

A Post-Occupancy Evaluation of the Outdoor Rooms  
on the Campus of Arizona State University

by

Byron Sampson

A Thesis Presented in Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

Approved April 2022 by the  
Graduate Supervisory Committee:

Kenneth Brooks, Chair  
German Mejia Ramirez  
Joseph Ewan

ARIZONA STATE UNIVERSITY

May 2022

## ABSTRACT

This paper explores the post-construction occupancy satisfaction of the outdoor learning spaces built on the Tempe campus of Arizona State University in response to the Novel Coronavirus pandemic. On March 27, 2020, the Coronavirus Aid, Relief and Economic Security (CARES) Act was signed into law and provided a pandemic-related Federal grant to assist the University in securing equipment and material to augment existing spaces to comply with The Centers for Disease Control and Prevention Guidelines (CDC) guidelines. The scope of the intervention measures encompassed the physical spaces, cleaning, access to and from buildings, and classroom scheduling. Beyond the execution of the guidelines for the interior spaces, ASU administrators considered 16 exterior locations on the Tempe campus for outdoor learning environments. Four sites were selected for implementation with the priority criteria for location based on historic pedestrian traffic patterns and proximity to buildings of high-volume use. The site review team (SRT) that developed the criteria and made the site selections was made up of The Office of the University Architect, Facilities Management and ASU Grounds. Based on reviewing empirical data, there is a gap in knowledge regarding post-occupancy satisfaction in regard to site development interventions. The four outdoor rooms have been in use for one year. A small sample survey was taken in the spring of 2021 and an in-depth analysis was performed at the start of the spring 2022 semester to measure user reactions. On-site volunteer post-occupancy surveys were done to document overall user satisfaction, usage, locations and assess site amenities: seating, lighting, etc. The survey evaluated the design consequences of the outdoor learning environments. The data provided insights as to design solutions that can be applied to future installations at ASU and other campuses. The overarching conclusion from the analysis is that safety is a major concern from the subjects and the initial programming of the SRT was validated. In the long term, a post-occupancy evaluation can guide more effective, economical and sustainable results for the built environment.

## DEDICATION

The Design School, in the Herberger Institute of Design and the Arts, has been very supportive of a full time employee and part time graduate student that was ready to stop, but through encouragement and compassion, allowed me to persevere. John, Joe, Mauricio and Corie; thank you for everything and keeping me on the right track. To Joe, for the lunch chat in 2009 that got me to come teach a Junior Level Design Studio as a Faculty Associate. To the long afternoon chats with Milagros overlooking Orange Mall from Engrained and the vibrant, DIRECT challenge to start my graduate work in earnest. To Ken, with a firm and mindful hand, for pushing me to completion, asking me to look up and out as to what this journey will mean to me and what it could lead to. Thank you all so much.

This is also dedicated to all of the students and staff, past, present and future, that have created one of the most amazing Universities that I have had the privilege and honor to study, learn from and work with for the past 13 years. Inspired leadership from the Administration has grown Arizona State University from a local school to an international presence, one with impact that permeates into the larger community.

The outdoor environment of the upper Sonoran desert is one of the most verdant and unique biomes on earth. It is my hope that this work will assist in educating others to live in a manner that is conducive to learning, growing and inspiring future designers. The devoted staff that manages and shepherds the built environment for the University that were a part of this effort are the best in the country and I am humbled to work with them.

To the team at ASU Facilities Design and Management for giving me the time and patience to complete this journey. Especially to Norman and Dan for being advocates, humorists, and friends – I am a better person because of you both.

To my “family”, all of you in Arizona, Texas and Florida, I dedicate this work, without your love and support this would not have occurred. You listened, cajoled, helped and pushed me to the finish line, thank you. To my father, in whose footsteps I follow; through this process I realized just how large those strides were and what he had to overcome, rest in power. To Andy, Chris, Catherine, Robert – your humor and encouragement kept me afloat.

To my daughter, Safia, for your edits, hugs, insights, rapier wit and steady voice of confidence.

To my wife, Roberta, you reminded me often, with love, what Liz Lemon, from 30 Rock, said, “...graduate students are the worst!!”

## ACKNOWLEDGMENTS

Arizona State University's Phoenix-area campuses are located in the Salt River Valley on ancestral territories of Indigenous peoples, including the Akimel O'odham (Pima) and Pee Posh (Maricopa) Indian Communities. It is my hope that this work is indicative and respectful of their cultures.

I wish to acknowledge the following people for their work on this project, without their help, insights and patience, this work could not have been accomplished:

Thesis Committee - The Design School

Kenneth Brooks, Chairperson

Mauricio Mejia, PhD., Member

Joseph Ewan, Member

Corie Cisco, Graduate Advisor

Milagros Zingoni, Member Emeritus

The Site Review Team and staff at Arizona State University:

Alex Kohnen, Vice President for Facilities Development and Management

Edmundo Soltero, PhD., University Architect

Alana Levine, Director and Site Review Team Lead

Norman Yatabe, PLA, Landscape Architect

Maria Pijem, Project Manager

Marta Ortiz, Project Coordinator

Michael D. Meyer, Manager of Grounds

Alan Roberts, Project Architect

## TABLE OF CONTENTS

	Page
LIST OF FIGURES .....	viii
CHAPTER	
1 PROJECT UNDERSTANDING .....	1
Introduction.....	1
Justification.....	2
Objectives.....	3
Scope .....	4
Location Description .....	5
Limitations .....	5
2 ASU SETTING .....	6
Introduction.....	6
Change Agent .....	6
Student Success and the Charter .....	9
Student Demographics .....	10
One University, Many Places .....	12
Site Amenities as a Unifying Element .....	13
Common Ground Plane .....	13
Outdoor Room/Pandemic Response .....	14
What are the Quality Interactions .....	22
3 LITERATURE REVIEW .....	23
Introduction.....	23
Campus Design.....	23
Post-Occupancy Evaluations.....	24
Connection to Nature .....	25
Favorable Climate .....	27
Successful Spaces .....	29

CHAPTER	Page
Social Aspects .....	31
Economic Considerations.....	32
Design Criteria .....	34
4 RESEARCH METHODOLOGY .....	37
Introduction.....	37
Research Hypothesis and Questions.....	37
Sampling Strategy.....	38
Institutional Review Board .....	39
Data Collection.....	39
Research Findings and Sampling .....	40
Demographic Data .....	40
Location Dynamics.....	42
Social Indicators.....	45
Site Amenities .....	47
Safety .....	49
Attractiveness.....	50
5 FINDINGS, CONCLUSIONS AND RECOMMENDATIONS .....	51
Introduction.....	51
Site Features .....	51
Safety .....	51
Shade and Human Comfort.....	52
WIFI .....	53
Tables and Chairs .....	54
Power and Lighting .....	55
Location, Visibility and Proximity .....	56
Lighting .....	58
Blue Lights.....	58

CHAPTER	Page
Benefits and Reflections .....	59
Future Studies.....	62
REFERENCES .....	64
APPENDIX	
A    INSTITUTIONAL REVIEW BOARD APPLICATION .....	68
B    INSTITUTIONAL REVIEW BOARD APPROVAL .....	80
C    SURVEY CONSENT FORM.....	83
D    SURVEY CONTEST RULES FORM .....	85
E    SURVEY DATA AND RESULTS .....	87
BIOGRAPHICAL SKETCH .....	105



## LIST OF FIGURES

Figure		Page
1.	Fig. 2.01 1987 Tempe campus Aerial – ASU controlled buildings .....	8
2.	Fig. 2.02 2022 Tempe campus Aerial – ASU controlled buildings .....	9
3.	Fig. 2.03 ASU Undergraduate Enrollment Diagram, ABOR Strategic Report .....	10
4.	Fig. 2.04 ASU Freshman Demographic Enrollment, ABOR Strategic Report .....	11
5.	Fig. 2.05 ASU First-generation Enrollment, ABOR Strategic Report .....	12
6.	Fig. 2.06 COVID Outdoor Room Planning Maps, Office of the University Architect.....	16
7.	Fig. 2.07 COVID Outdoor Room Planning Maps, Office of the University Architect.....	16
8.	Fig. 2.08 COVID Outdoor Room Planning Maps, Office of the University Architect.....	17
9.	Fig. 2.09 Cady Mall Outdoor Room, Office of the University Architect .....	19
10.	Fig. 2.10 Schwada Hall Outdoor Room, Office of the University Architect .....	20
11.	Fig. 2.11 Bateman Physical Science Complex Outdoor Room, Office of the University Architect .....	20
12.	Fig. 2.12 Hassayampa Academic Village Outdoor Room, Office of the University Architect .....	21
13.	Fig. 4.01 Survey Access Point, Office of the University Architect .....	39
14.	Fig. 4.02 Gender Demographic Diagram .....	41
15.	Fig. 4.03 Ethnicity Demographic Diagram .....	42
16.	Fig. 4.04 Proximity to Residences and Classrooms Diagram .....	43
17.	Fig. 4.05 Frequency of Visits Diagram .....	44
18.	Fig. 4.06 Convenience Rating Diagram .....	44
19.	Fig. 4.07 Time of Day Diagram .....	45
20.	Fig. 4.08 Time in the Outdoor Rooms Diagram .....	46
21.	Fig. 4.09 Social Activities Diagram .....	47
22.	Fig. 4.10 Site Amenities Diagram .....	48
23.	Fig. 4.11 Site Amenities Diagram .....	48
24.	Fig. 4.12 Safety Diagram .....	49

Figure		Page
25.	Fig. 4.13 Site Attractiveness Diagram .....	50
26.	Fig. 5.01 Tempe Annual Weather Data (weatherspark.com) .....	53
27.	Fig. 5.02 Survey start date (weatherspark.com) .....	55
28.	Fig. 5.03 Survey End Date (weatherspark.com) .....	56

# CHAPTER 1

## PROJECT UNDERSTANDING

### Introduction

The past three years has brought about significant changes to the country and the academic environment in particular. The on-going responses to the COVID-19 pandemic and the need for greater flexibility in meeting the needs for public safety have influenced how the built environment will be shaped in the future. At Arizona State University, over the past 9 years, the student population has grown a great deal. Each year, on every campus of the University, the student population represents the vast array of the human diaspora. Each group has come to further their education and research. Creating an environment that is conducive to that effort is fundamental to the long term success of the University.

Many recent events have brought a variety of issues to the forefront of our consciousness. As the aforementioned populace and pandemic becomes a growing part of the academic environment and awareness, the shape and form of the campus environment has to be taken into consideration. Several campuses across the country were not designed for these instances and a growing student population. In various ways, the historic structure of many other institutions could prevent the development of outdoor rooms that are reflective of the mission of the University. The effective implementation of outdoor rooms will allow for rapid adaptation to various needs. Are there common elements that can lead to greater responsiveness to a public health emergency and academic delivery that is in line with the larger University goals and charter? Have the outdoor rooms developed in response to the pandemic of 2020 met the needs of the student population and what can be learned from it? How can these lessons be applied on a larger community wide basis and, if possible, promote greater connectivity amongst the population coming out of the isolation?

Coupled with the dynamics of the student population, the density of the Tempe campus has and will increase to meet the instructional and research needs of the University. Much like major

urban areas, increased density of the campus will give rise to the closer proximity of the people on campus. The north plaza of the Memorial Union on the Tempe campus is a good example of an outdoor room that allows for the comingling of people in a dense core. With that, the likelihood of impromptu and scheduled interactions will also grow and the need for spaces to accommodate those exchanges need to be assessed, understood and designed in a manner to allow them to occur equitably and naturally. These spaces will also need to address compatibility with technological innovation and access, and how to effectively respond to any communal health concerns in the present and future. The technological advances within the personal computer and cellular phone industry, coupled with computing power and connectivity, will allow the users greater flexibility and accessibility to do more without being limited to a specific location. These advances and the climate of the Phoenix metropolitan area give rise to the use of outdoor rooms for instruction, learning and socialization.

As we continue to address the once-in-a-century pandemic and the need for healthy and safe responses for the students and staff of the University, the campus environment has taken on even greater significance. The purpose of this research will be to assess the user preferences to the outdoor rooms that were built as the result of the closure of interior learning spaces and how the outdoor rooms have actually been used. The intent will be to describe the four locations that were built over the summer of 2020 and use an Institutional Review Board-approved voluntary surveys to gather user input and responses to a series of questions about habits, concerns and site features.

Justification - How and what changed?

The student population of ASU has gone through considerable growth. Coupled with that growth has been a shift in the demographic profile of the students, marking a level of diversity at the University and the Tempe campus in particular. This was expressed by Dr. Morgan Olsen, Chief Financial Officer of ASU, in a meeting in the Fulton Center, "I have noticed, looking at the bus stop across the street from my office window that the student population has changed during my time here. You can see the full spectrum of humanity right there." This observation lead to an

investigation into how the built environment of the campus could and should respond to the varied view points of the students.

The growth of the University and student population is requiring the University to enhance the building design and construction practices which will include outdoor rooms for learning. The Tempe campus has and will be increasing in density over the next several years and, with that, the loss of planted areas to absorb water and enhance the cooling effects of the night time temperatures. The area for vegetation will diminish and have an impact on the mature tree canopy cover over the heart of the campus. Although the building mass on the campus will increase in height and create shade, the composition of the buildings will potentially enhance the thermodynamics of the air temperature by releasing absorbed heat later in the day, thus contributing to the urban heat island. Annual daily temperatures are rising, so for prolonged periods of time; accessible, comfortable outdoor rooms will become increasingly important for the students.

The pandemic required that outdoor rooms be refined beyond mere open space and accommodate the need for in person instruction, connection to the technological network of the University, and the hybrid learning platform that was implemented in response to student needs. Dr. Michael Crow, President of ASU, was instrumental in asking the faculty and staff to be creative and resourceful in responding to the needs and safety of the students and maintain the high level of educational instruction during this period.

### Objectives

The objective of this work is to ascertain what elements of the pandemic response were of short- and long-term benefit to the students and institution. Can these elements inform what can be done in the future regarding public health, student and staff wellbeing, and institutional and community benefit overall?

The goal of this work is to create a primer that can be used to start accessing the various student groups on the Tempe campus to garner insights into the following: what specific examples of

spatial inclusion/exclusion exist for them, what are some the spaces on the Tempe campus that are safe and comfortable to be in as a response to the pandemic, and what components could possibly be introduced to the campus outdoor rooms that would enhance that experience. One component of the Sustainable Sites Evaluation Scorecard is a three-year monitoring period to assess the design for overall performance to determine if the outcomes were meeting the design intent. The Landscape Architectural Foundation “Evaluating Landscape Performance” is broken into three major components – Project Features, Project Claims, Measured Benefits; which is sub divided into Ecological, Economic, Socio-Cultural and Aesthetic. What seemed to be missing was an assessment of how the outdoor rooms were being used and by whom.

This parallel assessment, in the form of a post-occupancy survey and evaluation, could be very valuable in understanding the longitudinal benefits to the students and how the University and the greater community could respond to future pandemics and outdoor learning space requests.

Coupling user feedback and expert assessment with Landscape Performance Evaluation standards will inform a more sustainable response to outdoor room/space needs in the future.

#### Scope

The research will be limited to the ASU Tempe campus with a focus on the four outdoor learning spaces built in response to the pandemic. This research is an exploration of a post-occupancy evaluation (POE) process to this particular project scope; including the design criteria used to create the outdoor rooms, an evaluation of the outdoor rooms as it relates to access and climatic response due to climate change and location. There will be voluntary online interviews with the users of the space, how they are responding to the locations and the amenities that exist in the outdoor rooms. The responses will be coded to reflect site preferences and possible improvements. The survey responses are intended to reveal some demographic data that could give insight as to who is currently using the outdoor rooms. The goal of the research is to understand if there are trends in user demographics – time of use, type of use and whether in groups and/or alone and preferred site amenities. This information could lead to design improvements that could make all future outdoor rooms more equitably accessible.

## Location Description - Tempe campus development

Founded by the 13<sup>th</sup> Territorial Legislature in 1885 as the Territorial Normal School, the school opened to 33 students in a four-classroom building, on 5 acres of land purchased from a local butcher and 15 acres from the Town of Tempe Council. ASU was the first institution of higher learning in the Arizona Territory ([asu.edu](http://asu.edu)). As the non-land grant institution, it was a voter initiative, Prop 200 in 1958, which created Arizona State University from Arizona State College.

ASU has developed into a major research institution growing in prominence each year. The Carnegie Foundation classification system ranked ASU R1: Doctoral Universities; Very High Research Activity. This reflects an institution with undergraduate and graduate instructional programs, four year full time and research doctoral comprehensive programs. The Fall 2020 campus immersion student population was 74,795 (CCIHE, 2020).

The University also has a Digital Immersion ranking by the Carnegie Foundation which has a ranking of R2 for High Research Activity. The Fall 2020 semester student population was 53,993 (CCIHE 2020). The online format also has a bachelor and graduate program base, the Research Doctoral focus is professional dominant (CCIHE).

## Limitations

This research project will not be a design solution but a set of guidelines for future campus development based on the insights of the subjects. The Tempe campus has the largest student and staff population among the four ASU campuses in the Phoenix metro area. Since the surveys are voluntary, responses from underserved populations such as BIPOC, LBGTQIA+, special needs and special interest students on the Tempe campus may not be recorded. The surveys are limited to the four outdoor rooms that are currently installed and the users that inhabit them. Further follow-up research will be needed to determine any specific needs for underserved and underrepresented populations on the Tempe campus and the University in general.

It is recognized that the population of ASU is growing and the demographics are changing. This will have a profound impact on the built environment and how it responds to the user needs.

## CHAPTER 2

### THE ASU SETTING

#### Introduction

This chapter will focus on the background of Arizona State University in terms of student growth, student success and the commitment to the design principles of the New American University.

#### The Change Agent

Dr. Michael Crow was invested as the 16<sup>th</sup> President of Arizona State University in July of 2002. He immediately unveiled the vision for ASU to become a “New American University”, a reconceptualization of 21<sup>st</sup> century education ([newamericanuniversity.asu.edu](http://newamericanuniversity.asu.edu)). Dr. Crow’s vision was to have the University become a knowledge enterprise concurrently in the pursuit of broad access to quality education, significant societal impact, and excellence in all things ([newamericanuniversity.asu.edu](http://newamericanuniversity.asu.edu)).

This was codified in November of 2014 with the establishment of the first ever ASU Charter and Design Aspirations, the guiding principles of the University. Dr. Crow was responding to his experience in higher education and working with education leaders who desired for educational institutions that were more connected to people and communities while being impactful and responsive to the same (ASU Thrive). The ASU charter defines that the success of the University is to be measured by who is included and how they succeed, creating public value through research and discovery and being responsible for the economic, social cultural and health of the communities it serves.

The Design Aspirations are encapsulated in eight sections –

- Leverage Our Place,
- Enable Student Success,
- Transform Society,
- Fuse Intellectual Disciplines,



- Value Entrepreneurship,
- Be Socially Embedded,
- Conduct Use-Inspired Research and
- Engage Globally ([asu.edu](http://asu.edu)).

These aspirations directly relate to gaining an understanding of the places we inhabit, serving the students, cultures and economics of them, and making those impacts scalable and sustainable. The physical manifestation is expected to support, enhance and advance the aspirations of the University.

These aspirations are evident in the growth of the University in recent years. Between 2004 and 2018, Arizona State University has seen a 52% increase in overall student population to a total of 111,249 students. Approximately 80% of that growth was on the metropolitan campuses. Another 8,702 students enrolled in 2019, with a dramatic increase in online learning. The online programs began in earnest on the Skysong campus in the fall of 2010 and have seen exponential growth each year to a recorded total of over 45,000 students in the fall of 2019 ([asu.edu/about/facts-and-figures](http://asu.edu/about/facts-and-figures)). It can be deduced that the impact of this type of growth in online course delivery led to the rapid deployment of course delivery in response to the pandemic. The development of the outdoor rooms had to match this speed of delivery and sophistication.

Within the University, the academic and research space has grown at a tremendous rate. On the Tempe campus this can be seen in the assignable square footage, and building area used for academic and research space. Some of this growth can be attributed to the partnership with residential housing providers, and leased spaces across of the valley as needs arose. The University owned buildings went from 8.2 million gross square feet in 1987 to 20.1 million in 2022, reflected in the growth of the student population and research investments (ASU Sybase and Redshift Data Warehouses).

Very few institutions in the country have experienced the rate and scale of change and expansion as seen at ASU, yet all have experienced the impact of responding to the pandemic.

The illustrations below highlight the growth of the Tempe campus over the course of the past thirty five years. In Figure 2.01, the structures in gold represent 8.2 million gross square feet of building area in 1987. In Figure 2.02, with the highlights in maroon, represents the growth of the Tempe campus and illustrates 20.1 million gross square feet of building area in 2022. These figures do not include the 7.64 million gross square feet of public – private partnership space that is on university land. The density of the campus and university overall will be growing and the need for effective outdoor rooms and learning spaces will be critical.

Fig. 2.01 1987 Tempe campus Aerial – ASU controlled buildings (ASU FDM Data Sheets).

