SIGNIFICANT DESIGN ATTRIBUTES FOR OUTDOOR LEARNING ENVIRONMENT IN HIGHER LEARNING INSTITUTIONS

Fadzidah Abdullah[1], Maheran Yaman[2], Aliyah Nur Zafirah Sanusi[3], Nayeem Asif [4], Farha Salim[5]
[1,3,4]*Department of Architecture, International Islamic University Malaysia,*
[2,5]*Department of Landscape Architecture, International Islamic University Malaysia,*
Corresponding author: fadzidah@iium.edu.my

ABSTRACT

Higher learning institutions are where knowledge of many different disciplines of educational programs is concentrated and disseminated to students. Besides gaining knowledge in the tertiary education system, students are engaging in diverse social, economic, and cultural activities. Students have minimal exposure to outdoor learning activities in the contemporary formal learning system at higher learning institutions because they are using exam-oriented educational programs. In addition, the utilization of outdoor spaces for learning is perceived as causing discomfort for learning because there is not enough provision of learning tools and facilities. Hence, this study aims to identify the most recent characters of outdoor learning settings that are significant for effective higher educational programs. A review of recent scholars' works was conducted to develop a design framework for outdoor learning in a higher learning institution. Later, a survey questionnaire was conducted to validate the significance of the identified design characters. This study highlights the characters of outdoor learning spaces as parts of the significant design attributes in developing and improving students' learning experience at the tertiary level of education. The information generated from this study will benefit the policymakers, the higher education authorities, designers, academicians, and future students, with a greater understanding of how to design and utilize successful outdoor learning space at higher learning institutions.

Keywords: Outdoor teaching and learning, active and interactive, design attributes, design values, tertiary education

INTRODUCTION

Having outdoor learning spaces in higher learning institution is relatively a new idea in the 21st century that against the traditional way of learning in the classroom environment. Most formal learning in a higher learning institution is delivered in formal indoor classrooms. Outdoor learning is often regarded as leisure for an educational trip rather than a formal learning activity. In the current digital age, information could be accessed at the fingertip, and scholars have confirmed that the learning trend evolves faster today compared to the last decade (Oblinger, 2006). Learning now could occur anywhere and anytime, with the support of learning environment and facilities.

Researchers commonly use the term outdoor learning as an essential learning pedagogy for children early education. In fact, Wattchow (2012) has gone the extra miles to produce a guide for children, Outdoor Learning, titled: *Learning outside the classroom: Theory and guidelines for practice*. Other research also shows that pupils, who explore and utilize their surrounding learning environment at maximum level, demonstrate an improved capability to think creatively and critically. Those pupils also demonstrate the result of better academic performance. Outdoor Learning also offers low-cost and non-invasive pedagogical solutions to public health challenges, particularly for well-being, mental health, and physical literacy (Mann et al., 2021).

Despite being a burgeoning approach for children development, the outdoor learning approach has not been utilized at higher learning institutions because the idea seems to be irrelevant and uncomfortable. Safety, climate, pedagogy syllabus and physical facility are the common factors

that influence the lack of outdoor space utilization in higher learning faculty. Hence, this paper aims to identify the attributes of outdoor learning settings that are significant for effective higher educational programs. To achieve the objective, this research reviewed the subject matter, and a survey questionnaire was conducted to validate the significance of identified design attributes. This study highlighted the characters of outdoor learning spaces as being significant elements in developing and improving students' learning experience at three (3) chosen higher learning institutions. The chosen institutions were the Schools of Architecture in International Islamic University Malaysia (IIUM), Universiti Teknologi MARA, Puncak Alam (UiTM) and Universiti Putra Malaysia (UPM).

LITERATURE REVIEW

Outdoor Learning

Outdoor learning principally refers to the process of gaining knowledge outside of the conventional class or outside of an enclosed learning space. The definition of outdoor learning is gradually expanding and evolving following the modern culture and trend (Fagerstam, 2012). Researchers relate the outdoor learning as experiential learning (Lewis, 1975), nature environmental education (Backman and Crompton, 1984), outdoor activities (Fagerstam, 2012), environmental-sustainable education (Beames, Higgins and Nicols, 2011), learning outside the typical classroom or building (Norhati, Hafisah and Masran, 2013) and informal learning (Priest, 1986).

In the context of this research, the concept of 'outdoor learning' is used, which refers to the learning, which occurs from the utilization of outdoor spaces outside the faculty classroom. This concept is derived from Beames, Higgins and Nicols (2011) and Eaton (1998) works.

Outdoor Learning Spaces

Higher learning physical spaces need to be considered a complex network of connected learning environments (Zandvliet, 2014; Wilson, 2009). The complex higher learning environment components comprise various learning processes with different pedagogies, spaces, technologies, cultures, communities, and academic mindset conditions. In their studies, Alexander et al. (1977) observed that the outdoor spaces that are merely "leftover" between buildings would generally not be used. The "leftover" areas between buildings have the potential to be used for learning setting (Wilson, 2009).

