-Disagree Statements	81	.894	12
U. Rockaway	More or Less of Elements (Directional)	192	.838	16
PCSU	More or Less of Elements (Directional)	171	.767	16
Boardman U.	More or Less of Elements (Directional)	246	.851	16
ESU	More or Less of Elements (Directional)	251	.800	16
Redwood U.	More or Less of Elements (Directional)	221	.838	16
U. Yaquina	More or Less of Elements (Directional)	204	.830	16
HSU	More or Less of Elements (Directional)	219	.747	16
U. Tillamook	More or Less of Elements (Directional)	84	.711	16

Assessments are strongly correlated with composite items calculated for each of the four sections of the instrument (importance, attractiveness, amount, and functionality). The high correlations observed (greater than $r = .5$) for 62 of the 65 items within the four primary sections are a positive indication of internal consistency. To assess the internal consistency of each section, Cronbach's alpha was utilized to investigate the contribution of each individual item to the section to which it belongs. Appendix G contains the item-total statistics and Cronbach's alpha values for each item (by section) and Appendix I contains the distribution of responses for each individual item.

Overall consistency of scores on importance items. The importance section of the instrument yielded reliable scores ($\alpha = .912$; $n = 1,524$; 22 items). By institution, the section yielded scores with similar reliability, with reliability coefficients between .873 and .937. Appendix G contains the reliability statistics for the field test administration for all participants (not separated by institution). Three items within the importance section were identified during the reliability analysis as detrimental to the internal consistency of the section: the importance of parking, the importance of campus building exterior cohesiveness, and importance of the presence of cigarette disposal receptacles. Although these items were listed as impacting the observed reliability of scores obtained in this administration, the section would be improved only very slightly.

Removing the presence of parking item would have generated a Cronbach's alpha value between .001 and .003 greater than the observed coefficient for the four campuses (half of the sample), and lower it by the same amount at the other four campuses. Similarly, removing the building cohesiveness item would have improved the observed Cronbach's alpha value .001-.004 at three of the campuses, have no effect at four campuses, and have a negative impact at one institution. The presence of cigarette disposal receptacles item, if removed, would have resulted in slightly larger improvements in the Cronbach's alpha observed (.001-.014). This item lowered the internal consistency of the importance section at seven of the eight campuses, although it is important to note that one of the campuses in this study has banned smoking on campus grounds and coincided with a more inconsistent response on this item. Appendix H contains tables detailing the reliability coefficients, item-total correlations, and Cronbach's alpha with each item removed. The individual items with lower internal consistency are further discussed in the next chapter.

Overall consistency of scores on attractiveness items. The attractiveness section of the instrument yielded highly reliable scores ($\alpha = .926$; $n = 1{,}643$; 15 items) overall. In the aggregate, all items contributed positively to the overall reliability of the scores observed. Removing items would have reduced the observed Cronbach's alpha. Appendix H contains the complete analysis of the attractiveness section items by institution.

Overall consistency of scores on amount items. Similar to the attractiveness section, the section devoted to assessing participants' satisfaction with the amount of campus elements yielded substantially reliable data. The amount section of the instrument elicited highly consistent feedback from respondents in the aggregate ($\alpha =$ .923; $n = 1{,}612$; 15 items. One item in the amount section was identified during the reliability analysis as detrimental to the overall consistency of the section: the amount of parking. Deletion of this item from the instrument would have increased the observed internal consistency of the amount section between .001 and .007 at six of the eight participating campuses. This is reviewed further in the discussion chapter.

Overall consistency of scores on functionality items. The functionality satisfaction section of the instrument was also found to be consistent for the field test administration sample. This section yielded reliable scores (α = .915; n = 1,552; 13 items) overall. The functionality section's internal consistency was reduced by the parking item, just as the amount section was. At all eight campuses, the item focused on the placement of parking (level of satisfaction with the placement of parking on campus) decreased the reliability of the functionality section between .001 and .014. A majority of the items within the functionality section exhibited strong inter-item correlations with an overall average of r = .479. The parking item had a much lower relationship with the other items in the section with an average observed inter-item correlation of r = .344. This item had a substantial impact on the observed reliability coefficient for the section. Overall, if the item had been excluded, the reliability for all scores for the functionality section would have been .921, rather than the .915 observed.

Internal consistency summary. It is clear from the extremely high observed Cronbach's alpha values that the instrument collected highly consistent data in the field test administration, with few exceptions. Three importance items (parking, cohesiveness, and cigarette disposal) stimulate further consideration, along with the two other parking measures (amount, functionality). This result was not entirely surprising to the researcher or the campus architects consulted for the study, given the often-charged discussions associated with parking on college campuses.

Summary

The analysis employed for assessing this survey instrument focused on measurement validity, the reliability of the scores obtained in the field test, and the consistency of the four primary sections of the instrument (importance of campus environment, satisfaction with the attractiveness of campus environment elements, satisfaction with the amount of campus environment elements, and satisfaction with the functionality of campus environment elements).

As evidence for validity, the literature review, architect/expert interviews, and resulting item definition, development, and refinement process were detailed. The researcher engaged both students and architects to review the items to improve the response process and clarity of the instrument. Finally, evidence related to the relationships between the individual items and composite variables was presented to support the notion of internal structure validity of the sections. Although a few items were not as highly related to the overall composite variable for the section, there may still be value in keeping the items of lesser relation. This are covered in the discussion chapter.

The scores obtained on the field test were determined to be reliable; on the six sections of the instrument, the observed Cronbach's alpha values were in excess of the .7 requirement. Overall, the four primary sections (importance, attractiveness, amount, and functionality) taken together yielded $\alpha = .963$ ($n = 1{,}524$; 65 items). Individually, the four primary sections all had reliability coefficients of .912 or greater. When considering the reliability of the four primary sections by institution, these results were further supported. The agree-disagree statements and additional amount sections (more or less of a given element) were slightly less consistently answered, and this is discussed in the next chapter.

The final section of data analysis was concerned with the internal consistency within the four primary sections of the instrument—importance, attractiveness, amount, and functionality. Whereas each section was found to be internally consistent, five items had a negative impact on the observed reliability of the field test results. Unsurprisingly, these items were: parking (importance of, amount of, and functionality [placement] of), building cohesiveness (importance), and cigarette disposal (importance). The responses to these questions and their value or detriment to the instrument are reviewed in the discussion.

CHAPTER V

DISCUSSION

Introduction

This final chapter presents a synopsis of the information covered by the previous chapters along with a discussion of the results detailed in Chapter 4. The research questions for this study were focused exclusively on investigating the validity and reliability of a newly-developed instrument focused on measuring student perceptions of the outdoor physical campus environment at institutions of higher education. Conclusions and suggestions for future research are presented along with an extended discussion of the results of the reliability and validity analyses.

Summary of Study

Earlier chapters presented the case for the importance of the physical campus environment through a description of its structure and planning, as well as the breadth of its impact on both current and prospective students. The early American college campus may have initially resembled its European siblings but soon departed as a wholly distinct environment in both architectural style and spatial design. Campus environments have evolved and developed as enrollment has fluctuated over time. Enrollment has generally increased from the inception of American higher education; however the boom in enrollment in the Post World War II era fundamentally altered the higher education campus environment. The structures built to accommodate the influx of students after World War II is largely still present as aging physical plant. Today, campus planners are charged with both the maintenance and creation of functional yet visually pleasing outdoor spaces to be enjoyed by students, faculty, staff, and community members.

For many institutions, the Post World War II enrollment boom ushered in at least two important developments: first, a rapid expansion of the physical campus environment to host an increasing number of students; and second, the creation of the enrollment management function. Enrollment management arose out of the desire to attract and compete for the best and brightest students possible. Enrollment managers (often in conjunction with university marketing units) leverage the outdoor campus environment to attract new students and retain current ones. Their efforts are often demonstrated in campus marketing materials such as viewbooks and institutional websites. Marketing and college choice research indicates that because higher education is an intangible good, consumers will often use less direct methods for determining quality and make decisions based upon a campus's image. The campus tour is a crucial part of the college selection process, allowing prospective students to see the campus environment firsthand and envision what it might be like to be a student at a particular institution.

As previously discussed, the outdoor physical campus environment is an area of great expense but has largely been ignored as a subject of direct assessment. Current efforts have been limited to building space analysis and square footage utilization. The goal of this study was to distill the environment into operational components for the purposes of measurement. A survey instrument was developed to assess student perceptions of the environment by measuring their satisfaction with individual components of the physical campus environment. The items focused on student satisfaction with the attractiveness, amount, and functionality of elements of the physical campus along with the importance of these elements. An instrument focused on the evaluation of the outdoor physical campus environment would be of use to both campus planners and enrollment management units. With this instrument, campus planners or architects could utilize student perception data when determining priorities for campus improvements. Enrollment managers could utilize the perception data gathered using the Outdoor Physical Campus Assessment to understand what areas of the outdoor environment are of greatest (or least) satisfaction and importance to current students.

Overview of the Problem

Purpose Statement

The purpose of this study is to develop a valid and reliable instrument to evaluate student perceptions of the outdoor campus environment as defined by campus design and campus ecology literature. For this study, a questionnaire was developed. The questionnaire was reviewed by campus architects/planners and current students prior to field testing. Participants were asked to rate their satisfaction with elements of the outdoor physical campus, and then asked to rate the importance they attribute to these same elements. It is hoped that the information collected through this instrument will provide valuable feedback for campus planners and enrollment managers about the physical campus environment from a student perspective, and may be adapted for use as a tool for benchmarking and competitor analysis.

Research Questions

Research Question 1. Is the Outdoor Physical Campus Assessment tool a valid measure for assessing student perceptions of (a) satisfaction with, and (b) the importance of elements of the physical campus environment?

Research Question 2. Did the Outdoor Physical Campus Assessment collect reliable data during the field test administration?

Research Question 3. Within the Outdoor Physical Campus Assessment, are the importance and satisfaction (attractiveness, amount, and functionality) items collecting internally consistent data?

Review of the Methodology

A survey methodology was selected for this study because the researcher wished to collect data from a large number of respondents in a standardized approach. No suitable instruments were found in an exhaustive search, so a new survey was developed for this study. Prior to developing the survey, the researcher consulted campus architects, higher education consultants, and literature focused on physical campus planning and the college campus environment. Once the instrument was developed, campus architects reviewed the survey for content and wording prior to testing the instrument with students. Once the instrument contents were refined, focus groups and cognitive interviews with students resembling the target population were employed to test the instrument and make final adjustments prior to deployment. The final instrument without institutional customization can be found in Appendix D.

Satisfaction and importance measures comprised a majority of the questions. Participants were asked about their satisfaction with elements of the outdoor physical campus environment elements (including but not limited to: trees, landscaping, walkways, lighting, seating areas, trash receptacles, artwork, and water features). Following the satisfaction questions, the same elements appeared in questions focused on understanding the importance participants placed on the elements within the campus environment at their current institution. The survey also included biographic questions along with questions about the respondent's overall familiarity with the outdoor campus environment to be used in subsequent research.

The population for the study consisted of degree-seeking students over the age of 18 at public universities in Ohio. To qualify for the study, a participant must have been currently enrolled as of the 15th day of the fall term at a main campus location (regional campuses were excluded). Students who suppressed their directory information were excluded from the study. The sample consisted of 7,978 randomly-selected students at eight universities in Ohio. Surveys invitations (in the form of email) were sent via SurveyMonkey™ approximately 30 days after the start of the term (except at one institution) on a rolling basis, determined by the start date of the fall term.

At each institution, the survey was open for 30 days and at the conclusion of the data collection period, the results were downloaded from SurveyMonkey™. The response rate was low; 1,710 students completed at least one portion of the survey (21.43%). This was not altogether surprising, given that the survey was deployed via email and may have been automatically discarded by inbox junk mail filters. The survey yielded 1,522 usable responses (response rate of 19.07%) for the sections analyzed for reliability. Although Lipka (2011) cited 20% as an acceptable response rate for a student survey, it is difficult to find a corroborating source that cites this 20% threshold exactly. The response rate of this field test administration compared to that of a very popular student engagement survey provides context; the 2011 National Survey of Student Engagement had an average response rate 26% at public institutions (NSSE, 2011). For the same administration year, larger institutions tended to have lower response rates (institutions with more than 20,000 enrolled undergraduate students had an average response rate of 21%). Each institution included in this study had undergraduate enrollment greater than 20,000. Further, the email addresses provided by the institution were generally the university-given email address assigned by the institution (to every new degree-seeking student), which may not have been regularly checked by the student. Given that it is difficult to know how many members of the sample even received the email, estimating the percentage of students who chose not to respond (rather than never viewing the email) is not possible. The data were analyzed using SPSS 19.0.

Major Findings

On the whole, the notion of validity was supported through evidence presented for content standards, response process standards, and internal structures standards. The responses from the field test administration indicated that on the whole, the Outdoor Physical Campus Assessment collected reliable data. Reliability analysis was performed on the satisfaction and importance items ($\alpha = .963$; $n = 1,524$; 65 items), agree-disagree statement items ($\alpha = .912$; $n = 1,522$; 12 items), and the more or less amount items ($\alpha =$

.813; n = 1,588; 16 items). Based upon these results, which are a lower-bound estimate of reliability, the field test administration collected highly reliable data. Internally, the importance and three satisfaction sections (attractiveness, amount, and functionality) were collecting largely consistent data. Five of the 65 items within the importance and satisfaction sections failed to positively impact reliability; three of those items were related to parking.

Discussion of Results

Research Question 1

Is the Outdoor Physical Campus Assessment tool a valid measure for assessing student perceptions of (a) satisfaction with, and (b) the importance of elements of the physical campus environment? Chapter 4 detailed the process utilized to create an instrument that yielded valid and reliable data. Measurement validity is primarily focused on developing items that best represent the concepts they intend to measure. For the type of questions created for the Outdoor Physical Campus Assessment, it was also crucial that the provided responses encompass the whole set of valid answers a respondent would wish to provide. In terms of overall construction, it was also hoped that the individual sections would be internally cohesive, lending additional evidence of the validity of the items as they relate back to an overarching concept, such as importance.

Under a newer view of validity (the *Standards*), five areas of evidence are used to judge validity. Two were not applicable to this study (evidence based on relations to other variables, evidence based on consequences) because there were no other measures of the outdoor campus environment or its impact that could be consulted. Chapter 4 presented a variety of activities engaged by the researcher to bolster the remaining three standards: (a) evidence based on content, (b) evidence based on response process, and (c) evidence based on internal structure.

To increase the content validity of the instrument, the researcher focused on gaining an in-depth knowledge of campus planning and environments through a review of the literature, communication with experts in the field, and the creation of clear definitions of elements of the campus environment. As previously detailed, campus architects and campus consulting experts were interviewed during the early stages of this research. These interviews yielded a wealth of information, including: what would be of interest to campus planners or consultants if an instrument would be developed, how an instrument might be deployed, how the data may be used if obtained, and what areas of literature should be consulted. During that same time period, the researcher conducted a wide literature sweep of available assessments and literature focused on campus planning and design, college choice, higher education marketing, admissions and recruiting, and campus environments. Through this review, a list of elements was generated for the instrument. The campus architects were again consulted to check the definitions of these elements and provide feedback on how comprehensive they perceived the instrument to be. Additions and revisions were made based on their feedback and the instrument was improved by this process. The campus architects asserted that the instrument was a valid measure of the outdoor campus environment from their perspective.

To validate the response process of the instrument, the researcher engaged in two primary tasks: expert review and student review. The campus architects were again called to review a draft copy of the instrument to determine if the wording of the items represented their view of the elements being scrutinized. At this time, the architects also critiqued the provided responses, providing valuable feedback to ensure that the response options were comprehensive and useful for analysis. After the instrument was modified with changes suggested by the experts, student focus groups and cognitive interviews were utilized to ensure the item wording was sufficiently clear and the items were being interpreted as intended by the researcher and the campus architects. The provided responses were also evaluated by the student focus groups and interviews, and several modifications were made in response to their feedback. Overall, the students interpreted the items as intended and were able to answer a majority of the questions with the provided responses. In most cases, if a response option was not present as desired by the focus group or interviewee, it was added. As a whole, the expert reviewers and students who participated in the focus groups and cognitive interviews agreed that the items and responses were valid as worded and they felt that the items could be answered as asked.

To validate the internal structures of the instrument, principal component analysis was conducted along with item-total correlations. The principal components analysis provided support for internal structures by demonstrating that the importance items clustered on one component and all three sections of satisfaction items clustered on another. Although that finding was indicative of cohesive response patterns in the sample, the satisfaction items are of greater value to the stakeholders who would implement this instrument if they are interpreted as three separate sections (satisfaction with attractiveness of elements, satisfaction with amount of elements, and satisfaction with functionality of elements). Item-total analysis indicated that a majority of the items had observed correlation coefficients excess of the *r* = .5 value suggested by Gliner et al. (2009), indicating high internal consistency among the items and corresponding section.

Only the importance section had items that failed to meet the threshold for relationship strength as defined by Gliner et al. (2009) for item-total correlation. Three of the importance items (importance of the cohesiveness of building exteriors [*r* = .492], importance of cigarette disposal receptacles [*r* = .434], and importance of the presence of parking on campus (*r* = .419]) had item total correlations below the threshold. Upon review, it was clear from the distribution of the answers that these questions were answered differently than the other importance items. Appendix I contains histograms for each item within the four primary sections of the instrument. For two of the items, cohesiveness of building exteriors and cigarette disposal receptacles, the difference is due to the variation in the answers. The standard deviations for these items were 1.51 and 1.72, respectively, whereas the standard deviations for the other items in this section were between 0.78 and 1.34. The third item, parking, also had a vastly different response pattern compared with the other importance items.

For the cohesiveness item there was meaningful variation in the distribution of responses. Although its overall relationship to the importance section was barely below the threshold (*r* = .492), there were obvious differences in how the question was answered by institution (*SD* = 1.51). This item may be an example of students validating their own choice in institution. Students at institutions with highly cohesive environments tended to rate the importance of a cohesive environment very highly, whereas students at more eccentric or varied campuses did not place the same value on cohesiveness. The students at campuses with eccentric design or campuses with more modern facilities and grounds tended to be more neutral about the importance of cohesive design.

The cigarette disposal item was less related to the overall importance items (r = .434). The standard deviation for this item was far higher than those of the other items (SD = 1.72) but it was relatively consistent among institutions, with one exception. One of the campuses within the study banned smoking on campus, and its respondents rated the cigarette disposal receptacles as “very unimportant” far more often than the other institutions (14% at the non-smoking campus, and between 2.5% and 9.9% the remaining campuses). In retrospect, it may have been worthwhile to include a question on the instrument asking respondents if they were smokers or non-smokers themselves, as this may have impacted the responses provided by participants.

The third item that was not strongly related to the other importance measures was focused on parking. Anecdotally, this is not a surprise. The standard deviation for the parking item was 1.09 which would put it in the middle of the distribution of standard deviations within the importance section. However, the distribution was very negatively skewed and leptokurtic, which differentiated it from the other items in the section. A sweeping majority of respondents rated parking as important (n = 396) or very important (n = 879), which means that a total of 1,275 participants selected these two responses

(83.7%). No other item in this section resembled this response pattern. Parking is clearly an issue of primary importance to respondents, and this finding was altogether unsurprising to both the campus architects and the researcher.

The importance section was the only one that had item-total correlations below the .5 threshold; three items within the 22-item section failed to exhibit a strong relationship with the calculated total item variable. The attractiveness item section had individual item-total correlation values between .636 and .773, indicating strong relationships with the total attractiveness score calculated for the statistic. The amount item section exhibited similarly high individual item-total correlation values (between r = .564 and r = .773) indicating equally strong relationships with the total amount score calculated for the statistic. The functionality item section featured individual item-total correlations between .589 and .815, again providing support of strong relationships between the individual items and the total functionality score calculated for the statistic. These values provide strong evidence for internal structures validity.

Research Question 2

Did the Outdoor Physical Campus Assessment collect reliable data during the field test administration? The reliability analysis results indicated that the field test administration data was reliable overall. As outlined in Chapter 3, reliability coefficients above .7 were considered consistent, as suggested by Gliner et al. (2009). The four primary sections taken together were highly consistent (α = .963; n = 1,524; 65 items), agree-disagree statement items were highly consistent (α = .912; n = 1,522; 12 items), and the more or less amount items were fairly consistent (α = .813; n = 1,588; 16 items).

The four primary sections collected reliable data on an individual basis as well, as detailed in Table 13.

Although the data collected were from one true field test, having eight different institutions participating in the study provided the researcher with eight distinct environments to measure. Cronbach's alpha statistics were run for each section by institution, and the results were largely consistent; Table 14 contains these results. The variation in Cronbach's alpha values within each section (by institution) were as follows: .064 (importance), .050 (attractiveness), .031 (amount), and .017 (functionality). Taken together, the four primary sections only fluctuated .009 by institution of attendance. The section containing agree-disagree statements (which had lower observed reliability overall) were relatively consistent by institution, varying .027. The more or less items had the lowest reliability and the greatest differential by institution, varying .127 across the institutions included in the study.

Education research literature indicates reliability coefficients greater than .70 are sufficient, but an observed coefficient alpha above .90 "probably means that the items are somewhat repetitious or that there may be more items in the scale than are really necessary for a reliable measure of the concept for research purposes" (Gliner et al., 2009, p. 220). In a statistical sense this is a completely valid observation; adding redundant items that would be answered similarly by respondents will inflate reliability statistics. Each section developed for this instrument was created based upon the literature focused on campus environments and campus design along with interviews of campus architects and higher education consulting professionals. Removing a section from the instrument may have a negative impact upon its overall validity, as an area of content would no longer be represented. Attractiveness, amount, and functionality are separate concepts and a single item to measure all three would be inappropriate.

Research Question 3

Within the Outdoor Physical Campus Assessment, are the importance and satisfaction (attractiveness, amount, and functionality) items collecting internally consistent data? In Chapter 4, results for individual item analysis were discussed. In short, only five items negatively impacted yielded scores that failed to positively impact the reliability of the section to which they belonged. Three items that failed to contribute to the internal consistency of their section were focused on importance (cohesiveness of building exteriors, cigarette disposal receptacles, and the presence of parking). The fourth item that failed to positively impact internal consistency was part of the amount section (amount of parking). The fifth item that failed to positively impact internal consistency was part of the functionality section (functionality of parking placement). The remaining 60 items spread across the four primary sections of the instrument yielded highly internally consistent data.

Importance item analysis. Removing the item focused on the importance of the cohesiveness (similarity) of the exteriors of campus buildings would have improved the overall observed Cronbach's alpha ($\alpha = .912$) by .001. By institution, this item had mixed results. Appendix H contains the reliability analysis item statistics by institution. Removal of the item would have had no impact at four of the eight institutions. At three institutions, removal of this item would have had a positive impact on internal consistency (between .001 and .004), whereas at one campus the consistency would have suffered (.003). The three institutions at which the importance section's internal consistency would have been improved by removal of the cohesiveness item; all have very different style patterns (from unified design to eccentric design), which would prohibit a simplistic explanation for this result.

Removal of the cigarette disposal receptacle item from the importance section had more clear implications. At seven of the eight campuses, the cigarette disposal item had a negative impact on the observed internal consistency of the importance section. This impact ranged between .001 and .014 by campus. One of the participating campuses prohibits smoking on university grounds (and perhaps consequently had the least consistent responses). Excepting that institution, the section reliability coefficient would still be improved between .001 and .008 if the item were removed. As mentioned during the discussion of validation of internal structures, this item may have been answered inconsistently based upon whether the respondent was a smoker or a non-smoker.

Removal of the importance of parking question would have also yielded an improvement of the internal consistency of the importance item, but the effect was imperceptible (.00018). If the item were removed, coefficient alpha for the importance section would have been improved between .001 and .003 at four campuses and negatively impacted between .001 and .003 at four campuses. Ultimately, this question had very little impact on the overall internal consistency of the section. In the discussion of internal structures validity, this item was identified as less strongly-related to the overall composite importance variable calculated for the purposes of item-total correlation. The reason for this was based in the distribution of the responses to this question; 83.7% of respondents rated the importance of parking as important or very important. This question is a candidate for exclusion in subsequent administrations of the instrument, given the emphatic and consistent answers obtained during the field test.

Amount item analysis. The only item within the amount section that did not contribute positively to the internal consistency of its section was focused on parking. This question had a small but measurable impact on the reliability of the section; if removed, the reliability coefficient would have changed from $\alpha = .923$ to $\alpha = .927$. The responses to the amount section for six of the eight campuses would been more consistent (between .001 and .007). At one campus, removal of the item would have made little difference, and at yet another, removal of the item would have made the amount section less consistent. It is interesting to note that at the institution where the amount of parking question contributed positively to the consistency of the section scored the absolute lowest on the item of all campuses in terms of satisfaction. This item is a good candidate for removal in future versions of the instrument.

Functionality item analysis. The final item that negatively impacted its section's internal consistency in the field test focused on the functionality of the placement of parking on campus. Even with this item functionality section overall was highly reliable ($\alpha = .915$; $n = 1{,}552$; 13 items). As with the other parking questions, this item did not positively impact the observed internal consistency of its section. Removal of the parking item would have improved the section's internal consistency to $\alpha = .927$. This observation held for all campuses involved in the study, with a range of improvement between .001 and .014. The distribution of answers varied wildly for this question by institution; the distribution of answers with all respondents combined was relatively flat. This question is an excellent candidate for exclusion in subsequent administrations of this survey instrument.

Conclusions

Based upon the results of the field test administration, it appears the Outdoor Physical Campus Assessment was successful in obtaining reliable and valid information on student perceptions of satisfaction with the outdoor physical campus environment and the importance attributed to the outdoor campus environment. Evidence for the validity of the instrument was supported by a wide literature search, expert consultation, expert review, student focus groups and cognitive interviews, and item-total analysis. The results of the field test administration indicate that a majority of the items included in the Outdoor Physical Campus yielded highly reliable data as a whole and by institution of attendance.

The internal structures validity analysis and reliability statistics revealed that five items were of incidental or negative value to their separate item sections. Thompson (2003) noted that the observed reliability of an instrument will vary with every administration, and this proved true in the field test administration. The functionality of parking placement, amount of parking, and importance of cigarette disposal receptacles items all negatively impacted the sections of the instrument to which they belonged, but not to a practically meaningful degree. Two additional items were less clear in their impact: importance of parking and importance of the cohesiveness of building exteriors.

Recall that the overall reliability coefficient for the four primary sections (combined) was .963, even with these five negative or incidental contributors. Each are discussed as a candidate for removal in subsequent administrations of the Outdoor Physical Campus Assessment.

The importance of parking item was added as a direct request from the campus architects consulted for the study. Whether the intent was to debunk a myth of the importance of parking, or to obtain empirical proof of the importance of parking, the item was added. The importance of the cohesiveness of building exteriors item was derived directly from campus planning literature. Dober (1992) mentioned it as an element used for placemarking, and Turner (1984) and Gaines (1991) also attested to its importance. Ultimately, the item did not contribute in a meaningful way to the overall reliability of the importance section. Asking respondents to bring to mind the cohesiveness of the entire campus may have been unrealistic, and this may explain the wide distribution of responses. In a basic sense, the observed distribution patterns appear to suggest students at cohesive campuses valued cohesiveness, and students at less cohesive campuses found it less important. Overall, the item provided an interesting piece of information for campus architects. Because the items dealing with parking importance and the importance of cohesiveness of building exteriors had little impact on reliability and internal structures validity (as measured by item-total correlation), the research recommends including them in subsequent administrations of the Outdoor Physical Campus Assessment for their simple content coverage value.