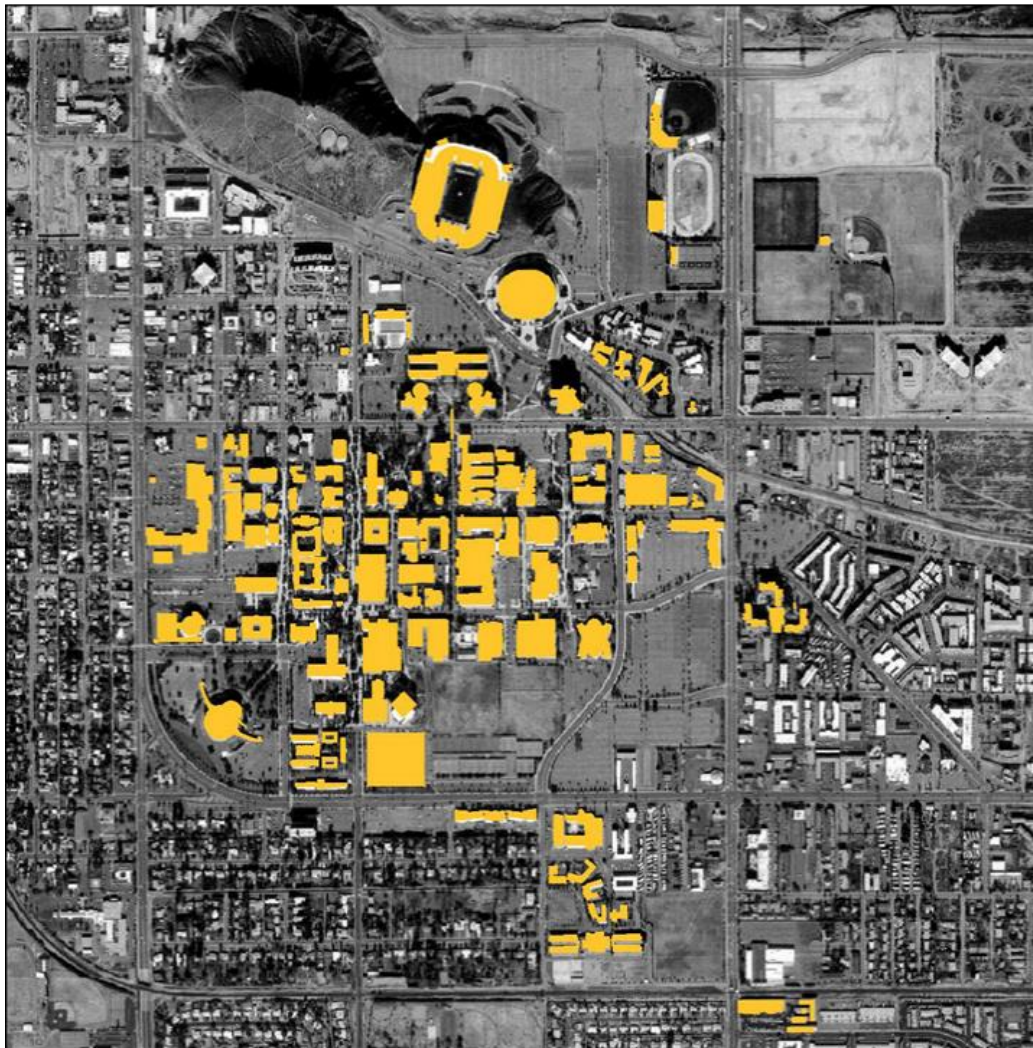
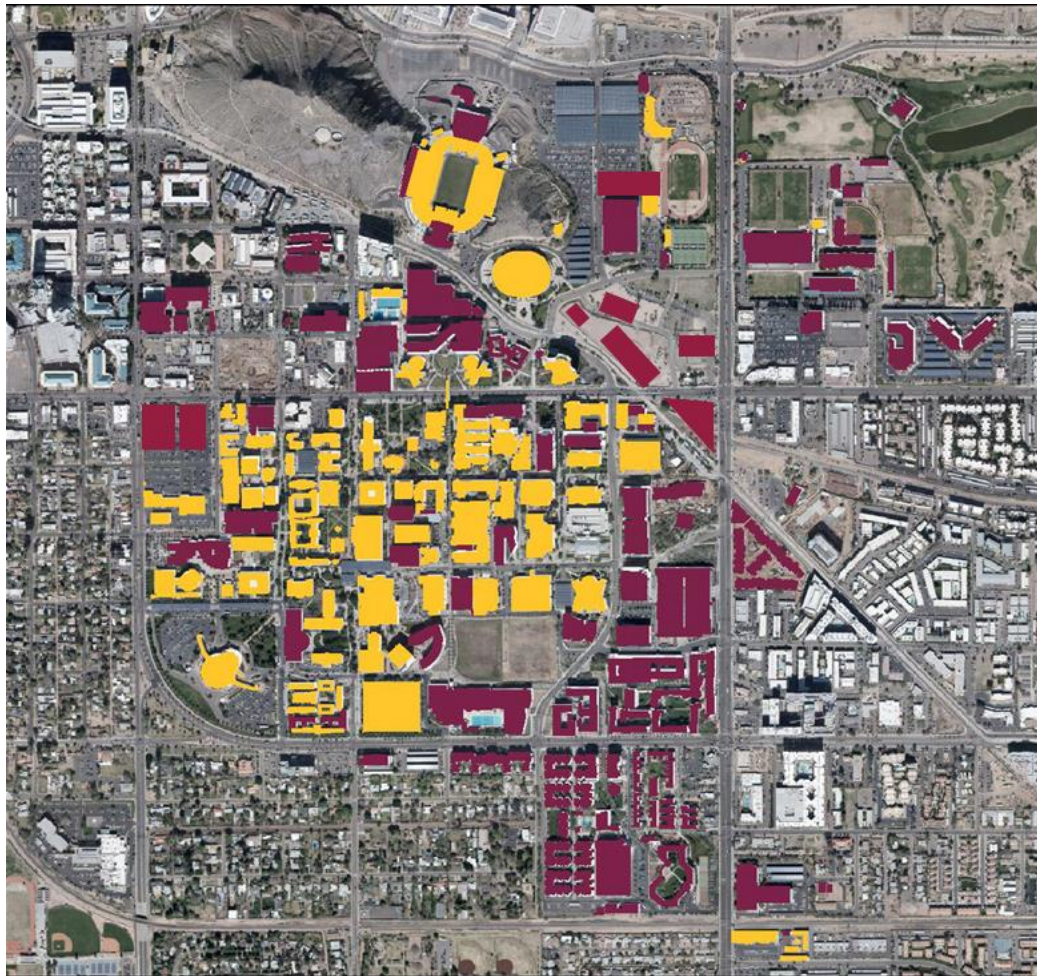


Fig. 2.02 2022 Tempe campus Aerial – ASU controlled buildings (ASU FDM Data Sheets).



### Student Success at ASU and the Charter

ASU is a comprehensive **public research university**, measured not by whom it excludes, but by **whom it includes** and **how they succeed**; advancing **research and discovery** of public value; and assuming **fundamental responsibility** for the economic, social, cultural and overall health of the **communities it serves**.

*ASU Charter - The New American University asu.edu*

The University charter was developed as part of the formation of “The New American University”. Inclusion and access are fundamental tenants of how the University engages with the community and its commitment to the student body. This new model philosophically moves away from the historic academic structure and concentration of America Universities and is forward focused.



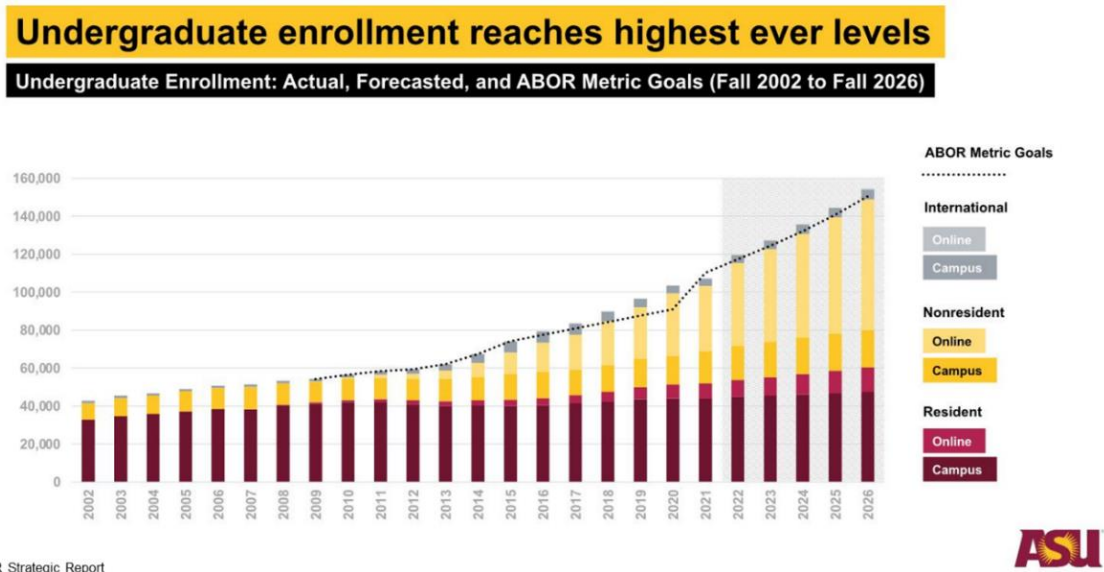
The Charter of Arizona State University exemplifies the long term commitment to the students, staff and community.

As programs grow in influence, desire and need, many academic programs may consolidate, be reimagined and thus move to other campuses in the system. This will mean the growth and diversity of the other campuses will change as well. By determining what interventions can be done to ease the stress and increase the well-being of all students on the Tempe campus, the University can be more welcoming, equitable and inclusive.

### Student Demographics

Over the past twenty years, the overall population of students has grown significantly as illustrated in Figure 2.03. In 2009, the University introduced metrics to track the progress of changes that were being implemented throughout the academic enterprise. One essential goal

Fig. 2.03 ASU Undergraduate Enrollment Diagram, ABOR Strategic Report PowerPoint 2022

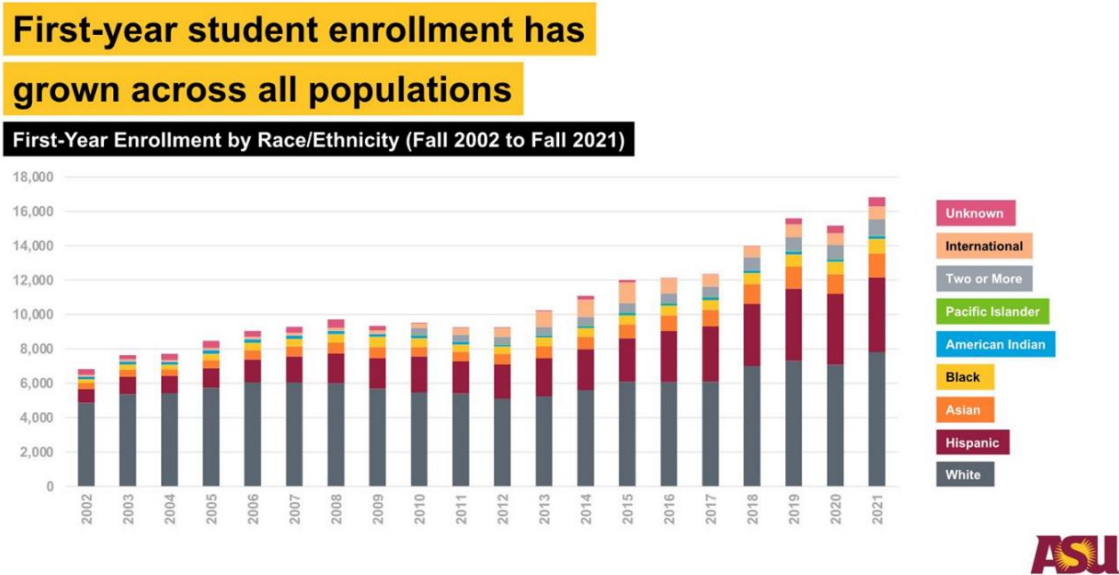


of the administration was to increase the number of students on campus to institute a sense of connection to the University. The Skysong campus, a partnership with the City of Scottsdale and the University, was initiated in 2008 with a 100 million dollar investment to incubate innovation and entrepreneurship. (Crow, 2009). This space was a catalyst for developing 300 degree

programs through the Online Learning Enterprise which was instrumental in the implementation of the hybrid instruction during the pandemic (asuonline@asu.edu). With the Online Learning platform, the student population has grown globally and created a unique partnership with The Starbucks Corporation, whereby Starbucks employees can earn a degree while working for the company (starbucks.asu.edu). These points of access could be a catalyst for some students to gravitate to in person learning as well.

The demographic shifts in the first year student enrollment are illustrated in Figure 2.04, with significant growth in the Hispanic population. The overall population did decline in 2020 as a result of the pandemic, however, the recovery has been exceptional. The projected growth metric for 2021 was reached with students eager to return to campus from hybrid learning models and isolated conditions. Coupled with the diversification of the student body, one metric that is

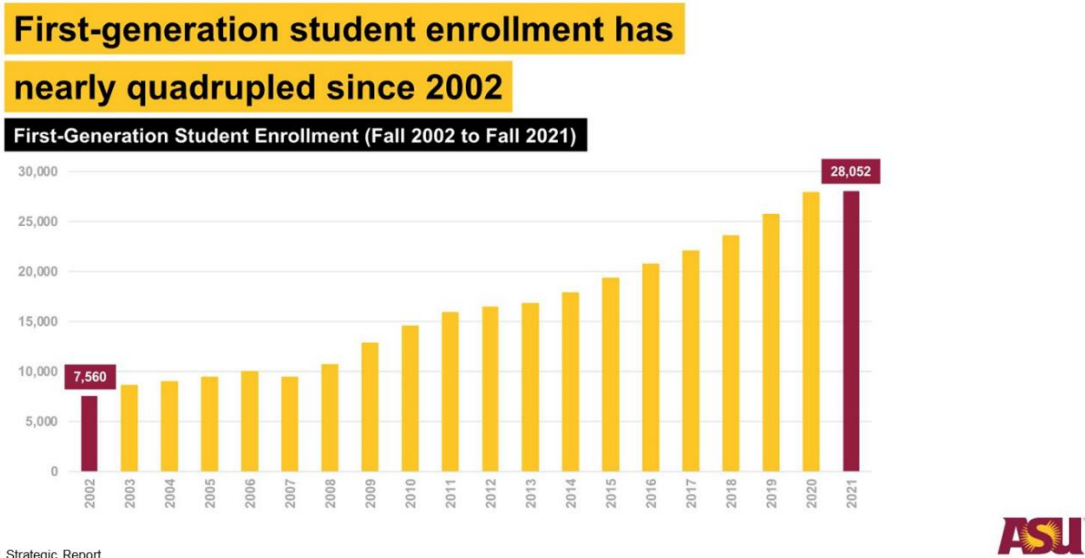
Fig. 2.04 ASU Freshman Demographic Enrollment, ABOR Strategic Report PowerPoint 2022



ABOR Strategic Report

impacting the entire country is the growth of First Generation students. The immigrant population has grown in the United States and will continue to do so despite actions to curb that growth. Over the last 8 years, ASU has promoted accessibility through the adoption of the Charter, leading to greater access for many students.

Fig. 2.05 ASU First-generation Enrollment, ABOR Strategic Report PowerPoint 2022



The sharp rise in demand for skilled labor over the past few decades has made it more urgent than ever to provide access to postsecondary education for all (Baum and Flores, 2011).

### One University in Many Places

In 2004, Dr. Crow gave a presentation that began to outline a larger vision for the University. The focus was an “Overview of the Transitional Design to 21<sup>st</sup> Century Excellence” (Crow, 2008). The presentation outlined the vision for the collection of campuses and schools in the University and how they must all adapt to meet the needs of the present and the challenges of the future. This meant developing a research institution with unparalleled academic achievement and a firm commitment to social, economic, cultural and environmental development (Crow, 2008). In the Office of the University Architect, a commitment was made to bring about the physical manifestation of these ideals. The 2005 University Comprehensive Master Plan laid the foundation by highlighting simple measures that could be undertaken to codify the intent. This led to the initiation of Design Guidelines for new University buildings and site development. The 2011 Comprehensive Master Plan Update bolstered the guidelines by introducing a wide-ranging review of the site elements on all of the campuses in the system and what were the common

factors that were beneficial or needed to be enhanced. These unified site elements would be implemented on each campus allowing students and staff to recognize that there was not a distinction from one campus to another in regard to site features and that the commitment was equitable across the enterprise platform (Office of the University Architect).

#### Site Amenities as a Unifying Element

The Office of the University Architect is in the Arizona State University Facilities Development and Management Department (FDM) under the ASU Business and Finance Office. In conjunction with Capital Planning and Management Group, all university-owned properties are overseen by FDM during design and construction. As an aid to consulting design professionals and construction teams, a series of guidelines were developed that outlined the best practices of the FDM departments; these guidelines simplified the long term maintenance of the campus built inventory. Where possible, building systems were examined with the maintenance crews so that the older systems could be upgraded to compatible platforms.

This effort established the site element standards for all campuses. These standards encompass pedestrian and site lighting, bollards, site furniture (tables, chairs, benches) and accent materials. Intentionally specific in nature, the standards were created in a manner to recede in the visual realm and allow the interest to be on the architecture variety of the campuses as they have evolved. This consistency has a two-fold benefit – reduced visual clutter and increased operations and maintenance efficiency (Office of the University Architect).

#### Common Ground Plane

Throughout the history of the Tempe campus, the architectural styling of the academic buildings have been indicative of the time of their development and the needs of the educational delivery. The diversity of architecture has led to many parts of the Tempe campus to appear disparate from others. In 2003, Ron McCoy was appointed as the first University Architect by Dr. Crow (asu.edu). In 2008, McCoy was overseeing the design and construction of every major project on

the four campuses in the University. He was impressed by “how important the connective tissue on the campus is” (Beimiller, 2008).

The connective tissue was made manifest in the 2017 Tempe Campus Hardscape Master Plan which codified what the elements of connectivity were to be moving forward. It became apparent that taking down unique architecture buildings in an effort to unify the campus was not feasible. However, the ground plane and selection of plant materials would prove to be the most effective way to accomplish developing a cohesive and unified campus environment. Specific to the Tempe campus, the Hardscape Master Plan incorporated the University standards for site elements, reinforcing Dr. Crow’s concept of “One University in Many Places”. The plan bore out the delineation of the outdoor room network so that these open spaces could be identified, preserved and possibly expanded in the future. In the early 2000’s, many of the buildings on the Tempe campus were approaching an age of 50 years or older and would require major renovation or demolition (Beimiller, 2008). Developing a common vocabulary for the development of new buildings and malls that would reflect the University mission was critical. William Whyte noted that vague stipulations cannot be enforced and a lack of guidelines does not give the design team and contractor more freedom, it just reinforces convention (Whyte, 1980).

#### Outdoor Room Network and Pandemic Response

In March 2020, Arizona State University made the decision to address the growing concern and impact of the COVID 19 pandemic. Dr. Michael Crow asked the University Provost, Dr. Mark Searle, to close in-person classes as of the 16<sup>th</sup> of that month. This date coincided with the beginning of the annual spring break for students, thereby reducing the potential rate of infections. On this date, all non-essential ASU staff were asked to begin to work from home in conjunction with the students no longer being on campus. The CDC guidelines were implemented on the University over the course of 5 months during the spring and summer of 2020.

Working remotely, the staff in Facilities Development and Management (FDM) were still continuously tasked with overseeing planning, design, and construction efforts. The adjustment



period was brief as the workload did not alleviate the schedule and budget impacts that are inherent with project demands. While the staff was functioning within the new operating base, ASU administration was heavily engaged in looking at the development and initiation of protocols and policies that were in accordance with the Center of Disease Control (CDC) guidelines.

There was recognition that there would be pandemic related Federal grant funding by way of the CARES Act for University wide renovations to meet the needs of public safety during the pandemic. Several committees were formed to address various aspects and formulate steps to be taken in response. This included such items as the physical space, cleaning, access to and from buildings, and classroom scheduling. The recognition that enclosed spaces presented a major health risk to students and staff led to the development of a hybrid delivery (online coupled with voluntary in classroom teaching) model of instruction. There was a great deal of discussion around how the population of students could be accommodated within the open space on all of the campuses. The committees debated several options and tasked the Office of the University Architect to begin analyzing the open space on the Tempe campus for potential outdoor classroom sites. In early June 2020, the University Landscape Architects were called upon to become part of a Site Review Team (SRT) to review the initial site studies, analyze various options (tents, canopies, tree shaded areas), validate findings, and make recommendations back to the administration as to what could and should be done.

Initially there were 16 sites (Figures 2.06 – 2.08 below) that were considered for outdoor room implementation. These sites were all across the Tempe campus and were designated as immediate and future locations. Upon receiving a debriefing from the FDM managers regarding the project goals, the SRT, led by Alana Levine, was comprised of FDM Grounds and the Shops, and the Office of the University Architect.

Fig. 2.06 COVID Outdoor Room Planning Maps, Office of the University Architect



Fig. 2.07 COVID Outdoor Room Planning Maps, Office of the University Architect



Fig. 2.08 COVID Outdoor Room Planning Maps, Office of the University Architect



The SRT developed assessment criteria to prioritize the potential site locations and base the site selections on least and highest amount of impact. The assessment criteria were based on:

- Existing conditions
  - Trees
    - Size
    - Proximity
    - Canopy Density/Loss

- Irrigation Impacts
  - Coverage
  - Rerouting
  - Valve Isolation/Retrofits
- Hardscape Adjacencies
  - Conditions
  - Size
  - Level of Connectivity
- Building Adjacencies
  - Classrooms
  - Lecture Halls
  - Front Doors
- Infrastructure
  - Tunnel locations
  - Electrical/Data Proximity
  - WIFI access

As part of the process, the SRT investigated temporary infrastructure solutions like tents and the facilities required to support them. To accommodate the average classroom size and rotations, the tents would have a very large footprint and would have to be anchored into the ground, in lieu of weighted containers on each corner. Another consideration that became apparent was that flooring would be required, along with considerable ventilation. Several zones of irrigation would have to be shut down or severely modified to accommodate the tent footprints. Many of the trees in the study areas rely on the turf irrigation for survival and would potentially be negatively impacted. The uncertainty of the timeframe that the tents would be in place and the seasonal climatic elements (monsoons, higher air temperatures at the beginning of each school year) weighed heavily on the shelter review.



The cost of the tents and the temporary nature of the installation were also contributing factors in not selecting this system. The exercise was beneficial to illustrate that an alternative was considered and the SRT could substantiate the reasoning for the final decision to proceed with a structured open air system by the Landscape Forms, the UPfit structure.

Of the original list of 16 sites, the SRT was able to fully endorse four locations with a few site modifications. The findings were presented to the COVID response committees and the CFO for review and comment. The locations were:

- Cady Mall – South, adjacent to Building Interdisciplinary A and B (Figure 2.09)
- Schwada Hall (Figure 2.10)
- Bateman Physical Science Complex on Palm Walk (Figure 2.11)
- Hassayampa Academic Village (Figure 2.12)

Fig. 2.09 Cady Mall Outdoor Room, Office of the University Architect



Fig. 2.10 Schwada Hall Outdoor Room, Office of the University Architect



Fig. 2.11 Bateman Physical Science Complex Outdoor Room, Office of the University Architect





Fig. 2.12 Hassayampa Academic Village Outdoor Room, Office of the University Architect



The pandemic required the University staff to respond rapidly without the full benefit of user inputs that would allow for greater insights to the interventions that were most desired and needed. The programs and interventions implemented in response to the pandemic were based on the CDC guidelines and the existing ASU Project Guidelines for campus development. Thus, a post-occupancy study would be required to obtain a baseline to understand what is or is not working in the new outdoor rooms and how this could be a point of departure for creating meaningful interventions. These interventions could be used within the larger community beyond the campus to respond to post pandemic recovery efforts and future needs.

What are the Quality of Interactions?

The COVID – 19 pandemic restrictions stipulated by the Center for Disease Control (CDC) required several safety measures that included social distancing and mask mandates ([www.cdc.gov](http://www.cdc.gov)). The cleaning and disinfectant protocols required multiple rotations of the custodial staff for classroom and other indoor public spaces. The initial institutional response, as directed by the University Provost and Chief Financial Officer, was to dismiss in-person learning after spring break of the 2020 spring semester. Starting during this period and in preparation for the 2020 fall semester, ASU staff worked diligently to implement the CDC guidelines and take measures to keep the returning students safe.

This meant that many of the classes that were to be held in the interior of buildings would now have to be held in exterior environments and/or in a hybrid format. The stipulations also would require behavioral changes in how instructors and students interacted, leading to increased stress and isolation. This is antithetical to the premise of the collegiate experience. The primary concern for the University with the advent of the pandemic, was the safety of the students and staff, curbing the possibility of infection, and developing protocols that could be implemented to contain and assist any infected individuals. This required strict enforcement of the CDC guidelines as they evolved through the initial stages of the pandemic.



## CHAPTER 3

### LITERATURE REVIEW

#### Introduction

This chapter will explore the relevant literature as it pertains to post-occupancy evaluations, student success and the development of outdoor rooms.

#### Campus Design and ASU

The historic core of the Arizona State University campus is located adjacent to University Drive. Over the years since its founding, the campus has added buildings that evoke the time and design trends in the built form of higher education. The past nine years has no exception in the development of new buildings on at ASU, with many more in various planning stages. The Noel Levitt's survey has been used to track the impressions of potential freshman as they determine their institution of choice (Jerke, et al., 2008). It states that the physical appearance of the campus has a major impact on the decision making process and is a primary driver in the final result. A green campus can create an environment that encourages students to spend time on campus and socialize with other students, while an urban feeling campus can increase the perception of social connectedness in students (Hajrasoulija & Ewing, 2016).

As competition increases, universities have been in a building boom to make more efficient and modern buildings to attract students. Across the nation, the cumulative capacity of colleges grew 26% between 2009 and 2019, while enrollment only increased by 3% (Gardner, 2022). The pandemic, transitioning to a hybrid academic delivery model and a surplus of building stock, is calling into question the current growth models. Planning models and typologies have primarily focused on building massing, with the impact of the pandemic there will be a reshaping of campus and building planning to mirror the hybrid instructional delivery (Gardner, 2022). There are seven dimensions to campus form that comprise a well-designed campus:

- Land-use organization – the degree that various land uses are mixed,
- Compactness – campus density and building proximity,

- Connectivity – the effectiveness of mall navigation and connection to spaces beyond the campus,
- Configuration – the strength of the campus spatial structure and ground plane form,
- Campus Living – students living on, near, or off campus,
- Greenness – open spaces in relationship to building mass,
- Context – the degree of urbanization in the surrounding area.

These dimensions can be measured and tested to desired outcomes for an institution (Hajrasoulija & Ewing, 2016). The application of these dimensions with sustainability (environmental and social) outcomes were part of the 2017 Tempe Campus Hardscape Master Plan development.

#### Post-Occupancy Evaluations

The process of post-occupancy evaluation (POE) has been used in the field of architecture for several decades. Primarily used to assess the user experience of built work as it is inhabited on a daily basis, the evaluation can provide input to the architect, owner and building managers regarding the performance of the design (AIA, 2013). The process has been revised and updated over the past decades; however, the mission has remained the same; getting actual building user feedback is valuable. There are economic impacts that can be measured in high user satisfaction which will drive other potential users to the building. This can be coupled with user physical health as it relates to indoor air quality and mental health based on the attractiveness of the space (Candido et al., 2015).

Beyond the chemo-physical (indoor environmental aspects) there are interactional metrics that are subjective to the users and need to be assessed. Researchers in Israel and Australia are looking into how the POE can have a greater impact on the built environment and improve the sustainability of buildings. The POE can integrate a range of fragmented aspects of the total construction process and the relationship of the building to the environment and users (Meir, et al., 2009). In 2011, with the assistance of two Universities and an Australian commercial property

stakeholders, a new system for building evaluation was introduced: Building Occupants Survey System Australia (BOSSA). The intent is for the review to be more holistic in the overall approach to post-occupancy evaluations. Comprised of three distinct components: a summative occupant survey tool; a pro-forma to capture details about the building's design, fit out and engineering systems; and a right-here-right-now questionnaire (Candido, et al., 2015). This system is one of the few that addresses and inquires about the user group's reactions to green spaces.

At Ben-Gurion University of the Negev, Israel, Professor Meir and his team examined the short-, medium-, and long-term benefits of the data obtained from post-occupancy surveys. The data suggests that the findings give insight into building issues and user-insight solutions; promote the positive and negative lessons learned; the creation of databases and the update, upgrade and generation planning and design protocols. This research has been viewed with skepticism by industry professionals and has hampered the adoption of POE as an integral part of the design and construction process (Meir, et al., 2009). The research illustrates the benefits from the POE are conflated with the various view points on the project – best value for monies expended, lower energy consumption, operating and maintenance costs, occupant health, well-being and productivity, the design consultancy's responsibility for the health and safety of the occupants (not just aesthetics), institutional concerns regarding building longevity, flexibility and adaptive character to context. Recent work in Australia is considering the need for longitudinal assessments to quantify and qualify the intended outcomes of the built environment (Candido, et al., 2015). The gap discovered regarding the use of post-occupancy surveys is that little to no data is present regarding exterior spaces and user satisfaction.

#### Connection to Nature

There is a great deal of literature concerning the mental health of occupants of open green space and a great deal of that research has been in areas with little to no ethnic diversity. Stress is a reality of daily life in dense urban conditions, as illustrated in the article about Singapore and Hong Kong (Xue, 2017). The authors describe the proximity to the open space as important; however, the user groups responded differently to each space. The same conditions regarding

density are present on the Tempe campus and the pressure on the open space will only grow as the demand for research and class space continues, forcing increased density on the campus. The researchers in the University City of Fuzhou, China, pointed out that the variety of open space configurations led to varied responses from the subjects, thereby garnering various models for design solutions in the space between the buildings or on the campuses as a whole (Liu, et.al. 2018).

In separate studies, Kaplan, Kuo, and their colleagues addressed more of the psychological and sociological aspects of the open space as it relates to human interactions and building of common trust and safety. Kaplan and colleagues point out that the assumption that people are basically similar and will respond to space based on the designer's own experiences and solutions is a road to ruin. (Kaplan, et al., 1998). As the data is illustrating, the diversity of the University is changing and so will the lived experiences of the students over time. Studies and surveys from the consulting firm, Educational Advisor Board (EAB) and the Chronicle of Higher Education are illustrating that women and first generation students are the fastest growing cohorts in higher education. From 2015 to 2019, the number of male students enrolled at the Tempe campus showed a slight decline (30,000 to 29,000) whereas the number of female student has begun to increase (21,000 to 25,000) (ASU EOSS).

Kuo and colleagues related that the communication network of the women in a dense housing project in Chicago was based in part by the visual and physical access to green space and that led to the reduction of mental fatigue. (Kuo, et al.,1998). All of these factors are important design criteria for future outdoor room developments; especially in consideration of the ASU design guidelines and uniformity standards of the site elements.

With the shared experiences of hybrid class work, relegated social interaction, newness of place and being away from what is familiar; student life on campus during the pandemic can be extremely stressful. Many students are in situations where they are not coming into contact with friends in a manner that is familiar or desired. This can lead to increased stress due to a heightened sense of isolation. As Dixon and team relate in their work on prejudice reduction and

social perception, many times the solution is believed to be proximity and frequency of contact that will lead to better understanding; however, the research illustrates that it is the quality of the contact that is more important (Dixon, 2010). With the pandemic policy to socially distance and isolate to reduce the rate of infection, the quality of interactions can be difficult. The outdoor rooms will allow for these interactions to occur in a manner in compliance with the CDC guidelines.

#### Favorable Climate

The climatic conditions of the Phoenix metropolitan area makes it an attractive destination for students seeking a higher education. The effects of climate change and urbanization have impacted the average temperatures in the valley for many years. This is evidenced by prolonged summer time high temperatures that are consistently exceeding normal high temperatures for a number of days.

Tempe has a very favorable climate for most of the year, especially during the time of the year when most classes are in session. The mean monthly annual average temperature of 72.1 degrees (F) (Arizona State Climate Office, 2019). Throughout the academic calendar year, mid-late August to early May, the average temperature is 68.9 degrees (F). These listed temperatures are based on average readings from 1896 – 2018. What has been observed over the past several years is an increase in the overall monthly temperatures. This is related to the increase in the overall density of the city as population has increased along with the construction of housing and commercial properties. Increased density has contributed to the urban heat island effect and the outdoor rooms must mitigate the climatic conditions in each individual space.

The overall population of Tempe has increased at a rate of 2.03% annually and based on recent census data increased 26.10% to a population of 203,923 from 161,719 in 2010. The increase in population in Phoenix has an annual growth rate of 1.54% and has grown 19.92% based on the latest census from 1.45 million to 1.73 million in 2020 ([www.worldpopulationreview.com/us-cities/phoenix-az-population](http://www.worldpopulationreview.com/us-cities/phoenix-az-population)). The impact of the decreasing open space and accelerated

urbanization in the valley cannot be isolated to a single municipal boundary. The increase in urbanization is leading to changes in natural air circulation, prevailing wind speed and solar radiation levels (Elnabawi & Hamza, 2019). The net impact is cumulative and will affect the University campuses and the greater community.

The impact of increased temperatures has been being studied by many scholars in a variety of countries over the last 10 to 20 years. One outcome of note is how the influence of human thermal exposure can be mitigated and improved. Human thermal exposure is the accumulated heat at any location as experienced by the pedestrian (Middell, et.al, 2021). Through the use of a robot created in the SHaDE Lab on the Tempe campus of ASU, various climatic readings were taken throughout the campus and local communities. From this data it was determined that native trees were better for the local environment due to the smaller leaf mass reducing the rate of transpiration from the tree canopy. Although the native trees are duly adapted to the upper reaches of the Sonoran desert, they are not as proficient for mitigating human thermal exposure. Engineered shade, created with canopies and shade structures, was found to be the most effective method to combat the hot conditions; however, it is not an absolute. The paradigm of “Right Shade, Right Place” posits that since trees take some time to grow to reach a viable shade capacity, depending on location, including non-natural shade alternatives while recognizing the co benefits of natural forms and their mature size is essential (Middell, et.al.2021).

The thermal characteristics of outdoor spaces and the spaces that connect them are vital to the livability and effectiveness of the urban environment. Thermally comfortable spaces allow users to spend more time outdoors (Elnabawi & Hamza, 2019). Urban areas, University campus settings, are influenced by the implications of climate change and rising temperatures. In hot climates, like the Phoenix metropolitan area, heat waves and prolonged heat increases heat stress, morbidity and decreased productivity (Elnabawi & Hamza, 2019). Design solutions must respond the climatic conditions of the environments of place.

## Successful Spaces

As part of this research, a comprehensive understanding of what comprises a successful space had to be understood. Theory of Place, compiled from the work of Canter and Graumann, presumes that a place's character can play a key role in shaping attitudes, perceptions and behaviors. The theory distinguished "place" and "space". There are two integrated frameworks at play, the first being architectural and the second people-place transaction; each having three components (Elnabawi & Hamza, 2019).

The architectural framework involves three discourses – space, form and function. These map the different types of design issues that need to be addressed in the environment and behavioral study. They are then translated into physical, psychological and functional form. When combined they address form and space, cognitive and emotional necessities and what activities will be addressed. The person-place transaction is composed of three paradigms – personal, social and cultural aspects connected to the design issues (Elnabawi & Hamza, 2019).

The work of William "Holly" Whyte, illustrated that "it is far easier, simpler to create spaces that work for people than those that don't." (Whyte, 1980, pg. 15). The studies done by Whyte's team connected several elements that were present in any urban condition – people, circulation, access to buildings, seating, choice, consistency and constituency. Whyte stated, "Given the basic elements of a center city – such as high pedestrian volumes, and concentration and mixture of activities – people in one place tend to act much like people in another." (Whyte, 1980, pg. 23). These observations did not characterize any particular demographic – gender, ethnicity, etc. as it was determined that the qualitative measures were too manipulative (Whyte, 1980). These observations helped to inform the survey to determine how the Tempe campus outdoor rooms were used.

The history of urban development shows how the oldest settlements were developed along paths, trails and market places. The planning followed the Life, Space, Buildings principles. Many of the colonial planning was also done in this manner, until the modernistic period beginning in the early

20<sup>th</sup> century (Gehl, 2013). From the earliest settlements along trade routes that developed into cities, the relationship has been that activity will spawn pedestrian interest and it builds on itself over time. This was evident in the early Greek and Roman colonies and into the Colonial era of the United States. Cities like Savannah, Georgia and Philadelphia, Pennsylvania were originally planned with this basic framework – public life and spaces are central to vibrant city life (Gehl, 2013). The earliest European colonial settlement was in Santa Fe, New Mexico in 1609. The layout of the settlement followed the Laws of the Indies of 1573, which was rigidly applied and formed the basis of many of the Spanish settlements throughout the South and West. This can be regarded as the first American planning code. The plan of the settlement was based on a plaza space surrounded by the principal buildings of the town (Morris, 1972). This adherence to the 1573 Law of the Indies was possibly the first time the Jan Gehl concept of Life, Space, Buildings was codified.

Urban design and city planning can be described as work involving several levels of scale. Large scale, which is holistic treatment of the city including quarters, functions and traffic facilities. Middle scale, the organization of spaces and buildings. Small scale, the human landscape, eye level, walking and living in the space. If the majority of the necessary planning and thinking is only at a larger scale, then the tendency is for the human scale to be seen as leftover space in the larger picture and therefore lacking in quality. Human scale will require consistent treatment (Gehl, 2013). Based on the study of urban plazas in New York City, the user groups in the spaces were not looking up at the buildings, but what is going on at eye level; at the human scale (Whyte, 1980).

In regard to campus planning and design, to ensure better conditions for the human dimension, working with the small scale is paramount. Gehl posits that the correct order of planning and thinking of the public environment is “Life, Space, Building, in that order, please” (Gehl, 2013, pg. 198). Designing for aesthetics and neglecting the functional aspects of climate, security, and opportunities for seating (Whyte, 1980).



The built environment shapes social relations, people experience this on a private/individual level with their bodies, the natural world and a public level with their social relationships and connections. Buildings, interiors and streetscapes are action settings, places shaping what people do and think and how they engage with one another (Goldhagen, 2017). Successful spaces have historically consistent characteristics that have been codified by urbanists Gehl and Whyte. They are comprised of seating, climatic mitigation, adjacencies to pedestrian activity and movement, moveable furniture and food venues.

### Social Aspects

There is empirical evidence and significant research supporting the theory that city dwellers in large urban areas are subject to greater levels of physical stress and subjective wellbeing. This can easily translate to University campuses and communities that are increasing in density. Since student success is highly dependent on student academic achievement, students are highly vulnerable to stress (Liu, et al., 2018). To expand on this in relationship to student population growth, many students could suffer higher stress levels due to growing campus density, academic pressures and isolation due to the pandemic. Natural open spaces offer people not only environmental services, (water and noise filtration, stabilizing microclimates, etc.) they also enhance social engagement and cohesion of those that may be alone or isolated (Kim & Kim, 2018). Studies in Hong Kong and Singapore by the National University of Singapore were done to examine the methods to improve upon the negative impacts of higher density by comparing green open space models within developed areas. The study took into account planning issues (land area, urban area, overall population and population density - as measured by person/km<sup>2</sup>, GDP and built up density) and climatic factors (rainfall, temperature, relative humidity, bright sunshine duration and global solar radiation) to understand the comparative and contrasting development models (Xue, et al., 2017). Views to nature have been demonstrated to improve physical and mental health (Kaplan, et al., 1998). The researchers characterized the two cities as follows: Hong Kong – “concrete Jungle” and Singapore – “A City in a Garden”, which is the national motto (Xue, et al., 2017) The open space and building patterns are very different and so are the citizen

responses to the open space; in Hong Kong the open spaces are detached from the building development, whereas in Singapore the green space is integral to them. The researchers found that the outdoor rooms in Hong Kong received higher, more active pedestrian traffic than the integral outdoor rooms in Singapore (Xue, et al., 2017). Natural settings coupled with active engagement in them can lead to people having more effective lives (Kaplan, et al., 1998).

In regard to safety, research in urban areas in the Netherlands found that vulnerable populations, the elderly and women, felt safer in greener areas; open space was preferred to enclosed green spaces (Maas, et al., 2009). Residents in large cities have been asked about life satisfaction data and open space over time, a longitudinal review of outdoor rooms could inform the efficacy of the spaces over time and what adjustments need to be made (Kim & Kim, 2018). As the female residents in an inner city Chicago housing area revealed visual access to and through common greenspace helped build trust and community (Kuo, et al., 1998). The size, condition and attractiveness of the outdoor rooms can have a direct effect on the type and quantity of use by inhabitants. (Sugiyama, et al., 2010). Students in the University City of Fuzhou, China were shown to gravitate to natural settings in open space and this contributed positively to their sense of restoration and health (Liu, et al., 2018). The growing female undergraduate cohort at ASU and the empirical data suggesting that natural settings are preferred gives hindrance to future interventions.

### Economic Considerations

Economists from the Brookings Institution are predicting that there will be lower birth rates as a result of the pandemic. Their expectations are based on fertility studies and data gathered after the 1918 Spanish Flu Pandemic and 2008 Great Recession. The stay-at-home order is leading to tremendous economic loss, uncertainty and insecurity (Kearney & Levine, 2021). They found that the narratives of increased births after major weather events or blackouts do not bear out to statistical examination. Based on the data from June 2020 and economic modeling, a 1 percent increase in state-year unemployment leads to a 0.9 to 2.2 percent decrease in birth rates. The ongoing school and day care closures are also contributing to the predictions of a decline in

births. The predictions in 2020 were that there would be 300,000 fewer births as a result of the pandemic, due to economic and societal anxiety (Kearney & Levine, 2021). These lower birth rates could equate to lower student populations for institutions of higher education in the future.

Colleges and Universities will need to alter the recruitment strategies and locations to remain viable. In a podcast interview with author Nathan Grawe, EAB interviewer Sally Amoroso discussed the results of his research and how his two most recent books project the impacts on higher education. The projections extend to the mid 2030's in regard to student population and the impact of the COVID-19 pandemic. Based on the statistical data, Grawe estimated that the birth declines from the Great Recession will reach colleges and Universities and approximate a 15% decline in college age students. The highest potential for student growth will be in the Hispanic/LatinX and Asian subgroups, while birth rates and high school graduation rates for African Americans has declined. The growth of first generation student and Hispanic students coming to four year institutions will increase over time and will be the focus of future recruiting (Grawe, 2020, ABOR Report, 2022).

This new trend will need to consider the academic readiness of the incoming students and how the institutions will adapt to serve them (Grawe, 2021). Having outdoor rooms and learning spaces that can serve as areas of restoration, renewal and stress relief for student retention and success. Research from the US Forest Service across the United States has shown that being near outdoor spaces reduces a person's cortisol levels, the hormone released in response to stress, and increases social connections and higher levels of civic engagement (USDA FS-1906, 2018). Co-curricular activities in outdoor rooms can be a part of developing affinity for the institution itself and others.

## Design Considerations/Site Design

There is no correct answer or response in a pandemic, as evidenced in the evolving guidelines that came about during the initial stages of the CDC guidelines. This can true of design responses to the needs of an institution as well. Often, the experts have the underlying assumption that they need to relay the message or just “educate the public” and that the public are lacking insight or are ignorant (Kaplan, 1998, pg. 2). This is an inappropriate response to any situation. A collaborative approach based on sound user input and evidenced based design responses is the soundest tactic. The current pandemic and the responses to it have been informed in part by historic information and the natural behavior patterns of the population affected by them.

For Arizona State University, the pandemic represented a radical change in circumstance in how it delivered instruction. Based on the CDC guidelines, ASU implemented a series of policies that include the development of the outdoor rooms and additional outdoor furniture per the ASU Project Guidelines (USHHS, 2020, ASU FDM project guidelines). A review of the Landscape Architectural Foundation Landscape Performance guidelines to objectively evaluate the interventions was based on Features, Claims, and Measured Benefits Performance Standards, which is subdivided into ecological, economic, socio-cultural and aesthetic parameters (Landscapeperformance.org). The analysis of the spaces based on these parameters illustrated that the initial assumptions based on the SRT analysis and collective design experiences were correct in addressing the immediate need.

Within the past several years, many studies have been undertaken to examine and improve the performance standards and metrics, which will need to include post-occupancy evaluations and social benefits (Yang, et al., 2016). Much work has been done to engage the initial planning and assessment of the site development with the adoption of the Sustainable Site Initiative (SITES™, Sustainable Sites Initiative, 2009), Leadership in Energy and Environmental Design (LEED™, U.S. Green Building Council, 2009) and the Landscape Architecture Foundation (LAF, 2010).

These programs have specific metrics for site and building assessments that address on and off site impacts and influences, along with measures for scoring the effectiveness of cumulative design decisions. Much of this work occurs at the planning and pre-occupancy stages of a project. SITES™ is one of the few rating systems listed that require a 3 year monitoring period so that the planned and designed features create the desired impacts. The WELL Building Standard™ version 2 (WELL v2™) seeks to expand on LEED and look at the built environment by creating standards that enhance human health and well-being ([www.v2.wellcertified.com](http://www.v2.wellcertified.com)). Each program is continually improving, yet each does not address social benefits, regional considerations and post-occupancy in depth. In 2012, the Council of Educators in Landscape Architecture (CELA) contributed to the area of performance research by opening a conference track to address developments in that area (Yang et al., 2016). Due to this, there is an increasing number of case studies that are assessing the social benefits as part of the research, which will only improve the metrics to evaluate design interventions and enhance the relevance of that part of the design process. The assessment of social benefits will expand the impact of Landscape Architects to include the social sciences as an integral part of their work. The Legacy Design™, a design and framework tool used by the landscape architecture firm Design Workshop, looks at each project in regard to the Environment, Economics, Community and Art in a balanced manner which leads to highly sustainable projects (Designworkshop.com).

A coherent space allows people to easily discern and make sense of where they are, which in turn, makes it more inviting to experience (Kaplan, et. al., 1998). This does not imply that the spaces have to be monotonous, devoid of complexity and that sight lines are important. If people cannot see a space, it will not be used, no matter how interesting it may be (Whyte, 1980). Many urban projects have been done with the primary focus on the visual aspects, with little to no effort placed on the physical, practical and psychological aspects of the space being developed (Gehl, et al., 2010). Recent research is suggesting that long term review and performance findings be undertaken. The dynamic of a project will change over time as the plant materials, urban development and user groups change over time (Yang, et al., 2016). Steven Tupu, principal and

founder of terrain in New York City, stated recently in a webinar, that although he and his team visit completed works, there has been limited research on or actual work done in regard to post-occupancy reporting – do the spaces work for the users as intended? (The Architectural League, 2022).

The pandemic has refocused much of the attention to the human scale, with comfort and safety at the forefront. The open space, as an extension of personal living spaces, has been at the forefront of many new retail and airport renovations done by the design firm Gensler. Recent work has forced design teams to look at, and often, reconsider underutilized spaces for social distancing. This is leading to creative solutions that will reduce stress and tension, provide for adequate environmental responses and support natural systems (GENSLER Research Blog Posts). Current climate considerations have also given rise to better understanding of providing better sensory experiences, which include the positive aspects of being in public spaces (Gehl, 2010).

During the initial restriction period of the pandemic, studies in the urban and peri-urban forests of Burlington, Vermont were conducted in regard to self-reported use and level of personal importance related to natural areas. The results indicated that the areas greatly increased in importance – visitation, access, openness, visual access to other people - during the social distancing restrictions. Many respondents were first time visitors and that access to the open spaces reduced stress and anxiety (Grima, et al., 2020)

Design consultants may not always share the experiences of the current or future student populations. The pressures to meet the project goals – building program of user needs, context, budget and schedule - often does not lend itself to sensitivity of the connective fabric of the larger public realm. Distinguished urbanist William Whyte noted in his book, *The Social Life of Small Urban Spaces*, that good places tend to be all of a piece, it can almost always be traced to a human being (Whyte, 1980). Post-occupancy research and reporting has been done in the realm of architecture; however, more research needs to take place in the exterior public realm to insure that the interventions are serving the users over time.

## CHAPTER 4

### RESEARCH METHODOLOGY

#### Introduction

This chapter will explore the research methods, data collection and survey results.