The results were more mixed for the item focused on the importance of cigarette disposal receptacles on campus. As previously discussed, the distribution of responses for this item was puzzling. The item was added at the request of the campus architects, who wished to understand if students saw the receptacles as important. At seven of the eight institutions, this question reduced the reliability of the importance section. Participants responding to this question may have been commenting more on seeing cigarette butts on the ground (a behavior issue) than the receptacles themselves, and there was no item on the instrument that asked participants to indicate whether they were smokers or non-smokers. It is important to note, however, that both the trash receptacles item and the recycling receptacles item were highly reliable. It is recommended that the importance of cigarette disposal receptacles item be included in subsequent administrations of the survey, but only with the addition of a new item that asks respondents whether they are smokers or non-smokers for further exploration of this issue.

The item focused on respondent satisfaction with the amount of parking reduced the observed reliability of the amount item section with regularity. By campus, the internal consistency of the amount section suffered at six of the eight institutions due to the inclusion of this item. Unsurprisingly, the mean response for this item was substantially lower (3.74) than the mean responses of all other items for this section (4.7-5.85). The item was added by request of the campus architects consulted for the research. Parking is an important consideration and substantial interest of most colleges and universities, and the campuses included in this study were no exception. The architects felt that including items on parking (as an element with which they must often contend) increased the content validity of the survey instrument. Including this item in the instrument in the future is more an argument of content validity than reliability—the instrument would be less valid to architects without it. However, the researcher is aware that students, without individually numbered and designated parking places on campus, would be disinclined to indicate high satisfaction with the amount of parking available.

The last item that negatively impacted the reliability of the instrument again dealt with parking. The third of the three parking items was focused on functionality of parking placement. This item is an obvious candidate for removal from subsequent administrations of the instrument. In the literature on campus planning, parking was considered a visual blight, an impediment to the pedestrian experience, and something to push to the periphery of campus. In general, placing the parking further from the center of campus requires pedestrians to walk further to their destinations, which can be viewed as an inconvenience to commuters. When examining the data further, the researcher noticed that individuals who indicated they use their car to get around campus indicated lower satisfaction with the placement of parking ($M = 3.88$) than their peers who walked ($M = 4.17$), cycled ($M = 4.02$), or utilized campus bus transportation ($M = 4.32$). Even with this item, the functionality section had an overall reliability coefficient of .915. The distribution of answers was unique for each campus, suggesting that students did not use the question as an opportunity to blindly vent frustration. Ultimately, despite its flaws, this item is still useful for obtaining a sense of student perceptions.

In summary, the Outdoor Physical Campus Assessment was internally consistent and viewed as valid by campus planning experts and the students who participated in the field tests and cognitive interviews. Item-total correlations supported the internal consistency of the four primary sections within the instrument. Five of the items in the four primary sections failed to contribute to the statistical consistency of the instrument. However, these items improved the content validity of the instrument by gathering data on elements of the campus environment as dictated by campus planning and environments literature and campus architects/planners.

Recommendations for Further Research

The next logical step in this research is to analyze the results in great detail as to how respondents' individual characteristics may have framed their responses. Questions, such as: "Is there a relationship between the choice rank of an individual's current institution and their level of satisfaction with the attractiveness of the outdoor campus environment," or "Do graduate students express lower levels of satisfaction with the amount of campus lighting," or "Are students in certain majors more likely to rate elements of the outdoor campus environment as important" can all be investigated using the data collected by the Outdoor Physical Campus assessment. The data gathered ranged from nominal/categorical to ordinal or quasi-ordinal (Kachigan, 1991), and the data were analyzed using parametric statistical techniques. Likert scales have been deemed ordinal by their nature, but are often treated as interval-level data (Kachigan, 1991; Nardi, 2003). Suskie (1996) argued that parametric tests are robust enough to deal with ordinal-level data, and that non-parametric techniques will often provide the same result.

In addition to the four primary sections of the instrument (importance, attractiveness, amount, and functionality), the instrument contained 12 items which asked participants to indicate their agreement with statements. These statements included: “When I first saw the campus, I thought ‘this is the right school for me,’” “The outdoor environment at this campus made me more interested in attending this school,” “The outdoor environment of this campus meets my needs,” and “I believe the outdoor campus environment shows a sense of campus personality.” These questions were formulated as a direct extension of campus environments literature. Although many authors have referred anecdotally to the importance of the constructs in this section, they have not been sufficiently analyzed. The data collected on the Outdoor Physical Campus Assessment will be of value in exploring student perceptions of the environment.

To improve the instrument in subsequent administrations, the researcher recommends adding an item to the biographic questions that asks participants to indicate whether they smoke, to help campus architects interpret the results of the items focused on cigarette disposal receptacles. Additional biographic, demographic, or behavioral questions may be necessary depending on how a researcher intends to use the data collected. It is also advised that future researchers send at least two email reminders to invited participants, as this had significant impact on response rate. One participating institution elected to not send email reminders to the sample and their partial response rate was 9.6% compared with the other seven institutions (which sent two reminders) that had a partial response rate of 23.31%. The survey response period was 30 days long, with reminders sent on day 7 and day 27. The chart in Appendix F reveals defined peaks in response on the first day, the seventh day, and the 27th day of deployment. The deployment window (30 days after the start of the term, for 30 days) appeared to be sufficient for the field test administration and would likely be sufficient for a more wide-scale deployment. Pursuant to Thompson's (2003) advice, reliability analysis should be conducted for every survey deployment.

Recommendations for Practitioners

The results of the field test indicated the Outdoor Physical Campus Assessment collected valid and reliable data. The instrument was constructed as a device for obtaining a sample of student perceptions so that campus planners/architects could determine how the physical campus was perceived, both in terms of satisfaction and importance. As stated in the recommendations section, the researcher suggests utilizing the same basic procedures used in this study for optimal deployment.

The researcher recommends utilizing a random or stratified random sample. The number required for this must be greater than 30, but will ultimately depend on the desired error rate and population size. At the time of this study, electronic survey studies are quite common and are generally well-received by students. Web surveys allow for easy delivery and survey building software or web vendors provide service at a relatively low price. Surveys should be sent early in the fall term to avoid conflicting with the more demanding portion of the semester or quarter. One additional benefit of sending surveys in the fall is the avoidance of between-term attrition. The survey should be open for at least two weeks with two or more email reminders to non-responders.

To customize the survey, institutions should consider adding their own questions to the end of the survey. As a service to the architects that were supportive of the study, the researcher offered to append up to 10 questions to the end of the survey instrument for the field test deployment. Six of the eight participating institutions elected to add questions, and most focused on bicycle paths and rental programs, campus community business development, campus athletics attendance, and safety. In a surface-level review of the responses to these items, it appears that the students enjoyed being asked specific questions about their everyday environment. They provided insightful and often humorous feedback about their surroundings that is of great interest to the campus architects of the participating institutions.

When analyzing the data, campus planners should first review the four primary areas in an overall sense (total importance score, total attractiveness score, total amount score, and total functionality score). Second, reviewing the items by element will prove instructive; for example, how did the institution rate on the importance of landscaping, the attractiveness of the landscaping, and the amount of the landscaping? If the landscaping was rated by students to be important, were students also satisfied with the attractiveness and amount the landscaping? It is important to understand that with an instrument of this type, focused primarily on obtaining a snapshot measure of importance or satisfaction, that the "why" questions will not be answered. Campus planners need to take this data and dig deeper to further explore the issues identified by the instrument.

Focus groups could be presented with the results, and then be asked, “Why do you believe your peers responded this way?”

In many cases, the information obtained by the instrument may simply confirm what the campus planner already believes—but this information transitions beliefs from suspicions to confirmed perceptions of the student body. The section of items focused on whether the respondents wanted more or less of specific elements provides direct feedback for campus planners. The information obtained through using the Outdoor Physical Campus Assessment is actionable. It can be used as part of strategic planning initiatives for the identification and prioritization of projects. It can also be used, if deployed at multiple campuses, as a benchmarking tool (although this should be conducted by an outside coordinating body, such as a state system or professional organization).

Enrollment managers could use this tool in a similar fashion. Assessment of the campus environment can be a powerful aid in strategic decision-making (Evans, 1983). Features of campus that bring the most satisfaction could be highlighted in campus tours and marketing materials to reinforce what current students appreciate about the campus. If the survey is deployed by an enrollment management unit instead of the campus architect or planner, the enrollment manager should ensure the results are shared with the architect or planner. Elements that are less satisfactory will be highlighted for possible refurbishment or replacement, assuming the campus planner or functional leader for the capital planning area is able to prioritize the improvements in the context of their other projects.

The statement-based questions will be of particular interest to enrollment managers. This section asked participants to indicate their agreement with statements such as “The layout of this campus confuses me,” “The outdoor environment of this campus makes me feel safe,” “The outdoor environment of this campus provides sufficient space for outdoor recreation activity,” “The outdoor environment at this campus makes me want to continue attending this school,” and “I am comfortable (feel at home) with the outdoor environment of this campus.” Responses in this section have the potential to identify areas of excellence or mediocrity requiring intervention. Custom-made questions added to the end of the survey could delve more into specific elements of the campus of interest to enrollment management professionals, such as impressions of the campus tour, other colleges considered by the now-enrolled student, and attributes that most attracted the student to campus.

The Outdoor Physical Campus Assessment is a powerful tool for taking a snapshot of student perceptions of the outdoor campus environment. The information collected by the survey is surface-level, but includes a large number of biographic and demographic items which can be used to mine the data to determine the overall satisfaction of students both in the aggregate and a sub-environmental level. The inclusion of items that focus on the importance of outdoor campus elements will allow campus planners and enrollment managers to obtain a sense of how much a given element matters to enrolled students. Armed with this information, campus planners and enrollment managers can make assertions about the student satisfaction with the outdoor campus environment and have better information for decision-making.

APPENDIXES

APPENDIX A

VIEWBOOK PHOTOGRAPH CATEGORIES

Appendix A

Viewbook Photograph Categories

- Advising
- Artistic Activity (Painting, Singing, Musical Instruments, Photography)
- Beauty (Outdoor)
- Buildings/Campus
- Bookstore
- Class (Inside)
- Class (Outside)
- Cultural/Arts (Performances, or cultural events)
- City
- Famous People
- Graduation
- International
- Internships
- Intramurals
- Inter-Varsity Sports
- Inter-Varsity Sports Fields
- Fairs
- Faculty Picture
- Fitness Center
- Medical
- Outdoor Recreation
- President/Trustee
- Profile (Student)
- Profile (Parent)
- Profile (Faculty)
- Profile (Alumni)
- Radio/TV/Newspaper
- Recruiters
- Religious
- ROTC
- Science Labs
- Socializing
- Student Picture
- Students working with small children
- Studying (Inside)
- Studying (Outside)
- Teacher working one-on-one or with small groups with students
- Technology
- Union Play
- Volunteer Work

Klassen, M. L. (2000). Lots of fun, not much work, and no hassles: Marketing images of higher education. *Journal of Marketing for Higher Education*, *10*(2), 11-26.

APPENDIX B

LIST OF INSTITUTIONS CONTACTED FOR VIEWBOOK ANALYSIS

Appendix B

List of Institutions Contacted for Viewbook Analysis

Publicly-Controlled Institutions	Privately-Controlled Institutions
University of Akron* Bowling Green State University* Central State University Cleveland State University* University of Cincinnati* Kent State University* Miami University* Northeastern Ohio Universities College of Medicine (NEOMED)* Ohio State University* Ohio University* Shawnee State University* University of Toledo* Wright State University* Youngstown State University*	Antioch University Ashland University Baldwin-Wallace College* Bluffton University* Capital University* Case Western Reserve University* Cedarville University* College of Mount Saint Joseph* College of Wooster* Defiance College* Denison University* Franklin University* Heidelberg University* Hiram College* John Carroll University* Kenyon College Lake Erie College* Malone University* Marietta College* Mount Union College (University of Mount Union)* Muskingum University Notre Dame College Oberlin College Ohio Dominican University Ohio Northern University Ohio Wesleyan University Otterbein College* Tiffin University* University of Dayton* University of Findlay* University of Rio Grande* Urbana University* Ursuline College* Walsh University* Wilberforce University Wilmington College Wittenberg University* Xavier University

* Provided a viewbook for inclusion in study

APPENDIX C

DOBER'S LANDSCAPE TAXONOMY

Appendix C

Dober's Landscape Taxonomy

1. Periphery
2. Boundaries
3. Gateways
4. Ceremonial open spaces
5. Active recreation open spaces
6. Passive recreation open spaces
7. Gardens and arboretums
8. Building settings
9. Vehicular circulation routes
10. Pedestrian circulation routes
11. Campus crossroads
12. Sculpture, fountains, memorials
13. Outdoor furniture
14. Lighting
15. Signs
16. Plantings
17. Accents
18. Special effects

Dober, R. P. (1992). *Campus design.* New York: John Wiley & Sons. (Page 226).

APPENDIX D

OUTDOOR PHYSICAL CAMPUS ASSESSMENT INSTRUMENT

Appendix D

Outdoor Physical Campus Assessment Instrument

Informed Consent and Participation Notes

Study Title: Survey of Student Opinions on the Outdoor Campus Environment
Principal Investigator: Erica Eckert

Thank you for taking the time to help me with this research!

You are invited to participate in a research study. This consent form (on the following page) will provide you with information on the research project, what you will be asked to do, and the benefits of this research.

Please note, your participation is completely voluntary. Please read this form carefully. If you choose not to participate in my study by completing this survey, feel free to close the survey without progressing past the consent form page.

This survey will take between 8 and 15 minutes to complete; please read each question carefully.

Thank you for your time!

Informed Consent

Purpose

This survey has been created to measure your perceptions of the outdoor campus environment. The initial goal of this research is to determine whether a survey instrument of this type can be successfully utilized to measure student perceptions. A secondary goal is to obtain information on elements of the outdoor campus environment to provide campus administration with a sense of how the students perceive the outdoor environment.

Procedures

As a participant, you will be asked to complete this survey. The survey will contain demographic questions and questions related to attending college (major, GPA, number of hours a week on campus, full- or part-time status, and familiarity with campus). The survey will also ask you questions on your opinions of individual elements of the outdoor campus, and to consider your agreement or disagreement with a few statements pertaining to the campus environment. After you complete the survey, you will not be contacted again unless you are selected in the drawing for a $25 gift card.

Benefits

This research may not benefit you directly. However, your participation in this study will help us to better understand using survey instruments to measure student perceptions of the environment. Your participation will help the researcher to refine this instrument for further use. This research has the potential to improve the effectiveness of campus improvement projects, and demonstrate to administration what elements of the environment the student population is most interested in improving.

Risks and Discomforts

There are no anticipated risks beyond those encountered in everyday life.

Privacy and Confidentiality

You are receiving this survey because you were randomly selected from your peers, and the only information the researcher has been given is your name and email address. This information is being stored in a secure location. Your responses to this survey are confidential will be used only in the aggregate. This means that individual responses to questions will not be used in a way that could be connected to an individual participant. Please note that "confidential" means that your response will be linked to your name and email address, but that information will not be shared with anyone at any point in time in the future.

Compensation

If you complete all portions of this survey in their entirety, you will be entered in a drawing for one of several $25 gift cards to Chipotle, Olive Garden, or Applebee's. Your probability of being selected in the drawing depends on the number of individuals completing the survey between October 5, 2011, and November 5, 2011 (subject to extension, if necessary).

Voluntary Participation

Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty.

Contact Information

If you have any questions or concerns about this research, you may contact Erica Eckert at eeckert@kent.edu or Dr. Mark Kretovics (dissertation director) at mkretov1@kent.edu. This project has been approved by the Kent State University Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

Consent Statement

I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. My completion and return of this survey will be indicative of my consent to participate in this research study. I may print or request a copy of this consent statement for future reference.

Biographic Data

*** 1. How old will you be on December 31 of this year?**

Response options:

15, 16, 17, 18, 19, 20, 21-24, 25-29, 30-39, 40-54, 55 or older

*** 2. What gender do you consider yourself?**

- Male
- Female
- Transgender

*** 3. What is your current class standing?**

- Freshman
- Sophomore
- Junior
- Senior
- Graduate (Master's or Doctoral)

Biographic Data, Continued

4. Did you come to THIS UNIVERSITY as an undergraduate transfer student (did you attend college after high school somewhere else before coming to this university)?

- ◯ Yes
- ◯ No

***5. Are you a full-time or part-time student (to be full-time, you must be enrolled in 12 or more undergraduate credit hours, or 8 or more graduate credit hours)?**

- ◯ Full Time
- ◯ Part Time

***6. Did you visit the campus informally before you selected THIS UNIVERSITY? (Examples include: Little Sibs weekend, on-campus concert or event, personal visit not sponsored by admissions office.)**

- ◯ Yes
- ◯ No

***7. Did you take a campus tour (with the Admissions Office) before you selected THIS UNIVERSITY ?**

- ◯ Yes
- ◯ No

***8. When choosing between colleges, was THIS UNIVERSITY ...**

- ◯ First Choice
- ◯ Second Choice
- ◯ Third Choice
- ◯ Less than Third Choice

Time on Campus

***9. Select the mode of transportation you use most frequently when traveling on campus for classes:**

- ◯ Walk
- ◯ Wheelchair
- ◯ Bicycle
- ◯ Drive (personal vehicle)
- ◯ Bus (campus or city transit)

***10. Do you live on or off campus?**

- ◯ On-Campus (Residence Hall)
- ◯ Off-Campus

11. If you live off-campus, how many hours a week do you spend on campus?

Response options:
Less than 7 hours, 6-15 hours, 16-24 hours, 25-34 hours, 35-44 hours, More than 45 hours

***12. In general, what makes a college or university campus attractive? Select all that apply:**

- [ ] Campus entrances
- [ ] Campus landscaping (flowers and shrub gardens)
- [ ] Trees on campus
- [ ] Green spaces (examples: lawns and open fields) on campus
- [ ] Artistic sculptures, statues, and other outdoor artwork on campus
- [ ] Fountains or water features on campus
- [ ] Outdoor meeting space (examples: spaces outside the student center, outdoor amphitheaters)
- [ ] Informal meeting spaces (examples: picnic tables, areas to meet outside with friends)
- [ ] Benches and other outdoor seating on campus
- [ ] Campus lighting (examples: walkway and street lighting)
- [ ] Trash receptacles on campus
- [ ] Campus directional signs (examples: building signs, direction-pointing signs)
- [ ] Walkways/sidewalks on campus
- [ ] Ramps and other accessibility aids on campus
- [ ] Well-maintained outdoor campus environment
- [ ] Clean outdoor campus environment
- [ ] Campus grounds in general
- [ ] Exteriors of campus buildings
- [ ] Style of architecture
- [ ] Cohesive architecture (the same style throughout campus)

Attractiveness of Features on Campus

***13. Indicate your level of satisfaction with the attractiveness of the following elements at THIS UNIVERSITY:**

	Very Satisfied	Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Dissatisfied	Very Dissatisfied
Attractiveness of entrances to campus (gateways for vehicles or foot traffic):							
Attractiveness of exteriors of campus buildings:							
Attractiveness of campus landscaping (examples: flowers and shrub gardens):							
Attractiveness of the trees on campus:							
Attractiveness of campus green spaces (examples: lawns and open fields):							
Attractiveness of sculptures and statues on campus:							
Attractiveness of fountains or water features on campus:							
Attractiveness of outdoor formal campus meeting space (examples: spaces outside the student center, outdoor amphitheaters, plazas):							
Attractiveness of informal meeting spaces (examples: picnic tables, places to meet outside with friends):							
Attractiveness of benches and other outdoor seating on campus:							
Attractiveness of campus lighting (examples: walkway and street lighting):							
Attractiveness of trash receptacles on campus:							
Attractiveness of recycling receptacles on campus:							
Attractiveness of cigarette disposal receptacles on campus:							
Attractiveness of walkways/sidewalks on campus:							

Amount of Features on Campus

*** 14. Indicate your level of satisfaction with the amount of the following elements at THIS UNIVERSITY:**

	Very Satisfied	Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Dissatisfied	Very Dissatisfied
Amount of campus landscaping (examples: flowers and shrub gardens):	◯	◯	◯	◯	◯	◯	◯
Amount of the trees on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of campus green spaces (examples: lawns and open fields):	◯	◯	◯	◯	◯	◯	◯
Amount of sculptures and statues on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of fountains or water features on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of outdoor formal campus meeting space (examples include: spaces outside the student center, outdoor amphitheaters, plazas):	◯	◯	◯	◯	◯	◯	◯
Amount of informal meeting spaces (examples: picnic tables, places to meet outside with friends):	◯	◯	◯	◯	◯	◯	◯
Amount of benches and other outdoor seating on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of campus lighting (examples: walkway and street lighting):	◯	◯	◯	◯	◯	◯	◯
Amount of trash receptacles on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of recycling receptacles on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of cigarette disposal receptacles on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of campus signs (examples: building signs, direction-pointing signs):	◯	◯	◯	◯	◯	◯	◯
Amount of walkways/sidewalks on campus:	◯	◯	◯	◯	◯	◯	◯
Amount of parking on campus:	◯	◯	◯	◯	◯	◯	◯

Amount of Features on Campus (Quantities)

***15. Please indicate if you would like more, less, or no change in the amount of the following features at THIS UNIVERSITY:**

	Much More	More	No Change is Necessary	Less	Much Less
Campus landscaping (examples: flowers and shrub gardens):	○	○	○	○	○
Trees:	○	○	○	○	○
Green spaces (examples: lawns and open fields):	○	○	○	○	○
Sculptures and statues on campus:	○	○	○	○	○
Fountains or water features on campus:	○	○	○	○	○
Formal campus meeting space (examples include: spaces outside the student center, outdoor amphitheaters, plazas):	○	○	○	○	○
Informal meeting spaces (examples: picnic tables, places to meet outside with friends):	○	○	○	○	○
Benches and other outdoor seating on campus:	○	○	○	○	○
Campus lighting (examples: walkway and street lighting):	○	○	○	○	○
Trash receptacles on campus:	○	○	○	○	○
Recycling receptacles on campus:	○	○	○	○	○
Cigarette disposal receptacles on campus:	○	○	○	○	○
Campus signs (examples: building signs, direction-pointing signs):	○	○	○	○	○
Walkways/sidewalks on campus:	○	○	○	○	○
Parking spots on campus:	○	○	○	○	○
Wheelchair ramps:	○	○	○	○	○

General Satisfaction with Features on Campus

*** 16. Please indicate your level of satisfaction with these elements at THIS UNIVERSITY:**

	Very Satisfied	Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Dissatisfied	Very Dissatisfied
Ease of gaining entry to campus (vehicular or pedestrian via campus entrances):	○	○	○	○	○	○	○
Ease of gaining entry to buildings on campus:	○	○	○	○	○	○	○
Ease of getting around outdoor campus areas:	○	○	○	○	○	○	○
Safety and stability of walkways and sidewalks on campus:	○	○	○	○	○	○	○
Usefulness of campus lighting (examples: walkway and street lighting):	○	○	○	○	○	○	○
Organization of campus (location of buildings, green space, open space, and walkways):	○	○	○	○	○	○	○
Overall maintenance of the outdoor campus environment:	○	○	○	○	○	○	○
Cleanliness of outdoor campus areas:	○	○	○	○	○	○	○
Level of care shown in campus design in general:	○	○	○	○	○	○	○
Cohesiveness (similarity) of exteriors of campus buildings:	○	○	○	○	○	○	○
Usefulness/readability of campus signs (examples: building signs, direction-pointing signs):	○	○	○	○	○	○	○
Placement of campus signs (examples: building signs, direction-pointing signs):	○	○	○	○	○	○	○
Placement of parking on campus:	○	○	○	○	○	○	○

Familiarity with Campus

***17. How would you rate your familiarity with the layout (where buildings are located; how to get from one location to another) on campus at THIS UNIVERSITY?**

- ◯ Excellent
- ◯ Very Good
- ◯ Good
- ◯ Fair
- ◯ Poor

***18. How difficult was it to become familiar with the layout (building locations) on THIS UNIVERSITY'S campus?**

- ◯ Very Difficult
- ◯ Difficult
- ◯ Somewhat Difficult
- ◯ Neither Difficult nor Easy
- ◯ Somewhat Easy
- ◯ Easy
- ◯ Very Easy

***19. Rank the items you use to know the layout of THIS UNIVERSITY'S campus by importance:**

	1st - Most important	2nd	3rd	4th	5th - Least important
Signs (examples: building signs, direction-pointing signs)	◯	◯	◯	◯	◯
Maps Displayed on Campus Signs	◯	◯	◯	◯	◯
Maps from Brochures or Internet	◯	◯	◯	◯	◯
Landmarks	◯	◯	◯	◯	◯
Asking people for help	◯	◯	◯	◯	◯

***20. How would you rate your ability to provide a lost student or parent with directions to a specific location on the THIS UNIVERSITY campus?**

- ◯ Excellent
- ◯ Very Good
- ◯ Good
- ◯ Fair
- ◯ Poor

Importance of Campus Features (Page 1 of 2)

This question focuses in on how important these elements of the outdoor campus at THIS UNIVERSITY are to you.

*21. Please indicate how important the following elements are to you on the THIS UNIVERSITY campus:

	Very Important	Important	Somewhat Important	Neutral	Somewhat Unimportant	Unimportant	Very Unimportant
The presence of attractive campus entrances:	○	○	○	○	○	○	○
The attractiveness of the exteriors of campus buildings:	○	○	○	○	○	○	○
The cohesiveness (similarity) of the exteriors of campus buildings:	○	○	○	○	○	○	○
The presence of campus landscaping (flowers and shrub gardens):	○	○	○	○	○	○	○
The presence of trees on campus:	○	○	○	○	○	○	○
The presence of green spaces (examples: lawns, open fields) on campus:	○	○	○	○	○	○	○
The presence of sculptures, statues, and other outdoor artwork on campus:	○	○	○	○	○	○	○
The presence of fountains or water features on campus:	○	○	○	○	○	○	○
The presence of outdoor formal campus meeting space (examples: spaces outside the student center, amphitheaters, plazas):	○	○	○	○	○	○	○
The presence of outdoor informal meeting spaces (examples: picnic tables, places to meet outside with friends):	○	○	○	○	○	○	○
The presence of benches and other outdoor seating on campus:	○	○	○	○	○	○	○

Importance of Campus Features (Page 2 of 2)

This question (a continuation of the last page) focuses in on how important these elements of the outdoor campus at THIS UNIVERSITY are to you.

***22. Please indicate how important the following elements are to you on the THIS UNIVERSITY campus:**

	Very Important	Important	Somewhat Important	Neutral	Somewhat Unimportant	Unimportant	Very Unimportant
The presence of walkways/sidewalks on campus:							
The presence of campus lighting (examples: walkway and street lighting):							
The presence of trash receptacles on campus:							
The presence of recycling receptacles on campus:							
The presence of cigarette disposal receptacles on campus:							
The presence of campus directional signs (examples: building signs, direction-pointing signs):							
The presence of ramps and other accessibility aids on campus (examples: curb cuts, lifts):							
The presence of parking on campus:							
The overall maintenance of the outdoor physical campus environment:							
The overall cleanliness of the outdoor physical campus environment:							
The level of care shown in the design of campus grounds in general:							

Opinions/Perceptions About Campus (Page 1 of 2)

Please indicate the extent to which you agree or disagree with the following prompts when thinking about outdoor campus at THIS UNIVERSITY.

***23. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
When I first saw the campus, I thought "this is the right school for me."	◯	◯	◯	◯	◯	◯	◯

***24. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The layout of this campus confuses me.	◯	◯	◯	◯	◯	◯	◯

***25. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
This campus is visually interesting.	◯	◯	◯	◯	◯	◯	◯

***26. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
I consider this campus attractive.	◯	◯	◯	◯	◯	◯	◯

***27. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The outdoor campus environment is well-maintained.	◯	◯	◯	◯	◯	◯	◯

***28. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The outdoor environment of this campus meets my needs.	◯	◯	◯	◯	◯	◯	◯

Opinions/Perceptions About Campus (Page 2 of 2)

Please indicate the extent to which you agree or disagree with the following prompts when thinking about outdoor campus at THIS UNIVERSITY.