#### Research Hypothesis and Questions

Based on the recent pandemic, there is a need for developing outdoor rooms and learning spaces that can be implemented to meet the needs of the University. This research is designed to determine if there are user preferences for amenities in the outdoor rooms/learning environments developed based on feedback from user.

The primary purpose of this work was to verify that the initial assumptions made by the ASU staff in response to the pandemic were correct and to determine what other outcomes needed to be considered for future installations. This will be done with a grounded theory approach as the initial theories were based on institutional knowledge and not user inputs.

#### Research Questions

RQ 1 - What features of the outdoor rooms were the most important to the user?

The SRT programmed and implemented the features and locations based solely on historical patterns and perceived needs, this study will determine if the initial assumptions were correct.

1A: Did the research reveal any features that were not included or needed?

This will be essential in understanding what changes need to be made for future installations and if immediate modifications need to be considered in the current outdoor rooms in the study.

1B: Did location have a bearing on user satisfaction?

Convenience is a critical component of the user experience and is part of the usage rates that outdoor will garner.

RQ 2 - What elements will give a sense of safety, hence use, in the outdoor rooms?

Safety in any urban/dense area is a concern, be it a community space or University campus. As the pandemic and shifting demographic patterns illustrated, the feeling of safety is subjective to the individual and feedback on existing outdoor rooms will inform future locations and amenities.

2a: What elements were essential for safety?

User inputs regarding specific design elements and features will evolve into guideline enhancements and design criteria in the future.

2b: Were there response trends that are of note?

The inputs from the respondents are the truest indication that the initial assumptions were correct or need to be modified in the future. These responses may evolve over time as new technologies and students arrive on campus. As the campus density grows, what elements of the outdoor rooms will foster student success; the spaces should respond to the needs of existing and future students.

### Sampling Strategy

A self-administered volunteer survey was used to gather post-occupancy responses from the students and staff of the four site areas that were built. As the student population on the Tempe campus is very large, it was determined that the best indication of user satisfaction would be to focus only on the users of the four sites, as not all students on the Tempe campus are guaranteed to use them. A great deal of consideration was given to the method of delivery as the pandemic heightened a sense of caution and personal safety among the staff, faculty and students.

A QR Code was developed for each site so that the responses could possibly be geo-tagged to verify that the locations corresponded to the four sites. The volunteer surveys were accessed through a table top sticker that was placed on every table in each of the four locations. It was acknowledged that this type survey may have a low response rate due to the nature of entry being on a volunteer basis (O'Leary, 2014). This was done in lieu of emails since there was no way of knowing who used the outdoor rooms and when. Having the survey access point in



immediate proximity to the user was determined to be the most productive method of getting relevant, site-specific data.

#### Institutional Review Board

The study was submitted to the Institutional Review Board (IRB) of ASU for review and audit in November of 2021, with approval given on 03 December 2021 with exemption granted. (Appendix A)

#### Data Collection

The survey was implemented a week after the start of the spring semester (20 Jan 22) per ASU Guidelines. The survey table toppers (see Fig. 4.01) were placed on site for two weeks and removed at the end of the time period (04 Feb 22). Periodic review of the sites was essential as it was discovered that the ASU Grounds crew and janitorial staff have instructions to power wash the site furniture as part of the COVID protocols. Some of the tables installed in the new outdoor



rooms have an orange peel High Density Polyethylene (HDP) surface which will allow for the easy removal of stickers, including table toppers.

Fig. 4.01 Survey Access Point, Office of the University Architect

The survey questions were developed in Qualtrics and were fashioned around user preferences as to days of the week, time of day, activities engaged in, site features, amenities and general demographic data. The demographic data was necessary to determine if there were any parallels to the overall student population of the Tempe campus. This data will help assess if there are user preferences based on gender, proximity, amenities or location on campus.

These feedback loops can inform future locations and amenities that would be included in them. It could also inform future guidelines for the development of outdoor rooms, as well as assist design consultants going forward.

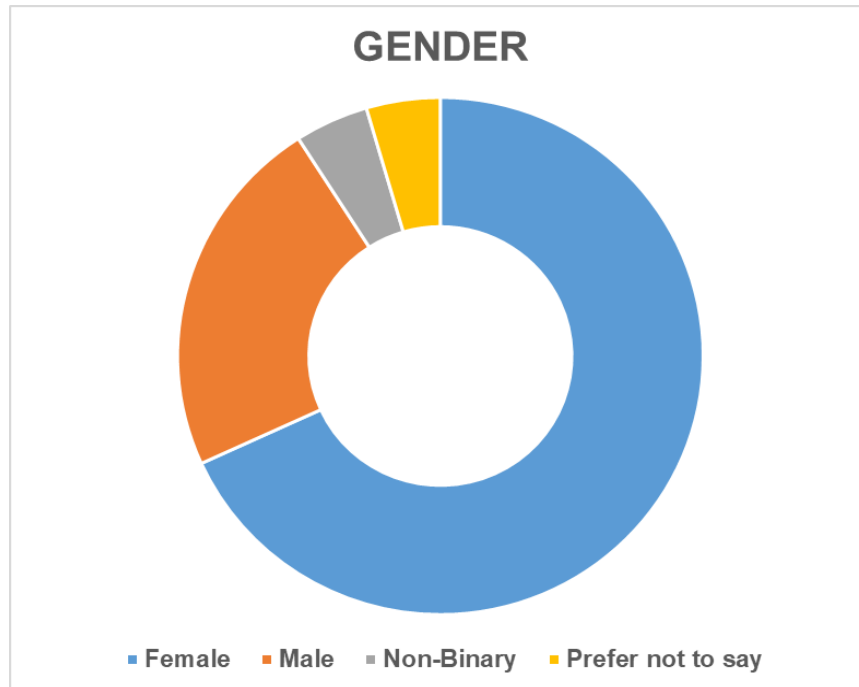
#### Research Findings/ Analysis of Data/Sampling

Of the four locations, one was closed due to construction proximity and there were no responses from that location. The sampling was specific to three sites and the response rate (n=31) was the total number of respondents. Of the total number of responses, about a third were not completed in full (n=9); however, there was useful data in all of the surveys to consider as part of this study. The statistical totals are based on the remaining respondents (n=22) as the demographic data was at the end of the survey. An advanced statistical review would set the ideal sample size for the Fall 2021 Tempe campus student population of 54,866 students at a larger number (n=594 - with a margin of error of 4% and a 95% confidence level). As the sample size was so small, it was determined that no site specific data would be collected, just the overall indications of user preferences.

#### Demographic Data: Gender and Ethnicity

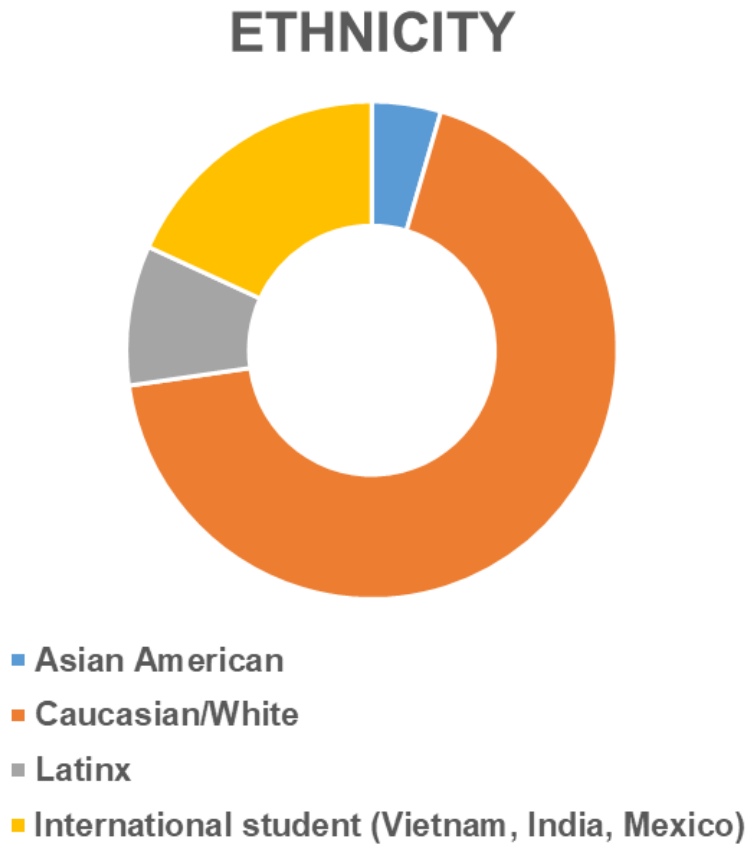
Questionnaire respondents constituted 15 females, 5 males, 1 non-binary and 1 person that preferred not say (see Fig. 4.02). There were no questions as to academic focus since the outdoor rooms were not aligned with any one program or school, but placed in open spaces across the Tempe campus.

Fig. 4.02 Gender Demographic Diagram



The ethnic composition of the respondent group reflected a majority of the student population based on the latest information from ASU Educational Outreach and Student Services (EOSS). While 5% self-identified as Asian American, 9% as LatinX and 18% as international students; 68% of the respondents identified as Caucasian (see Fig. 4.03). The international students were from India, Vietnam and Mexico. No geographic identifiers were used for the non-international student respondents.

Fig. 4.03 Ethnicity Demographic Diagram



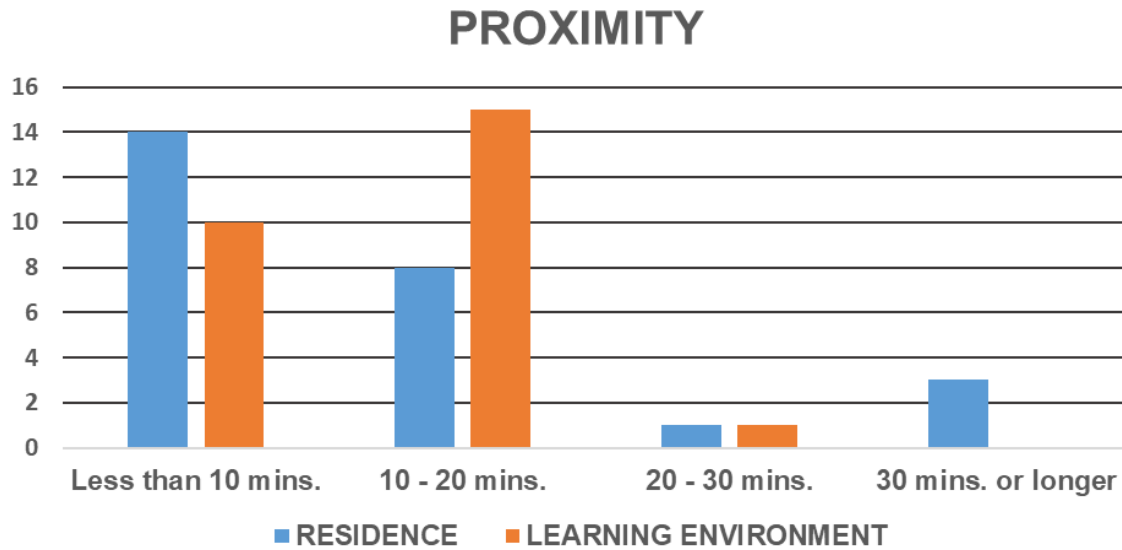
#### Location Dynamics

The data can be categorized by location identifiers (frequency of use, proximity to other needs) time and activities engaged in while in the space (eating, studying, etc.), aesthetic appeal, site features, site amenities and overall safety.

The survey asked respondents where was the outdoor room they were reviewing in relationship to their classes and residence. The time intervals were done in 10 minute increments as an average measure. The average walking speed for healthy adults is approximately 2.5 – 3 miles per hour, which equates to 0.42 - 0.5 miles in distance in ten minutes (thewalkingenglishman.com, 2022). This does not take into account meeting friends, incidental stops or food breaks.

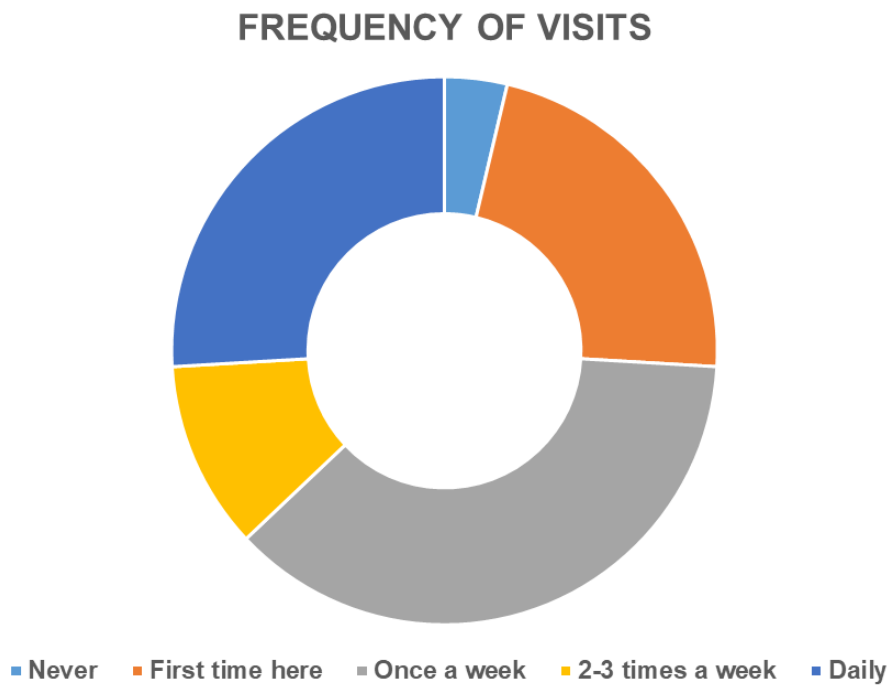
As illustrated in Figure 4.04, a majority of the respondents are within  $\frac{3}{4}$  - 1 mile of either their residence or indoor learning environment while using the space.

Fig. 4.04 Proximity to Residences and Classrooms Diagram



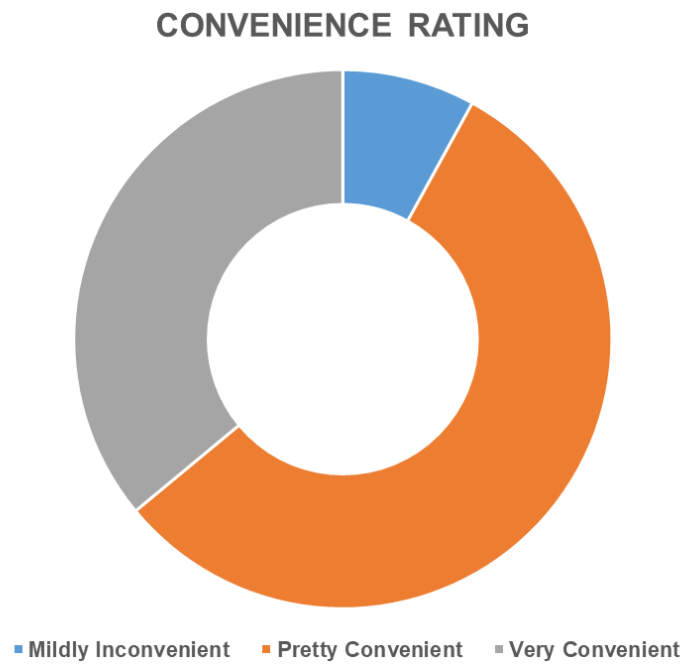
The survey considered the proximity of the outdoor rooms with the frequency of use and found that there was not a consistent pattern of use. 22% of the respondents indicated that it was their first time in the outdoor rooms. 36% stated that they were in the outdoor rooms once a week, with the balance varying between daily (25%) and 2-3 times weekly (14%). (See Fig 4.05). The never indicator (3%) was an anomaly and was included as that was a survey response.

Fig. 4.05 Frequency of Visits Diagram



The study showed that the respondents found the location of the outdoor rooms to be convenient for them (See Fig 4.06).

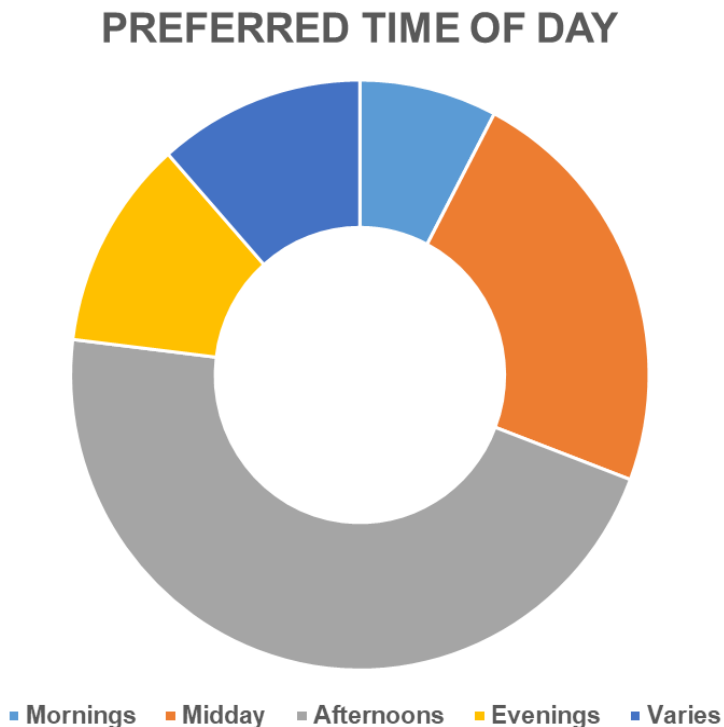
Fig. 4.06 Convenience Rating Diagram



## Social Indicators

A majority of the respondents (46%) indicated that their preference for the time of the day was in the afternoon. The midday category received 23% of the respondent selections with mornings and evenings at 8% and 12% respectively. (See Fig 4.07). This may indicate that there is either a break in class time between day and evening classes or the school day has ended and other activities are about to commence. Further fidelity as to specific hours within the time slots was not asked for or determined as part of this study.

Fig. 4.07 Time of Day Diagram



There was no strong preference for which day of the week that the respondents chose to frequent the outdoor rooms. This may indicate that schedule considerations and daily to weekly priorities shift for this sample group. There is no indication from the data that this would be true indefinitely and further study would need to take place to indicate a trend.

The study looked to determine if the respondents at the time of taking the survey would indicate the length of time they planned on being in the outdoor rooms. The indications were that respondents would stay anywhere from 10-20 minutes to over 30 minutes. (See Fig 4.08).

This led to gaining an understanding of what was occurring in the outdoor rooms overall. (See Fig. 4.09) The activities indicated in the study can be associated with combating social isolation and enhancing a sense of community. There is no indication from the data that the activities listed were done independently or collectively. The outdoor rooms could lend themselves to spontaneous activities that were not listed in the survey and could lead to further study. One subject indicated that often at the dinner hour, users would rearrange the tables to have a communal dining table and eat together. Upon completion of the meal, the tables and chairs would be moved apart to comply with the social distancing requirements. Another stated that their desire to eat lunch outdoors would not be as great had it not been for the pandemic.

Fig. 4.08 Time in the Outdoor Rooms Diagram

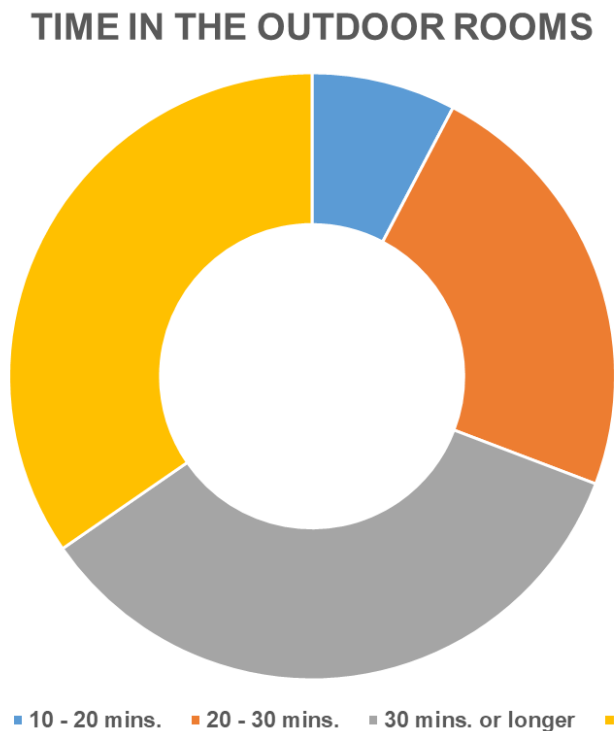
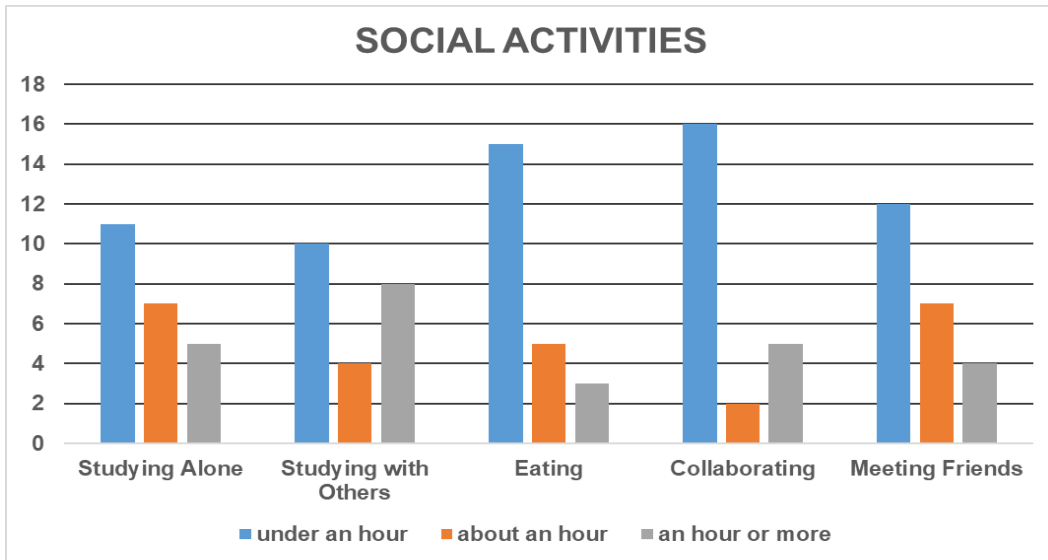




Fig. 4.09 Social Activities Diagram



#### Site Amenities

The outdoor rooms were outfitted with amenities that were in line with the University guidelines. The study revealed that certain amenities were very important to the users (See Figs. 4.10 and 4.11). It is of note that the fans were not operational due to the hospitable weather during the term of the study, additional data should be gathered at different times of the year to accurately assess their importance. However, another climatic mitigation, shade, was of high importance in the study. Lighting, WIFI and power needs were in line with the principal programming importance of the outdoor rooms. The responses supported that location was important and would be a driver for future planning.

The quantity of tables and chairs were dictated by the guidelines and policies set forth by the pandemic. (CDC, 2020). Responses indicated there is a strong preference for adequate quantities of comfortable seating in the outdoor rooms. The data indicated that the ability to connect to the University technology network was very important and validated the initial implementation programming. One respondent in the study stated that the outdoor rooms were a good place to attend class when there were no private rooms available inside a building.

The sense of safety was ranked by the respondents as one amenity of very high importance. The use of the outdoor rooms, like most urban plazas and spaces, will be very high if the users feel that the areas are safe to frequent.

Fig. 4.10 Site Amenities Diagram

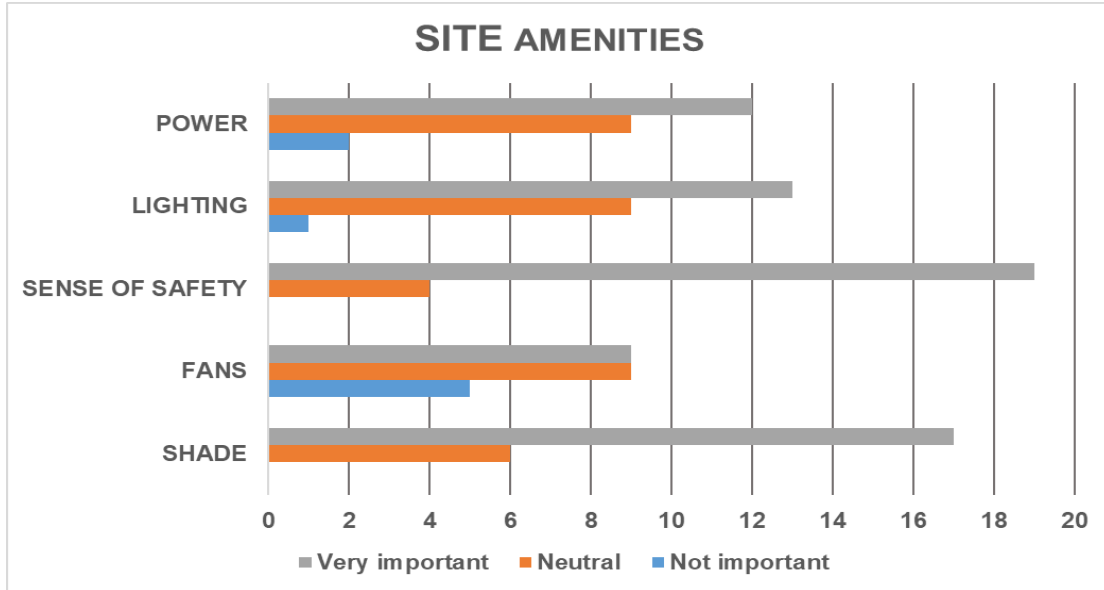
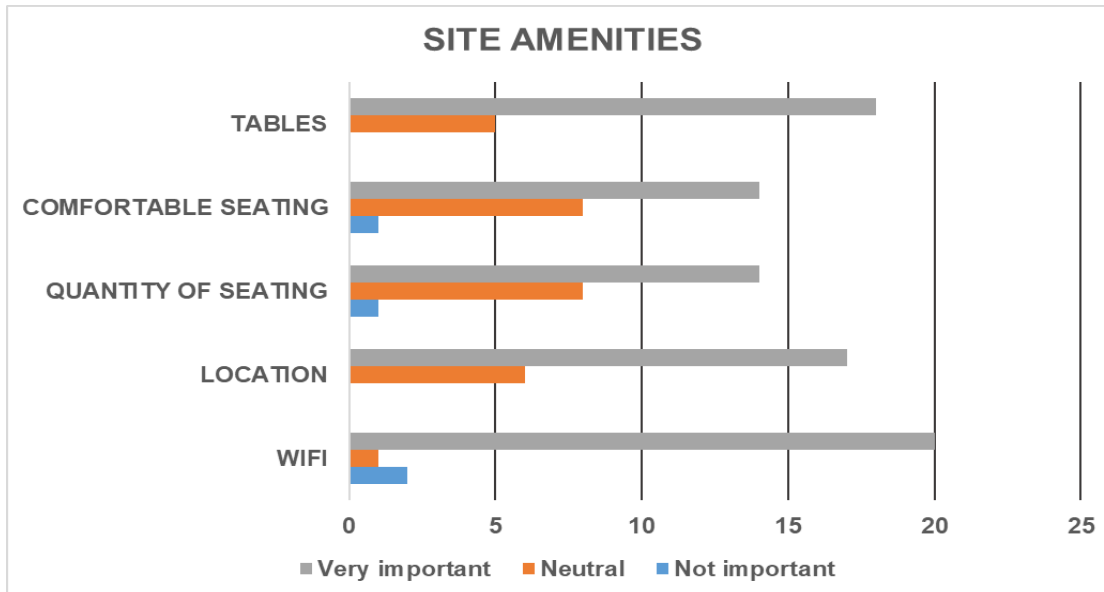


Fig. 4.11 Site Amenities Diagram



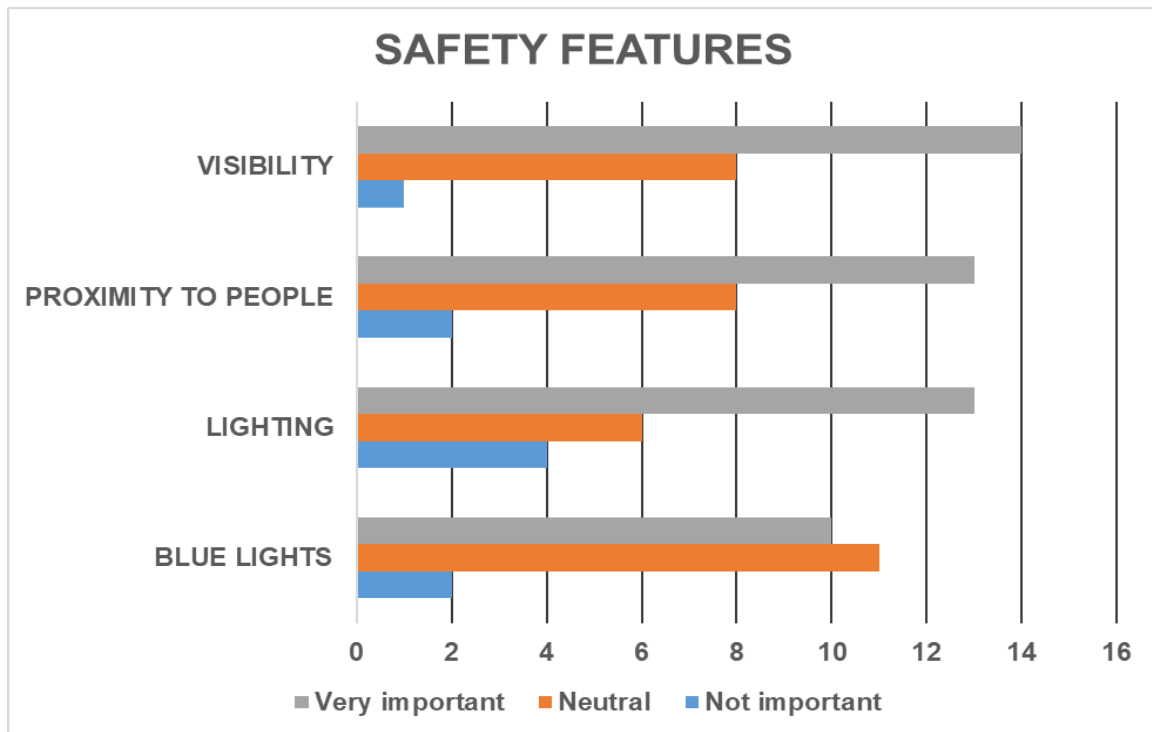
## Safety

As noted in Figure 4.12, the highest response rates regarding safety were items that are correlated to the research findings – visibility, lighting and proximity. These items are vitally important to the perception of safety and psychological comfort. What attracts people to outdoor venues is other people and a lively public realm (Whyte, 1980, Gehl, 2010).

Most of the female respondents ranked lighting, visibility and proximity to other people as being important to very important. These factors were important to the male respondents, however, they tended to be more neutral on the matter. The feelings of safety can be measured both subjectively (perception and feelings) and objectively (police statistics); the inherent stress of the academic environment coupled with being in a space that is unfamiliar – possibly uninviting – can diminish general health, well-being and quality of life (Maas, et al., 2009).

The ability to see and be seen, and good lighting are important factors in the 12 Quality Criteria from the section on protection. Shelter from the elements is essential to safety as well and is included in the same section (Gehl, 2010). Having the ability to extend the use of the outdoor rooms and easily transition from day to night time uses is essential to maintaining an active environment.

Fig. 4.12 Safety Diagram

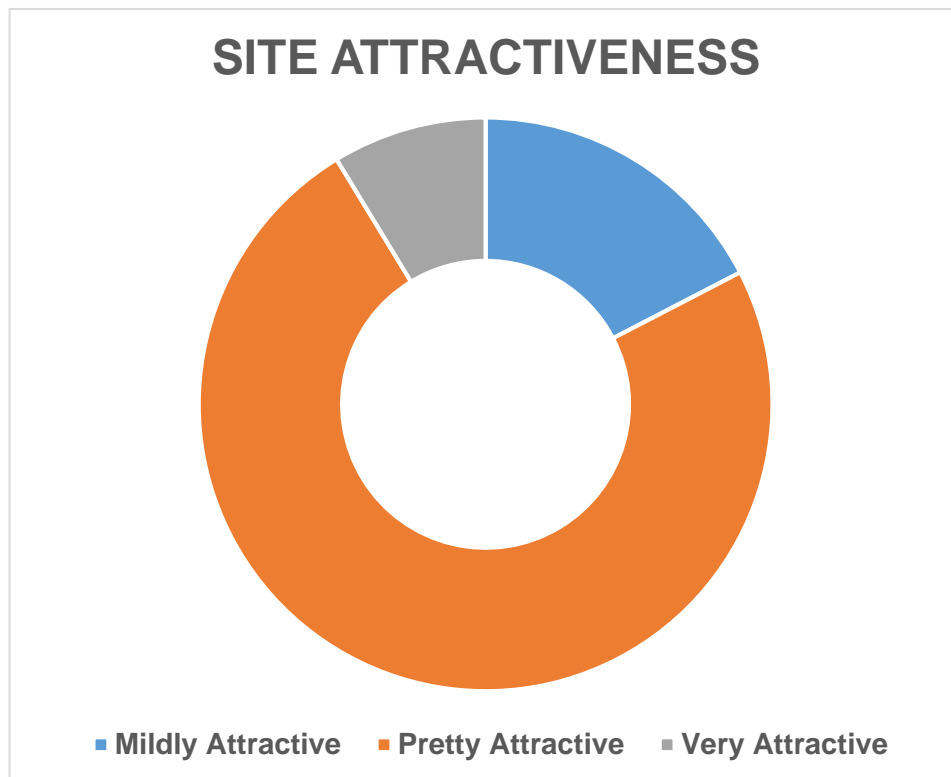


## Attractiveness

The respondents overwhelmingly found the outdoor rooms to be attractive. Good design and detailing, the use of good materials provide a positive sensory experience, and can be a sustainable model. The physical appearance of the campus will remain more important than ever as students are making the decision to attend a particular college or University (Jerke, et al., 2008). The competition for students will increase in the coming years as the pool of students declines (EAB, 2020). Attractive spaces solve many issues simultaneously, most important being activation, they are cared for more often and create a constituency. The open space is an embodiment of what we value (Jerke, et al., 2008).

A majority of the respondents felt that the outdoor rooms were attractive, with one stating that they enjoyed studying outside, it helped them focus on their studies and work.

Fig. 4.13 Site Attractiveness Diagram



## CHAPTER 5

### FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### Introduction

This chapter will begin to synthesize the data and draw conclusions from the survey responses. The response rate ( $n = 31$ , with  $n = 22$  full completion of the survey) was a small sample size, the analysis of the data will only be an inference of what is occurring during the study period. The research set out to determine what were the features and aspects of the outdoor rooms that resonated with the users, which can and should be applied to future planning and installations.

Research question 1 inquired about the features that resonated with the user groups in the outdoor rooms. The quest was to determine if the initial assumptions of user needs made by the University staff were correct and could be validated by on-site inputs. Jan Gehl has stated that the “experts” often start from a helicopter view and overlook the life of a space, how humans will actually use it at eye level (Gehl, 2010).

It was crucial to determine if the study would reveal features or amenities that were needed based on user feedback or if users required items that were not considered in the original programming. This would include future placement of the outdoor rooms.

#### Site Features

The ranking of the amenities from the study was an indication of preference of the respondents. The ranking reflects the number of people that responded to an item based on what the survey revealed.

#### Safety

The amenity that ranked the highest from the respondents was safety. As this is a subjective feeling in regard to site development, further research would need to be conducted to indicate what elements would contribute to a sense of safety.

Several studies indicated that visual access to and from outdoor rooms/green spaces elevated the sense of safety in respondents. Studies in the Netherlands, Hong Kong, Singapore, New York City and Copenhagen all concluded that visual acuity was vital to user satisfaction. This factor led to higher space usage overall, as people will gravitate to other people even if they wish to be alone.

The survey revealed that being proximate to other people was also a fundamental part of feeling safe in an outdoor room. As shown in the research of urban spaces, people engaged in a space leads to a higher sense of community. The sense of community, which is implied, warrants creating these spaces adjacent to other pedestrian areas or along pedestrian modal ways (streets, malls, bikeways, etc.). Higher volumes of pedestrian activity – voluntary or programmed – reduces the amount or desire of illicit activity as well (Whyte, 1980).

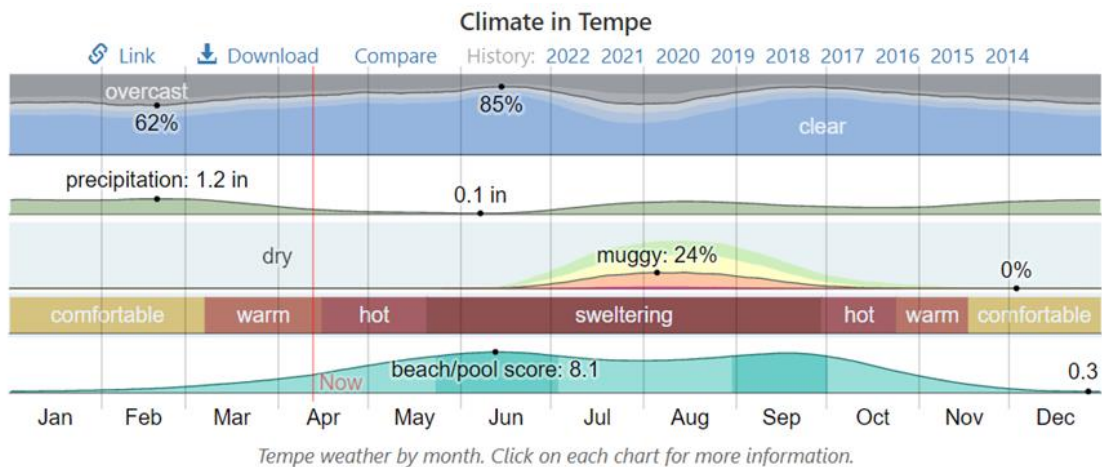
#### Shade and Human Comfort

In the Sonoran desert, every season has its own unique opportunities in regard to the sun and weather. Even during the most hospitable months of the year, the impact of the sun can be overwhelming. Most of the native species of plant materials have adopted strategies to cope the effects of the sun. At the human scale it is imperative that this be addressed to accommodate seasonal temperature shifts and to mitigate a changing climate.

The SHaDE Lab's findings indicated that the total effects on the human body are greater than just direct exposure and that native trees alone are not as effective a tool to mitigate climate issues. The fabric of the urban environment has to be taken into account to create outdoor rooms that are beneficial to the students. Structured shade elements, in concert with vegetative shade, will be the most effective in addressing human comfort (Middell, 2020). The shade structures employed were adjusted to the conditions of the Tempe campus and annual solar angles that are experienced there. Adjustment for specific site latitude and longitude were not done as the proximity of each site is within a half mile radius of the other (Olgay, 2015).

The study responses reflect the season in which it was conducted in late January; which is the most hospitable season in the Sonoran desert. The initial programming for the outdoor rooms was done from late May to early June of 2020, and the design solutions were informed by that season of the year. Outdoor fans were installed as part of the structure in consideration of the average temperatures at the beginning of the fall semester and end of the spring semester. The respondents did not rate the fans in the upper realm of importance due to the season in which the study was conducted.

Fig. 5.01 Tempe Annual Weather Data (weatherspark.com)



As the outdoor rooms are intended to be used year round, it will be important to understand what users may need in other seasons of the year. In the larger context of community development, providing shade in the form of structured and vegetative means is essential now and in future planning and installations. This study can be enhanced by conducting similar surveys in the other seasons of the year.

## WIFI

The pandemic was instrumental in the implementation of hybrid learning delivery of education at ASU. Connectivity to the technology infrastructure is a vital component to that delivery model and will continue to be in the future. The connection to the WIFI network was very important to the respondents and was part of the initial programming criteria of the outdoor rooms. Since amenity

aligned with the original programming, it allowed for class work and research to be done in these spaces with ease. One student had expressed in the study that these spaces allowed for the participation in ZOOM™ meetings when other private interior spaces were not available. The hardware for this technology is evolving constantly and, therefore, will need to be reassessed over time to insure compatibility to the existing system. This will include the structured shading elements that will house them. This amenity may be as important in the larger community context outside of instructional spaces (parks, retail malls and urban centers). At the University, the implementation of this amenity is a fundamental element in the success of the student population and of any future outdoor room installation.

#### Tables and Chairs

Throughout the campus, seating elements are a vital component of site development; people will sit wherever there is an opportunity to do so. One aspect on the study was understanding if comfortable seating was important alongside opportunities to do so. The survey results confirmed the aspect of the seating elements was equally important as the quantity of chairs. The quantity of seating was dictated partially by the pandemic protocols; the use of moveable furniture will not only allow for the expansion of seating in the outdoor rooms, but give the students autonomy over the seating to reconfigure it as they see fit to do so. In one location, the tables are conflated to create a communal dining table and then moved to allow for individual or small group seating configurations.

Many fixed seating options have been implemented over time on the Tempe campus with many going unused and subsequently, into disrepair. Accommodating the views to and from outdoor rooms to other activities, people and natural elements (sun, shade and vegetation) are necessary for space usage and vitality. Seating elements that are configurable in many ways will allow this to occur in a random manner, further empowering the user.

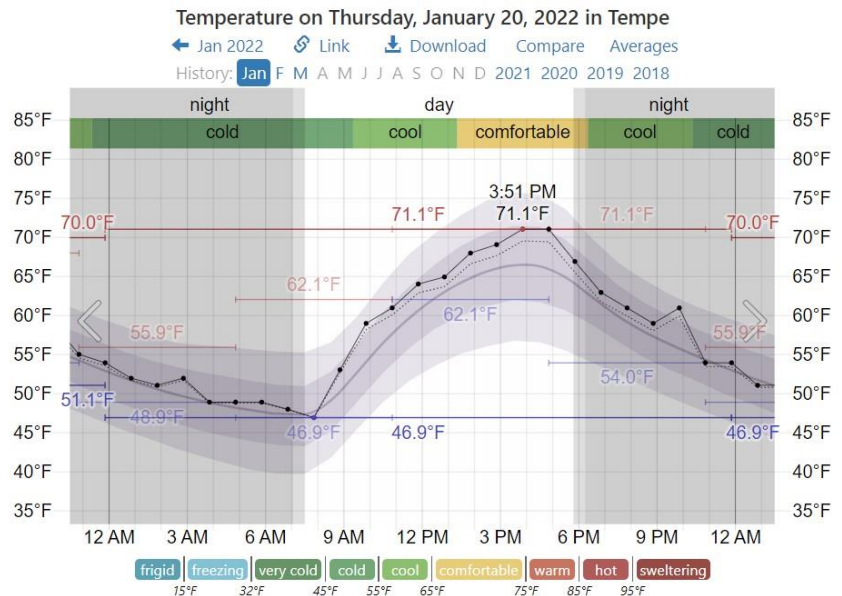


Moveable tables and chairs have been a prime component of the site development guidelines for many years at ASU, and the research has validated the use of this strategy for open space and outdoor room development.

### Power and Lighting

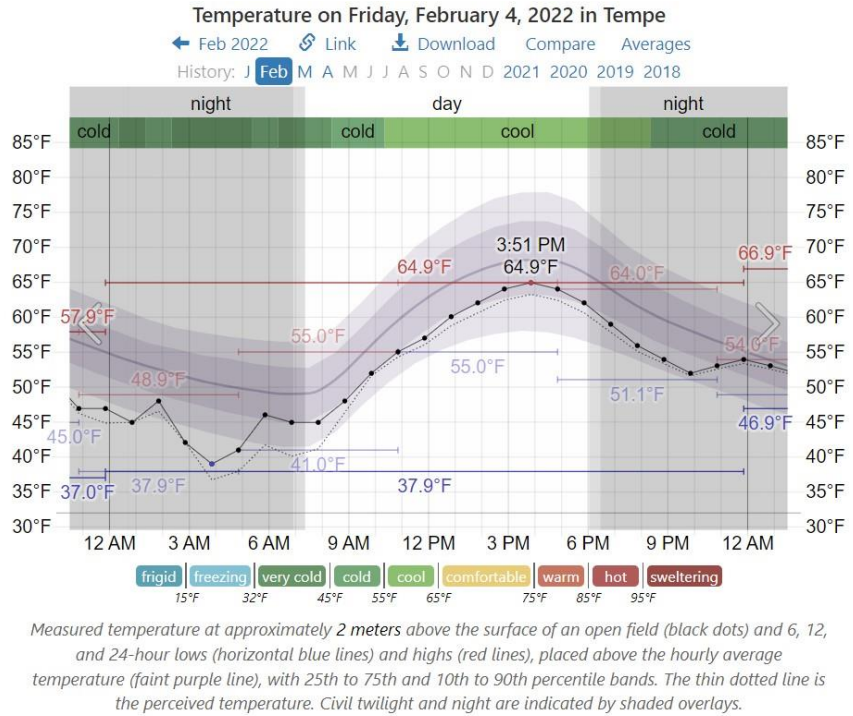
As stated above, connectivity to the technology infrastructure is vitally important for the delivery of hybrid instruction and to facilitate research and collaboration. The devices available to students for use in their daily lives include mobile phones and laptop computers that, depending on rate of usage, require electric power for charging. This amenity was seen to be slightly more important than lighting during the study period. Cooler nighttime temperatures in late January to early February could be a contributing factor to lower ratings for lighting.

Fig. 5.02 Survey Start Date  
(weatherspark.com)



Measured temperature at approximately 2 meters above the surface of an open field (black dots) and 6, 12, and 24-hour lows (horizontal blue lines) and highs (red lines), placed above the hourly average temperature (faint purple line), with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the perceived temperature. Civil twilight and night are indicated by shaded overlays.

Fig. 5.03 Survey End Date  
(weatherspark.com)



The average daily temperature during study period and reported preferred usage time was about 65-70 degrees, which is very comfortable for being outdoors. Sunset during the same period would occur at approximately 6:00P and the air temperature in the desert can fall rapidly, often by 6-10 degrees in 2 hours (weatherspark.com)

The evening to night time uses may go up as the daylight hours lengthen and midday and afternoon temperatures rise toward the end of the spring semester.