***29. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
I am comfortable (feel at home) with the outdoor environment of this campus.	◯	◯	◯	◯	◯	◯	◯

***30. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The outdoor environment of this campus makes me feel safe.	◯	◯	◯	◯	◯	◯	◯

***31. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The outdoor environment of this campus provides sufficient space for outdoor recreation activity.	◯	◯	◯	◯	◯	◯	◯

***32. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
I believe the outdoor campus environment shows a sense of campus personality.	◯	◯	◯	◯	◯	◯	◯

***33. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The outdoor environment at this campus made me more interested in attending this school.	◯	◯	◯	◯	◯	◯	◯

***34. Please indicate your level of agreement with this statement:**

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
The outdoor environment at this campus makes me want to continue to attend this school.	◯	◯	◯	◯	◯	◯	◯

Other Biographic Information

Don't give up! You have reached the last page of this survey-- just a few more questions to go.

***35. Select your current GPA; if you are a freshman use your high school GPA; if a transfer or graduate student in your first semester, use the GPA from your last school.**

Response options:
4.0 - 3.6, 3.5 - 3.1, 3.0 - 2.6, 2.5 - 2.1, 2.0 - 1.6, 1.5 - 1.1, 1.0 - 0.6, 0.5 - 0.0

***36. Select the group closest to your primary academic major:**

- Undecided
- Creative Arts (includes fine and applied arts)
- Performing Arts (includes music and theater/dance)
- Humanities (includes languages, philosophy, religion)
- Biological Science (includes biology, life sciences, environmental science)
- Physical Science (includes physics, chemistry, mathematics, astronomy)
- Computer Science (includes data systems, drafting, programming)
- Social Sciences (includes anthropology, sociology, political science, psychology)
- Business (includes accounting, finance, marketing, management, international business)
- Communication (includes journalism, public relations, visual communication/design, interpersonal/organizational)
- Education (includes pre-K through grade 12, educational administration, health education, art and music education, higher education administration)
- Health and Human Services (includes counseling, nursing, medical administration)
- Professional (medicine, law, dentistry, veterinarian, physical/occupational therapy, architecture)
- Engineering (includes civil, mechanical, electrical, chemical, computer, etc.)
- Other Majors

37. Select the race/ethnic background(s) you consider yourself:
(Please note, this question is optional and data and responses will be anonymous and only used in aggregate.)

- International Student (Non-US Citizen)
- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino(a)
- Native Hawaiian or Other Pacific Islander
- White

38. Approximately how far is campus from your home (permanent) address?

- Less than ten miles
- 11-20 miles
- 21-40 miles
- 41-80 miles
- 81-120 miles
- 120-300 miles
- 300-1000 miles
- More than 1000 miles

39. Please estimate the size of the in town in which you were raised:

- Rural (Less than 5,000 residents)
- Small-Suburban (Between 5,001 and 25,000 residents)
- Medium-Suburban (Between 25,001 and 75,000 residents)
- Large-Suburban (Between 75,001 and 200,000 residents)
- Metropolitan (Over 200,001 residents)
- I have no idea

You have reached the end of this survey. To complete and submit your survey, please click the "All Done!" button, below. If you are selected in the drawing as a gift card winner, you will be notified via email. Thank you for your time!

APPENDIX E

INVITATION AND REMINDER EMAIL MESSAGES

Appendix E

Invitation and Reminder Email Messages

Survey Invitation Email – Used at 6 of 8 Institutions

From: eeckert@kent.edu via surveymonkey.com member@surveymonkey.com
Reply-to: eeckert@kent.edu Date: Day, Date, Timestamp
Subject: Outdoor Campus Environment Survey Study
Mailed-by: smo.surveymonkey.com Signed-by: surveymonkey.com

Hello, Erica--
My name is Erica Eckert and I am a Ph.D. candidate in Higher Education Administration at Kent State University. I am interested in student opinions about the outdoor campus environment at public universities in Ohio. You have been randomly selected from your peers at [YOUR CURRENT INSTITUTION] to receive my survey; I hope you are willing to give me a few minutes of your time.

Once you complete the survey, you will be eligible for a drawing for a $25 gift card from Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty. You may choose among the restaurant options listed if you are selected.) This survey will take approximately 10 minutes to complete.

Here is a link to the survey:
[DYNAMIC SURVEYMONKEY LINK – BY PERSON]

This link is uniquely tied to this survey and your email address. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact me via email (eeckert@kent.edu)!

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.
[DYNAMIC SURVEYMONKEY OPT-OUT LINK – BY PERSON]

Thanks, and have a great day—Erica

Survey Invitation Email – From the University of Rockaway

From: -------@urockaway.edu via surveymonkey.com member@surveymonkey.com
Reply-to: -------@urockaway.edu Date: Wed, Sep 21, 2011 at 10:38 AM
Subject: Outdoor Campus Environment Survey Study
Mailed-by: smo.surveymonkey.com Signed-by: surveymonkey.com

Hello, Erica--

The University of Rockaway's Office of Capital Planning and Facilities Management is interested in your opinions about the outdoor campus environment at UR. This research is being conducted in a partnership with Erica Eckert, a Ph.D. candidate studying the outdoor campus environment of several Ohio public universities.

Once you complete the survey, you will be eligible for a drawing for one of two $25 gift cards from either Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty.)

This survey will take approximately 10 minutes of your time. This research is aimed at getting information from students so campus administration can know more about what you think. You were randomly selected from your peers at this school to receive this survey, and we would greatly appreciate your assistance.

Here is a link to the survey:
[DYNAMIC SURVEYMONKEY LINK – BY PERSON]

This link is uniquely tied to this survey and your email address. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact Erica Eckert (eeckert@kent.edu)!

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.
[DYNAMIC SURVEYMONKEY OPT-OUT LINK – BY PERSON]

Survey Invitation Email – From the University of Tillamook

From: Erica Eckert <eeckert@kent.edu>
To:
Cc:
Date: Thu, 20 Oct 2011 08:40:26 -0400
Subject: Dissertation Survey Research

Hello,

The University of Tillamook is interested in your opinions about the outdoor campus environment at UT. This research is being conducted by Erica Eckert, a Ph.D. candidate from Kent State University studying the outdoor campus environment of several Ohio public universities. This survey will be open until 11:59 pm on Sunday, November 20th.

This survey will take approximately 10 minutes of your time. This research is aimed at getting information from students so campus administration can know more about what you think. You were randomly selected from your peers at this school to receive this survey, and we would greatly appreciate your assistance.

Once you complete the survey, you will have the option of providing your email address and name which will enter you in a drawing for one of two $25 gift cards from either Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty.) If you provide this info, it will be used only to contact you regarding the prize drawing if you are a winner and will otherwise be discarded.

Here is a link to the survey:
[STATIC LINK]

This link is tied to this survey. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact Erica Eckert via email at eeckert@kent.edu.

Survey 7-Day Reminder Email – Used at 6 of 8 Institutions

From: eeckert@kent.edu via surveymonkey.com member@surveymonkey.com
Reply-to: eeckert@kent.edu Date: Day, Date, Timestamp
Subject: Outdoor Campus Environment Survey Reminder

Hello, Erica--

This email is a reminder about a survey invitation your received last week.

My name is Erica Eckert and I am a Ph.D. candidate in Higher Education Administration at Kent State University. I am interested in student opinions about the outdoor campus environment at public universities in Ohio.

Once you complete the survey, you will be eligible for a drawing for a $25 gift card from Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty. You may choose among the restaurant options listed if you are selected.)

This survey will take approximately 10 minutes to complete.

Here is a link to the survey:
[DYNAMIC SURVEYMONKEY LINK – BY PERSON]

This link is uniquely tied to this survey and your email address. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact me via email (eeckert@kent.edu)!

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.
[DYNAMIC SURVEYMONKEY OPT-OUT LINK – BY PERSON]

Thanks, and have a great day—
Erica

Survey 7-Day Reminder Email – From the University of Rockaway

From: -------@urockaway.edu via surveymonkey.com member@surveymonkey.com
Reply-to: -------@urockaway.edu Date: Wed, Sep 28, 2011 at 2:15 PM
Subject: Outdoor Campus Environment Survey Reminder

Hello, Erica--

This email message serves as a reminder-- The University of Rockaway's Office of Capital Planning and Facilities Management is interested in your opinions about the outdoor campus environment at UR.

Once you complete the survey, you will be eligible for a drawing for one of two $25 gift cards from either Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty.)

This research is being conducted in a partnership with Erica Eckert, a Ph.D. candidate studying the outdoor campus environment of several Ohio public universities.

The survey will take approximately 10 minutes of your time.

Here is a link to the survey:
[DYNAMIC SURVEYMONKEY LINK – BY PERSON]

This link is uniquely tied to this survey and your email address. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact Erica Eckert (eeckert@kent.edu)!

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.
[DYNAMIC SURVEYMONKEY OPT-OUT LINK – BY PERSON]

Survey Final Reminder Email – Used at 6 of 8 Institutions

From: eeckert@kent.edu via surveymonkey.com member@surveymonkey.com
Reply-to: eeckert@kent.edu Date: Day, Date, Timestamp
Subject: Final Reminder - Outdoor Campus Environment Survey - Closes [DAY]

Hello, Erica--

This email serves as a 'last call' for completing a survey about the outdoor campus environment at [YOUR CURRENT INSTITUTION]. The survey will close on [DAY], [MONTH DATE, YEAR] at [TIME].

Once you complete the survey, you will be eligible for a drawing for a $25 gift card from Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty. You may choose among the restaurant options listed if you are selected.)

This survey will take approximately 10 minutes to complete. The questions focus on student perceptions of the outdoor campus environment, and the survey is being sent to students at several public universities in Ohio. Your assistance is appreciated!

Here is a link to the survey:
[DYNAMIC SURVEYMONKEY LINK – BY PERSON]

This link is uniquely tied to this survey and your email address. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact me via email (eeckert@kent.edu)!

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.
[DYNAMIC SURVEYMONKEY OPT-OUT LINK – BY PERSON]

Thanks, and have a great day—
Erica

Survey Final Reminder Email – From the University of Rockaway

From: -------@urockaway.edu via surveymonkey.com member@surveymonkey.com
Reply-to: -------@urockaway.edu Date: Tue, Oct 18, 2011 at 2:27 PM
Subject: Final Reminder - Outdoor Campus Environment Survey - Closes Friday

Hello, Erica--

This email message serves as a final reminder-- The University of Rockaway's Office of Capital Planning and Facilities Management is interested in your opinions about the outdoor campus environment at UR.

The survey will be open until 11:59pm on October 21, 2011.

Once you complete the survey, you will be eligible for a drawing for one of two $25 gift cards from either Chipotle, Applebee's, or Olive Garden. (Your odds of winning depend on the number of completed surveys, but will likely be about one in fifty.)

This research is being conducted in a partnership with Erica Eckert, a Ph.D. candidate studying the outdoor campus environment of several Ohio public universities.

The survey will take approximately 10 minutes of your time.

Here is a link to the survey:
[DYNAMIC SURVEYMONKEY LINK – BY PERSON]

This link is uniquely tied to this survey and your email address. Please do not forward this message. Your responses are confidential and will not be shared except in the aggregate.

Please consider participating in this study. Your insights will add to the knowledge we have on the outdoor campus environment, and may lead to the improvement of campus spaces here and at other colleges and universities.

Thank you for your time-- if you have any questions about this research, please feel free to contact Erica Eckert (eeckert@kent.edu)!

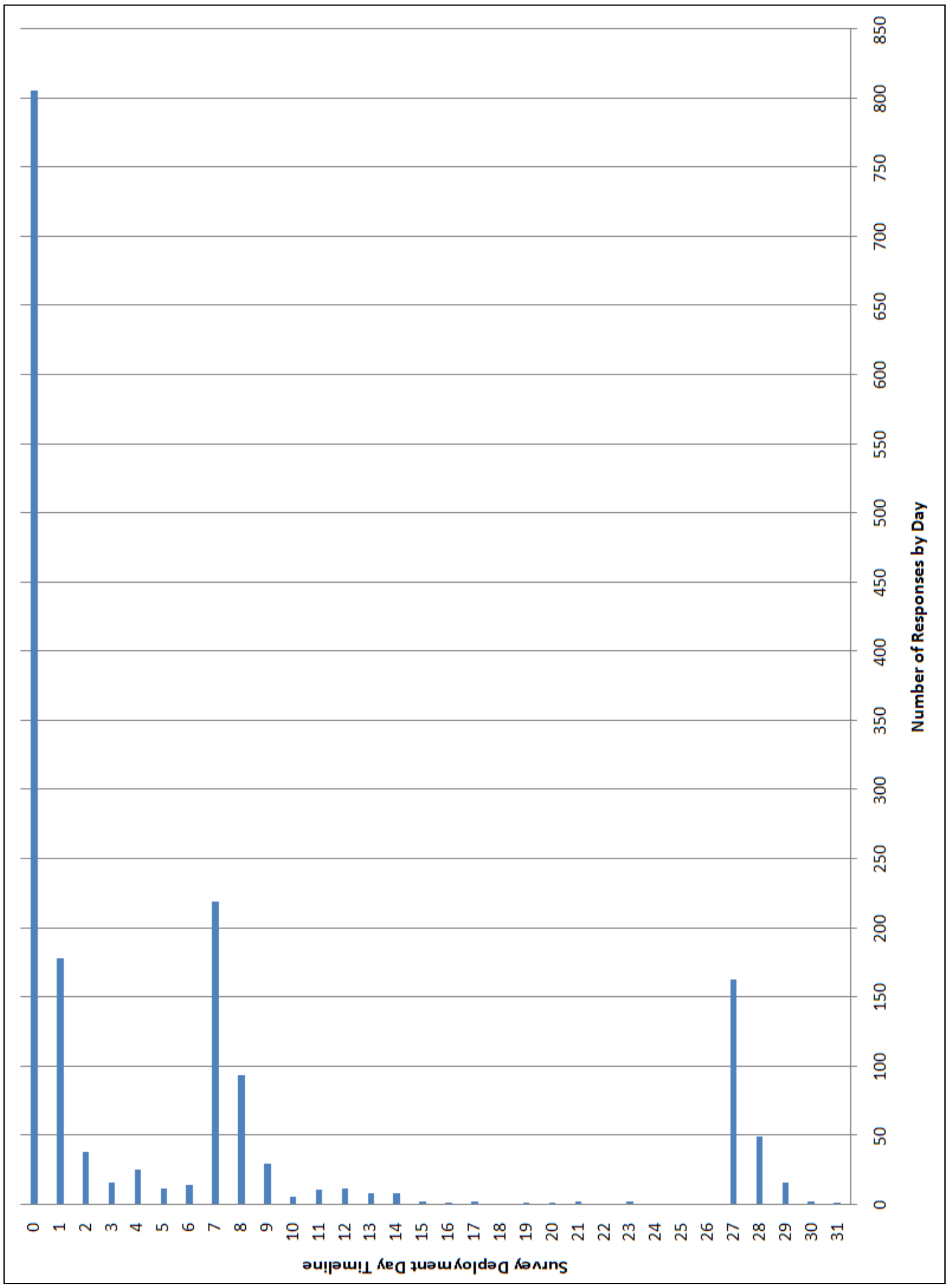
Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.
[DYNAMIC SURVEYMONKEY OPT-OUT LINK – BY PERSON]

APPENDIX F

SURVEY RESPONSE BY DAY

Appendix F

Survey Response by Day



APPENDIX G

RELIABILITY ANALYSIS BY SECTION

Appendix G

Reliability Analysis by Section

Table G1

Reliability Statistics—Importance Section

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Respondents
.912	.924	22	1,542

Table G2

Individual Item Reliability Analysis—Importance Section

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Importance: Campus Entrances	124.17	184.559	.580	.549	.907
Importance: Building Exteriors	123.86	186.079	.638	.648	.906
Importance: Cohesiveness	124.61	185.400	.421	.377	.913
Importance: Landscaping	123.79	186.137	.655	.608	.906
Importance: Trees	123.62	188.917	.575	.645	.908
Importance: Green Space	123.66	187.917	.629	.634	.907
Importance: Statues and Artwork	124.59	184.023	.527	.477	.909
Importance: Water Features	124.42	185.248	.515	.456	.909
Importance: Formal Meeting Space	124.20	184.838	.643	.637	.906
Importance: Informal Meeting Space	123.98	185.930	.647	.722	.906
Importance: Benches/Seating	123.87	187.114	.649	.618	.906
Importance: Walkways	123.33	191.893	.567	.577	.908
Importance: Lighting	123.32	191.489	.545	.578	.909
Importance: Trash	123.64	188.927	.614	.699	.907
Importance: Recycling	123.69	188.537	.545	.635	.908
Importance: Cigarette Disposal	124.58	186.574	.329	.278	.918
Importance: Signage	123.76	188.337	.561	.429	.908
Importance: Ramps	123.97	185.353	.519	.444	.909
Importance: Parking	123.47	193.184	.353	.254	.912
Importance: Maintenance	123.43	189.031	.669	.765	.907
Importance: Cleanliness	123.31	190.520	.647	.745	.907
Importance: Planned Design	123.50	188.123	.655	.632	.906

Table G3

Reliability Statistics—Attractiveness Section

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Respondents
.926	.928	15	1,643

Table G4

Individual Item Reliability Analysis—Attractiveness Section

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Attractive: Campus Entrances	75.55	164.760	.612	.430	.922
Attractive: Building Exteriors	75.33	165.662	.577	.397	.923
Attractive: Landscaping	75.07	166.613	.668	.600	.921
Attractive: Trees	74.94	167.540	.626	.599	.922
Attractive: Green Space	75.01	166.691	.638	.574	.921
Attractive: Statues and Artwork	75.85	161.379	.645	.463	.921
Attractive: Water Features	75.95	160.336	.617	.468	.922
Attractive: Formal Meeting Space	75.71	159.183	.717	.636	.919
Attractive: Informal Meeting Space	75.73	159.454	.729	.718	.918
Attractive: Benches/Seating	75.65	161.206	.708	.647	.919
Attractive: Lighting	75.66	161.611	.667	.483	.920
Attractive: Trash	75.81	161.722	.675	.682	.920
Attractive: Recycling	76.00	160.209	.647	.660	.921
Attractive: Cigarette Disposal	76.50	160.603	.579	.444	.924
Attractive: Walkways	75.42	163.181	.669	.479	.920

Table G5

Reliability Statistics—Amount Section

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Respondents
.923	.928	15	1,612

Table G6

Individual item Reliability Analysis—Amount Section

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Amount: Landscaping	72.16	197.135	.654	.598	.918
Amount: Trees	72.07	197.110	.604	.633	.919
Amount: Green Space	72.07	196.307	.659	.621	.918
Amount: Statues and Artwork	72.80	193.275	.643	.515	.918
Amount: Water Features	73.09	190.632	.643	.533	.918
Amount: Formal Meeting Space	72.77	190.122	.725	.668	.916
Amount: Informal Meeting Space	72.75	190.250	.730	.733	.916
Amount: Benches/Seating	72.68	190.753	.717	.665	.916
Amount: Lighting	72.64	191.958	.670	.494	.917
Amount: Trash	72.57	192.800	.695	.673	.917
Amount: Recycling	72.94	190.178	.635	.620	.919
Amount: Cigarette Disposal	73.20	193.570	.594	.442	.920
Amount: Signage	72.67	192.670	.668	.478	.918
Amount: Walkways	72.07	198.201	.660	.501	.918
Amount: Parking	74.17	191.769	.465	.238	.927

Table G7

Reliability Statistics—Functionality Section

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Respondents
.915	.923	13	1,552

Table G8

Individual item Reliability Analysis—Functionality Section

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Functionality: Campus Entrances	66.28	115.280	.611	.494	.910
Functionality: Entering Buildings	66.00	117.478	.692	.652	.908
Functionality: Getting Around Outside	65.97	116.882	.712	.644	.907
Functionality: Walkways	66.14	114.952	.647	.527	.908
Functionality: Lighting	66.42	114.668	.624	.480	.909
Functionality: Layout	66.20	112.342	.775	.635	.903
Functionality: Maintenance	65.95	116.816	.719	.720	.907
Functionality: Cleanliness	65.93	117.935	.643	.660	.909
Functionality: Campus Design Plan	66.02	114.622	.714	.626	.906
Functionality: Cohesiveness	66.31	115.001	.573	.429	.912
Functionality: Sign Legibility	66.38	112.607	.717	.797	.906
Functionality: Sign Placement	66.51	112.493	.689	.785	.907
Functionality: Parking Placement	67.71	112.355	.470	.277	.921

APPENDIX H

RELIABILITY BY INSTITUTION AND SECTION

Appendix H

Reliability by Institution and Section

Table H1

Individual Item Analysis by Institution – University of Rockaway

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.683	.718	.919	.924	-0.005
Building Exteriors	.666	.754	.919	.924	-0.005
Cohesiveness	.459	.526	.924	.924	0.000
Landscaping	.657	.775	.919	.924	-0.005
Trees	.558	.732	.921	.924	-0.003
Green Space	.674	.816	.919	.924	-0.005
Statues and Artwork	.627	.624	.920	.924	-0.004
Water Features	.569	.585	.921	.924	-0.003
Formal Meeting Space	.633	.699	.920	.924	-0.004
Informal Meeting Space	.613	.791	.920	.924	-0.004
Benches/Seating	.649	.730	.919	.924	-0.005
Walkways	.598	.617	.921	.924	-0.003
Lighting	.486	.653	.922	.924	-0.002
Trash	.621	.776	.920	.924	-0.004
Recycling	.643	.785	.919	.924	-0.005
* Cigarette Disposal	.319	.355	.929	.924	0.005
Signage	.624	.579	.920	.924	-0.004
Ramps	.546	.538	.921	.924	-0.003
* Parking	.266	.336	.925	.924	0.001
Maintenance	.725	.781	.918	.924	-0.006
Cleanliness	.692	.749	.919	.924	-0.005
Planned Design	.685	.676	.919	.924	-0.005
Attractiveness					
Campus Entrances	.607	.520	.946	.947	-0.001
Building Exteriors	.659	.558	.945	.947	-0.002
Landscaping	.752	.709	.943	.947	-0.004
Trees	.742	.729	.943	.947	-0.004
Green Space	.740	.695	.943	.947	-0.004
Statues and Artwork	.746	.640	.943	.947	-0.004
Water Features	.689	.636	.945	.947	-0.002
Formal Meeting Space	.789	.769	.942	.947	-0.005
Informal Meeting Space	.785	.806	.942	.947	-0.005
Benches/Seating	.776	.750	.942	.947	-0.005
Lighting	.752	.635	.943	.947	-0.004
Trash	.735	.726	.943	.947	-0.004

(*table continues*)

Table H1 (continued)

Individual Item Analysis by Institution – University of Rockaway

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Recycling	.657	.672	.945	.947	-0.002
Cigarette Disposal	.641	.578	.946	.947	-0.001
Walkways	.762	.711	.943	.947	-0.004
Amount					
Landscaping	.677	.698	.929	.934	-0.005
Trees	.697	.723	.929	.934	-0.005
Green Space	.726	.725	.928	.934	-0.006
Statues and Artwork	.716	.665	.928	.934	-0.006
Water Features	.677	.662	.929	.934	-0.005
Formal Meeting Space	.745	.753	.927	.934	-0.007
Informal Meeting Space	.754	.771	.927	.934	-0.007
Benches/Seating	.736	.709	.927	.934	-0.007
Lighting	.708	.621	.928	.934	-0.006
Trash	.723	.674	.928	.934	-0.006
Recycling	.668	.693	.929	.934	-0.005
Cigarette Disposal	.585	.494	.932	.934	-0.002
Signage	.683	.578	.929	.934	-0.005
Walkways	.693	.544	.929	.934	-0.005
* Parking	.424	.233	.938	.934	0.004
Functionality					
Campus Entrances	.551	.463	.914	.916	-0.002
Entering Buildings	.716	.684	.908	.916	-0.008
Getting Around Outside	.684	.605	.909	.916	-0.007
Walkways	.578	.503	.912	.916	-0.004
Lighting	.591	.478	.912	.916	-0.004
Layout	.807	.699	.903	.916	-0.013
Maintenance	.709	.786	.908	.916	-0.008
Cleanliness	.685	.763	.908	.916	-0.008
Campus Design Plan	.699	.595	.908	.916	-0.008
Cohesiveness	.592	.498	.912	.916	-0.004
Sign Legibility	.711	.870	.907	.916	-0.009
Sign Placement	.653	.860	.909	.916	-0.007
* Parking Placement	.545	.361	.917	.916	0.001

* Removal of item could improve reliability for this section at this institution.

Table H2

Individual Item Analysis by Institution – Prarie Creek State University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.640	.606	.921	.925	-0.004
Building Exteriors	.689	.655	.920	.925	-0.005
Cohesiveness	.447	.485	.925	.925	0.000
Landscaping	.653	.684	.921	.925	-0.004
Trees	.556	.625	.922	.925	-0.003
Green Space	.570	.528	.922	.925	-0.003
Statues and Artwork	.454	.526	.925	.925	0.000
Water Features	.481	.522	.925	.925	0.000
Formal Meeting Space	.652	.663	.921	.925	-0.004
Informal Meeting Space	.646	.770	.921	.925	-0.004
Benches/Seating	.667	.726	.921	.925	-0.004
Walkways	.621	.737	.921	.925	-0.004
Lighting	.662	.800	.920	.925	-0.005
Trash	.688	.813	.920	.925	-0.005
Recycling	.615	.765	.921	.925	-0.004
* Cigarette Disposal	.439	.381	.927	.925	0.002
Signage	.619	.635	.921	.925	-0.004
Ramps	.606	.524	.921	.925	-0.004
* Parking	.332	.386	.926	.925	0.001
Maintenance	.687	.857	.920	.925	-0.005
Cleanliness	.722	.886	.920	.925	-0.005
Planned Design	.713	.731	.920	.925	-0.005
Attractiveness					
Campus Entrances	.621	.492	.914	.919	-0.005
Building Exteriors	.644	.515	.914	.919	-0.005
Landscaping	.628	.581	.914	.919	-0.005
Trees	.591	.528	.916	.919	-0.003
Green Space	.635	.543	.914	.919	-0.005
Statues and Artwork	.611	.499	.915	.919	-0.004
Water Features	.610	.512	.915	.919	-0.004
Formal Meeting Space	.649	.599	.914	.919	-0.005
Informal Meeting Space	.682	.646	.912	.919	-0.007
Benches/Seating	.639	.646	.914	.919	-0.005
Lighting	.648	.515	.913	.919	-0.006
Trash	.624	.767	.914	.919	-0.005
Recycling	.617	.747	.915	.919	-0.004
Cigarette Disposal	.589	.471	.916	.919	-0.003
Walkways	.687	.543	.912	.919	-0.007

(*table continues*)

Table H2 (continued)

Individual Item Analysis by Institution – Prarie Creek State University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Amount					
Landscaping	.541	.491	.903	.907	-0.004
Trees	.553	.567	.903	.907	-0.004
Green Space	.579	.508	.902	.907	-0.005
Statues and Artwork	.542	.477	.903	.907	-0.004
Water Features	.557	.524	.903	.907	-0.004
Formal Meeting Space	.639	.646	.900	.907	-0.007
Informal Meeting Space	.676	.726	.898	.907	-0.009
Benches/Seating	.588	.652	.902	.907	-0.005
Lighting	.670	.526	.899	.907	-0.008
Trash	.627	.703	.900	.907	-0.007
Recycling	.616	.710	.901	.907	-0.006
Cigarette Disposal	.583	.448	.902	.907	-0.005
Signage	.717	.586	.897	.907	-0.010
Walkways	.604	.501	.901	.907	-0.006
Parking	.505	.352	.906	.907	-0.001
Functionality					
Campus Entrances	.574	.575	.903	.908	-0.005
Entering Buildings	.651	.707	.901	.908	-0.007
Getting Around Outside	.665	.637	.900	.908	-0.008
Walkways	.567	.499	.903	.908	-0.005
Lighting	.629	.510	.901	.908	-0.007
Layout	.746	.632	.896	.908	-0.012
Maintenance	.721	.719	.899	.908	-0.009
Cleanliness	.658	.659	.901	.908	-0.007
Campus Design Plan	.727	.669	.896	.908	-0.012
Cohesiveness	.567	.463	.905	.908	-0.003
Sign Legibility	.719	.739	.897	.908	-0.011
Sign Placement	.711	.748	.897	.908	-0.011
* Parking Placement	.455	.307	.914	.908	0.006

* Removal of item could improve reliability for this section at this institution.

Table H3

Individual Item Analysis by Institution – Boardman University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.484	.543	.900	.904	-0.004
Building Exteriors	.611	.738	.898	.904	-0.006
Cohesiveness	.503	.509	.901	.904	-0.003
Landscaping	.672	.695	.896	.904	-0.008
Trees	.647	.688	.897	.904	-0.007
Green Space	.687	.711	.896	.904	-0.008
Statues and Artwork	.546	.652	.899	.904	-0.005
Water Features	.590	.691	.898	.904	-0.006
Formal Meeting Space	.676	.783	.896	.904	-0.008
Informal Meeting Space	.659	.806	.897	.904	-0.007
Benches/Seating	.663	.675	.897	.904	-0.007
Walkways	.547	.670	.899	.904	-0.005
Lighting	.539	.656	.900	.904	-0.004
Trash	.579	.765	.899	.904	-0.005
Recycling	.550	.742	.899	.904	-0.005
* Cigarette Disposal	.190	.291	.918	.904	0.014
Signage	.491	.447	.900	.904	-0.004
Ramps	.427	.505	.902	.904	-0.002
Parking	.380	.403	.903	.904	-0.001
Maintenance	.614	.837	.898	.904	-0.006
Cleanliness	.590	.788	.899	.904	-0.005
Planned Design	.619	.681	.898	.904	-0.006
Attractiveness					
Campus Entrances	.505	.372	.912	.914	-0.002
Building Exteriors	.497	.414	.913	.914	-0.001
Landscaping	.556	.604	.911	.914	-0.003
Trees	.470	.456	.914	.914	0.000
Green Space	.544	.494	.911	.914	-0.003
Statues and Artwork	.623	.491	.909	.914	-0.005
Water Features	.658	.561	.907	.914	-0.007
Formal Meeting Space	.766	.712	.904	.914	-0.010
Informal Meeting Space	.711	.728	.906	.914	-0.008
Benches/Seating	.737	.711	.904	.914	-0.010
Lighting	.670	.497	.907	.914	-0.007
Trash	.675	.673	.907	.914	-0.007
Recycling	.662	.697	.908	.914	-0.006
Cigarette Disposal	.589	.467	.911	.914	-0.003
Walkways	.624	.495	.909	.914	-0.005

(*table continues*)

Table H3 (continued)

Individual Item Analysis by Institution – Boardman University

	Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Amount						
	Landscaping	.619	.595	.921	.925	-0.004
	Trees	.522	.656	.924	.925	-0.001
	Green Space	.588	.626	.922	.925	-0.003
	Statues and Artwork	.693	.612	.918	.925	-0.007
	Water Features	.694	.622	.918	.925	-0.007
	Formal Meeting Space	.753	.757	.916	.925	-0.009
	Informal Meeting Space	.732	.764	.917	.925	-0.008
	Benches/Seating	.768	.687	.916	.925	-0.009
	Lighting	.684	.508	.918	.925	-0.007
	Trash	.752	.746	.917	.925	-0.008
	Recycling	.661	.656	.920	.925	-0.005
	Cigarette Disposal	.605	.465	.921	.925	-0.004
	Signage	.660	.482	.919	.925	-0.006
	Walkways	.597	.519	.922	.925	-0.003
*	Parking	.513	.333	.926	.925	0.001
Functionality						
	Campus Entrances	.574	.468	.898	.904	-0.006
	Entering Buildings	.696	.640	.895	.904	-0.009
	Getting Around Outside	.749	.658	.893	.904	-0.011
	Walkways	.684	.591	.893	.904	-0.011
	Lighting	.641	.535	.896	.904	-0.008
	Layout	.799	.722	.890	.904	-0.014
	Maintenance	.747	.802	.893	.904	-0.011
	Cleanliness	.660	.706	.896	.904	-0.008
	Campus Design Plan	.698	.693	.895	.904	-0.009
	Cohesiveness	.467	.521	.902	.904	-0.002
	Sign Legibility	.680	.810	.894	.904	-0.010
	Sign Placement	.641	.787	.896	.904	-0.008
*	Parking Placement	.426	.302	.916	.904	0.012

* Removal of item could improve reliability for this section at this institution.

Table H4

Individual Item Analysis by Institution – Ecola State University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.548	.617	.898	.903	-0.005
Building Exteriors	.598	.687	.897	.903	-0.006
* Cohesiveness	.310	.366	.907	.903	0.004
Landscaping	.593	.593	.897	.903	-0.006
Trees	.601	.726	.897	.903	-0.006
Green Space	.633	.647	.896	.903	-0.007
Statues and Artwork	.439	.469	.902	.903	-0.001
Water Features	.391	.472	.903	.903	0.000
Formal Meeting Space	.584	.586	.897	.903	-0.006
Informal Meeting Space	.670	.712	.895	.903	-0.008
Benches/Seating	.649	.603	.896	.903	-0.007
Walkways	.563	.556	.899	.903	-0.004
Lighting	.519	.542	.899	.903	-0.004
Trash	.616	.728	.897	.903	-0.006
Recycling	.521	.633	.899	.903	-0.004
* Cigarette Disposal	.390	.294	.904	.903	0.001
Signage	.532	.499	.899	.903	-0.004
Ramps	.525	.512	.899	.903	-0.004
Parking	.423	.428	.901	.903	-0.002
Maintenance	.650	.759	.897	.903	-0.006
Cleanliness	.596	.719	.898	.903	-0.005
Planned Design	.611	.626	.897	.903	-0.006
Attractiveness					
Campus Entrances	.603	.519	.921	.925	-0.004
Building Exteriors	.548	.457	.923	.925	-0.002
Landscaping	.686	.641	.920	.925	-0.005
Trees	.614	.625	.921	.925	-0.004
Green Space	.675	.603	.920	.925	-0.005
Statues and Artwork	.625	.446	.921	.925	-0.004
Water Features	.527	.371	.924	.925	-0.001
Formal Meeting Space	.682	.586	.919	.925	-0.006
Informal Meeting Space	.761	.748	.917	.925	-0.008
Benches/Seating	.723	.662	.918	.925	-0.007
Lighting	.702	.568	.918	.925	-0.007
Trash	.706	.701	.918	.925	-0.007
Recycling	.751	.746	.917	.925	-0.008
Cigarette Disposal	.571	.531	.923	.925	-0.002
Walkways	.659	.509	.920	.925	-0.005

(*table continues*)

Table H4 (continued)

Individual Item Analysis by Institution – Ecola State University

	Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
	Amount					
	Landscaping	.705	.690	.917	.923	-0.006
	Trees	.618	.660	.919	.923	-0.004
	Green Space	.677	.686	.918	.923	-0.005
	Statues and Artwork	.604	.541	.919	.923	-0.004
	Water Features	.612	.592	.919	.923	-0.004
	Formal Meeting Space	.724	.721	.916	.923	-0.007
	Informal Meeting Space	.765	.788	.914	.923	-0.009
	Benches/Seating	.773	.748	.914	.923	-0.009
	Lighting	.692	.590	.917	.923	-0.006
	Trash	.695	.704	.916	.923	-0.007
	Recycling	.694	.691	.916	.923	-0.007
	Cigarette Disposal	.574	.516	.920	.923	-0.003
	Signage	.644	.544	.918	.923	-0.005
	Walkways	.657	.567	.918	.923	-0.005
*	Parking	.415	.227	.930	.923	0.007
	Functionality					
	Campus Entrances	.586	.528	.911	.915	-0.004
	Entering Buildings	.700	.680	.908	.915	-0.007
	Getting Around Outside	.689	.645	.908	.915	-0.007
	Walkways	.691	.635	.907	.915	-0.008
	Lighting	.704	.624	.906	.915	-0.009
	Layout	.752	.620	.904	.915	-0.011
	Maintenance	.699	.716	.908	.915	-0.007
	Cleanliness	.545	.617	.913	.915	-0.002
	Campus Design Plan	.675	.594	.908	.915	-0.007
	Cohesiveness	.627	.463	.910	.915	-0.005
	Sign Legibility	.699	.753	.907	.915	-0.008
	Sign Placement	.679	.740	.908	.915	-0.007
*	Parking Placement	.504	.343	.919	.915	0.004

* Removal of item could improve reliability for this section at this institution.

Table H5

Individual Item Analysis by Institution – Redwood University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.553	.581	.935	.937	-0.002
Building Exteriors	.685	.665	.933	.937	-0.004
Cohesiveness	.484	.544	.937	.937	0.000
Landscaping	.754	.685	.932	.937	-0.005
Trees	.623	.679	.934	.937	-0.003
Green Space	.724	.722	.933	.937	-0.004
Statues and Artwork	.632	.568	.934	.937	-0.003
Water Features	.577	.542	.935	.937	-0.002
Formal Meeting Space	.728	.709	.932	.937	-0.005
Informal Meeting Space	.697	.781	.933	.937	-0.004
Benches/Seating	.680	.689	.933	.937	-0.004
Walkways	.688	.676	.933	.937	-0.004
Lighting	.682	.673	.933	.937	-0.004
Trash	.660	.789	.933	.937	-0.004
Recycling	.576	.719	.935	.937	-0.002
* Cigarette Disposal	.379	.411	.941	.937	0.004
Signage	.635	.532	.934	.937	-0.003
Ramps	.582	.580	.935	.937	-0.002
Parking	.576	.502	.935	.937	-0.002
Maintenance	.735	.826	.933	.937	-0.004
Cleanliness	.688	.800	.933	.937	-0.004
Planned Design	.755	.766	.932	.937	-0.005
Attractiveness					
Campus Entrances	.563	.373	.898	.903	-0.005
Building Exteriors	.519	.393	.899	.903	-0.004
Landscaping	.611	.608	.896	.903	-0.007
Trees	.402	.425	.902	.903	-0.001
Green Space	.550	.499	.898	.903	-0.005
Statues and Artwork	.673	.543	.893	.903	-0.010
Water Features	.513	.424	.900	.903	-0.003
Formal Meeting Space	.647	.547	.894	.903	-0.009
Informal Meeting Space	.682	.699	.893	.903	-0.010
Benches/Seating	.701	.687	.892	.903	-0.011
Lighting	.575	.385	.897	.903	-0.006
Trash	.636	.710	.894	.903	-0.009
Recycling	.631	.664	.895	.903	-0.008
Cigarette Disposal	.583	.477	.898	.903	-0.005
Walkways	.610	.435	.895	.903	-0.008

(*table continues*)

Table H5 (continued)

Individual Item Analysis by Institution – Redwood University

	Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Amount						
	Landscaping	.577	.512	.898	.903	-0.005
	Trees	.463	.566	.901	.903	-0.002
	Green Space	.582	.558	.898	.903	-0.005
	Statues and Artwork	.633	.514	.895	.903	-0.008
	Water Features	.579	.460	.897	.903	-0.006
	Formal Meeting Space	.716	.675	.892	.903	-0.011
	Informal Meeting Space	.693	.735	.893	.903	-0.010
	Benches/Seating	.708	.674	.893	.903	-0.010
	Lighting	.578	.396	.897	.903	-0.006
	Trash	.663	.685	.894	.903	-0.009
	Recycling	.597	.641	.897	.903	-0.006
	Cigarette Disposal	.626	.511	.896	.903	-0.007
	Signage	.650	.483	.895	.903	-0.008
	Walkways	.646	.538	.896	.903	-0.007
*	Parking	.399	.234	.910	.903	0.007
Functionality						
	Campus Entrances	.651	.572	.896	.905	-0.009
	Entering Buildings	.701	.742	.896	.905	-0.009
	Getting Around Outside	.731	.751	.894	.905	-0.011
	Walkways	.624	.529	.897	.905	-0.008
	Lighting	.524	.362	.903	.905	-0.002
	Layout	.719	.603	.894	.905	-0.011
	Maintenance	.711	.721	.894	.905	-0.011
	Cleanliness	.661	.653	.896	.905	-0.009
	Campus Design Plan	.707	.672	.895	.905	-0.010
	Cohesiveness	.609	.478	.898	.905	-0.007
	Sign Legibility	.741	.835	.892	.905	-0.013
	Sign Placement	.671	.797	.895	.905	-0.010
*	Parking Placement	.383	.249	.919	.905	0.014

* Removal of item could improve reliability for this section at this institution.

Table H6

Individual Item Analysis by Institution – University of Yaquina

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.616	.607	.914	.918	-0.004
Building Exteriors	.653	.715	.913	.918	-0.005
Cohesiveness	.450	.519	.918	.918	0.000
Landscaping	.688	.705	.912	.918	-0.006
Trees	.664	.744	.913	.918	-0.005
Green Space	.681	.705	.913	.918	-0.005
Statues and Artwork	.446	.470	.918	.918	0.000
Water Features	.525	.495	.916	.918	-0.002
Formal Meeting Space	.634	.687	.913	.918	-0.005
Informal Meeting Space	.687	.770	.912	.918	-0.006
Benches/Seating	.683	.659	.913	.918	-0.005
Walkways	.618	.664	.914	.918	-0.004
Lighting	.551	.656	.915	.918	-0.003
Trash	.663	.649	.913	.918	-0.005
Recycling	.552	.555	.915	.918	-0.003
* Cigarette Disposal	.317	.380	.924	.918	0.006
Signage	.582	.495	.914	.918	-0.004
Ramps	.479	.475	.917	.918	-0.001
* Parking	.302	.341	.919	.918	0.001
Maintenance	.711	.828	.913	.918	-0.005
Cleanliness	.718	.838	.913	.918	-0.005
Planned Design	.703	.741	.912	.918	-0.006
Attractiveness					
Campus Entrances	.630	.462	.912	.918	-0.006
Building Exteriors	.499	.365	.916	.918	-0.002
Landscaping	.689	.671	.911	.918	-0.007
Trees	.667	.707	.911	.918	-0.007
Green Space	.581	.670	.914	.918	-0.004
Statues and Artwork	.550	.434	.916	.918	-0.002
Water Features	.625	.490	.913	.918	-0.005
Formal Meeting Space	.665	.616	.911	.918	-0.007
Informal Meeting Space	.688	.704	.910	.918	-0.008
Benches/Seating	.682	.596	.911	.918	-0.007
Lighting	.641	.531	.912	.918	-0.006
Trash	.708	.682	.910	.918	-0.008
Recycling	.611	.590	.913	.918	-0.005
Cigarette Disposal	.511	.360	.917	.918	-0.001
Walkways	.708	.553	.910	.918	-0.008

(*table continues*)

Table H6 (continued)

Individual Item Analysis by Institution – University of Yaquina

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Amount					
Landscaping	.704	.686	.921	.927	-0.006
Trees	.620	.660	.923	.927	-0.004
Green Space	.705	.646	.921	.927	-0.006
Statues and Artwork	.626	.524	.923	.927	-0.004
Water Features	.672	.569	.922	.927	-0.005
Formal Meeting Space	.703	.624	.921	.927	-0.006
Informal Meeting Space	.724	.713	.920	.927	-0.007
Benches/Seating	.704	.654	.921	.927	-0.006
Lighting	.686	.550	.921	.927	-0.006
Trash	.698	.713	.921	.927	-0.006
Recycling	.623	.588	.923	.927	-0.004
Cigarette Disposal	.635	.484	.923	.927	-0.004
Signage	.643	.473	.922	.927	-0.005
Walkways	.676	.562	.922	.927	-0.005
* Parking	.467	.276	.930	.927	0.003
Functionality					
Campus Entrances	.616	.559	.918	.922	-0.004
Entering Buildings	.676	.639	.915	.922	-0.007
Getting Around Outside	.786	.757	.912	.922	-0.010
Walkways	.723	.643	.913	.922	-0.009
Lighting	.672	.525	.915	.922	-0.007
Layout	.805	.688	.910	.922	-0.012
Maintenance	.730	.740	.914	.922	-0.008
Cleanliness	.613	.613	.917	.922	-0.005
Campus Design Plan	.743	.706	.913	.922	-0.009
Cohesiveness	.558	.442	.919	.922	-0.003
Sign Legibility	.663	.840	.916	.922	-0.006
Sign Placement	.653	.837	.916	.922	-0.006
* Parking Placement	.528	.385	.925	.922	0.003

* Removal of item could improve reliability for this section at this institution.

Table H7

Individual Item Analysis by Institution – Heceta State University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.556	.621	.864	.873	-0.009
Building Exteriors	.565	.650	.864	.873	-0.009
* Cohesiveness	.371	.371	.874	.873	0.001
Landscaping	.562	.558	.865	.873	-0.008
Trees	.370	.681	.870	.873	-0.003
Green Space	.390	.640	.870	.873	-0.003
Statues and Artwork	.532	.483	.865	.873	-0.008
Water Features	.527	.466	.865	.873	-0.008
Formal Meeting Space	.596	.639	.863	.873	-0.010
Informal Meeting Space	.545	.728	.865	.873	-0.008
Benches/Seating	.534	.617	.866	.873	-0.007
Walkways	.337	.476	.871	.873	-0.002
Lighting	.457	.504	.869	.873	-0.004
Trash	.521	.731	.867	.873	-0.006
Recycling	.421	.701	.869	.873	-0.004
Cigarette Disposal	.452	.453	.872	.873	-0.001
Signage	.489	.366	.867	.873	-0.006
Ramps	.525	.495	.866	.873	-0.007
* Parking	.256	.245	.876	.873	0.003
Maintenance	.526	.676	.867	.873	-0.006
Cleanliness	.504	.663	.868	.873	-0.005
Planned Design	.480	.510	.868	.873	-0.005
Attractiveness					
Campus Entrances	.637	.504	.919	.924	-0.005
Building Exteriors	.636	.466	.919	.924	-0.005
Landscaping	.624	.536	.920	.924	-0.004
Trees	.590	.596	.921	.924	-0.003
Green Space	.550	.510	.922	.924	-0.002
Statues and Artwork	.722	.594	.916	.924	-0.008
Water Features	.594	.476	.921	.924	-0.003
Formal Meeting Space	.695	.617	.917	.924	-0.007
Informal Meeting Space	.719	.735	.916	.924	-0.008
Benches/Seating	.716	.707	.916	.924	-0.008
Lighting	.682	.528	.917	.924	-0.007
Trash	.645	.691	.919	.924	-0.005
Recycling	.659	.665	.918	.924	-0.006
Cigarette Disposal	.600	.461	.920	.924	-0.004
Walkways	.610	.449	.920	.924	-0.004

(*table continues*)

Table H7 (continued)

Individual Item Analysis by Institution – Heceta State University

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Amount					
Landscaping	.643	.581	.913	.919	-0.006
Trees	.566	.656	.915	.919	-0.004
Green Space	.622	.673	.914	.919	-0.005
Statues and Artwork	.670	.570	.912	.919	-0.007
Water Features	.650	.529	.912	.919	-0.007
Formal Meeting Space	.696	.631	.911	.919	-0.008
Informal Meeting Space	.693	.729	.911	.919	-0.008
Benches/Seating	.700	.710	.911	.919	-0.008
Lighting	.641	.517	.913	.919	-0.006
Trash	.695	.711	.911	.919	-0.008
Recycling	.610	.656	.914	.919	-0.005
Cigarette Disposal	.594	.483	.914	.919	-0.005
Signage	.633	.481	.913	.919	-0.006
Walkways	.655	.504	.913	.919	-0.006
* Parking	.489	.282	.921	.919	0.002
Functionality					
Campus Entrances	.663	.564	.908	.915	-0.007
Entering Buildings	.687	.660	.908	.915	-0.007
Getting Around Outside	.671	.637	.908	.915	-0.007
Walkways	.641	.558	.909	.915	-0.006
Lighting	.659	.569	.908	.915	-0.007
Layout	.713	.620	.906	.915	-0.009
Maintenance	.694	.707	.907	.915	-0.008
Cleanliness	.696	.699	.907	.915	-0.008
Campus Design Plan	.662	.595	.908	.915	-0.007
Cohesiveness	.601	.500	.911	.915	-0.004
Sign Legibility	.749	.810	.904	.915	-0.011
Sign Placement	.729	.805	.905	.915	-0.010
* Parking Placement	.399	.261	.924	.915	0.009

* Removal of item could improve reliability for this section at this institution.

Table H8

Individual Item Analysis by Institution – University of Tillamook

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Importance					
Campus Entrances	.658	.624	.890	.898	-0.008
Building Exteriors	.720	.735	.889	.898	-0.009
* Cohesiveness	.294	.326	.902	.898	0.004
Landscaping	.630	.779	.891	.898	-0.007
Trees	.448	.673	.895	.898	-0.003
Green Space	.633	.705	.892	.898	-0.006
Statues and Artwork	.555	.577	.893	.898	-0.005
Water Features	.464	.634	.895	.898	-0.003
Formal Meeting Space	.646	.829	.891	.898	-0.007
Informal Meeting Space	.627	.842	.891	.898	-0.007
Benches/Seating	.648	.804	.890	.898	-0.008
Walkways	.455	.618	.895	.898	-0.003
Lighting	.461	.668	.895	.898	-0.003
Trash	.454	.681	.895	.898	-0.003
Recycling	.373	.616	.897	.898	-0.001
* Cigarette Disposal	.247	.457	.906	.898	0.008
Signage	.569	.733	.892	.898	-0.006
Ramps	.542	.668	.893	.898	-0.005
Parking	.468	.556	.895	.898	-0.003
Maintenance	.656	.791	.891	.898	-0.007
Cleanliness	.620	.855	.892	.898	-0.006
Planned Design	.579	.809	.893	.898	-0.005
Attractiveness					
Campus Entrances	.519	.441	.891	.897	-0.006
Building Exteriors	.536	.459	.891	.897	-0.006
Landscaping	.563	.620	.890	.897	-0.007
Trees	.604	.707	.888	.897	-0.009
Green Space	.579	.563	.889	.897	-0.008
Statues and Artwork	.578	.482	.889	.897	-0.008
Water Features	.510	.552	.893	.897	-0.004
Formal Meeting Space	.726	.740	.883	.897	-0.014
Informal Meeting Space	.670	.855	.885	.897	-0.012
Benches/Seating	.659	.758	.886	.897	-0.011
Lighting	.514	.413	.892	.897	-0.005
Trash	.553	.734	.890	.897	-0.007
Recycling	.512	.727	.892	.897	-0.005
Cigarette Disposal	.534	.429	.891	.897	-0.006
Walkways	.539	.455	.891	.897	-0.006

(*table continues*)

Table H8 (continued)

Individual Item Analysis by Institution – University of Tillamook

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Institution Section Alpha	Section Improvement When Removed
Amount					
Landscaping	.571	.727	.901	.906	-0.005
Trees	.580	.734	.901	.906	-0.005
Green Space	.560	.542	.902	.906	-0.004
Statues and Artwork	.625	.489	.900	.906	-0.006
Water Features	.570	.505	.902	.906	-0.004
Formal Meeting Space	.677	.709	.897	.906	-0.009
Informal Meeting Space	.670	.815	.898	.906	-0.008
Benches/Seating	.617	.722	.900	.906	-0.006
Lighting	.640	.498	.899	.906	-0.007
Trash	.652	.688	.899	.906	-0.007
Recycling	.553	.629	.902	.906	-0.004
Cigarette Disposal	.609	.561	.900	.906	-0.006
Signage	.639	.520	.899	.906	-0.007
Walkways	.587	.570	.902	.906	-0.004
Parking	.493	.342	.906	.906	0.000
Functionality					
Campus Entrances	.564	.621	.907	.911	-0.004
Entering Buildings	.647	.703	.904	.911	-0.007
Getting Around Outside	.638	.660	.904	.911	-0.007
Walkways	.654	.510	.903	.911	-0.008
Lighting	.576	.421	.906	.911	-0.005
Layout	.725	.654	.900	.911	-0.011
Maintenance	.739	.788	.900	.911	-0.011
Cleanliness	.624	.727	.904	.911	-0.007
Campus Design Plan	.752	.689	.900	.911	-0.011
Cohesiveness	.489	.353	.910	.911	-0.001
Sign Legibility	.715	.775	.900	.911	-0.011
Sign Placement	.703	.805	.901	.911	-0.010
* Parking Placement	.527	.507	.912	.911	0.001

* Removal of item could improve reliability for this section at this institution.