#### Location, Visibility and Proximity

The responses indicated that the proximity to indoor learning environments and residences were typically within a maximum walking distance of 20 minutes. A small percentage of respondents showed that their walks were longer. The walking times corresponded to an approximate half mile walk, which is about the depth of the Tempe campus north to south. The time coding did not take into account any incidental encounters or detours, that information was not germane to the satisfaction survey.

The study also considered the convenience factors, which is an individual consideration and subjective. The sample data revealed that a majority of the respondents found the outdoor rooms to be either pretty convenient or very convenient. This information confirmed the findings of the Site Review Team. It is inferred that the locations of the outdoor rooms aided in the visibility of the users and where they needed and wanted to be or go.

This data was compared to the proximity rating and there appeared to be a correlation between the two factors. Combining this with the reported social activities, the indications are that the levels and types of activities are associative with the convenience of the outdoor rooms.

Research Question 2 was directed at the issues of safety and what elements or amenities in the outdoor rooms contribute or diminish a sense of safety. The respondent feedback is essential to get a true understanding of the lived experience in the outdoor rooms. There were four areas that were considered in the study – visibility, proximity to people, lighting and blue lights (emergency phone stanchions). Of additional importance is the physical manifestation of the outdoor rooms as expressed in the respondent's ratings of overall attractiveness. People are drawn to visually appealing spaces and will build a constituency around them (Whyte, 1980, Jerke, et al., 2008).

Within the respondent group, visibility scored higher than the neutral selection. The research supported that outdoor rooms are used and considered safer if they can be seen by potential users (Whyte 1980, Gehl, 2010, Maas et.al., 2009). This data correlates with the analysis from RQ1, in that, location and proximity to residences and learning environments will generate more activity over all. The research and responses bore out that having the outdoor rooms supported by the utility and technology infrastructure is very important. These observations also reinforced the initial findings of the SRT.

There is no way of ensuring that illicit activity will not occur in any urban environment. What has proven to be of benefit is high activity levels of desired uses. What the research illustrates is that a significant quality of a healthy outdoor urban environment is the ability to meet in a space, in person, face to face, as part of daily life (Gehl, 2010). Crime prevention strategies emphasize

stronger social connections and familiarity. Through the development of stronger social connections in the outdoor rooms, situational awareness is heightened and incongruities are more pronounced (Witten, et al., 2015).

The research demonstrates that dynamic and active spaces will draw people to them. The attractiveness of the space will increase the desire for people to remain there for longer periods of time. Attractiveness is subjective and the user inputs will be a direct indication of that evaluation.

### Lighting

The respondents related the need for lighting with overall safety. The study was conducted in the latter part of January and, as illustrated above, the sunset hours were about 6:00 PM. There were no indications from the responses that users required lighting, the drop in ambient temperature may have something to do with reduced evening uses. It may be inferred that the respondents had used the outdoor rooms during the fall semester and had used the space later in the day; however, there is no way of verifying that without additional research. The presence of other people in any space is an indication that the space is acceptably good and therefore, safe; based on research of urban areas (Maas, et al., 2009, Xue, et al., 2017, Gehl, 2010).

### Blue Lights

The blue lights are a safety measure that is an overall campus network integrated with the ASU Police Department. The network is based on a line of sight system so that individuals can move from one stanchion to the next so that the responding officers can triangulate to a location and avert an incident. The study responses indicated that the presence of the blue lights were valued, but not as highly as visibility and lighting.

The study did not indicate if any one of the respondents had used the system and this would be an area for further study.

## Benefits and Reflections

The post-occupancy assessment would be of major benefit to any educational institution as the user feedback could uncover unique opportunities for major or minor interventions that would build a constituency base for them. Public community centers and parks could benefit from this work as well. Understanding the shifting needs of an area over time could assist in predicting capital improvements in certain areas of a University or municipality. Legacy developers could anticipate what a development may require over time and plan for renovations in a timely manner.

A primary benefit is that the user groups over time are intrinsically engaged in the development of the outdoor rooms and vested in the process. Similar in intent as Deborah Marton, the former Director of the Design Trust for New York City Parks, had reflected on the new guidelines for New York City – as a shift in the conception of parks “from the park as end-product to park as work-in-progress.” (Carlisle and Pevner, 2012). In regard to the use of post-occupancy data, this could be the same for outdoor rooms at Arizona State University. Beyond just site observation, post-occupancy evaluations will be able to assist in the long-term planning of outdoor rooms and reflect the student population and needs of the institution over time.

A post-occupancy evaluation survey for the outdoor rooms and spaces is an essential tool in the experience and knowledge base of the design profession of Landscape Architecture. This study was able to uncover the gap in knowledge that this type of research could fill and provide long term benefit to the University. This data and research from the post-occupancy assessments could be applied to the broader community, and help municipalities engage in better and sustainable planning for neighborhoods. The SITES and Landscape Architectural Foundation have several avenues of evaluation and standards for use in the programming and assessment of potential and designed outdoor environments.

The Landscape Architecture Foundation has developed a wealth of knowledge and a Performance Standards tool kit to assist design professionals in rating the immediate impacts of interventions on a site. The worksheets and performance matrix are fantastic measures to

determine if the intended outcomes were met by the implementation of the design. The LEED scorecard along with the SITES worksheet consider ecosystem services as well, with LEED primarily focused on the building impacts. Adding a dimension of longitudinal study will bolster the findings as it will assess the outcomes over time; determining if the needs of the users in the outdoor rooms will change over time and adapting to those evolving needs.

The post-occupancy survey validated many of the initial assumptions made by the Site Review Team at the onset of the COVID-19 pandemic response. This research is extremely beneficial to understanding the user experience and concerns so that future campus installations can be modified to meet any evolving trends and possibly modify current locations.

Connectivity in physical form and through utilities is essential to any outdoor rooms. The respondents indicated that the use of digital platforms will not wane and the University's use of hybrid instructional delivery will allow the students more options for learning and collaboration as new technology comes to market. The topics regarding safety are interrelated to the balance of the study areas and contribute to a larger whole. In short, people like being around other people. Attractive, active outdoor rooms with ample seating will draw people to them. If they are very visible and well lit at night, the activity levels may extend for longer periods of time. Building on the work of the urbanists Whyte and Gehl, the POE can be used to truly understand the way an outdoor space can live. By doing so, the creation of future exterior developments will be based on activation and not purely aesthetics and allow for the focus to be on the interactions of the user groups and not just be left over areas created by buildings. In fact, the inverse would be true, the buildings would be the backdrop to a dynamic, active and inspiring outdoor room.

Post-occupancy assessments that include the feedback loops from the maintenance staff at an institution are crucial. This information is critical to the development of sustainable systems that reduce the cost of operations long term. These assessments feed into project and design guidelines that further define and codify the intent of the institution and its mission. The short-term benefit of this work could include any immediate concerns that need to be addressed, such as: additional litters, chairs and tables, better lighting, enhanced maintenance of the immediate or

adjacent plant materials. The long-term benefits could include expansion of existing locations and understanding what elements would be required in those expansions. This could be applied to new locations in other areas of the campus as renovation and new build construction take place in connection to the larger master planning efforts.

The lessons learned from this process are many and are coming to light as this paper has been written. The following points are highly recommended to enhance the outcomes of the research:

- Conduct a thorough site walk of the study area prior to the implementation of research, any conflicts or impediments can then be noted and planned for,
- Documentation of the research site context to note off-site influences, so they can be assessed for their benefits or detractions,
- Periodic recorded site observations over the course of the day is essential, the results of the survey in this study in regard to preferred occupancy and use was different from the SRT opinion,
- Photo document the research area in use during each visit for recall and record (maintaining the anonymity of the occupants) so that the photo record can be correlated to the survey responses,
- On-site and post survey interviews are critical to substantiate the survey results and give a personal voice to the user experience. This is also a vehicle to obtain insights on important topics and areas of concern that may not be covered and lead to better questions in future research.
- Conduct a pilot survey session to verify the methodology (QR Codes, on-site polling, workshops) will work with the current user groups.
- Solicit as much help as one can to get as many different perspectives and insights as possible. One person cannot cover every aspect of the research needs.

This list is a small sample of what can be done to obtain a comprehensive understanding of the research site, area and user group(s).

There are several benefits to doing post-occupancy evaluations in Landscape Architecture. The information gleaned from direct user feedback can be an objective measure of a design solution when gauged against the original programmatic intent. These insights can impact the learning and social outcomes so that the economic investments into the outdoor rooms can be maximized. On the Tempe campus and throughout the ASU campuses in the Valley, creating active and engaged outdoor rooms that encourage student interaction could be another key component for marketing the campus to student pools beyond the region. This could be a recruiting tool for potential students as it demonstrates a commitment to providing alternative spaces for education and engagement, and illustrates how people can thrive in this environment across all seasons.

As an instrument to further the profession, POE studies can assist design firms in maximizing the collective knowledge of the built environment by getting insights from the users and operational staff of the site. This will enhance the knowledge base of a firm and create a database of best practices.

#### Future Study

More research needs to be done in regard to the individual sites on campus. The sample size ( $n = 31$ ) was not large enough to determine a discernable trend or pattern. The locations of the sites vary and the adjacent uses could have an impact on detailed interventions in the future. By having the results of this study as a baseline, a new post-evaluation study coupled with on-site observations and contextual site surveys may produce additional fidelity to the unique characteristics of each site. This will assist in the future planning efforts within the Tempe campus and be a primer for implementation in the community at large.

A mixed- methods ethnographic study of underrepresented groups on campus could uncover particular needs for these communities that were not considered in this study due to a lack of knowledge and understanding. The student demographics are changing and additional research into these groups may discover unique opportunities to meet the needs of the First Generation, LatinX, LGTBQIA+ and Indigenous student populations.



Longitudinal surveys coupled with staff assessments and on-site user interviews would be a valuable set of tools to track usage over time and to see what changes can be anticipated. The undergraduate student population of the Tempe campus changes fully over the course of a 6 year cycle. This evolution will bring to bear a shifting need or focus on the outdoor rooms and campus uses. As noted in this paper, the growth sectors for future students will be from areas that are different from the previous and current student recruiting pools. This dynamic will need to be surveyed and assessed to determine if the outdoor rooms are serving this new cohort of students and could provide insights as to the adaptability and flexibility of the installations.

Another area of further scholarship could be the inclusion of the outdoor room study in the Sustainable Sites Initiative analysis. The non-tangible aspects of the work could be an additional measure of the overall success of a project type as evidenced by the findings and research of urban spaces. Higher user inputs will give way to better investments from an economic and societal standpoint.

## REFERENCES

- American, I. O. A. (2013). *The architect's handbook of professional practice*. John Wiley & Sons, Incorporated.
- Amoruso, S. (2021). Higher Ed's demographic future, A conversation with Dr. Nathan Grawe, *EAB Podcast*
- Architectural League NY, 594 Broadway, Suite 607, New York, NY 10012. 212.753.1722 (<https://archleague.org/event/ff-distance-edition-terrain-nyc-landscape-architecture/>)
- Arizona State Climate Office, 2019 (<https://azclimate.asu.edu/>)
- Arizona State University, Demographic Data (<https://www.asu.edu/about/facts-and-figures>)
- Arizona State University, Office of the President (2022) *ABOR – ASU State of the University and Arizona State University: Strategic Enterprise Plan 2022*. (<https://president.asu.edu/watch/state-of-the-university-and-arizona-state-university-strategic-enterprise-plan-2022>)
- Arizona State University, Office of the President *New American University* (<https://newamericanuniversity.asu.edu>)
- Arizona State University, Office of the University Architect (2005) *University Master Plan* (<https://cfo.asu.edu/masterplan>)
- Andrews, J. (2017). The Velocity of Change, *ASU Thrive*, 20(4), 28-37.
- Baum, S., & Flores, S. M. (2011). Higher Education and Children in Immigrant Families. *The Future of Children*, 21(1), 171–193. <http://www.jstor.org/stable/41229016>
- Biemiller, L. (2008). Punch List. *Chronicle of Higher Education*, 54(26).
- Campus Life: In Search of Community. The Carnegie Foundation for the Advancement of Teaching; Ernest L. Boyer (frwd.); Princeton, New Jersey; 1990.
- Candido, Kim, J., de Dear, R., & Thomas, L. (2016). BOSSA: a multidimensional post-occupancy evaluation tool. *Building Research and Information : the International Journal of Research, Development and Demonstration*, 44(2), 214–228. <https://doi.org/10.1080/09613218.2015.1072298>
- Carlisle, S., and Pevzner, N. (2012) NYC High Performance Landscape Guidelines. In Scenario 02: Performance, Spring.
- Carnegie Classification of Institutions of Higher Education (CCIHE), Center for Postsecondary Research, Indiana University School of Education, 201 N. Rose Avenue, Bloomington, IN 47405 <http://carnegieclassifications.iu.edu>
- Clair, R., Gordon, M., Kroon, M. *et al.* The effects of social isolation on well-being and life satisfaction during pandemic. *Humanit Soc Sci Commun* 8, 28 (2021). <https://doi.org/10.1057/s41599-021-00710-3>
- Crow, M. M. (2008, June). Building an entrepreneurial university. In *The Future of the Research University: Meeting the global challenges of the 21st century* (pp. 11-30).

Danya, K., Jangki, J., (2018). *Does happiness data say urban parks are worth it? Landscape and Urban Planning*, 178, 1-11.  
<https://doi.org/10.1016/j.landurbplan.2018.05.010>

Design Workshop, Inc., <https://www.designworkshop.com/dw-legacy-design.html>

Elnabawi, M. H., & Hamza, N. (2019). Behavioural perspectives of outdoor thermal comfort in urban areas: a critical review. *Atmosphere*, 11(1), 51.

Gardner, L. (2022) The Overbuilt Campus, After a yearslong surge in construction, colleges retrench and retool. *The Chronicle of Higher Education*, 68(12).

Gehl, J. (2010). *Cities for people*. Island press.

Gensler Research and Insight, <https://www.gensler.com/blog>

Goldhagen. (2017). *Welcome to your world : how the built environment shapes our lives* (First edition.). Harper, an imprint of HarperCollinsPublishers.

Grawe, N. D. "Lynn Steen's Imprint on *Demographic Change and the Demand for Higher Education*." *Numeracy* 11, Issue 2 (2018): Article 9. DOI: <https://doi.org/10.5038/1936-4660.11.2.9>

Grima N, Corcoran W, Hill-James C, Langton B, Sommer H, Fisher B (2020). The importance of urban natural areas and urban ecosystem services during the COVID-19 pandemic. *PLoS ONE* 15(12): e0243344. <https://doi.org/10.1371/journal.pone.0243344>

Hajrasouliha, A. H., & Ewing, R. (2016). Campus does matter. *Planning for Higher Education*, 44, 30-45.

Haven Kiers, A., Owens, P. E., (2021). *The Campus Landscape as Laboratory: Experiential Learning, Research, Outreach, and Stewardship*. *Landscape Journal*, Volume 40, Number 2, 2021. PP 53-78. <https://muse.jhu.edu/article/845315>

Jerke, D., Parter, D.R. and Lassar, T.J. (2008). *Urban design and the Bottom Line: Optimizing the return on perception*. Washington DC, Urban Land Institute.

Kaplan, R., Kaplan, S. and Ryan, R. (1998). *With People in Mind, Design and Management of Everyday Nature*. Washington, DC, Island Press.

Kaplan, S. and Kaplan, R., (2003) Health, Supportive Environments, and the Reasonable Person Model. *American Journal of Public Health* 93, 1484\_1489,  
<https://doi.org/10.2105/AJPH.93.9.1484>

Kearney, M. S., & Levine, P. (2021). The coming COVID-19 baby bust: Update. Brookings Institution. 2020.

Kim, Cha, S., & Kim, Y. (2018). Space choice, rejection and satisfaction in university campus. *Indoor + Built Environment*, 27(2), 233–243. <https://doi.org/10.1177/1420326X16665897>

Kuo, F.E., Sullivan, W.C., Coley, R.L., Brunson, L. (1998). *Fertile Ground for Community: Inner-City Neighborhood Common Spaces*. *American Journal of Community Psychology*, Volume 26, No. 6, 823-851

Landscape Architecture Foundation, "Evaluating Landscape Performance" PDF, [www.landscapeperformance.org](http://www.landscapeperformance.org)

Liu, C., Zhang, Y., Lin, Y., You, D., Zhang, W., Huang, Q., Konijnendijk van den Bosch, C.C., Lan, S. (2018). *The relationship between self-rated naturalness of University greenspace and students' restoration and health. Urban Forestry and Urban Greening, 34, 259-268.*

Maas, J., Spreeuwenberg, P., Van Winsum-Westra, M., Verheij, R., de Vries, S., Groenewegen, P. (2009). Is green space in the living environment associated with people's social safety? *Environment and Planning A, 41, 1763-1777.*  
<https://doi.org/10.1068/a4196>

McPherson, M., Smith-Lovin, L., & Brashears, M. E. (2006). Social Isolation in America: Changes in Core Discussion Networks over Two Decades. *American Sociological Review, 71(3), 353–375.*  
<https://doi.org/10.1177/000312240607100301>

Meir, I. A., Garb, Y., Jiao, D., & Cicelsky, A. (2009). Post-occupancy evaluation: An inevitable step toward sustainability. *Advances in building energy research, 3(1), 189-219.*

Middel, A., AlKhaled, S., Schneider, F. A., Hagen, B., & Coseo, P. (2021). 50 grades of shade. *Bulletin of the American Meteorological Society, 102(9), E1805-E1820.*

O'Leary, Z. (2014). *The Essential Guide to Doing Your Research Project.* London, SAGE.

Olgay, V., *Design With Climate: Bioclimatic Approach to Architectural Regionalism,* (2015, 2nd Edition). 179

Sugiyama, T., Francis, J., Middleton, N. J., Owen, N., Giles-Corti, B. (2010). *Association between recreational walking and attractiveness, size, and proximity of neighborhood open spaces. American Journal of Public Health, 100, 1752-1757*

The Sustainable SITES Initiative, U.S. Green Building Council, 2101 L Street, NW, Suite 600, Washington, DC 20037 (<https://sustainablesites.org>)

Thelin. (2014). *Essential documents in the history of American higher education.* John Hopkins University Press.

U.S. Department of Agriculture, Forest Service. 2018. *Urban nature for human health and well-being: a research summary for communicating the health benefits of urban trees and green space.* FS\_1096. Washington, DC. 24p.

U.S. Department of Health and Human Services, CDC Guidelines  
<https://www.hhs.gov/about/agencies/asa/hhs-covid-19-workplace-safety-plan/index.html>

U.S. Department of the Treasury, CARES Act 2020 <https://home.treasury.gov/policy-issues/coronavirus/about-the-cares-act>

Weather Spark website (<https://weatherspark.com/>)

Whyte, W.H. (1980). *The Social Life of Small Urban Spaces.* New York, Project for Public Spaces.

Witten, K., Kearns, R., Carroll, P. (2015). *Urban Inclusion as wellbeing: Exploring children's accounts of confronting diversity on inner city streets*. *Social Science and Medicine*, 133, 349-357.

[www.worldpopulationreview.com/us-cities/phoenix-az-population](http://www.worldpopulationreview.com/us-cities/phoenix-az-population)

Xue, F., Gou, Z., Lau, S., *The green open space development model and associated us behaviors in dense urban settings: Lessons from Hong Kong and Singapore*. *URBAN DESIGN International*, 2017, Vol. 22, 4, 287-302.  
<https://doi:10.1057/s1289-017-0049-5>

Yang, B., Li, S., & Binder, C. (2016). A research frontier in landscape architecture: Landscape performance and assessment of social benefits. *Landscape Research*, 41(3), 314-329.  
<https://doi.org/10.1080/01426397.2015.1077944>

APPENDIX A  
INSTITUTIONAL REVIEW BOARD APPLICATION

	Page: 1 of 7	
	<b>PREPARED BY:</b> IRB Staff	<b>APPROVED BY:</b> Heather Clark
<b>DOCUMENT TITLE:</b> HRP 503 A Social Behavioral Protocol	<b>DEPARTMENT:</b> Office of Research Integrity and Assurance (ORIA)	<b>EFFECTIVE DATE:</b> [9/8/2021]

**INSTRUCTIONS**

Complete each section of the application. Based on the nature of the research being proposed some sections may not apply. Those sections can be marked as N/A. Remember that the IRB is concerned with risks and benefits to the research participant and your responses should clearly reflect these issues. You (the PI) need to retain the most recent protocol document for future revisions. Questions can be addressed to [research.integrity@asu.edu](mailto:research.integrity@asu.edu). **PIs are strongly encouraged to complete this application with words and terms used to describe the protocol is geared towards someone not specialized in the PI's area of expertise.**

**IRB: 1. Protocol Title:** ASU Tempe Campus Outdoor Learning Space Post Occupancy Study

**IRB: 2. Background and Objectives**

- 2.1 List the specific aims or research questions in 300 words or less.
- 2.2 Refer to findings relevant to the risks and benefits to participants in the proposed research.
- 2.3 Identify any past studies by ID number that are related to this study. If the work was done elsewhere, indicate the location.

**TIPS for streamlining the review time:**

- ✓ Two paragraphs or less is recommended.
- ✓ Do not submit sections of funded grants or similar. The IRB will request additional information, if needed.

Response:

The objective of the survey is to explore the post construction occupancy user satisfaction of the outdoor learning spaces built on the ASU Tempe campus in response to the Novel Coronavirus pandemic. With the advent of the Centers for Disease Control and Preventions Guidelines (CDC) issued in March of 2020, Arizona State University (ASU) implemented measures to address the guidelines and renovate existing learning spaces for compliance. There was a Pandemic Related Federal Grant that was received to assist the University in securing equipment and material to augment existing spaces to comply with the CDC guidelines. The scope encompassed everything from the occupied physical spaces, cleaning, access to and from buildings, and classroom scheduling. ASU considered several exterior locations on campus and neighboring high-use academic and public buildings.

Four sites were selected from a possible 14 locations across the Tempe campus. The criteria for location prioritization was based on historic pedestrian traffic patterns and high-volume use buildings. The site review team (SRT) that developed the criteria and surveyed each of the fourteen locations was made up of several service departments within the University: The Office of the University Architect, Facilities Management and Grounds.

The sites have been in use for one year and an in-depth post occupancy evaluation (POE) needs to be performed to measure user reactions and satisfaction. On-site post occupancy surveys will be taken to document overall satisfaction, usage, locations and gauge the features such as seating, lighting and other site amenities. The on-line surveys will evaluate the design consequences of the outdoor learning environments. The surveys will pose no great risk to the users as the responses will be anonymous. The data will be beneficial for planning future outdoor learning spaces. Responses will provide insights for potential pandemic responses in the future.

**IRB: 3. Data Use - What are the intended uses of the data generated from this project?**

Examples include: Dissertation, thesis, undergraduate project, publication/journal article, conferences/presentations, results released to agency, organization, employer, or school. If other, then describe.

Response:

The intended use of the information will be for my Master's thesis, publication in professional periodicals, and presentation at an international conference of university educators and for professional education within my unit at ASU.