APPENDIX I

VISUAL ITEM ANALYSIS

Appendix I

Visual Item Analysis

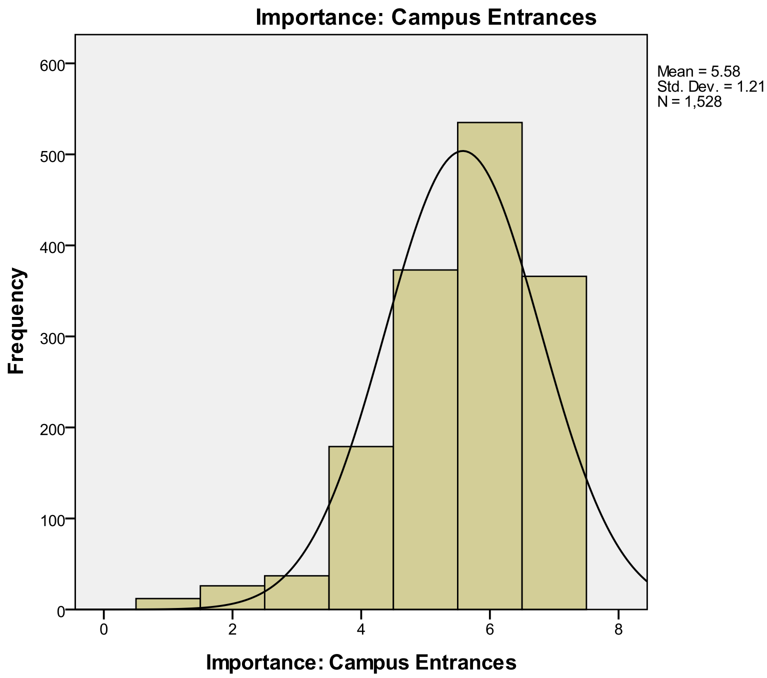


Figure I1. Item Response Pattern for Importance: Campus entrances

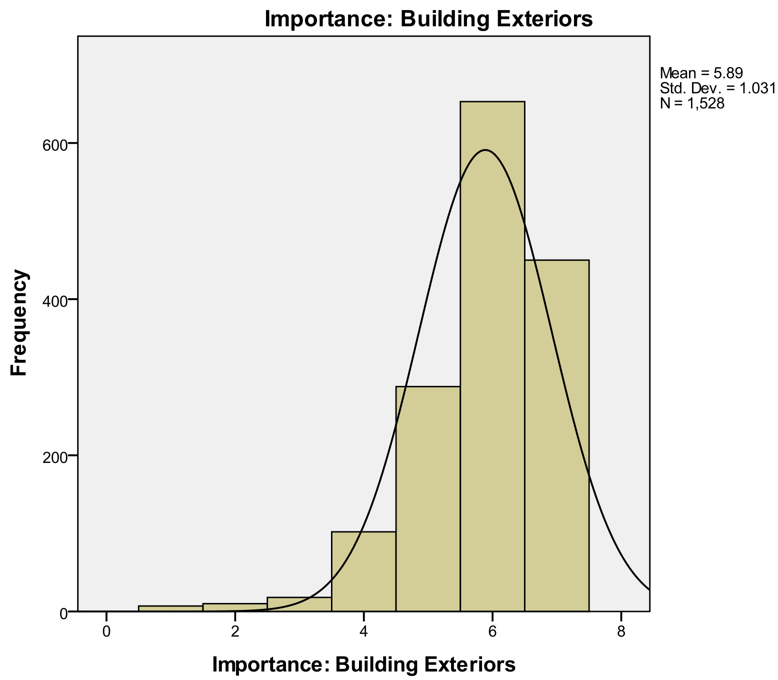


Figure I2. Item Response pattern for Importance: Building exteriors

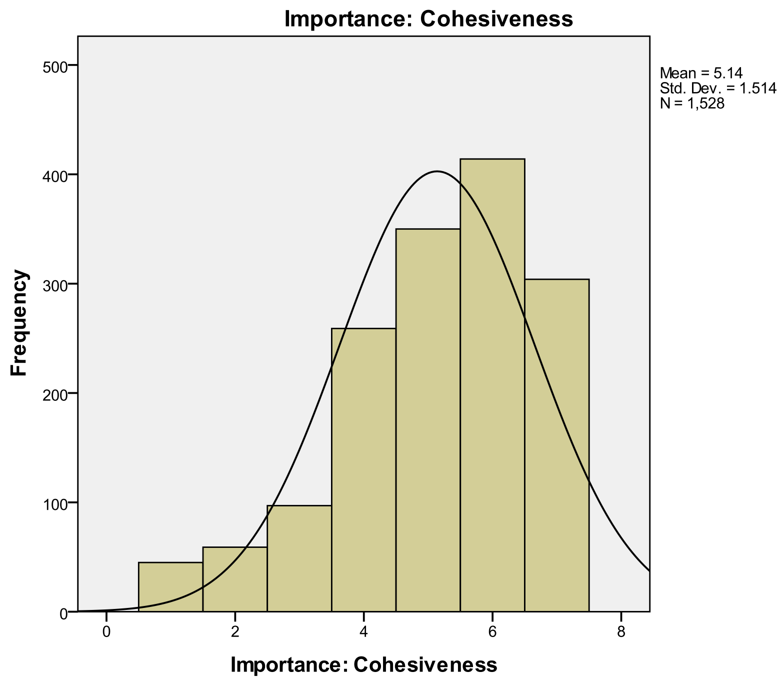


Figure I3. Item Response Pattern for Importance: Building exterior cohesiveness

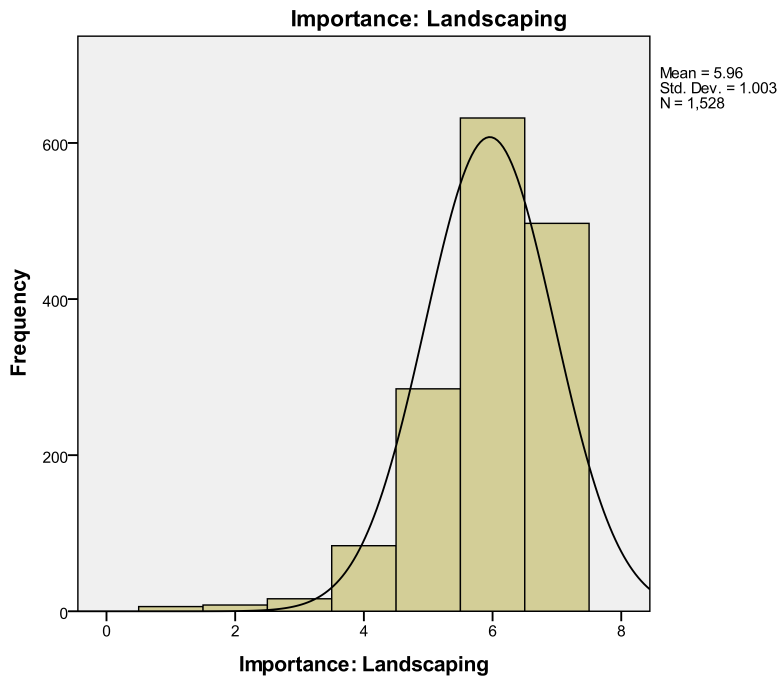


Figure I4. Item Response Pattern for Importance: Landscaping

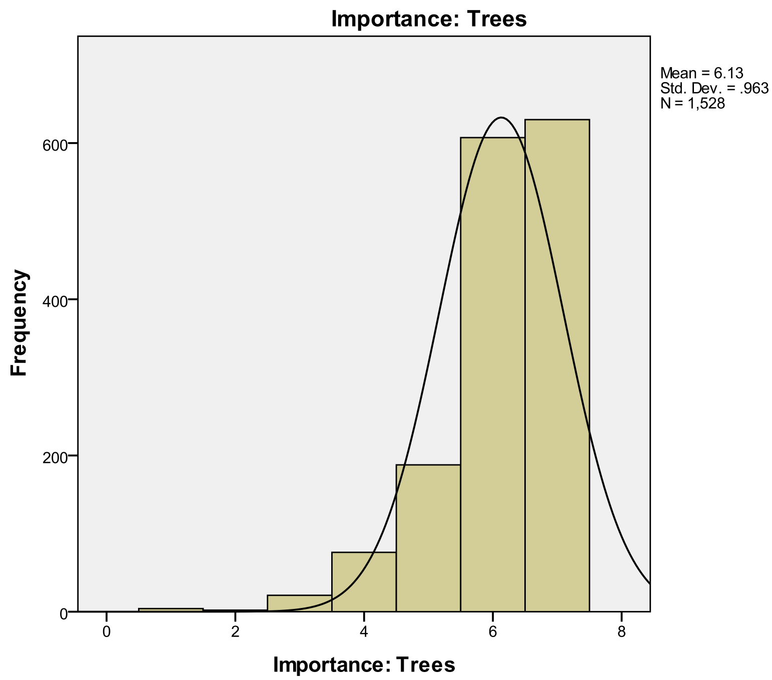


Figure I5. Item Response Pattern for Importance: Trees

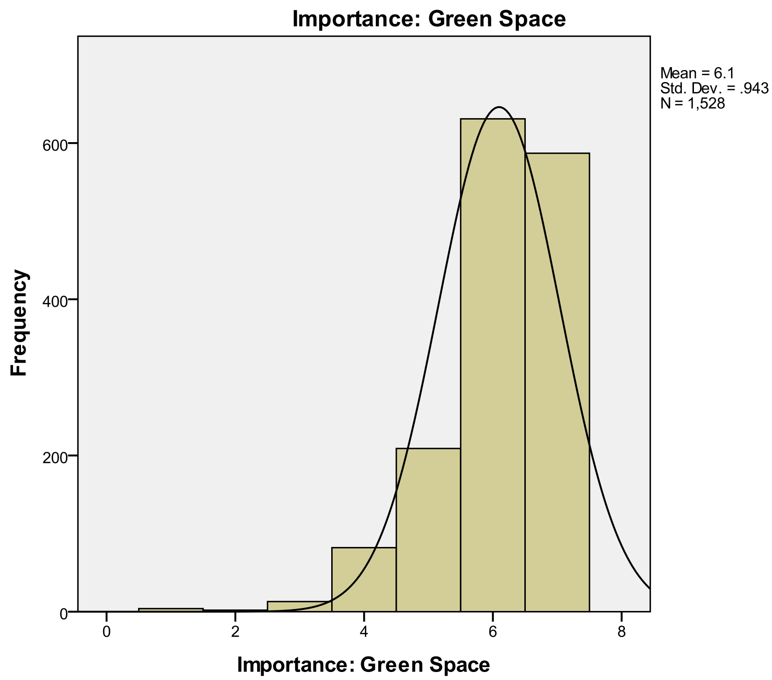


Figure I6. Item Response Pattern for Importance: Green space

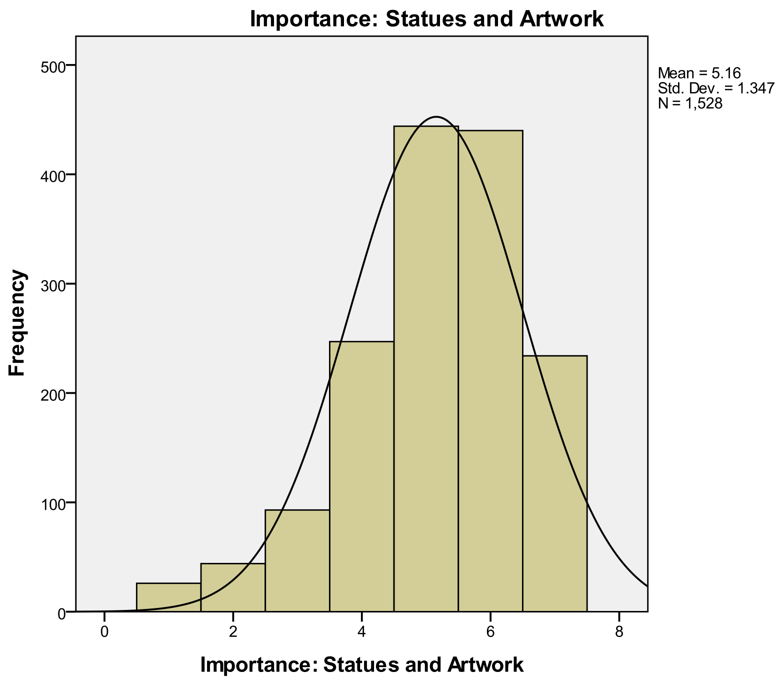


Figure I7. Item Response Pattern for Importance: Statues and artwork

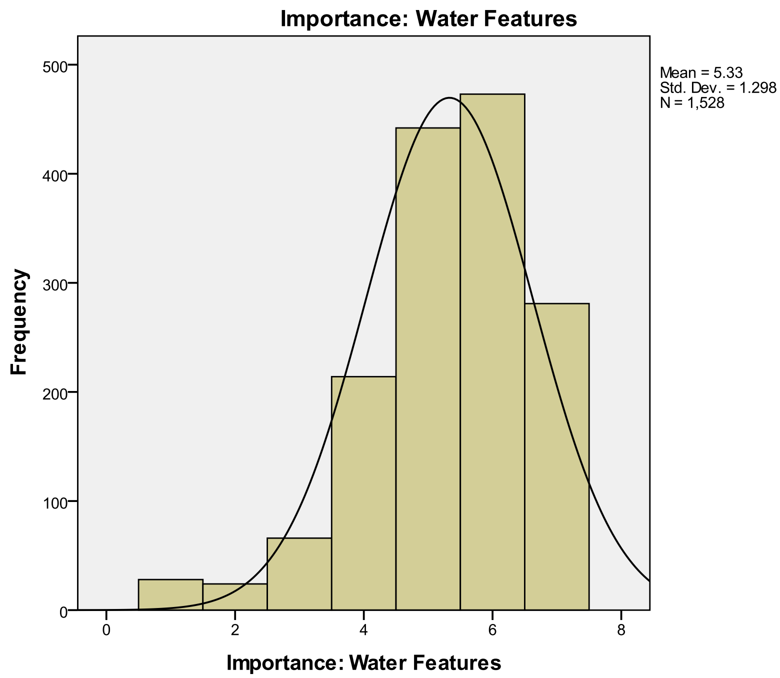


Figure I8. Item Response Pattern for Importance: Water features

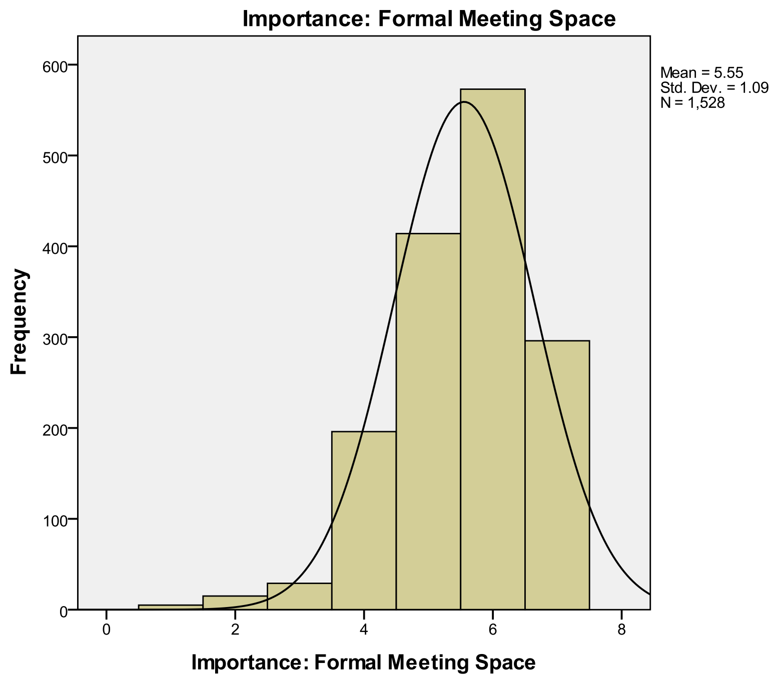


Figure I9. Item Response Pattern for Importance: Formal meeting space

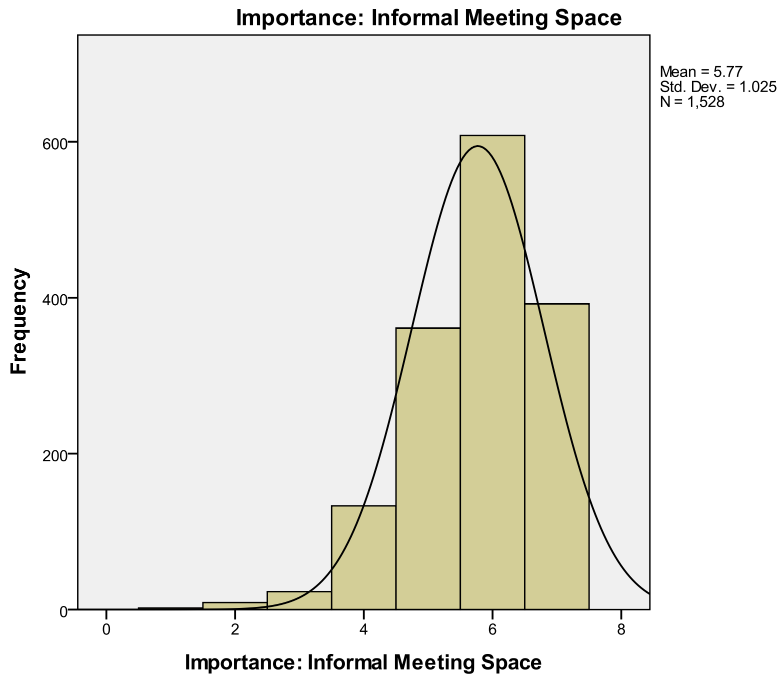


Figure I10. Item Response Pattern for Importance: Informal meeting space

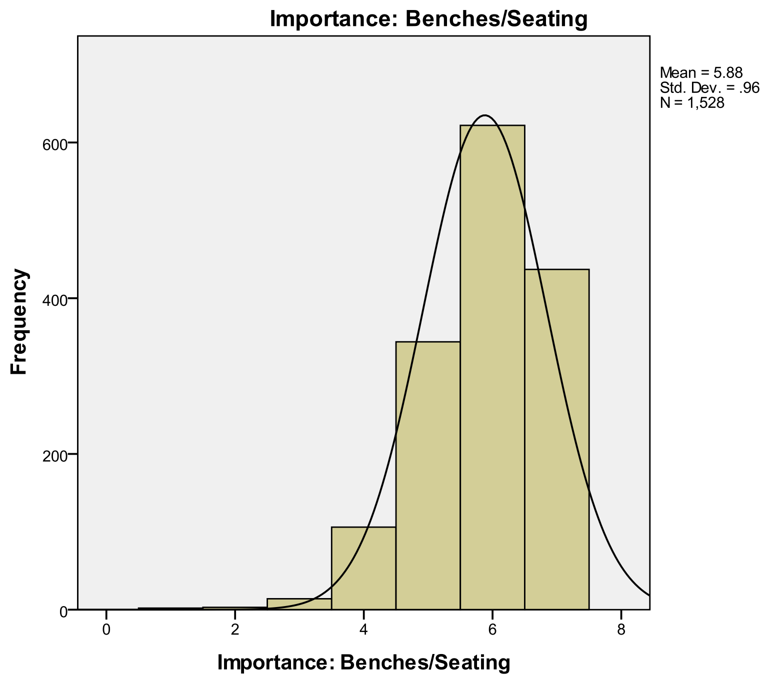


Figure I11. Item Response Pattern for Importance: Benches/Seating

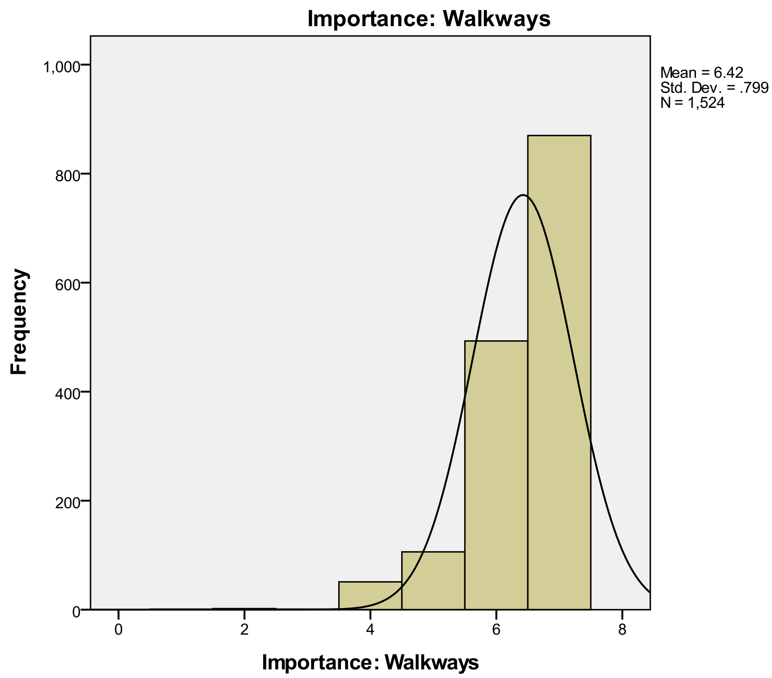


Figure I12. Item Response Pattern for Importance: Walkways

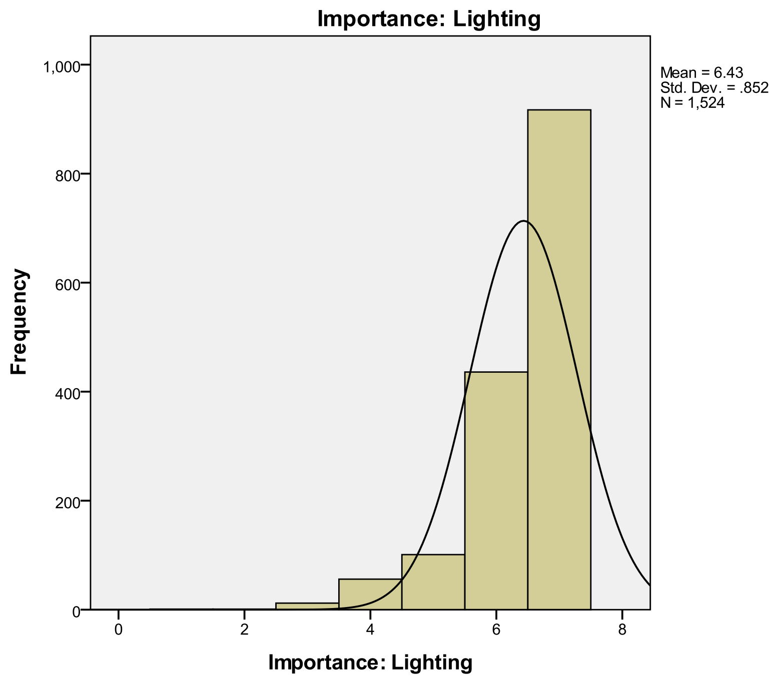


Figure I13. Item Response Pattern for Importance: Lighting

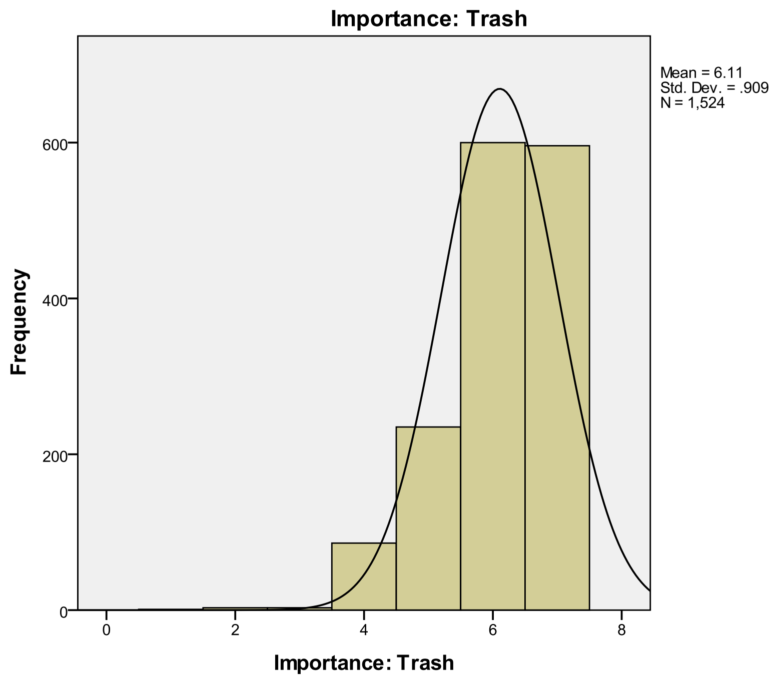


Figure I14. Item Response Pattern for Importance: Trash

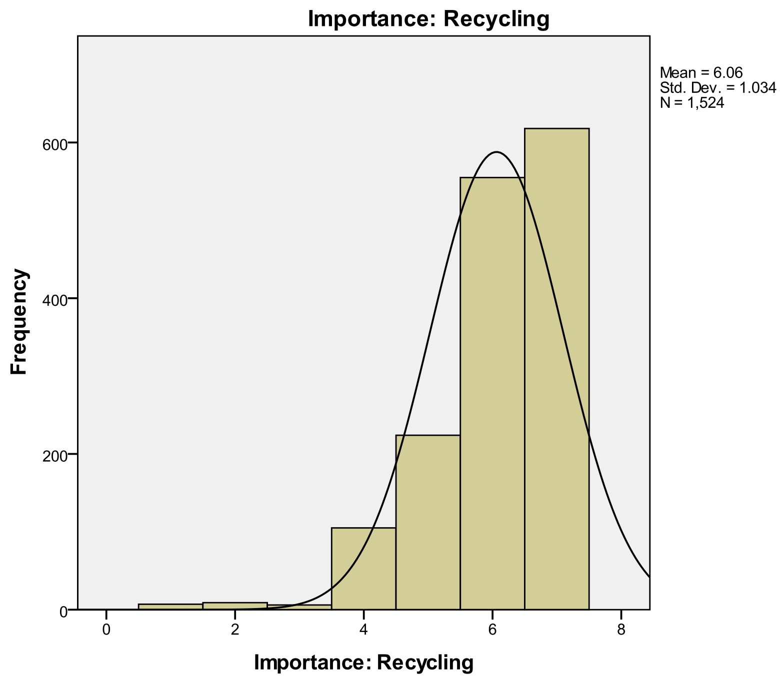


Figure I15. Item Response Pattern for Importance: Recycling

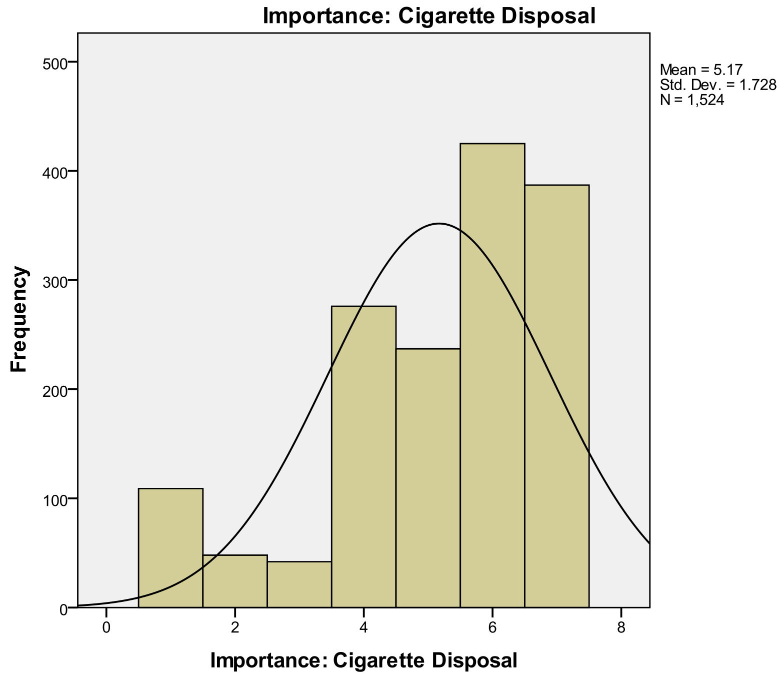


Figure I16. Item Response Pattern for Importance: Cigarette disposal

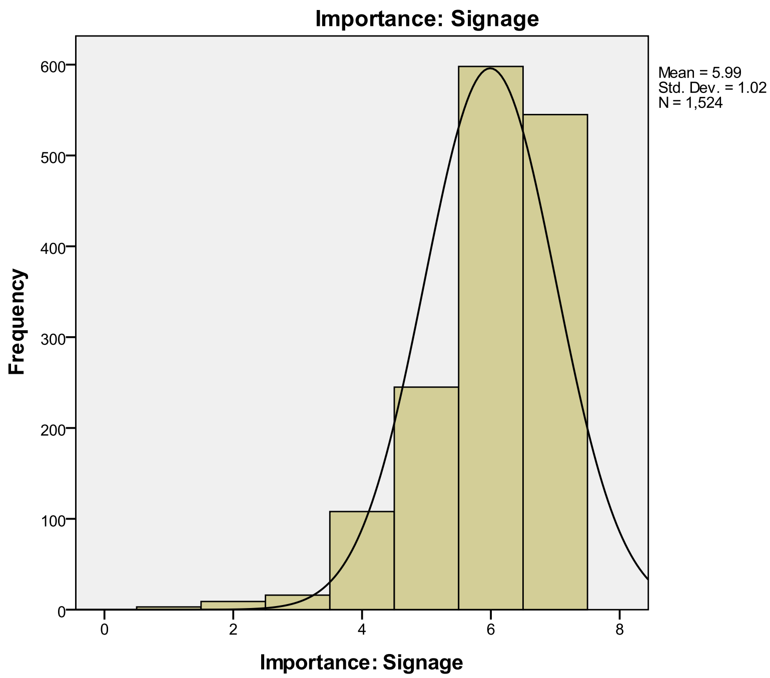


Figure I17. Item Response Pattern for Importance: Signage

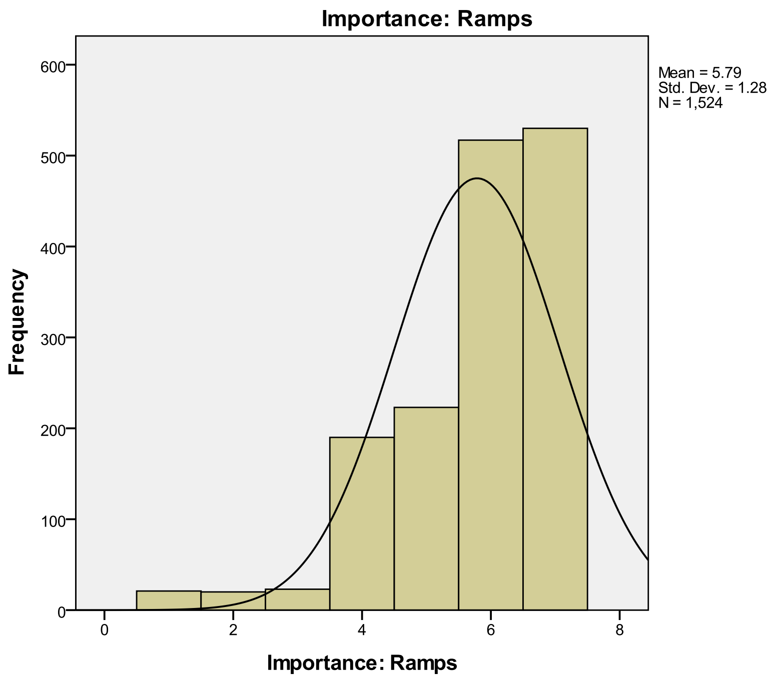


Figure I18. Item Response Pattern for Importance: Ramps

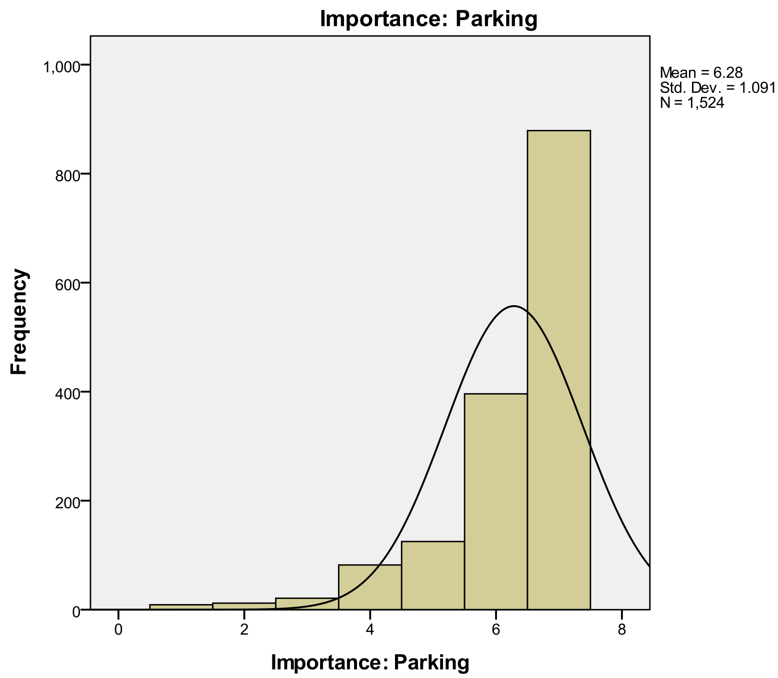


Figure I19. Item Response Pattern for Importance: Parking

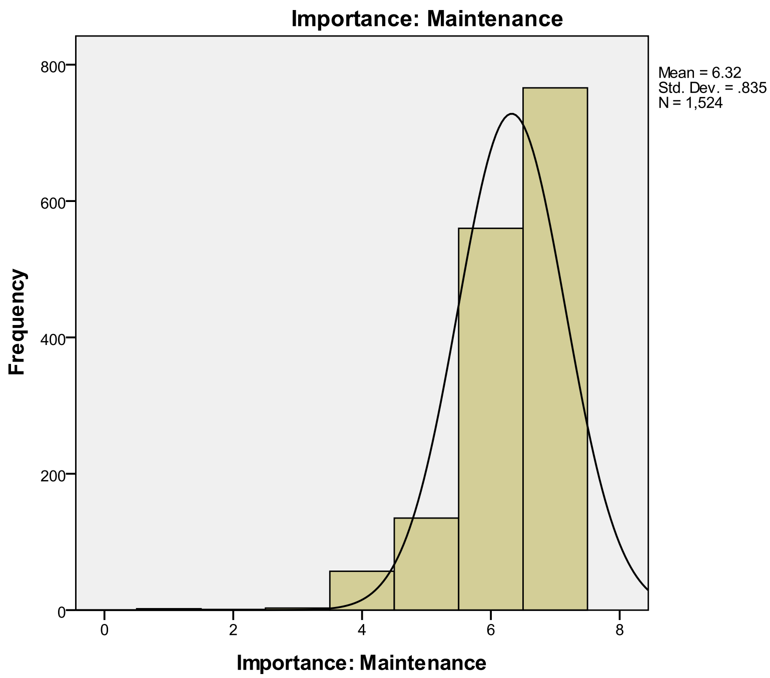


Figure I20. Item Response Pattern for Importance: Maintenance

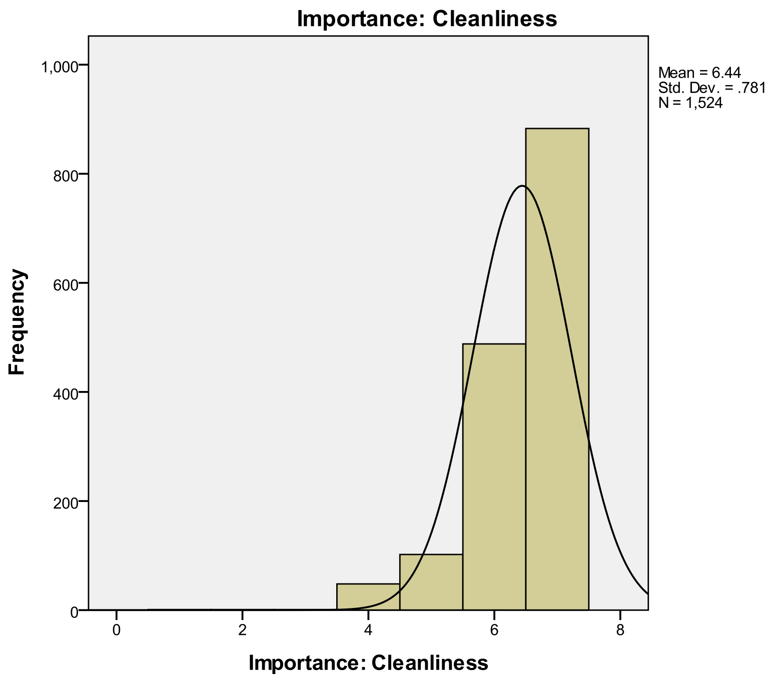


Figure I21. Item Response Pattern for Importance: Cleanliness

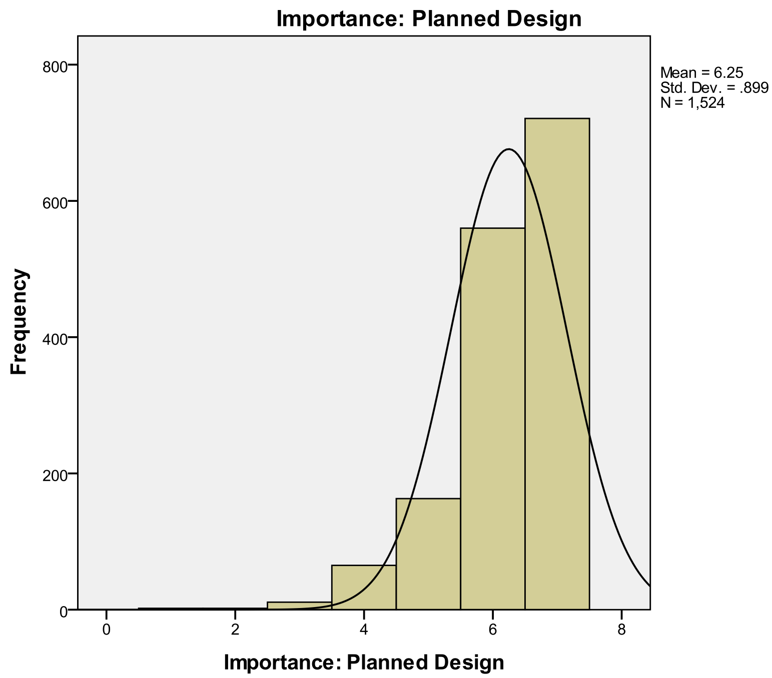


Figure I22. Item Response Pattern for Importance: Planned design

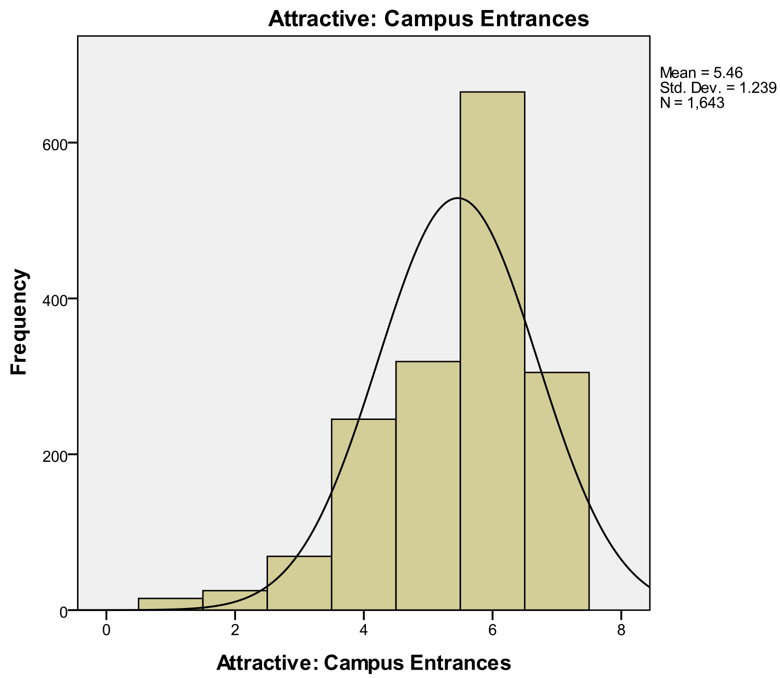


Figure I23. Item Response Pattern for Attractiveness: Campus entrances

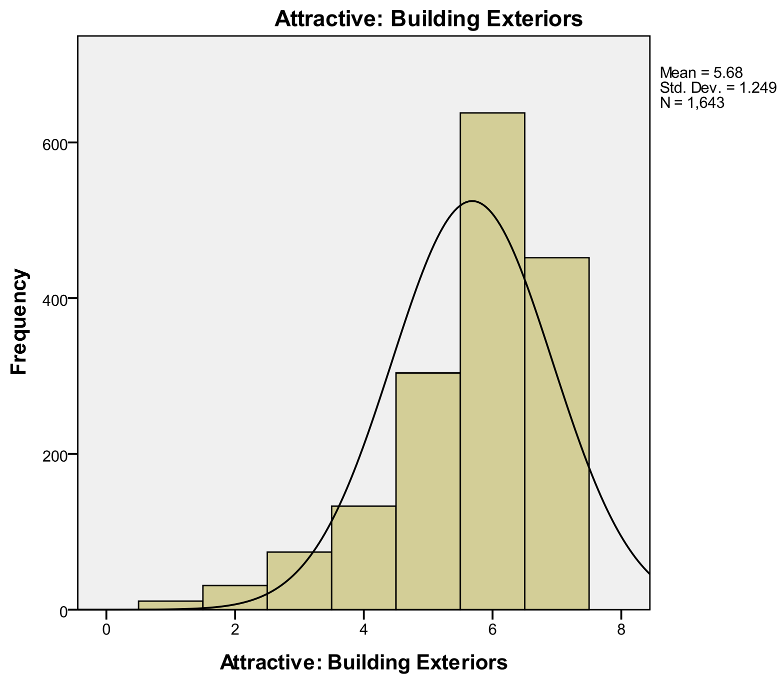


Figure I24. Item Response Pattern for Attractiveness: Building exteriors

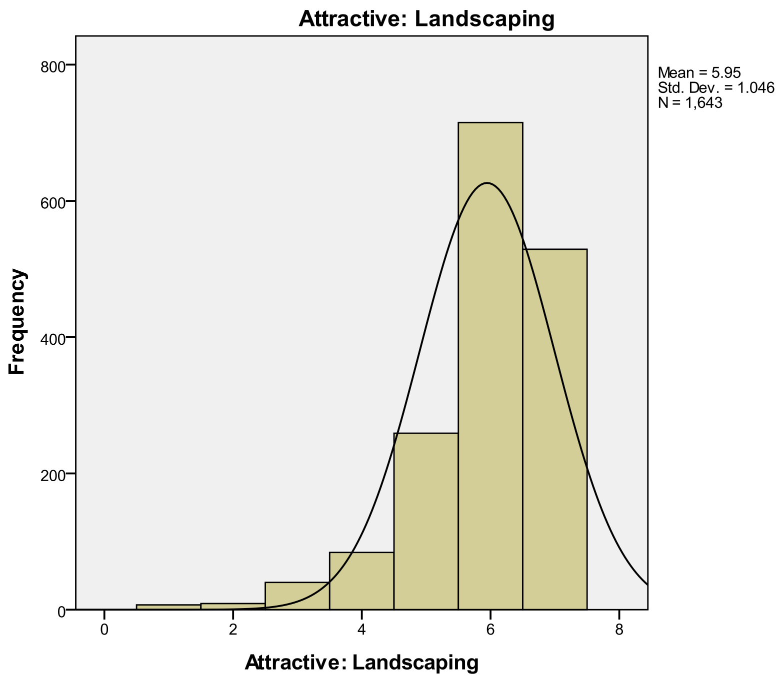


Figure I25. Item Response Pattern for Attractiveness: Landscaping

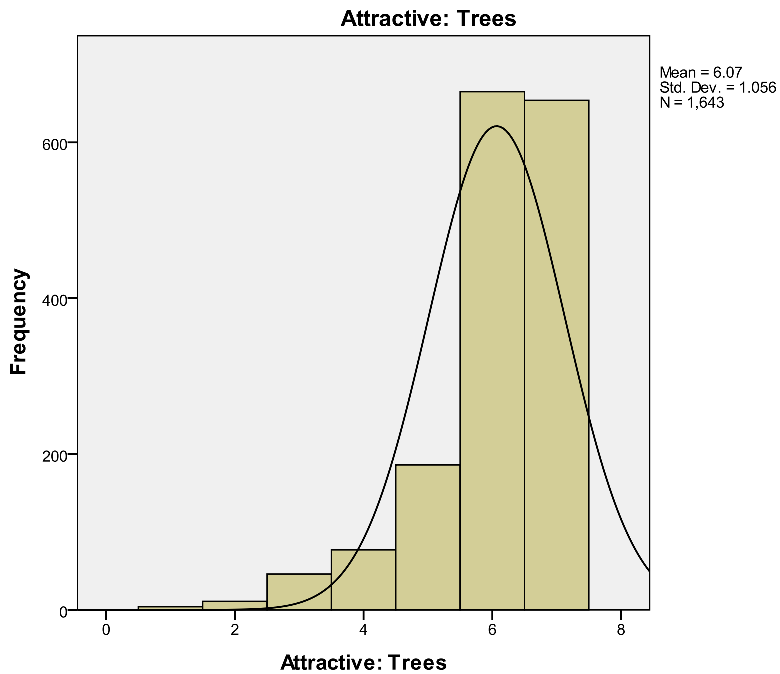


Figure I26. Item Response Pattern for Attractiveness: Trees

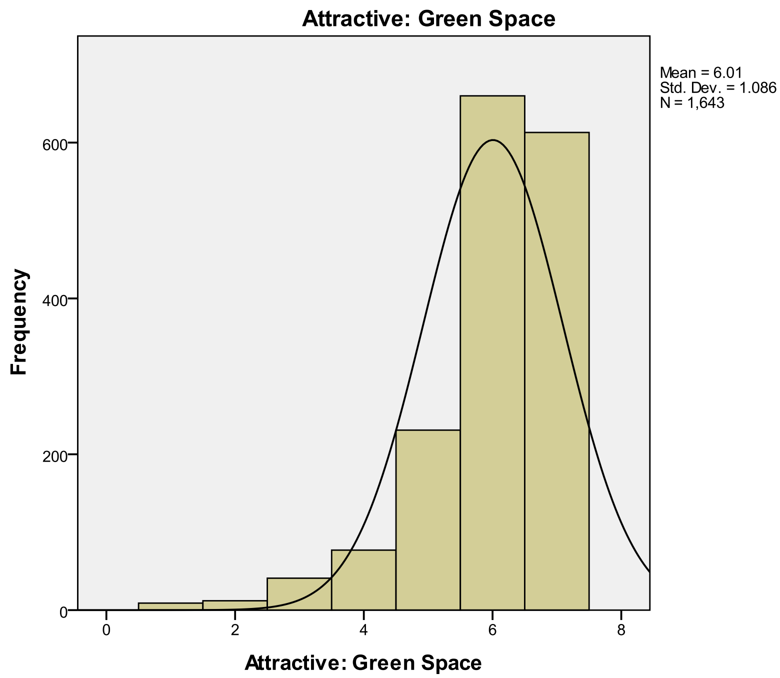


Figure I27. Item Response Pattern for Attractiveness: Green space

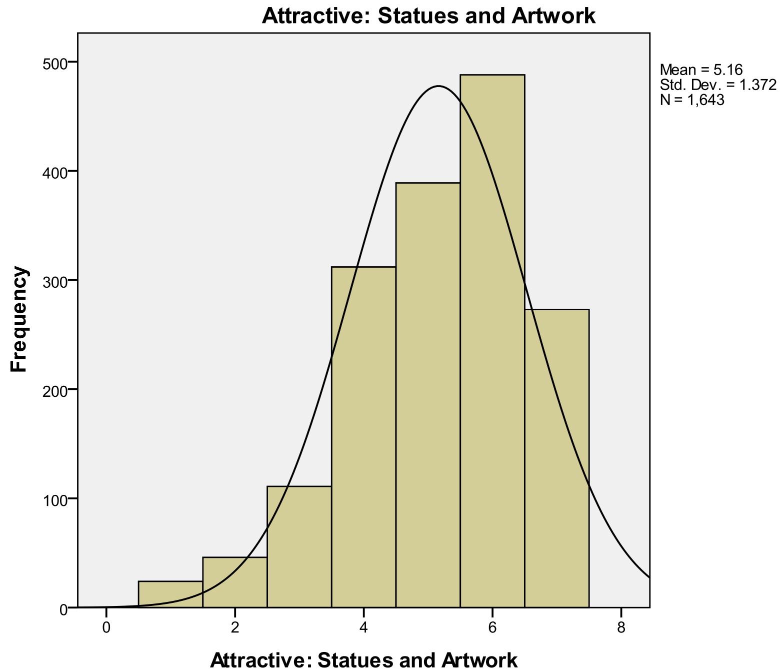


Figure I28. Item Response Pattern for Attractiveness: Statues and artwork

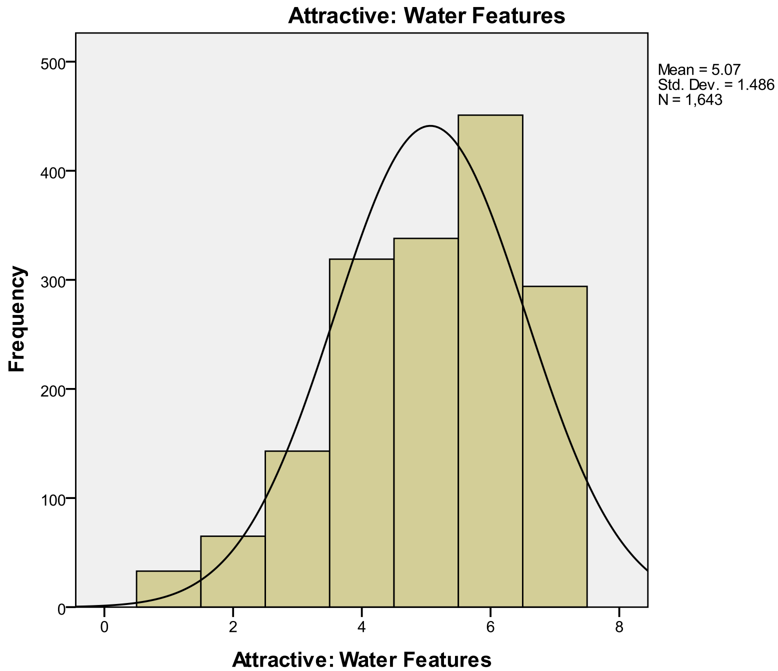


Figure I29. Item Response Pattern for Attractiveness: Water features

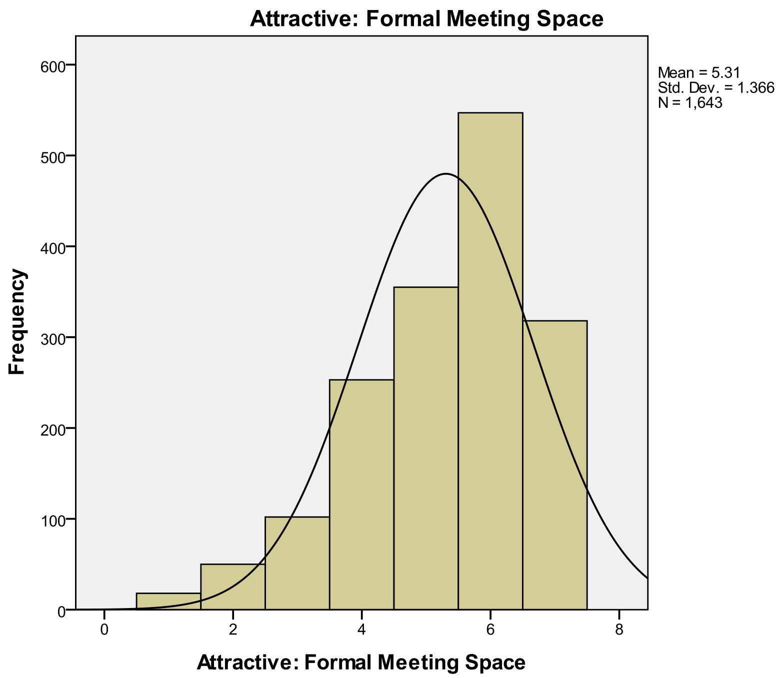


Figure I30. Item Response Pattern for Attractiveness: Formal meeting space

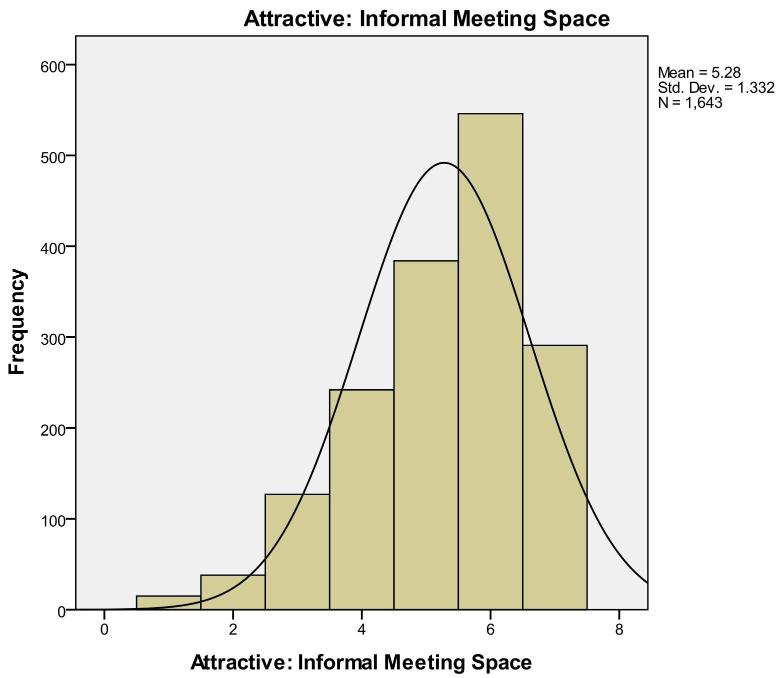


Figure I31. Item Response Pattern for Attractiveness: Informal meeting space

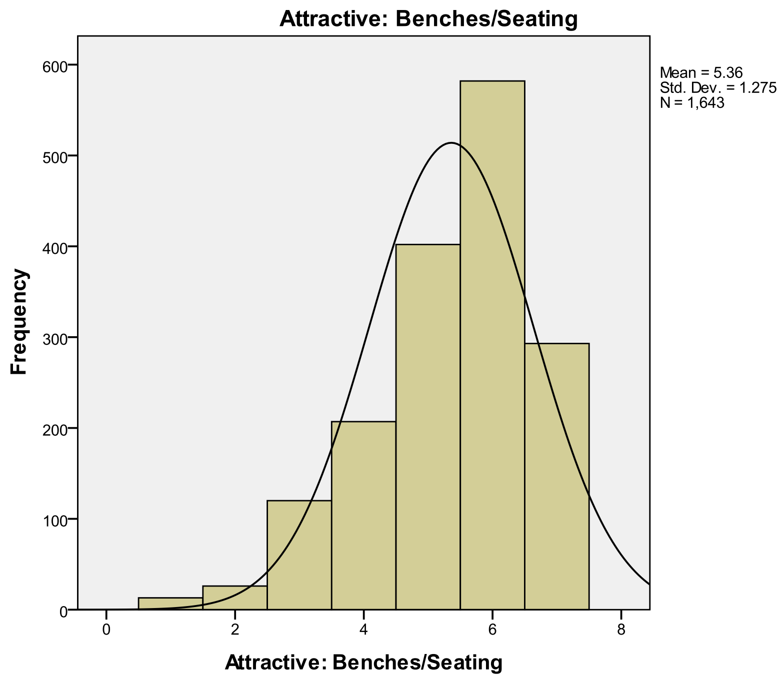


Figure I32. Item Response Pattern for Attractiveness: Benches/Seating