**IRB: 4. Inclusion and Exclusion Criteria**

4.1 List criteria that define who will be included or excluded in your final sample. Indicate if each of the following special (vulnerable/protected) populations is included or excluded:

- Minors (under 18)
- Adults who are unable to consent (impaired decision-making capacity)
- Prisoners
- Economically or educationally disadvantaged individuals

4.2 If not obvious, what is the rationale for the exclusion of special populations?

4.3 What procedures will be used to determine inclusion/exclusion of special populations?

**TIPS for streamlining the review time.**

- ✓ Research involving only data analyses should only describe variables included in the dataset that will be used.
- ✓ For any research which includes or may likely include children/minors or adults unable to consent, review content [\[here\]](#)
- ✓ For research targeting Native Americans or populations with a high Native American demographic, or on or near tribal lands, review content [\[here\]](#)  
For research involving minors on campus, review content [\[here\]](#)

**Response:**

The study will use site-specific surveys will measure user responses. The responses will be anonymous, with the intent that only ASU students and staff over 18 years of age will participate. Participants that are visually impaired maybe unintentionally excluded from participating in the survey unless assisted in doing so. The QR code used on the survey will be the access method.

**IRB: 5. Number of Participants**

Indicate the total number of individuals you expect to recruit and enroll. For secondary data analyses, the response should reflect the number of cases in the dataset.

**Response:**

The total number of campus users (n=\_) is not known at this time; however, it is assumed to be between 100 - 1000

**IRB: 6. Recruitment Methods**

6.1 Identify who will be doing the recruitment and consenting of participants.

6.2 Identify when, where, and how potential participants will be identified, recruited, and consented.

6.3 Name materials that will be used (e.g., recruitment materials such as emails, flyers, advertisements, etc.) Please upload each recruitment material as a separate document, Name the document:

recruitment\_methods\_email/flyer/advertisement\_dd-mm-yyyy

6.4 Describe the procedures relevant to using materials (e.g., consent form).

✓

**Response:**

The recruitment of subjects will be by table top flyers at each outdoor learning environment location. The flyers will have a QR code on them that is site specific and data gathering will be conducted for a two week period of time. The access periods will be restricted to measure user feedback and assess the unique characteristics of each site. The survey will be the same in form and content with the each heading designating the locations on the Tempe campus. The consent and incentive copy will be in the body of the survey. There is no obligation to participate in the survey and the incentive winner will be drawn at random at the end of the study period. Only respondents that complete the survey will be eligible (one of ten \$10.00 Starbucks gift cards). There is a possibility that users may fill out more than one survey: however, the data given voluntarily by the respondent and the random selection process will prevent duplication of a card winner.

**IRB: 7. Study Procedures**

- 7.1 List research procedure step by step (e.g., interventions, surveys, focus groups, observations, lab procedures, secondary data collection, accessing student or other records for research purposes, and follow-ups). Upload one attachment, dated, with all the materials relevant to this section. Name the document: supporting documents dd-mm-yyyy
- 7.2 For each procedure listed, describe **who** will be conducting it, **where** it will be performed, **how long** is participation in each procedure, and **how/what data** will be collected in each procedure.
- 7.3 Report the total period and span of time for the procedures (if applicable the timeline for follow ups).
- 7.4 For secondary data analyses, identify if it is a public dataset (please include a weblink where the data will be accessed from, if applicable). If not, describe the contents of the dataset, how it will be accessed, and attach data use agreement(s) if relevant.

**TIPS for streamlining the review time.**

- ✓ Ensure that research materials and procedures are explicitly connected to the articulated aims or research questions (from section 2 above).
- ✓ In some cases, a table enumerating the name of the measures, corresponding citation (if any), number of items, sources of data, time/wave if a repeated measures design can help the IRB streamline the review time.

Response:

7.1 The research procedure will be to create the specific QR Codes for each site survey, the codes will be branded with ASU for clarity and safety purposes. The flyers will be distributed to each site and placed in the space. Daily review of each site will be done to ensure that the integrity of the flyers is intact. ASU Grounds will be informed not to remove the flyers for the duration of the survey.

Any photography will be done in public spaces in a normal public manner and so that the occupants will not be identifiable. The photography will be for reference and context for the final paper and NOT a means of recording habits, influences or any other measurable data.

7.2 The PI (Kenneth Brooks) will offer direction and insight if subjects are in the space when the flyers are distributed. The four sites are on the Tempe campus of ASU (Palm Walk, Schwada, Interdisciplinary A&B, HAV). Participation will be via the internet by way of a QR Code. The data collected will be post occupancy user satisfaction information. The survey should take ten (10) minutes to complete.

7.3 The length of the survey period will be two weeks – running concurrent per site.

7.4 Not applicable

---

**IRB: 8. Compensation**

8.1 Report the amount and timing of any compensation or credit to participants.

8.2 Identify the source of the funds to compensate participants.

8.3 Justify that the compensation to participants to indicate it is reasonable and/or how the compensation amount was determined.

8.4 Describe the procedures for distributing the compensation or assigning the credit to participants.

**TIPS for streamlining the review time.**

- ✓ If partial compensation or credit will be given or if completion of all elements is required, explain the rationale or a plan to avoid coercion
- ✓ For extra or course credit guidance, see “Research on educational programs or in classrooms” on the following page: <https://researchintegrity.asu.edu/human-subjects/special-considerations>.
- ✓ For compensation over \$100.00 and other institutional financial policies, review “Research Subject Compensation” at: <https://researchintegrity.asu.edu/human-subjects/special-considerations> for more information.

Response:

8.1 Only respondents that complete the survey will be eligible for one of ten \$10.00 Starbucks gift cards.

8.2 The funding of the incentives will be from the personal resources of the PI/researcher.

8.3 Since there will be little, if any, personal contact with the subjects; the amount and vendor seemed to be compatible with the demographic and proximity of potential use. All of the data will be kept in a secure location, not on the web, cloud or public server, and will be accessible only to the PI and the committee. All data given to the committee will be aggregated and anonymous.

8.4 The awards will be distributed via email notification, if that data is supplied.

**IRB: 9. Risk to Participants**

List the reasonably foreseeable risks, discomforts, or inconveniences related to participation in the research.

**TIPS for streamlining the review time.**

- ✓ Consider the broad definition of “minimal risk” as the probability and magnitude of harm or discomfort anticipated in the research that are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.
- ✓ Consider physical, psychological, social, legal, and economic risks.
- ✓ If there are risks, clearly describe the plan for mitigating the identified risks.

Response:

It is anticipated that there will be minimal risk to the participant by responding to the survey. The amount of contact is low and involvement is strictly voluntary. There should be no added risk than users currently face when walking across or sitting on campus.

**IRB: 10. Potential Direct Benefits to Participants**

List the potential direct benefits to research participants. If there are risks noted in 9 (above), articulated benefits should outweigh such risks. These benefits are not to society or others not considered participants in the proposed research. Indicate if there is no direct benefit. A direct benefit comes as a direct result of the subject’s participation in the research. An indirect benefit may be incidental to the subject’s participation. Do not include compensation as a benefit.

Response:

There are no direct benefits that can accrue to participants

**IRB: 11. Privacy and Confidentiality**

Indicate the steps that will be taken to protect the participant's privacy.

- 11.1 Identify who will have **access to the data**.
- 11.2 Identify where, how, and how long data will be **stored** (e.g. ASU secure server, ASU cloud storage, filing cabinets).
- 11.3 Describe the procedures for **sharing, managing and destroying data**.
- 11.4 Describe any special measures to **protect** any extremely sensitive data (e.g. password protection, encryption, certificates of confidentiality, separation of identifiers and data, secured storage, etc.).
- 11.5 Describe how any **audio or video recordings** will be managed, secured, and/or de-identified.
- 11.6 Describe how will any signed consent, assent, and/or parental permission forms be secured and how long they will be maintained. These forms should separate from the rest of the study data.
- 11.7 Describe how any data will be **de-identified**, linked or tracked (e.g. master-list, contact list, reproducible participant ID, randomized ID, etc.). Outline the specific procedures and processes that will be followed.
- 11.8 Describe any and all identifying or contact information that will be collected for any reason during the course of the study and how it will be secured or protected. This includes contact information collected for follow-up, compensation, linking data, or recruitment.
- 11.9 For studies accessing existing data sets, clearly describe whether or not the data requires a Data Use Agreement or any other contracts/agreements to access it for research purposes.
- 11.10 For any data that may be covered under FERPA (student grades, etc.) additional information and requirements is available at <https://researchintegrity.asu.edu/human-subjects/special-considerations>.

Response:

11.1 The PI (Kenneth Brooks) and thesis committee will have access to the data. The thesis committee will be given data that is aggregated and anonymous.

11.2 The raw data will be stored on the PI's personal external hard drive until the thesis is completed.

11.3 The aggregate composite data will be stored on the external hard drive for a period of two (2) years at which time it will be destroyed.

11.4 At this time, no extremely sensitive data will be gathered.

11.5 No audio/visual recordings will be taken

11.6 No signed consent forms will be taken. The initiation of the QR code will act as informed consent

11.7

11.8 Any identifying information collected for the drawing will be kept separate for the raw and aggregated data on a different external hard drive and will be destroyed once the winners are selected, notified and the awards distributed.

11.9 Not applicable

**IRB: 12. Consent**

Describe the procedures that will be used to obtain consent or assent (and/or parental permission).

12.1 Who will be responsible for consenting participants?

12.2 Where will the consent process take place?

12.3 How will the consent be obtained (e.g., verbal, digital signature)?

**TIPS for streamlining the review time.**

- ✓ If participants who do not speak English will be enrolled, describe the process to ensure that the oral and/or written information provided to those participants will be in their preferred language. Indicate the language that will be used by those obtaining consent. For translation requirements, see Translating documents and materials under <https://researchintegrity.asu.edu/human-subjects/protocol-submission>
- ✓ Translated consent forms should be submitted after the English is version of all relevant materials are approved. Alternatively, submit translation certification letter.
- ✓ **If a waiver for the informed consent process is requested, justify the waiver in terms of each of the following: (a) The research involves no more than minimal risk to the subjects; (b) The waiver or alteration will not adversely affect the rights and welfare of the subjects; (c) The research could not practicably be carried out without the waiver or alteration; and (d) Whenever appropriate, the subjects will be provided with additional pertinent information after participation.** Studies involving confidential, one time, or anonymous data need not justify a waiver. A verbal consent or implied consent after reading a cover letter is sufficient.
- ✓ ASU consent templates are [\[here\]](#).
- ✓ Consents and related materials need to be congruent with the content of the application.

**Response:**

The PI will be responsible for the consenting participants

The consent form will be a link at the beginning of the survey, with the caveat that advancing to the next page implies consent and an understanding of the consent form.

**IRB: 13. Site(s) or locations where research will be conducted.**

List the sites or locations where interactions with participants will occur-

- Identify where research procedures will be performed.
- For research conducted outside of the ASU describe:
  - Site-specific regulations or customs affecting the research.
  - Local scientific and ethical review structures in place.
- For research conducted outside of the United States/United States Territories describe:
  - Safeguards to ensure participants are protected.
- For information on international research, review the content [\[here\]](#).

For research conducted with secondary data (archived data):

- List what data will be collected and from where.
- Describe whether or not the data requires a Data Use Agreement or any other contracts/agreements to access it for research purposes.
- For any data that may be covered under FERPA (student grades, etc.) additional information and requirements is available [\[here\]](#).
- For any data that may be covered under FERPA (student grades, homework assignments, student ID numbers etc.), additional information and requirements is available [\[here\]](#).

**Response:**

Any photography will be done in public spaces in a normal public manner and so that the occupants will not be identifiable. The photography will be for reference and context for the final paper and NOT a means of recording habits, influences or any other measurable data.

**IRB: 14. Human Subjects Certification from Training.**

Provide the names of the members of the research team.

ASU affiliated individuals do not need attach Certificates. Non-ASU investigators and research team members anticipated to manage data and/or interact with participants, need to provide the most recent CITI training for human participants available at [www.citiprogram.org](http://www.citiprogram.org). Certificates are valid for 4 years.

**TIPS for streamlining the review time.**

- ✓ If any of the study team members have not completed training through ASU's CITI training (i.e. they completed training at another university), copies of their completion reports will need to be uploaded when you submit.
- ✓ For any team members who are affiliated with another institution, please see "Collaborating with other institutions" [\[here\]](#)
- ✓ The IRB will verify that team members have completed IRB training. Details on how to complete IRB CITI training through ASU are [\[here\]](#)



Response:

Kenneth Brooks – PI and Advisor

Byron Sampson – Graduate Student

Persons listed above have completed IRB training and are affiliated with ASU

Rev. 11/29/2021

## PROCEDURES FOR THE REVIEW OF HUMAN SUBJECTS RESEARCH

### General Tips:

- Have all members of the research team complete IRB training before submitting.
- Ensure that all your instruments, recruitment materials, study instruments, and consent forms are submitted via ERA when you submit your protocol document. Templates are [\[here\]](#)
- Submit a complete protocol. Don't ask questions in the protocol – submit with your best option and, if not appropriate, revisions will be requested.
- If your study has undeveloped phases, clearly indicate in the protocol document that the details and materials for those phases will be submitted via a modification when ready.
- Review all materials for consistency. Ensure that the procedures, lengths of participation, dates, etc., are consistent across all the materials you submit for review.
- Only ASU faculty, full time staff may serve as the PI. Students may prepare the submission by listing the faculty member as the PI. The submit button will only be visible to the PI.
- Information on how and what to submit with your study in ERA is [\[here\]](#). Note that if you are a student, you will need to have your Principal Investigator submit.
- For details on how to submit this document as part of a study for review and approval by the ASU IRB, visit <https://researchintegrity.asu.edu/human-subjects/protocol-submission>.

APPENDIX B  
INSTITUTIONAL REVIEW BOARD APPROVAL



EXEMPTION GRANTED

[Kenneth Brooks](#)  
[HIDA: The Design School](#)  
480/965-2533  
Kenneth.Brooks@asu.edu

Dear [Kenneth Brooks](#):

On 12/3/2021 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Tempe Campus Outdoor Learning Environment Satisfaction Survey
Investigator:	<a href="#">Kenneth Brooks</a>
IRB ID:	STUDY00014983
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"><li>• 21 1124 Recruitment Data.pdf, Category: Recruitment Materials;</li><li>• IRB Social Behavioral Protocol, Category: IRB Protocol;</li><li>• Tempe Campus Outdoor Learning Environment Satisfaction Survey Consent Form, Category: Consent Form;</li><li>• Tempe Campus Outdoor Learning Environment Satisfaction Survey Contest Rules, Category: Recruitment materials/advertisements /verbal scripts/phone scripts;</li><li>• Tempe Campus Outdoor Learning Environment Satisfaction Survey HAV QR Code, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li><li>• Tempe Campus Outdoor Learning Environment Satisfaction Survey HAV QR Code, Category:</li></ul>

	Recruitment Materials;
--	------------------------

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 12/3/2021.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

If any changes are made to the study, the IRB must be notified at [research.integrity@asu.edu](mailto:research.integrity@asu.edu) to determine if additional reviews/approvals are required. Changes may include but not limited to revisions to data collection, survey and/or interview questions, and vulnerable populations, etc.

REMINDER - All in-person interactions with human subjects require the completion of the ASU Daily Health Check by the ASU members prior to the interaction and the use of face coverings by researchers, research teams and research participants during the interaction. These requirements will minimize risk, protect health and support a safe research environment. These requirements apply both on- and off-campus.

The above change is effective as of July 29<sup>th</sup> 2021 until further notice and replaces all previously published guidance. Thank you for your continued commitment to ensuring a healthy and productive ASU community.

Sincerely,

IRB Administrator

cc: Byron Sampson

APPENDIX C  
SURVEY CONSENT ACKNOWLEDGEMENT



## Consent Acknowledgement

### Tempe Campus Outdoor Learning Environment Satisfaction Survey

Dear Participant,

Byron Sampson, University Landscape Architect in the Office of the University Architect at Arizona State University, is conducting a research study of post occupancy satisfaction of the Outdoor Learning Environments on the Tempe campus.

You have been invited to participate in a study, which will involve an online survey that should take approximately ten minutes to complete. The questions will ask you about your experience in the space, site amenities, time of usage, aesthetics and safety. You have the right not to answer any question and stop participating at any time.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You must be 18 years or older to participate in the study. You will be entered into a raffle to win a \$10 Starbucks gift card. Ten participants will be selected as winners.

Your response will assist ASU in improving services to serve you better and enhance ASU's planning and development of future outdoor learning environments. There are no foreseeable risks or discomforts to your participation. Your responses will be anonymous. The results of this study may be used in reports, presentations or publications, but your name will not be used. Results will only be shared in aggregate form to protect your anonymity.

If you have any questions concerning the research study, please contact [Byron Sampson](#). All de-identified data collected as a part of this current study will not be shared with other investigators for future research purposes. If you have any questions about your rights as a participant in this research or feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board through the ASU Office of Research Integrity and Assurance at 480-965-6788.

Thank you for your participation.

Sincerely,

Kenneth Brooks  
[Kenneth.Brooks@asu.edu](mailto:Kenneth.Brooks@asu.edu)  
Professor  
The Design School  
Arizona State University

Byron Sampson  
[Byron.Sampson@asu.edu](mailto:Byron.Sampson@asu.edu)  
University Landscape Architect,  
FDM  
Arizona State University

11/03/2021

Rev. 12/02/2021

APPENDIX D  
SURVEY CONTEST RULES



## Contest Rules

### Tempe Campus Outdoor Learning Environment Satisfaction Survey

- Entry:** All students that have completed the survey will be entered into a raffle. Upon the closing of the 2 week access window, the winners will be notified within one week.
- Eligibility:** This contest is open to all ASU students that completed the survey.
- Gift Card recipient selection:** Contestants enter by (1) completing the survey (2) adding their ASU email to the end of the survey. All contestants who successfully enter the contest within the timeframe indicated in these Official Rules will be entered into a random drawing. Ten contestants will be selected as winners.
- Gift Card recipient notification:** The winners will be notified via email following the end of the survey. Inability to contact a winner may result in disqualification and the selection of an alternate winner.
- Use of contest information:** All entries become ASU property.
- Conduct:** All contestants agree to be bound by these Official Rules. ASU, in its sole discretion, reserves the right to disqualify any person it finds to be tampering with the entry process or is otherwise in violation of these Official Rules.
- Limitations of liability:** ASU is not responsible for late, lost or misdirected entries or for any computer, online, telephone or technical malfunctions that may occur. If, for any reason, the contest is not capable of running as planned, including infection by computer virus, bugs, tampering, unauthorized intervention or technical failures of any sort, ASU may cancel, terminate, modify or suspend the contest. By entering, each contestant agrees to follow these Official Rules and agrees to hold harmless and indemnify the Arizona Board of Regents, ASU, Sun Devil Athletics and each of their respective officers, employees and agents against any and all liability, damages or causes of action (however named or described), with respect to or arising out of either (i) the contest, including contestant's participation and ASU's administration of the contest; or (ii) the receipt or use of the prize awarded in the contest.

8. **Prize:**

Prize quantity	Prize	Description	Number of winners	Value
10	Starbucks gift card	Gift card	10	\$10

ASU reserves the right to substitute a prize of equal or greater value and/or to terminate, modify or withdraw this contest, in whole or in part (including altering the manner in which the prize is distributed), at any time and without prior notice, for any reason including, but not limited to, the delay or cancellation of the Game, or, if viruses, bugs, tampering or other causes beyond ASU's control affect the administration, security, fairness or proper play or conduct of the contest. Arizona law will govern the contest and any claims arising therefrom. All contestants agree that the venue for any claim arising from the contest will be located in Phoenix, Arizona.

If you have any questions concerning the study, please contact [Byron Sampson \(Byron.sampson@asu.edu\)](mailto:Byron.sampson@asu.edu) or [Kenneth Brooks \(Kenneth.brooks@asu.edu\)](mailto:Kenneth.brooks@asu.edu)

11/03/21

Rev 12/02/2021



APPENDIX E  
SURVEY RESULTS/DATA

	B	C	D	E
2	Location	Finished	How often do you visit this space?	How close is the space to your living quarters?
3	HAV	True	Weekly	10 - 20 mins.
4	InterD A&B	True	Daily	30 mins. or longer
5	InterD A&B	True	Daily	30 mins. or longer
	InterD A&B	True	Once a week	Less than 10 mins.
6				
7	Interd A&B	True	Daily	Less than 10 mins.
8	Interd A&B	True	Daily	Less than 10 mins.
	Interd A&B	True	Once a week	10 - 20 mins.
9				
10	Interd A&B	True	First time here	Less than 10 mins.
11	Interd A&B	False	Once a week	Less than 10 mins.
	Interd A&B	False	Daily	10 - 20 mins.
12				
13	Interd A&B	True	Weekly	Less than 10 mins.
14	Interd A&B	True	Once a week	Less than 10 mins.
15	Interd A&B	True	Weekly	Less than 10 mins.
16	Interd A&B	True	2-3 times a week	10 - 20 mins.
	Interd A&B	True	Once a week	30 mins. or longer
17				
18	Interd A&B	True	First time here	10 - 20 mins.
19	Interd A&B	True	2-3 times a week	Less than 10 mins.
20	Interd A&B	False		
21	Interd A&B	False	2-3 times a week	Less than 10 mins.
22	Interd A&B	True	First time here	Less than 10 mins.
	Interd A&B	True	First time here	20 - 30 mins.
23				
24	Interd A&B	True	First time here	Less than 10 mins.
25	Interd A&B	False		
26	Interd A&B	True	Never	Less than 10 mins.
27	Interd A&B	True	Daily	Less than 10 mins.
28	Interd A&B	False		
29	Interd A&B	False	Once a week	
30	Bateman	False		
31	Bateman	True	First time here	10 - 20 mins.
32	Bateman	True	Weekly	10 - 20 mins.
33	Bateman	False	Daily	10 - 20 mins.