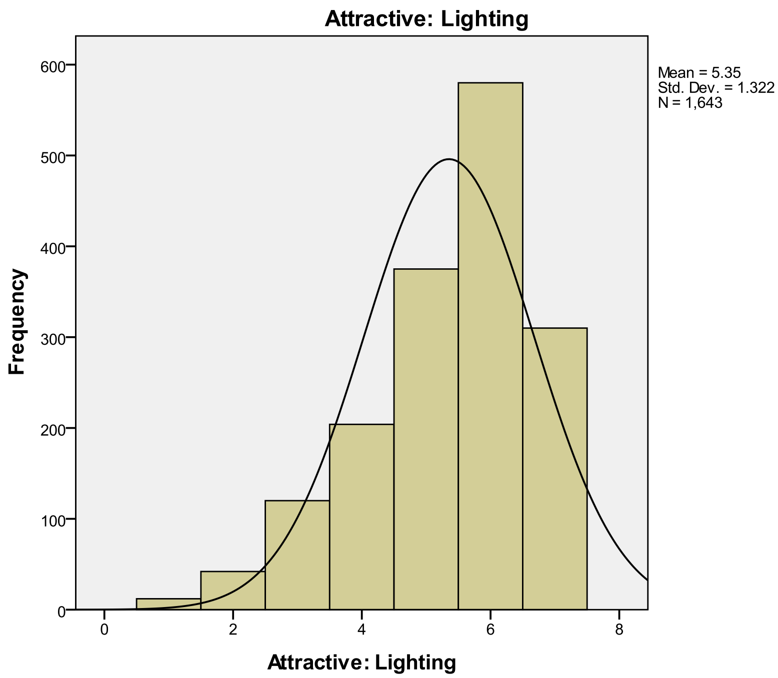


Figure I33. Item Response Pattern for Attractiveness: Lighting

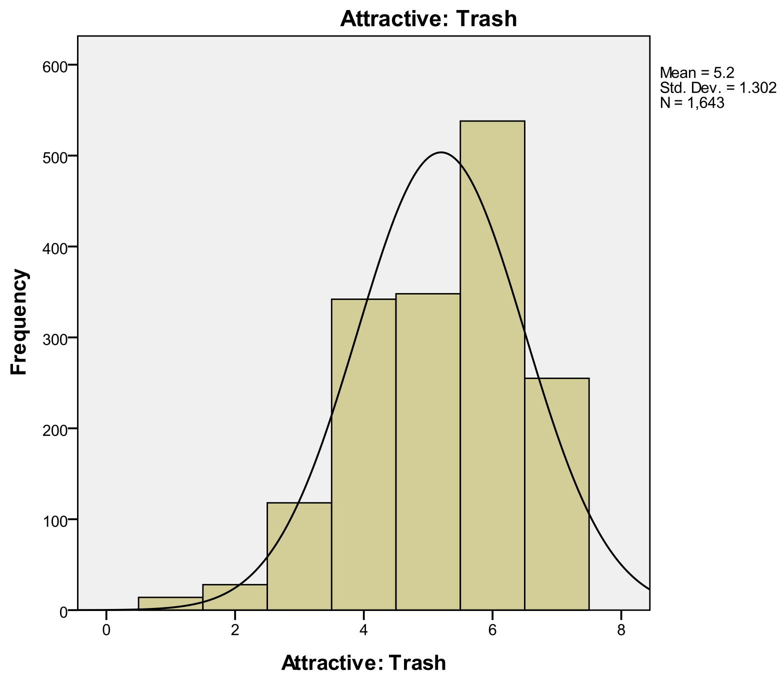


Figure I34. Item Response Pattern for Attractiveness: Trash

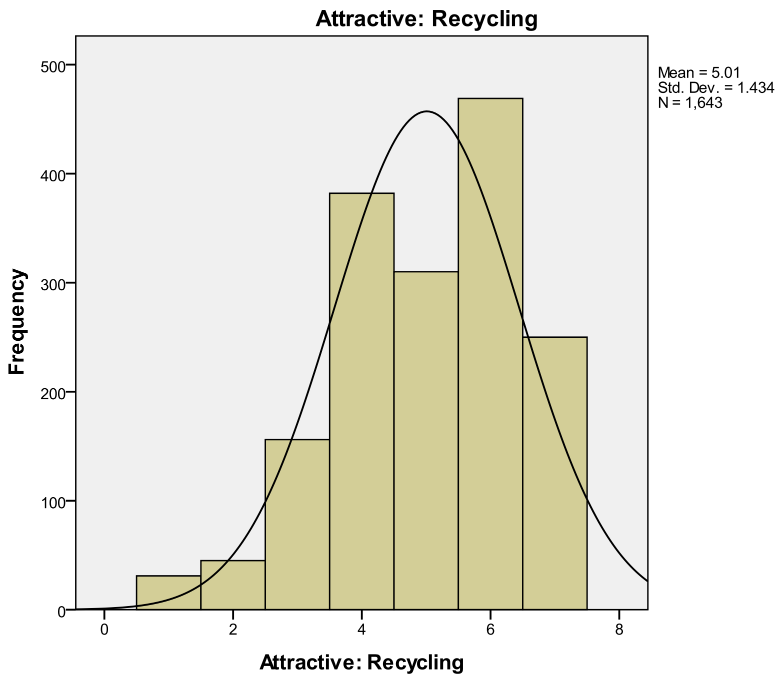


Figure I35. Item Response Pattern for Attractiveness: Recycling

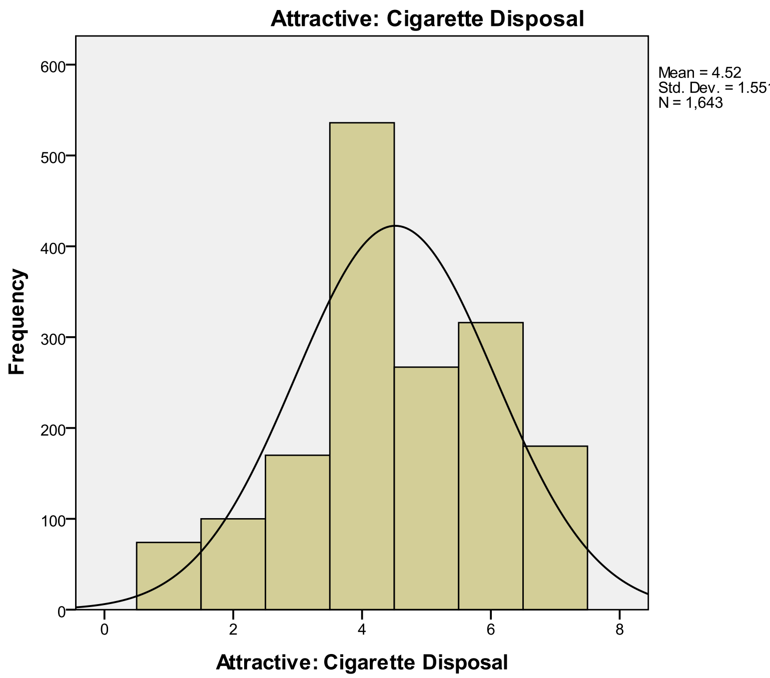


Figure I36. Item Response Pattern for Attractiveness: Cigarette disposal

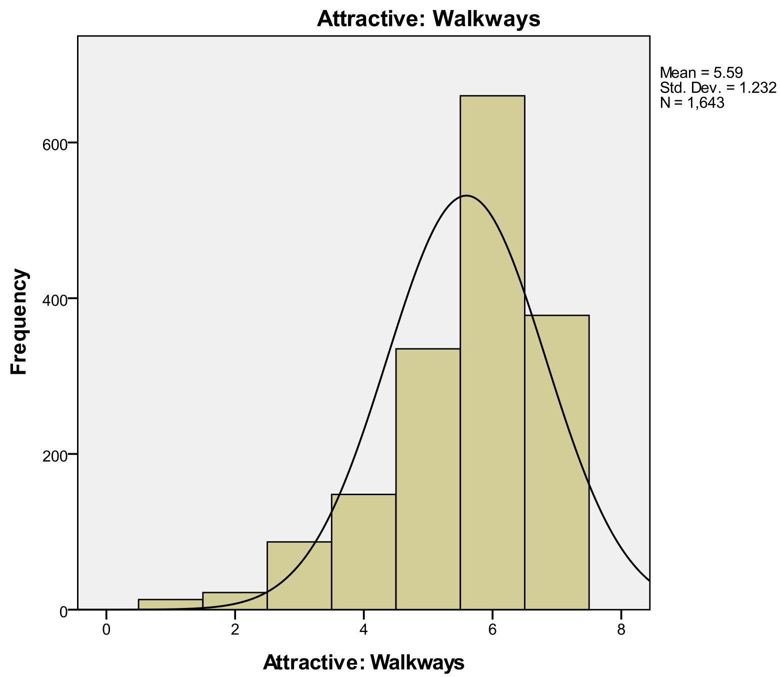


Figure I37. Item Response Pattern for Attractiveness: Walkways

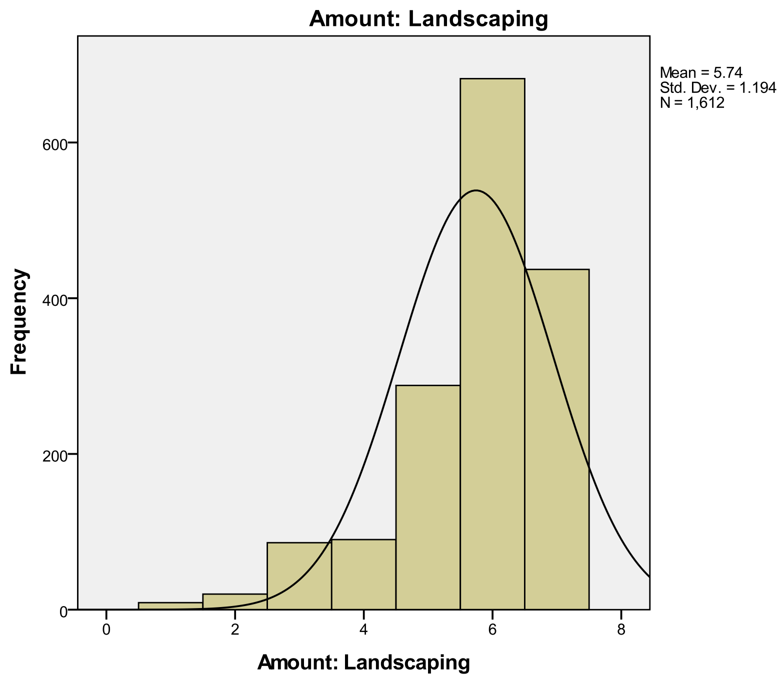


Figure I38. Item Response Pattern for Amount: Landscaping

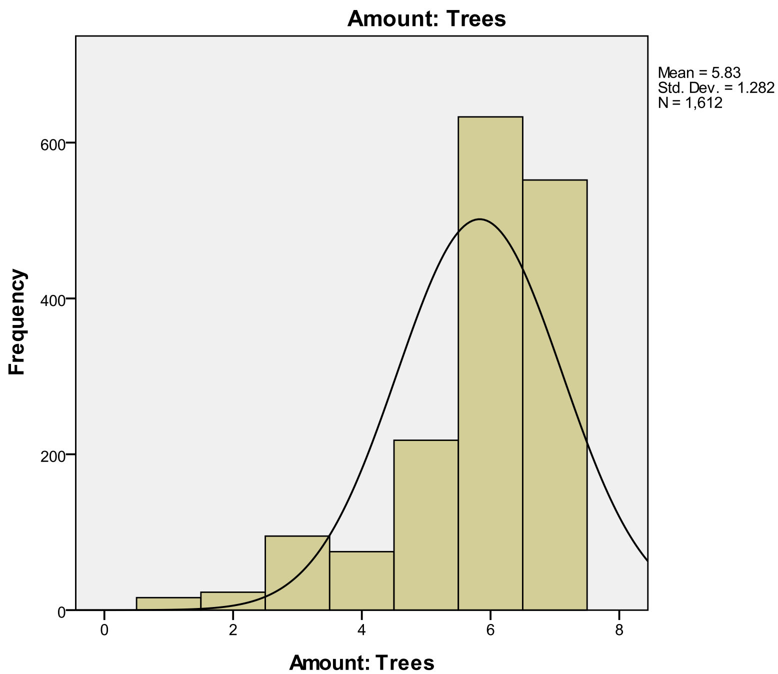


Figure I39. Item Response Pattern for Amount: Trees

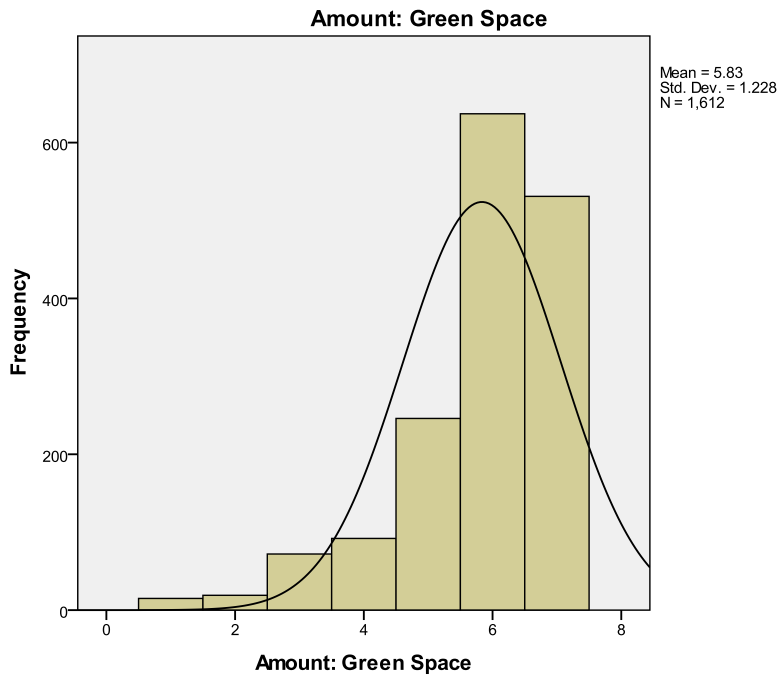


Figure I40. Item Response Pattern for Amount: Green space

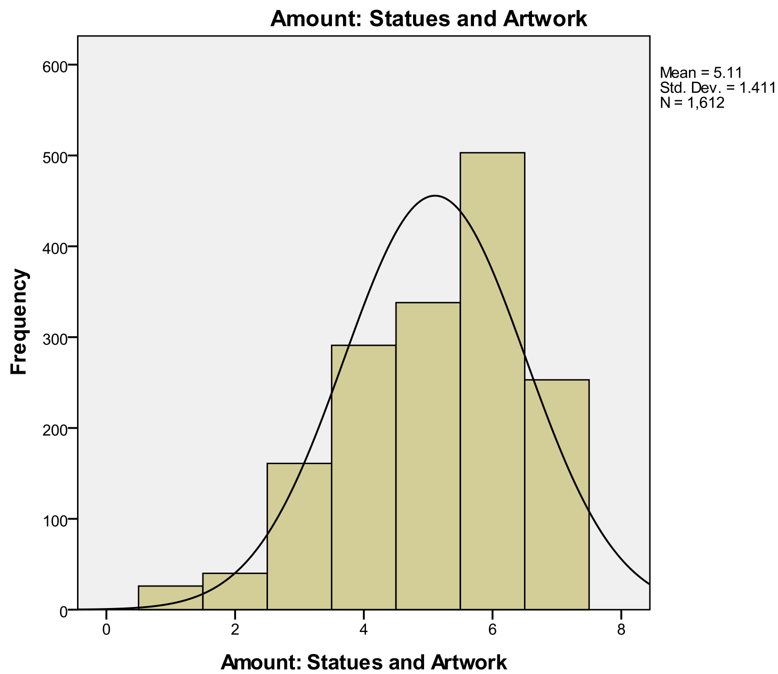


Figure I41. Item Response Pattern for Amount: Statues and artwork

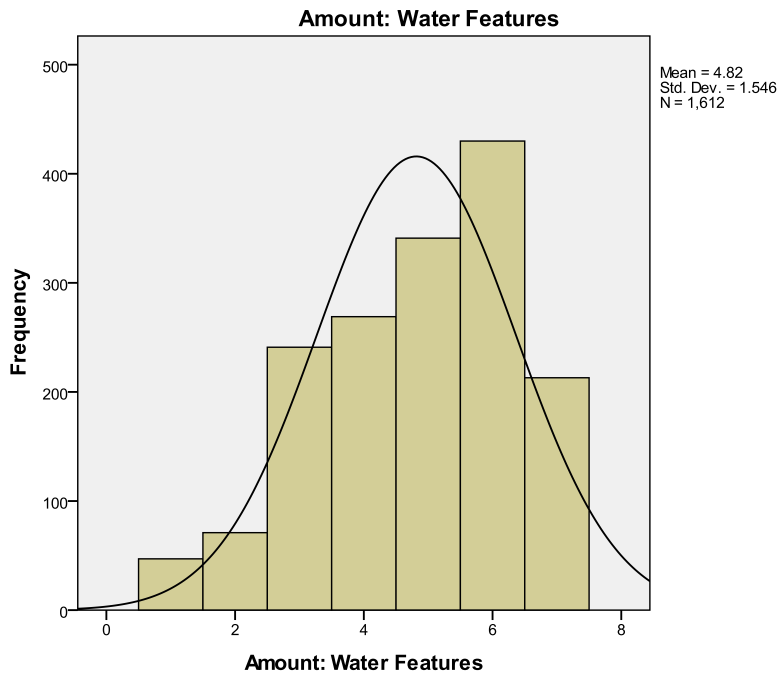


Figure I42. Item Response Pattern for Amount: Water features

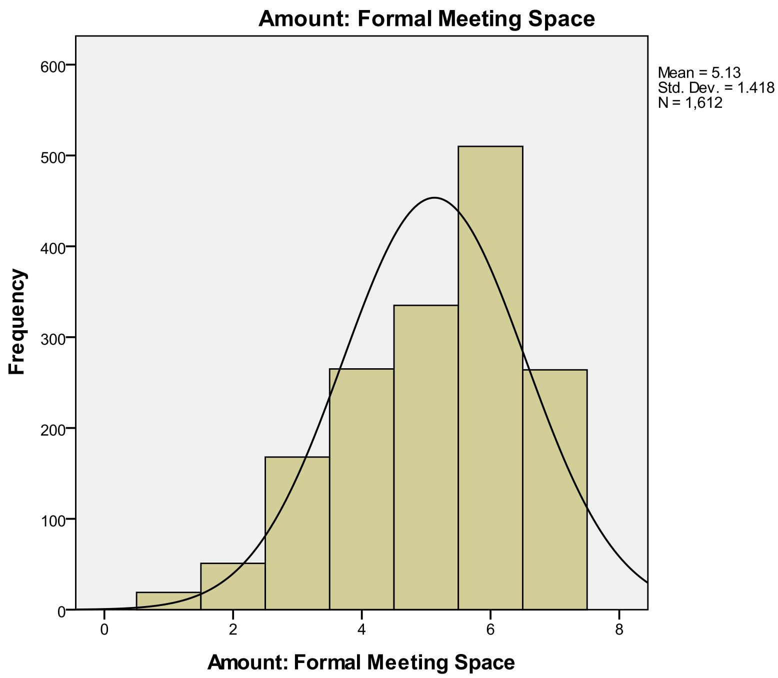


Figure I43. Item Response Pattern for Amount: Formal meeting space

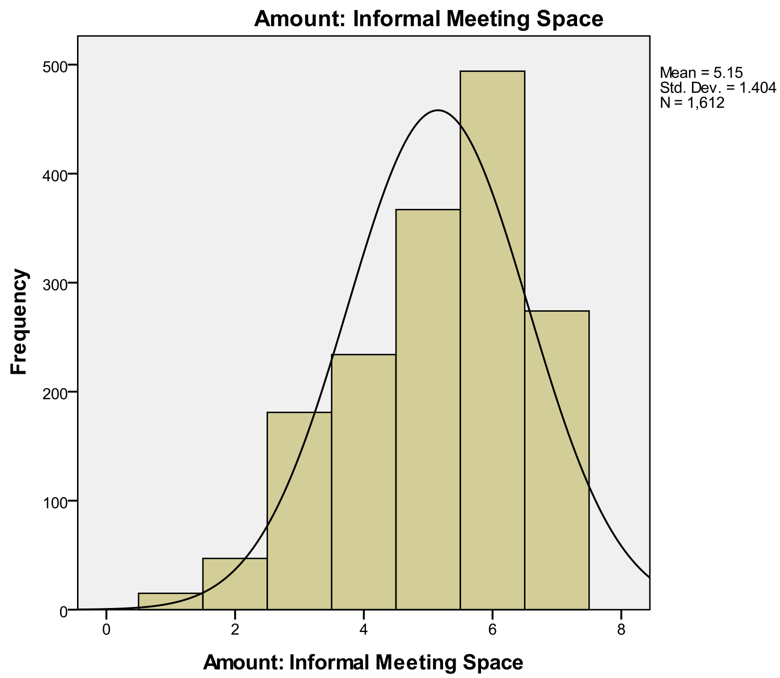


Figure I44. Item Response Pattern for Amount: Informal meeting space

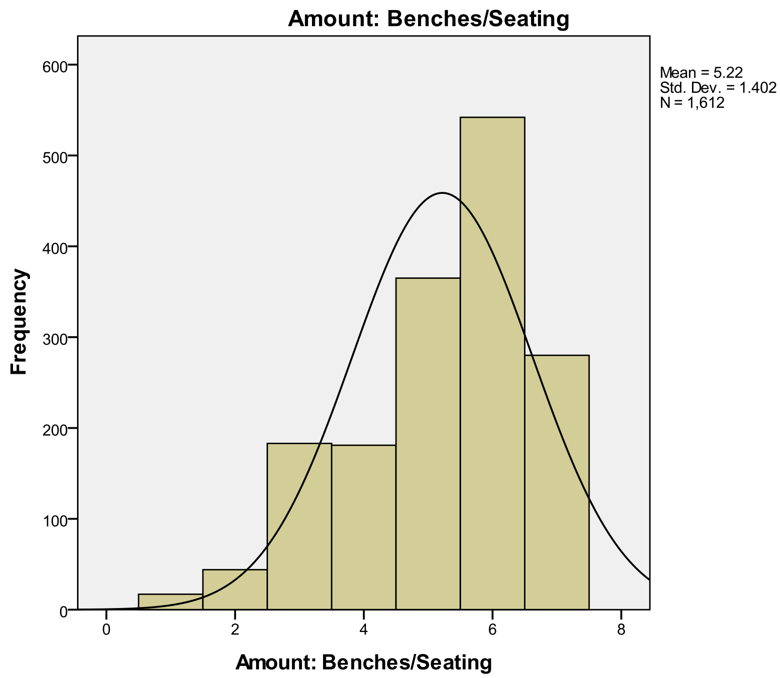


Figure I45. Item Response Pattern for Amount: Benches/Seating

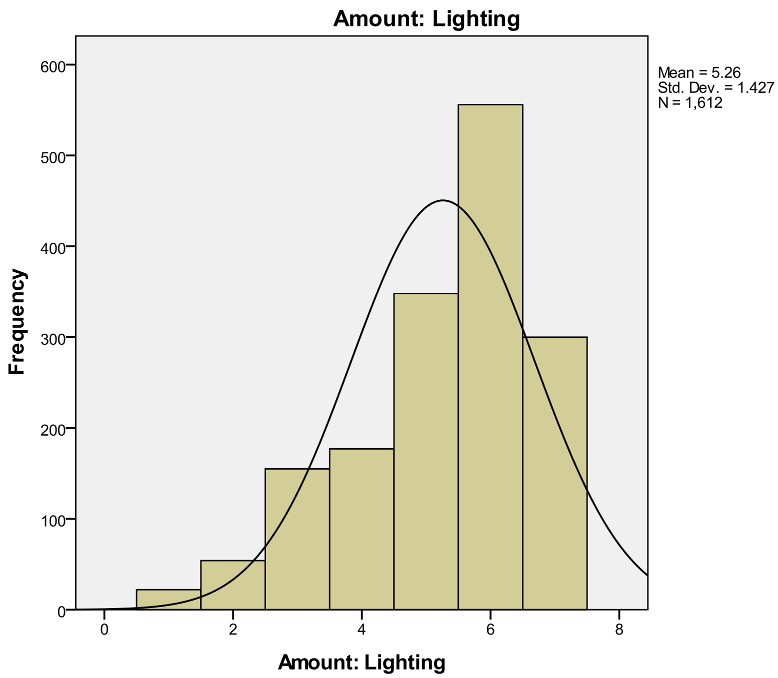


Figure I46. Item Response Pattern for Amount: Lighting

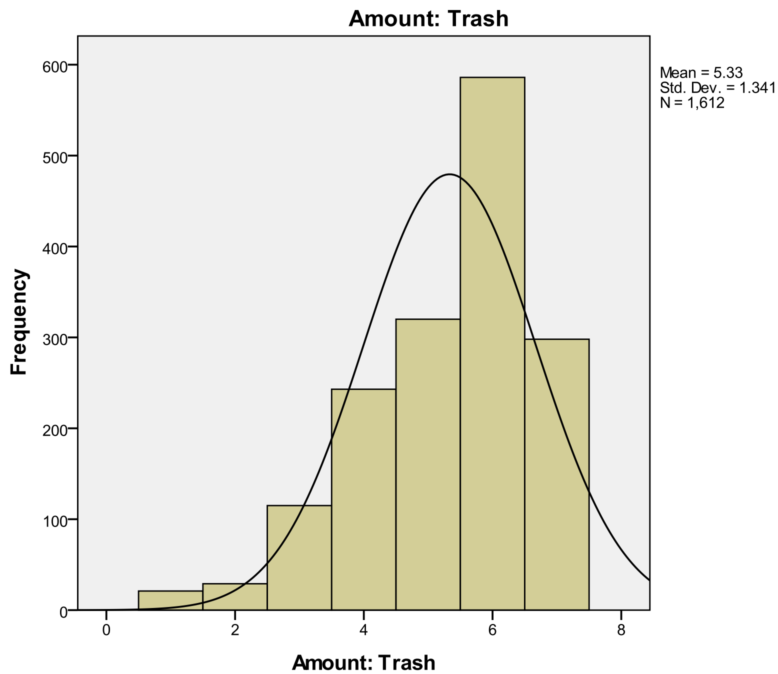


Figure I47. Item Response Pattern for Amount: Trash

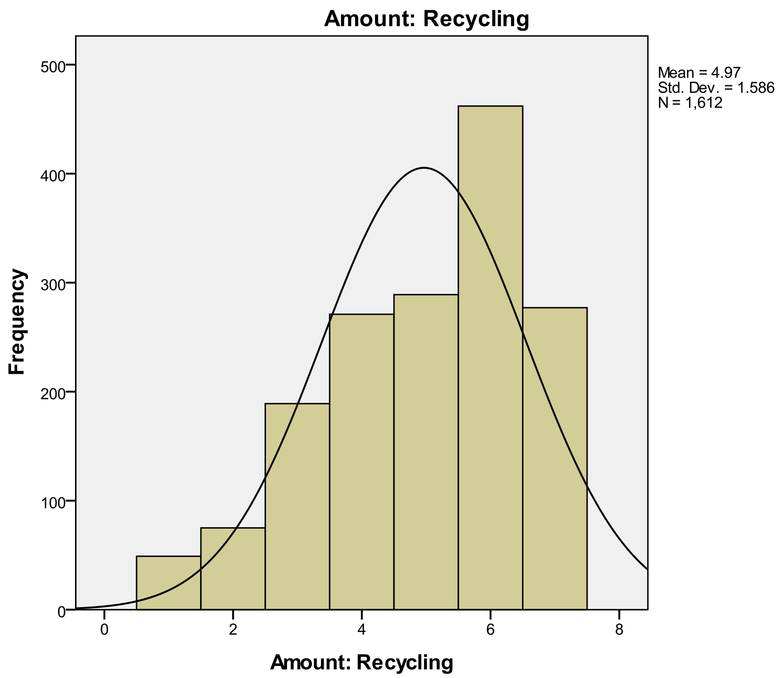


Figure I48. Item Response Pattern for Amount: Recycling

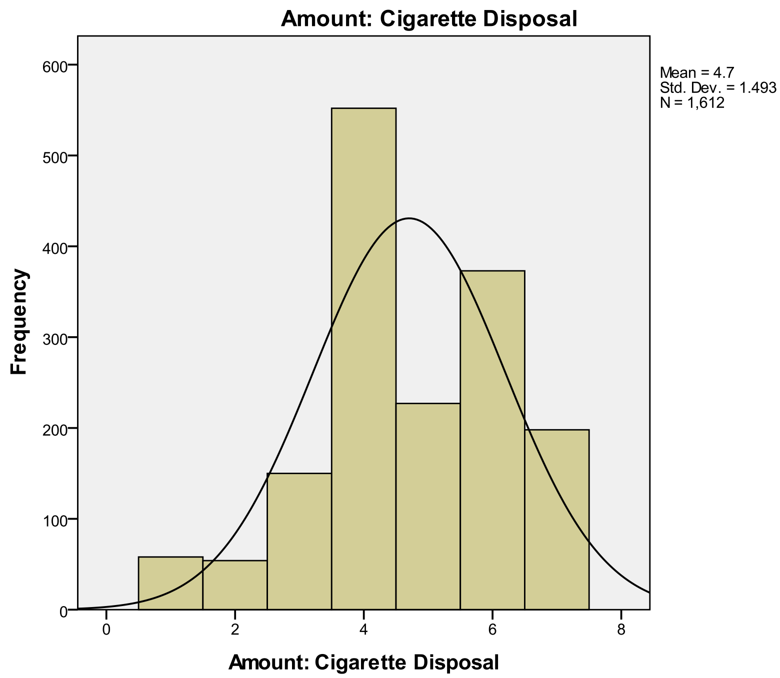


Figure I49. Item Response Pattern for Amount: Cigarette Disposal

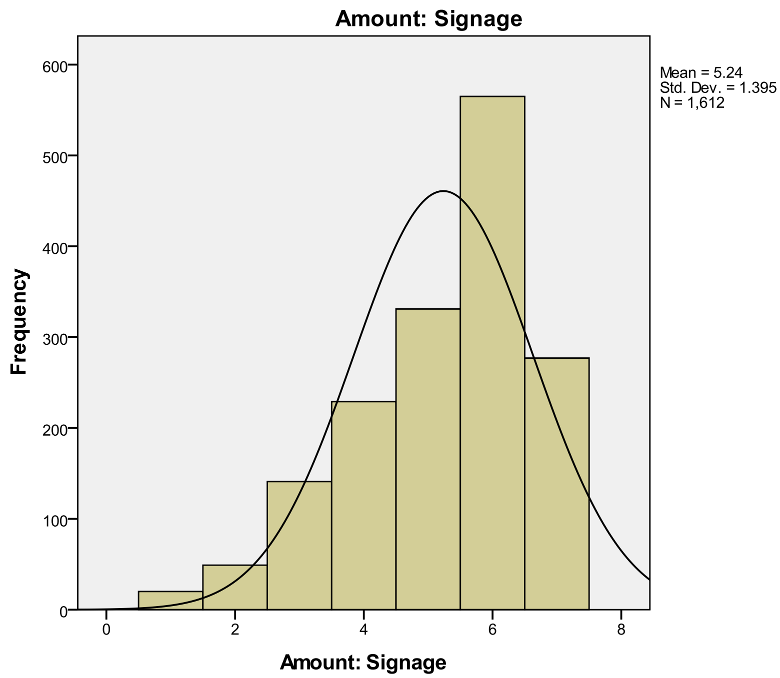


Figure I50. Item Response Pattern for Amount: Signage

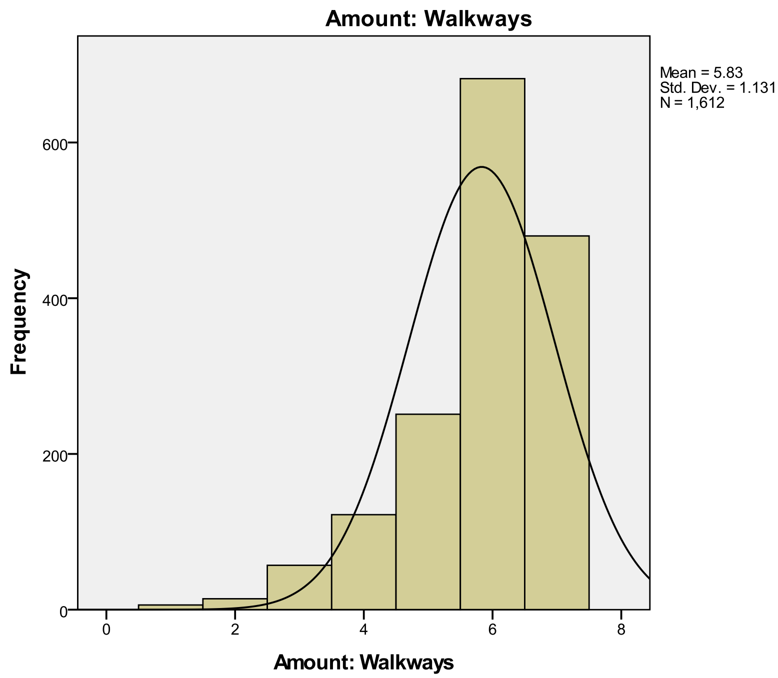


Figure I51. Item Response Pattern for Amount: Walkways

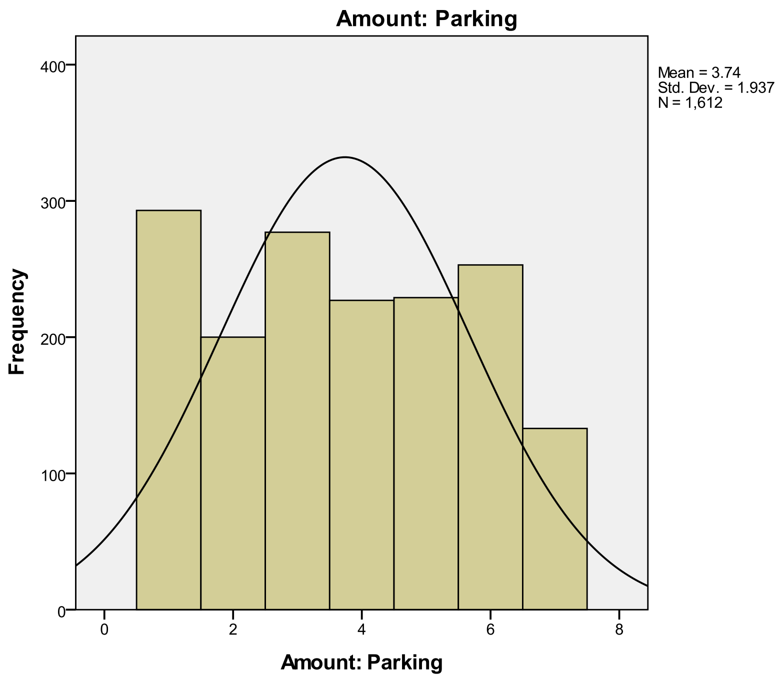


Figure I52. Item Response Pattern for Amount: Parking

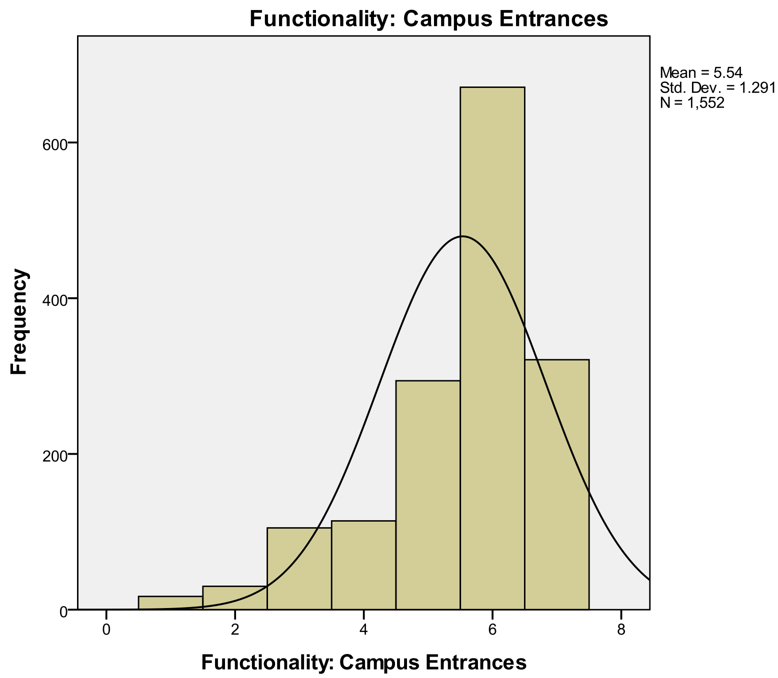


Figure I53. Item Response Pattern for Functionality: Campus Entrances

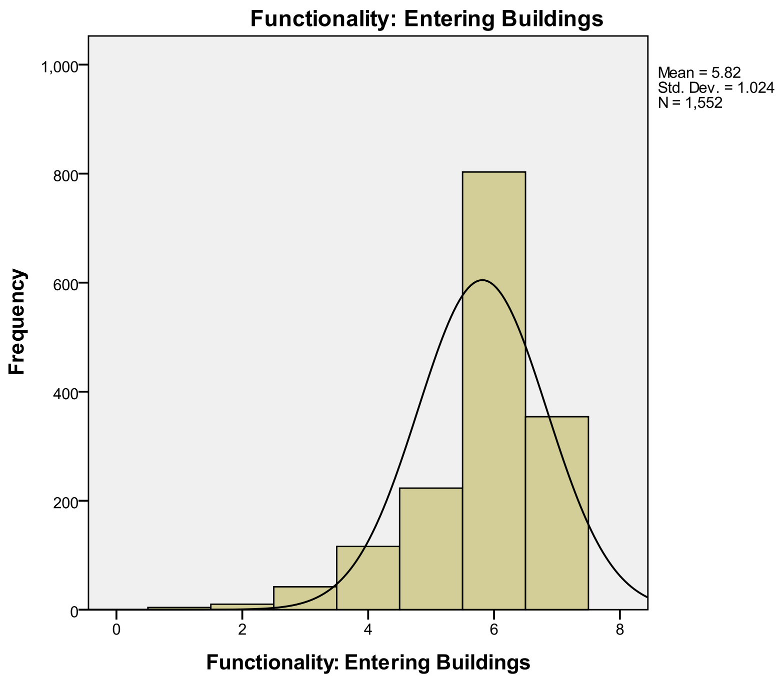


Figure I54. Item Response Pattern for Functionality: Entering Buildings

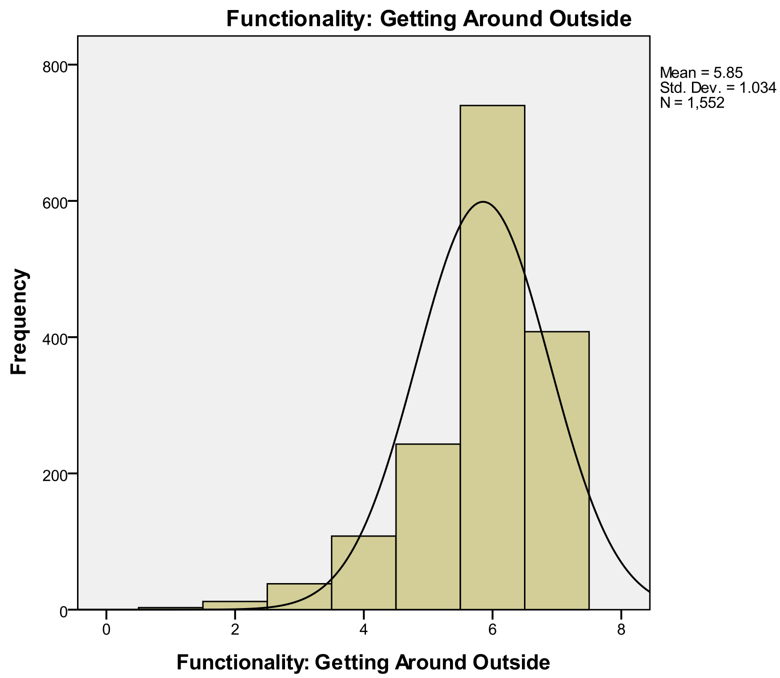


Figure I55. Item Response Pattern for Functionality: Getting Around Outside

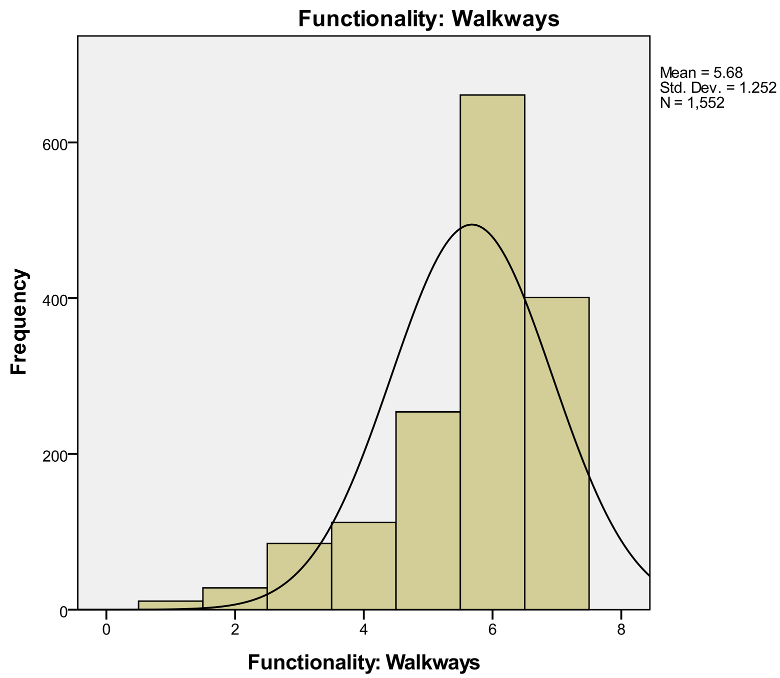


Figure I56. Item Response Pattern for Functionality: Walkways

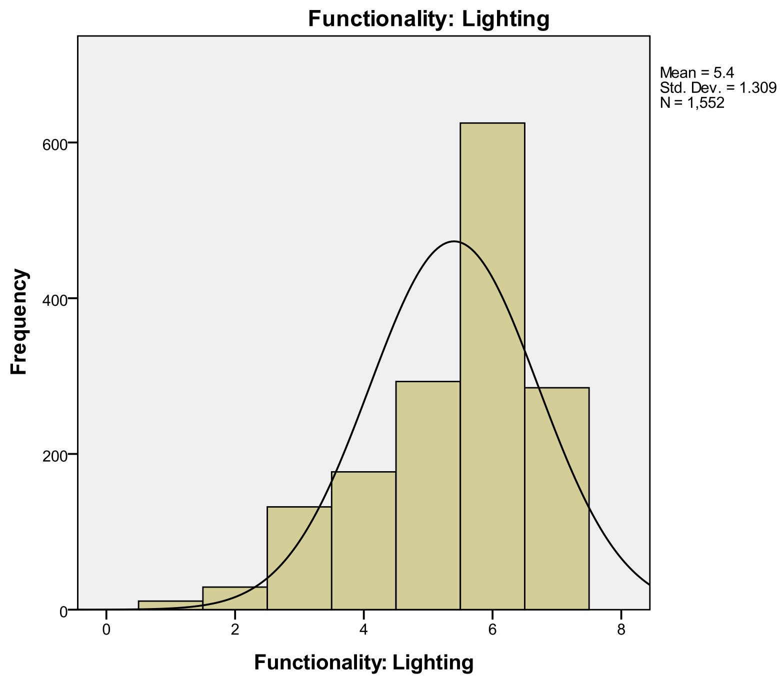


Figure I57. Item Response Pattern for Functionality: Lighting

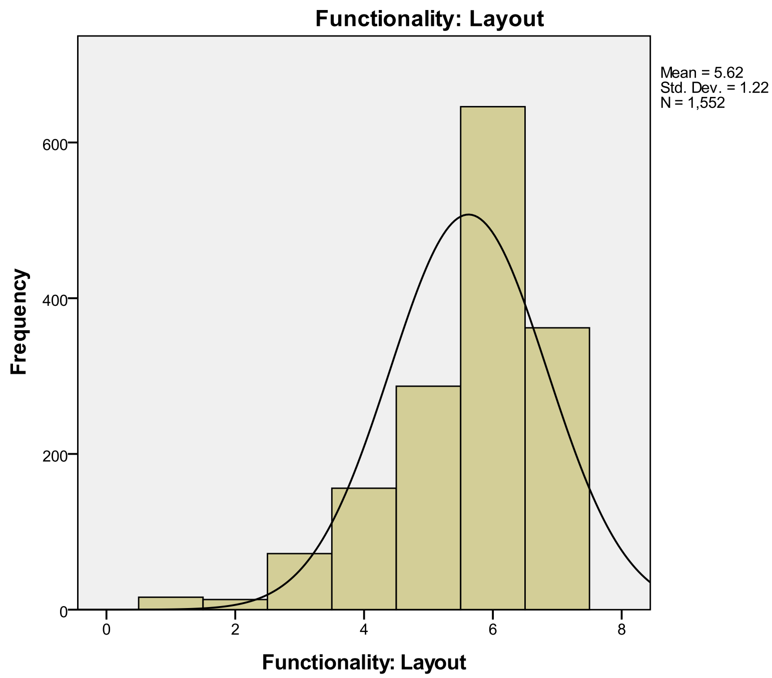


Figure I58. Item Response Pattern for Functionality: Layout

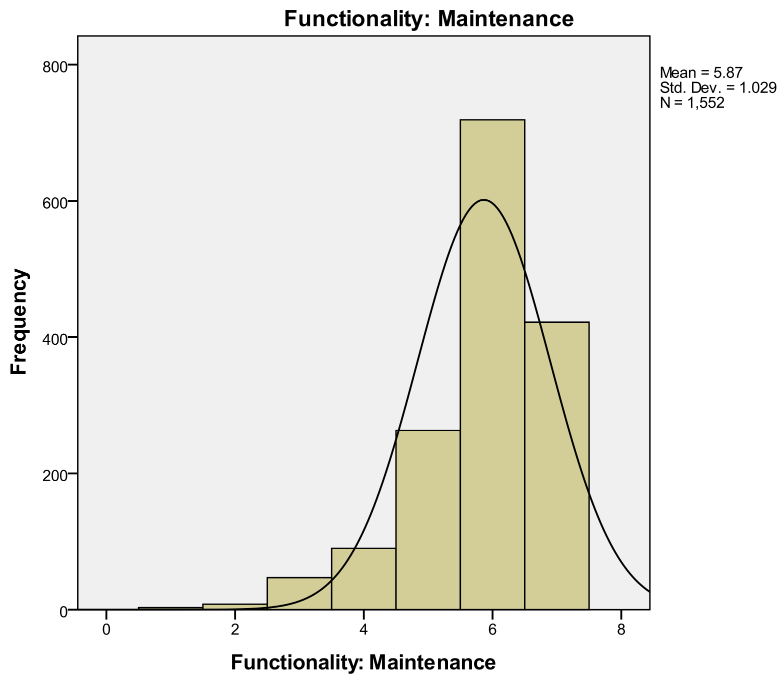


Figure I59. Item Response Pattern for Functionality: Maintenance

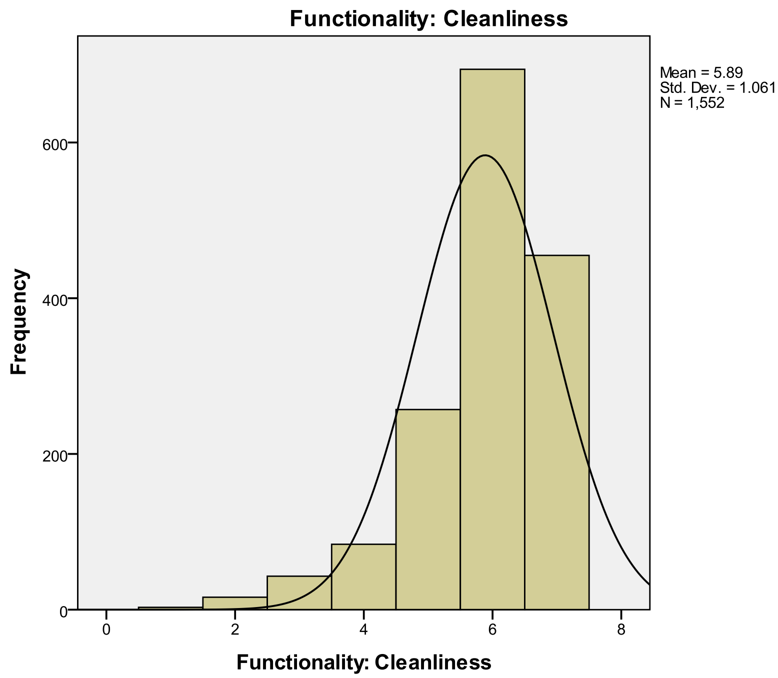


Figure I60. Item Response Pattern for Functionality: Cleanliness

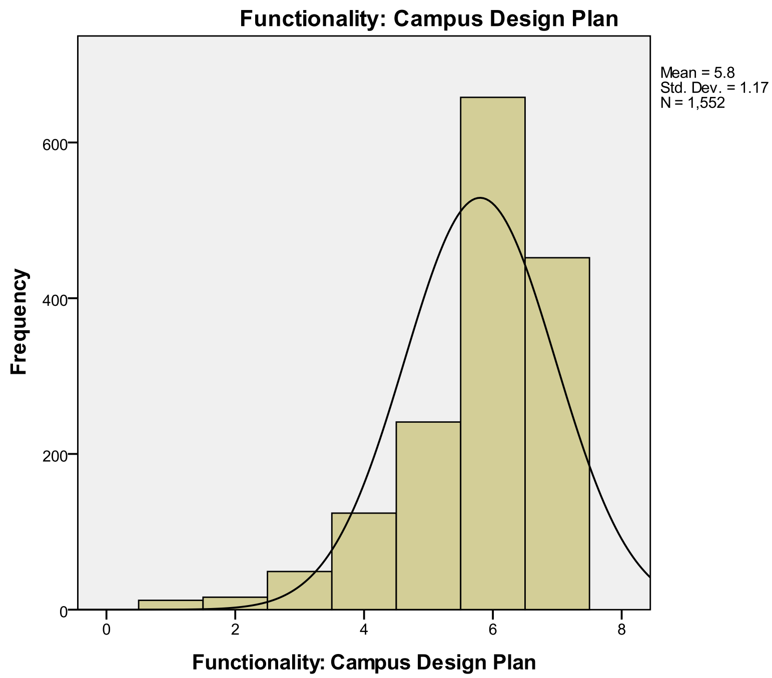


Figure I61. Item Response Pattern for Functionality: Campus Design Plan

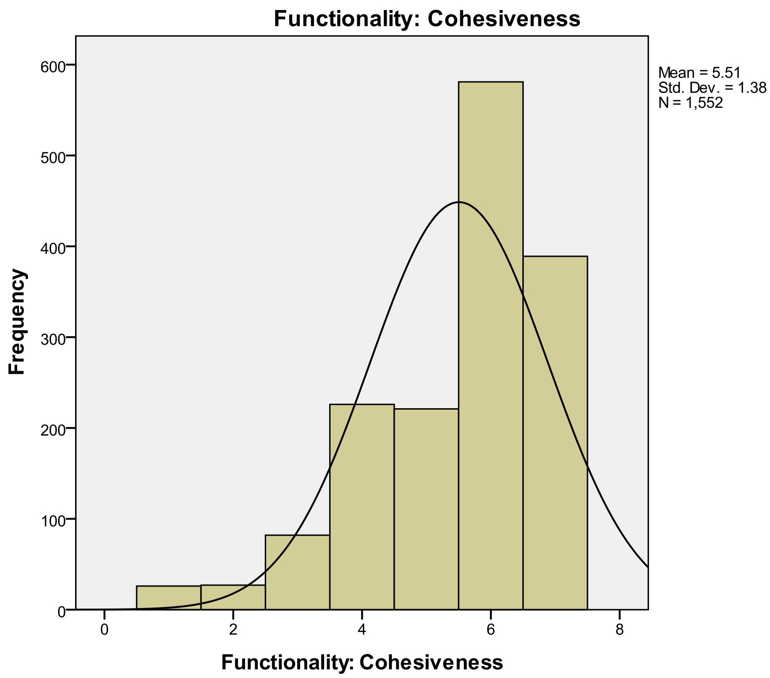


Figure I62. Item Response Pattern for Functionality: Building Exterior Cohesiveness

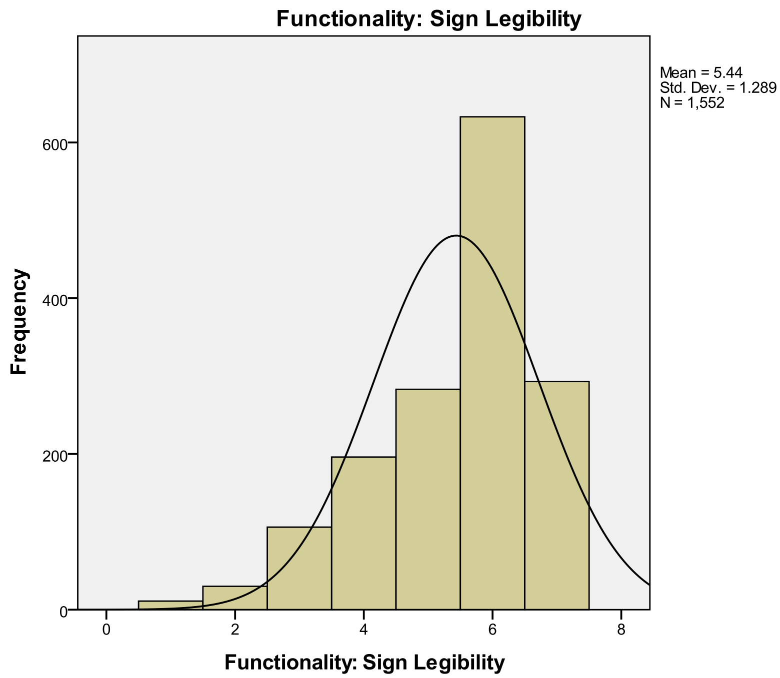


Figure I63. Item Response Pattern for Functionality: Sign Legibility

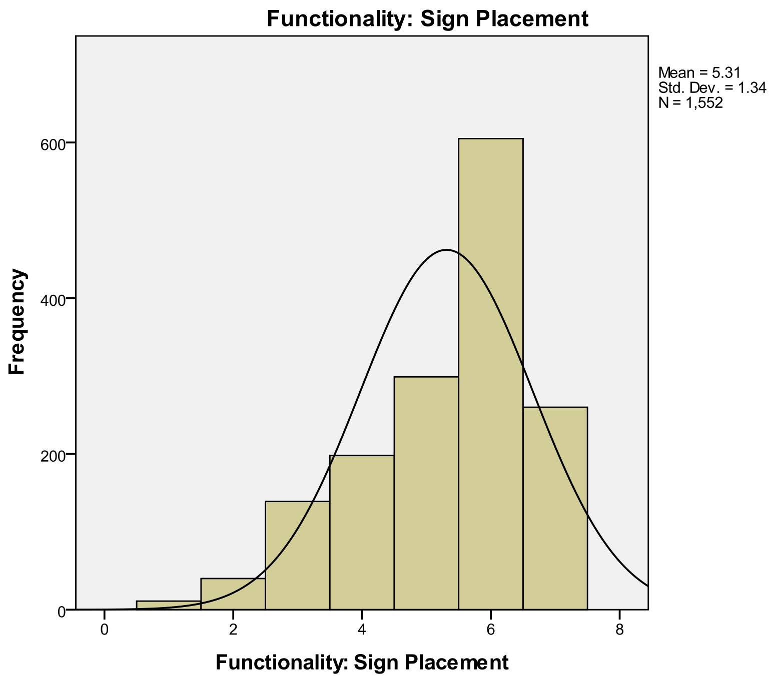


Figure I64. Item Response Pattern for Functionality: Sign Placement

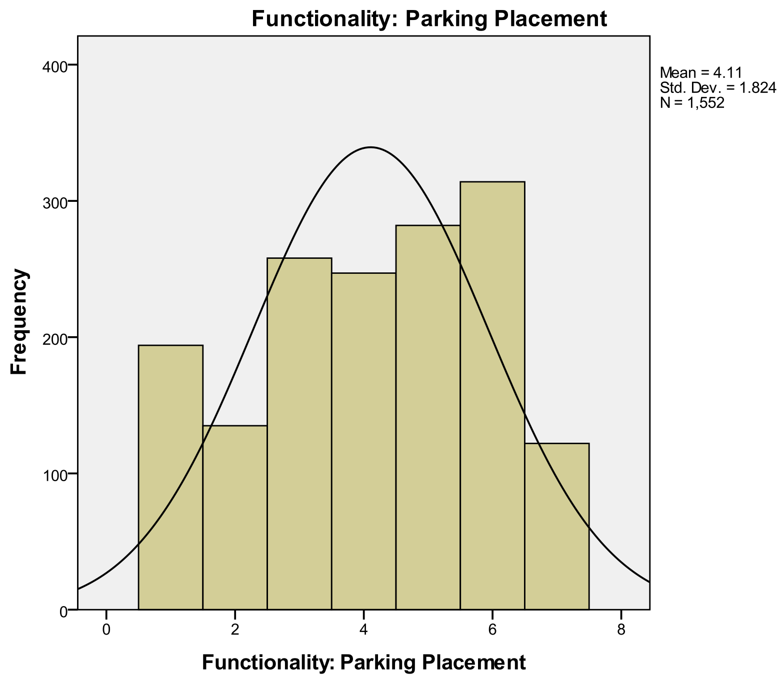


Figure I65. Item Response Pattern for Functionality: Parking Placement

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