	B	F	G	H
2	Location	How close is the space to your classroom/lecture hall?	When you visit, what is your favorite time to occupy the space?	What day(s) of the week do you usually visit this space? - Mondays
3	HAV	10 - 20 mins.	Midday	Sometimes
4	InterD A&B	Less than 10 mins.	Varies	Frequently
5	InterD A&B	10 - 20 mins.	Afternoons	Frequently
	InterD A&B	10 - 20 mins.	Mornings	Seldom
6				
7	Interd A&B	Less than 10 mins.	Afternoons	Sometimes
8	Interd A&B	Less than 10 mins.	Midday	Frequently
	Interd A&B	10 - 20 mins.	Evenings	Seldom
9				
10	Interd A&B	10 - 20 mins.	Varies	Sometimes
11	Interd A&B	10 - 20 mins.	Evenings	Seldom
	Interd A&B	Less than 10 mins.	Afternoons	Sometimes
12				
13	Interd A&B	10 - 20 mins.	Afternoons	Seldom
14	Interd A&B	10 - 20 mins.	Afternoons	Sometimes
15	Interd A&B	Less than 10 mins.	Afternoons	Sometimes
16	Interd A&B	Less than 10 mins.	Afternoons	Frequently
	Interd A&B	10 - 20 mins.	Afternoons	Seldom
17				
18	Interd A&B	10 - 20 mins.	Evenings	Seldom
19	Interd A&B	Less than 10 mins.	Afternoons	Frequently
20	Interd A&B			
21	Interd A&B	10 - 20 mins.	Afternoons	Sometimes
22	Interd A&B	10 - 20 mins.	Midday	Seldom
	Interd A&B	10 - 20 mins.	Midday	Seldom
23				
24	Interd A&B	Less than 10 mins.	Midday	
25	Interd A&B			
26	Interd A&B	10 - 20 mins.	Afternoons	Seldom
27	Interd A&B	10 - 20 mins.	Afternoons	Seldom
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Less than 10 mins.	Varies	Seldom
32	Bateman	Less than 10 mins.	Mornings	Seldom
33	Bateman	20 - 30 mins.	Midday	Sometimes

	B	I	J	K
		What day(s) of the week do you usually visit this space? - Tuesdays	What day(s) of the week do you usually visit this space? - Wednesdays	What day(s) of the week do you usually visit this space? - Thursdays
2	Location			
3	HAV	Seldom	Sometimes	Seldom
4	InterD A&B	Frequently	Frequently	Frequently
5	InterD A&B	Frequently	Frequently	Frequently
	InterD A&B	Sometimes	Sometimes	Sometimes
6				
7	Interd A&B	Sometimes	Frequently	Frequently
8	Interd A&B	Frequently	Frequently	Frequently
	Interd A&B	Sometimes	Seldom	Sometimes
9				
10	Interd A&B	Sometimes	Sometimes	Sometimes
11	Interd A&B	Seldom	Seldom	Seldom
	Interd A&B	Sometimes	Sometimes	Sometimes
12				
13	Interd A&B	Sometimes	Sometimes	Sometimes
14	Interd A&B	Seldom	Sometimes	Seldom
15	Interd A&B	Sometimes	Seldom	Sometimes
16	Interd A&B	Sometimes	Frequently	Sometimes
	Interd A&B	Seldom	Seldom	Seldom
17				
18	Interd A&B	Seldom	Seldom	Seldom
19	Interd A&B	Seldom	Sometimes	Seldom
20	Interd A&B			
21	Interd A&B	Sometimes	Sometimes	Sometimes
22	Interd A&B	Seldom	Sometimes	Seldom
	Interd A&B	Seldom	Sometimes	Seldom
23				
24	Interd A&B			
25	Interd A&B			
26	Interd A&B	Seldom	Seldom	Seldom
27	Interd A&B	Sometimes	Sometimes	Sometimes
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Seldom	Seldom	Seldom
32	Bateman	Frequently	Seldom	Frequently
33	Bateman	Frequently	Frequently	Frequently

	B	L	M	N
2	Location	What day(s) of the week do you usually visit this space? - Fridays	What day(s) of the week do you usually visit this space? - Weekends	How much time do you plan on spending here today?
3	HAV	Sometimes	Sometimes	20 - 30 mins.
4	InterD A&B	Frequently	Sometimes	10 - 20 mins.
5	InterD A&B	Frequently	Seldom	30 mins. or longer
	InterD A&B	Seldom	Seldom	10 - 20 mins.
6				
7	Interd A&B	Frequently	Frequently	30 mins. or longer
8	Interd A&B	Frequently	Frequently	20 - 30 mins.
	Interd A&B	Frequently	Sometimes	10 - 20 mins.
9				
10	Interd A&B	Sometimes	Sometimes	20 - 30 mins.
11	Interd A&B	Seldom	Seldom	Less than 10 mins.
	Interd A&B	Sometimes	Seldom	20 - 30 mins.
12				
13	Interd A&B	Seldom	Sometimes	20 - 30 mins.
14	Interd A&B	Sometimes	Seldom	20 - 30 mins.
15	Interd A&B	Seldom	Seldom	Less than 10 mins.
16	Interd A&B	Frequently	Sometimes	20 - 30 mins.
	Interd A&B	Seldom	Sometimes	30 mins. or longer
17				
18	Interd A&B	Seldom	Sometimes	10 - 20 mins.
19	Interd A&B	Frequently	Seldom	30 mins. or longer
20	Interd A&B			
21	Interd A&B	Sometimes	Sometimes	10 - 20 mins.
22	Interd A&B	Seldom	Seldom	20 - 30 mins.
	Interd A&B	Sometimes	Sometimes	30 mins. or longer
23				
24	Interd A&B		Sometimes	30 mins. or longer
25	Interd A&B			
26	Interd A&B	Seldom	Sometimes	30 mins. or longer
27	Interd A&B	Sometimes	Sometimes	30 mins. or longer
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Seldom	Seldom	10 - 20 mins.
32	Bateman	Seldom	Seldom	30 mins. or longer
33	Bateman	Frequently	Sometimes	20 - 30 mins.

	B	O	P	Q
		How do you feel about the location of this space on campus? 0 - Very Inconvenient 3 - Mildly inconvenient 7 - Pretty Convenient 10 - Very Convenient		
2	Location		Has the pandemic affected how you use this space?	If your score was 7 or higher above, please give an example.
	HAV	6	0	
3				
4	Interd A&B	9	0	
5	Interd A&B	6	0	
	Interd A&B	8	8	It's a good space to do zoom classes outside when there's no private rooms inside.
6				
7	Interd A&B	10	0	
8	Interd A&B	8	0	
	Interd A&B	6	5	
9				
10	Interd A&B	8	2	
11	Interd A&B	6	6	
	Interd A&B	6	7	My desire to eat lunch outside wouldn't be as strong without Covid
12				
13	Interd A&B		5	
14	Interd A&B	3	0	
15	Interd A&B	7	0	
16	Interd A&B	8	2	
	Interd A&B	7	0	It's close enough to my apartment and Starbucks
17				
18	Interd A&B	7	0	
19	Interd A&B	9	0	
20	Interd A&B			
21	Interd A&B	8	4	
22	Interd A&B	7	0	
	Interd A&B	10	4	
23				
24	Interd A&B	10	4	
25	Interd A&B			
26	Interd A&B	10	4	
27	Interd A&B	10	6	
28	Interd A&B			
29	Interd A&B		1	
30	Bateman			
31	Bateman	5	0	
32	Bateman	10	0	
33	Bateman	10	5	

	B	R	S	T
		How often do you use the space for the following activities? - Studying alone	How often do you use the space for the following activities? - Studying with others	How often do you use the space for the following activities? - Eating
2	Location			
3	HAV	about an hour	an hour or more	under an hour
4	InterD A&B	under an hour	about an hour	under an hour
5	InterD A&B	an hour or more	under an hour	an hour or more
	InterD A&B	about an hour		under an hour
6				
7	Interd A&B	an hour or more	an hour or more	under an hour
8	Interd A&B	under an hour	an hour or more	an hour or more
	Interd A&B	under an hour	about an hour	about an hour
9				
10	Interd A&B	under an hour	under an hour	about an hour
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B	under an hour	an hour or more	about an hour
14	Interd A&B	an hour or more	an hour or more	under an hour
15	Interd A&B	about an hour	under an hour	under an hour
16	Interd A&B	an hour or more	about an hour	about an hour
	Interd A&B	under an hour	an hour or more	under an hour
17				
18	Interd A&B	under an hour	under an hour	under an hour
19	Interd A&B	under an hour	under an hour	under an hour
20	Interd A&B			
21	Interd A&B	under an hour	under an hour	under an hour
22	Interd A&B	under an hour	under an hour	under an hour
	Interd A&B	an hour or more	about an hour	under an hour
23				
24	Interd A&B	about an hour	under an hour	about an hour
25	Interd A&B			
26	Interd A&B	about an hour	an hour or more	under an hour
27	Interd A&B	about an hour	an hour or more	an hour or more
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	under an hour	under an hour	under an hour
32	Bateman	about an hour	under an hour	under an hour
33	Bateman			

	B	U	V	W
		How often do you use the space for the following activities? - Collaborative projects	How often do you use the space for the following activities? - Meeting friends	How often do you use the space for the following activities? - All of the above
2	Location			
3	HAV	an hour or more	about an hour	about an hour
4	InterD A&B	under an hour	under an hour	about an hour
5	InterD A&B	under an hour	under an hour	about an hour
	InterD A&B	under an hour	under an hour	about an hour
6				
7	Interd A&B	under an hour	about an hour	an hour or more
8	Interd A&B	under an hour	an hour or more	about an hour
	Interd A&B	an hour or more	about an hour	under an hour
9				
10	Interd A&B	under an hour	about an hour	about an hour
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B	an hour or more	an hour or more	about an hour
14	Interd A&B	under an hour	under an hour	about an hour
15	Interd A&B	under an hour	under an hour	about an hour
16	Interd A&B	an hour or more	about an hour	about an hour
	Interd A&B	an hour or more	an hour or more	about an hour
17				
18	Interd A&B	under an hour	under an hour	under an hour
19	Interd A&B	under an hour	under an hour	under an hour
20	Interd A&B			
21	Interd A&B	under an hour	under an hour	under an hour
22	Interd A&B	under an hour	under an hour	under an hour
	Interd A&B	about an hour	an hour or more	an hour or more
23				
24	Interd A&B	under an hour	about an hour	about an hour
25	Interd A&B			
26	Interd A&B	under an hour	under an hour	under an hour
27	Interd A&B	about an hour	about an hour	about an hour
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	under an hour	under an hour	under an hour
32	Bateman	under an hour	under an hour	under an hour
33	Bateman			



	B	X	Y
		How do you feel about the overall aesthetics of this space? 0 - Very unappealing/unattractive 3 - Mildly unappealing/unattractive 7 - Pretty appealing/attractive 10 - Very appealing/attractive	How important are these items for your appreciation of the space? - Shade for human comfort
2	Location		
	HAV	7	Neutral
3			
4	InterD A&B	7	Very important
5	InterD A&B	4	Very important
	InterD A&B	7	Very important
6			
7	Interd A&B	8	Very important
8	Interd A&B	4	Neutral
	Interd A&B	6	Neutral
9			
10	Interd A&B	7	Very important
11	Interd A&B		
	Interd A&B		
12			
13	Interd A&B	5	Very important
14	Interd A&B	5	Very important
15	Interd A&B	7	Very important
16	Interd A&B	10	Very important
	Interd A&B	6	Neutral
17			
18	Interd A&B	7	Very important
19	Interd A&B	7	Neutral
20	Interd A&B		
21	Interd A&B	7	Very important
22	Interd A&B	7	Very important
	Interd A&B	10	Very important
23			
24	Interd A&B	7	Neutral
25	Interd A&B		
26	Interd A&B	7	Very important
27	Interd A&B	6	Very important
28	Interd A&B		
29	Interd A&B		
30	Bateman		
31	Bateman	7	Very important
32	Bateman	8	Very important
33	Bateman		

	B	Z	AA	AB
		How important are these items for your appreciation of the space? - Fans for air circulation	How important are these items for your appreciation of the space? - Safety	How important are these items for your appreciation of the space? - Lighting
2	Location			
3	HAV	Very important	Very important	Very important
4	InterD A&B	Neutral	Very important	Very important
5	InterD A&B	Very important	Very important	Very important
	InterD A&B	Very important	Very important	Neutral
6				
7	Interd A&B	Very important	Very important	Very important
8	Interd A&B	Not important	Very important	Not important
	Interd A&B	Neutral	Very important	Very important
9				
10	Interd A&B	Neutral	Very important	Neutral
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B	Neutral	Very important	Neutral
14	Interd A&B	Neutral	Neutral	Neutral
15	Interd A&B	Neutral	Very important	Very important
16	Interd A&B	Neutral	Neutral	Neutral
	Interd A&B	Neutral	Neutral	Neutral
17				
18	Interd A&B	Very important	Very important	Very important
19	Interd A&B	Not important	Very important	Neutral
20	Interd A&B			
21	Interd A&B	Very important	Very important	Very important
22	Interd A&B	Not important	Neutral	Very important
	Interd A&B	Very important	Very important	Neutral
23				
24	Interd A&B	Very important	Very important	Very important
25	Interd A&B			
26	Interd A&B	Neutral	Very important	Neutral
27	Interd A&B	Very important	Very important	Very important
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Not important	Very important	Very important
32	Bateman	Not important	Very important	Very important
33	Bateman			

	B	AC	AD	AE
		How important are these items for your appreciation of the space? - Electrical services	How important are these items for your appreciation of the space? - WIFI	How important are these items for your appreciation of the space? - Location
2	Location			
3	HAV	Very important	Very important	Very important
4	InterD A&B	Very important	Very important	Very important
5	InterD A&B	Very important	Very important	Very important
	InterD A&B	Very important	Very important	Very important
6				
7	Interd A&B	Very important	Very important	Very important
8	Interd A&B	Not important	Not important	Very important
	Interd A&B	Very important	Very important	Very important
9				
10	Interd A&B	Neutral	Very important	Neutral
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B	Neutral	Very important	Very important
14	Interd A&B	Neutral	Very important	Neutral
15	Interd A&B	Neutral	Very important	Very important
16	Interd A&B	Not important	Very important	Very important
	Interd A&B	Neutral	Very important	Neutral
17				
18	Interd A&B	Neutral	Not important	Very important
19	Interd A&B	Neutral	Very important	Neutral
20	Interd A&B			
21	Interd A&B	Very important	Very important	Very important
22	Interd A&B	Very important	Very important	Very important
	Interd A&B	Very important	Very important	Very important
23				
24	Interd A&B	Very important	Very important	Very important
25	Interd A&B			
26	Interd A&B	Very important	Very important	Neutral
27	Interd A&B	Very important	Very important	Very important
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Neutral	Neutral	Neutral
32	Bateman	Neutral	Very important	Very important
33	Bateman			

	B	AF	AG	AH
		How important are these items for your appreciation of the space? - Adequate quantity of seating	How important are these items for your appreciation of the space? - Comfortable seating	How important are these items for your appreciation of the space? - Tables
2	Location			
3	HAV	Very important	Very important	Very important
4	InterD A&B	Very important	Very important	Very important
5	InterD A&B	Very important	Very important	Very important
	InterD A&B	Very important	Very important	Very important
6	Interd A&B	Very important	Very important	Very important
7	Interd A&B	Very important	Very important	Very important
8	Interd A&B	Neutral	Neutral	Very important
	Interd A&B	Neutral	Neutral	Neutral
9	Interd A&B	Neutral	Very important	Very important
10	Interd A&B	Neutral	Very important	Very important
11	Interd A&B			
	Interd A&B			
12	Interd A&B	Very important	Neutral	Neutral
13	Interd A&B	Very important	Very important	Very important
14	Interd A&B	Very important	Very important	Very important
15	Interd A&B	Not important	Very important	Very important
16	Interd A&B	Neutral	Neutral	Neutral
	Interd A&B	Neutral	Neutral	Neutral
17	Interd A&B	Neutral	Neutral	Neutral
18	Interd A&B	Very important	Very important	Very important
19	Interd A&B	Neutral	Neutral	Neutral
20	Interd A&B			
21	Interd A&B	Very important	Very important	Very important
22	Interd A&B	Neutral	Not important	Very important
	Interd A&B	Neutral	Neutral	Very important
23	Interd A&B	Very important	Very important	Very important
24	Interd A&B	Very important	Very important	Very important
25	Interd A&B			
26	Interd A&B	Very important	Very important	Very important
27	Interd A&B	Very important	Neutral	Very important
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Very important	Very important	Very important
32	Bateman	Very important	Very important	Very important
33	Bateman			

	B	AI	AJ	AK
2	Location	In regards to your personal safety, how do you feel about this space?	What would improve the safety of this space? - Blue Emergency Phones	What would improve the safety of this space? - Lighting
3	HAV	0	Neutral	Very important
4	InterD A&B	10	Not important	Very important
5	InterD A&B	3	Neutral	Very important
6	InterD A&B	2	Very important	Neutral
7	Interd A&B	9	Neutral	Not important
8	Interd A&B	10	Very important	Not important
9	Interd A&B	7	Neutral	Very important
10	Interd A&B	0	Very important	Very important
11	Interd A&B			
12	Interd A&B			
13	Interd A&B	10	Very important	Very important
14	Interd A&B	0	Neutral	Neutral
15	Interd A&B	9	Very important	Very important
16	Interd A&B	8	Neutral	Very important
17	Interd A&B	7	Neutral	Neutral
18	Interd A&B	9	Very important	Very important
19	Interd A&B	7	Very important	Neutral
20	Interd A&B			
21	Interd A&B	5	Neutral	Very important
22	Interd A&B	5	Neutral	Very important
23	Interd A&B	5	Neutral	Neutral
24	Interd A&B	10	Very important	Very important
25	Interd A&B			
26	Interd A&B	9	Very important	Very important
27	Interd A&B	8	Neutral	Neutral
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	9	Very important	Not important
32	Bateman	10	Not important	Not important
33	Bateman			

	B	AL	AM	AN
		What would improve the safety of this space? - Proximity to populated areas	What would improve the safety of this space? - Visibility	What would improve the safety of this space? - Other
2	Location			
3	HAV	Very important	Very important	
4	InterD A&B	Very important	Neutral	
5	InterD A&B	Very important	Very important	
	InterD A&B	Very important	Very important	
6				
7	Interd A&B	Not important	Very important	
8	Interd A&B	Neutral	Very important	
	Interd A&B	Very important	Very important	Not important
9				
10	Interd A&B	Very important	Very important	Neutral
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B	Very important	Very important	
14	Interd A&B	Neutral	Neutral	
15	Interd A&B	Very important	Very important	
16	Interd A&B	Neutral	Neutral	Not important
	Interd A&B	Neutral	Neutral	Neutral
17				
18	Interd A&B	Very important	Neutral	Neutral
19	Interd A&B	Neutral	Neutral	
20	Interd A&B			
21	Interd A&B	Very important	Very important	Not important
22	Interd A&B	Very important	Very important	
	Interd A&B	Neutral	Very important	Very important
23				
24	Interd A&B	Neutral	Neutral	Neutral
25	Interd A&B			
26	Interd A&B	Very important	Very important	Neutral
27	Interd A&B	Neutral	Neutral	Neutral
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Not important	Not important	Not important
32	Bateman	Very important	Very important	
33	Bateman			

	B	AO	AP	AQ
2	Location	What would improve the safety of this space? - Other - Text	How do you identify? - Selected Choice	How do you identify? - Other - Text
3	HAV		Male	
4	InterD A&B		Male	
5	InterD A&B		Female	
	InterD A&B		Female	
6				
7	Interd A&B		Female	
8	Interd A&B		Female	
	Interd A&B		Male	
9				
10	Interd A&B		Female	
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B		Female	
14	Interd A&B		Female	
15	Interd A&B		Female	
16	Interd A&B		Female	
	Interd A&B		Female	
17				
18	Interd A&B		Female	
19	Interd A&B		Female	
20	Interd A&B			
21	Interd A&B			
22	Interd A&B		Female	
	Interd A&B		Male	
23				
24	Interd A&B		Non-Binary	
25	Interd A&B			
26	Interd A&B		Female	
27	Interd A&B		Female	
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman		Prefer not to say	
32	Bateman		Male	
33	Bateman			

	B	AR	AS	AT
			What is your ethnicity? - International student	
2	Location	What is your ethnicity? - Selected Choice	(please list country below) - Text	What is your ethnicity? - Other - Text
3	HAV	International student (please list country below)		
4	InterD A&B	Caucasian/White		
5	InterD A&B	Asian American		
6	InterD A&B	International student (please list country below)	Hispanic	
7	Interd A&B	Caucasian/White		
8	Interd A&B	Caucasian/White		
9	Interd A&B	International student (please list country below)	India	
10	Interd A&B	Caucasian/White		
11	Interd A&B			
12	Interd A&B			
13	Interd A&B	Caucasian/White		
14	Interd A&B	Caucasian/White		
15	Interd A&B	Caucasian/White		
16	Interd A&B	Caucasian/White		
17	Interd A&B	Caucasian/White		
18	Interd A&B	Caucasian/White		
19	Interd A&B	Caucasian/White		
20	Interd A&B			
21	Interd A&B			
22	Interd A&B	Latinx		
23	Interd A&B	International student (please list country below)	Vietnam	
24	Interd A&B	Latinx		
25	Interd A&B			
26	Interd A&B	Caucasian/White		
27	Interd A&B	Caucasian/White		
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman	Caucasian/White		
32	Bateman	Caucasian/White		
33	Bateman			



	B	AU	AV	AW
				Would you be willing to participate in a 10-15 minute follow up interview? If so, you will be contacted via ASU email to set up a phone interview. - Selected Choice
2	Location	Would you like to be eligible for the Starbucks Gift Card drawing?	If you would like to be eligible for the \$10.00 Starbucks Gift Card, please enter your ASU email address below.	
	HAV	Yes		
3				
4	InterD A&B	Yes		
5	InterD A&B	Yes		
	InterD A&B			
6				
7	Interd A&B	Yes		
8	Interd A&B	Yes		
	Interd A&B	Yes		
9				
10	Interd A&B	Yes		
11	Interd A&B			
	Interd A&B			
12				
13	Interd A&B	Yes		
14	Interd A&B	Yes		
15	Interd A&B	Yes		
16	Interd A&B	Yes		
	Interd A&B	Yes		
17				
18	Interd A&B	Yes		
19	Interd A&B	Yes		
20	Interd A&B			
21	Interd A&B			
22	Interd A&B	Yes		
	Interd A&B	Yes		
23				
24	Interd A&B	Yes		
25	Interd A&B			
26	Interd A&B	Yes		
27	Interd A&B	Yes		
28	Interd A&B			
29	Interd A&B			
30	Bateman			
31	Bateman			
32	Bateman	Yes		
33	Bateman			

	B	AX
		Would you be willing to participate in a 10-15 minute follow up interview? If so, you will be contacted via ASU email to set up a phone interview. - Yes - Text
2	Location	
	HAV	
3		
4	InterD A&B	
5	InterD A&B	
	InterD A&B	
6		
7	Interd A&B	
8	Interd A&B	
	Interd A&B	
9		
10	Interd A&B	
11	Interd A&B	
	Interd A&B	
12		
13	Interd A&B	
14	Interd A&B	
15	Interd A&B	
16	Interd A&B	
	Interd A&B	
17		
18	Interd A&B	
19	Interd A&B	
20	Interd A&B	
21	Interd A&B	
22	Interd A&B	
	Interd A&B	
23		
24	Interd A&B	
25	Interd A&B	
26	Interd A&B	
27	Interd A&B	
28	Interd A&B	
29	Interd A&B	
30	Bateman	
31	Bateman	
32	Bateman	
33	Bateman	

## BIOGRAPHICAL SKETCH

The researcher, Byron Sampson, is an employee of Arizona State University and has been in the role of University Landscape Architect for the past thirteen years in the Office of the University Architect and was appointed the very first University Landscape Architect in the history of the institution. During this tenure he has focused on the connectivity and unification of the campus features that are common to all of the campuses in the Arizona State University network.

Although each campus is unique in regard to the physical location and building form, one of the primary goals of his work was to allow for any student or staff person to recognize that they are on an ASU facility. This is especially prevalent at the campus in Tempe, the oldest in the system, where the growth and architectural styles over the course of its history are apparent. He was instrumental in the development of the 2011 University Master Plan Updates along with the 2017 Tempe Campus Hardscape Master Plan. As part of the 2017 Hardscape Master Plan was the development of the Outdoor Room Network in recognition of the increasing density of the Tempe campus and the need for open space throughout the campus for student and staff to enjoy and mitigate the climatic conditions of the Sonoran Desert. Byron Sampson is a person of color that recognizes the importance of achievement, representation and acknowledgement of the growing diversification and inclusion within the University and Higher Education platforms in general. He is a 1980 graduate of Texas Tech University with a degree in Landscape Architecture. He is a member of the American Society of Landscape Architects (ASLA), the Association of University Landscape Architects (AULA) and is a registered Landscape Architect in the State of Arizona.