Wilson (2009) proposes a "Learning Spectrum model" inspired by a student-centric learning approach. In his Learning Spectrum model, the learning spaces can be designed in structured and unstructured way depending on the purpose of learning approaches, examples in active learning or reflective learning approaches. This model suggests that every square meter of an outdoor area within the campus spaces can support the learning process and activities. Unstructured learning space is designated for independent, peer to peer, social learning, and self-directed study. In contrast, the structured learning space is purposely for teacher-led study.

Design Principles for Effective Learning Environment

Moos (1979) suggests that the environmental systems of an institution need to be changed in response to the technological advances that often instigate the large-scale changes and adaptations in the social environment context. The effectiveness or ineffectiveness of a particular outdoor

learning space in higher learning (HL) depends on the design principles imposed on the earlier stage of HL physical development. Properly designed physical learning environment has proven to inculcate students' sense of belonging in the environment and their positive feeling to pursue learning (Norhati, Hafisah & Masran, 2013; Farrington et al., 2012; Oblinger, 2006; Brown, 2005). In addition, campus buildings need to have the ability to support and foster occupants' imaginations and connection to themselves, peers, the larger community, and the immediate natural environment (Alexander, Ishikawa, & Silverstein, 1977; Upitis, 2004).

Systematic literature review conducted for this research has resulted in the identification of seventeen (17) attributes for Outdoor Learning Spaces. Table 1 summarizes the literature review related to the design characters of effective outdoor learning spaces in a higher learning environment.

Table 1 Significant design attributes for designing effective outdoor learning spaces

Attributes of effective learning spaces	References
1. Universal Design that is functional to people with various capabilities and can be used for multiple purposes/activities.	Center for Universal Design, North Carolina State University, 1997; Kent & Myrick, 2003; Jamieson et al., 2005; Konings et al., 2005; Siddall, 2006; Graves and Berg, 2009; Mitchell et al., 2010; UNESCO, 2012; Norhati and Hafisah, 2013; Zandvliet, 2014.
2. Supportive Design that can develop, inspire, encourage and energize the learners' potential.	Konings et al., 2005; Siddall, 2006; JISC, 2006; Jaskari, 2009; Zaini, 2009; Souter, Riddle, Sellers & Keppell, 2011.
3. Ubiquitous Designed spaces that can be used physically and virtually (via internet communication).	Siddall, 2006; Graves and Berg, 2009; Souter, Riddle, Sellers & Keppell, 2011.
4. Flexible Designed spaces that enables to be reallocated, reconfigured and flexible to be used currently and in the future.	Center for Universal Design, North Carolina State University, 1997; Oblinger, 2005; Jamieson et al., 2005; JISC, 2006; Graves and Berg, 2009; Mitchell et al., 2010; Souter, Riddle, Sellers & Keppell, 2011.
5. Simplicity Designed spaces that are simple and friendly to anyone.	Center for Universal Design, North Carolina State University, 1997; Jamieson et al., 2005; JISC, 2006; Siddall, 2006; Souter, Riddle, Sellers & Keppell, 2011; Oblinger, 2005; Norhati and Hafisah, 2013; Zandvliet, 2014.
6. Interactive Designed spaces that allow users to effectively communicate or access necessary information by using ICT.	Center for Universal Design, North Carolina State University, 1997; Konings et al., 2005; JISC, 2006; Jaskari, 2009.
7. Safety Designed spaces that help to foster emotional and cultural safety. The spaces should also minimize hazards and accidents.	Center for Universal Design, North Carolina State University, 1997; Oblinger, 2005; Jaskari, 2009; UNESCO, 2012.
8. Comfortable Designed spaces that allow students to be physically comfortable.	Center for Universal Design, North Carolina State University, 1997; Kent & Myrick, 2003; Oblinger, 2005; Siddall, 2006; Jaskari, 2009; UNESCO, 2012; Harrop and Turpin, 2013; Norhati and Hafisah, 2013; Zandvliet, 2014.
9. Engagement Designed spaces that allow students to gather	Kent & Myrick, 2003; Oblinger, 2005; Konings et al., 2005; Oblinger, 2006; Tanner, 2009; Jaskari, 2009;

with others for academic sociability**.**	Zaini, 2009; Mitchell et al., 2010; Souter, Riddle, Sellers & Keppell, 2011; UNESCO, 2012; Harrop and Turpin, 2013; Norhati and Hafisah, 2013.
10. Peace Designed spaces that help to foster mental health and comfort.	Jaskari, 2009; Souter, Riddle, Sellers & Keppell, 2011; Harrop and Turpin, 2013.
11. Technologies and facilities support. Designed spaces that give access to information technologies and various academic facilities or equipment.	Oblinger, 2005; Oblinger, 2006; Long and Ehrmann, 2005; Siddall, 2006; Graves and Berg, 2009; Zaini, 2009; Mitchell et al., 2010; UNESCO, 2012; Harrop and Turpin, 2013; Norhati and Hafisah, 2013; Zandvliet, 2014.
12. Identity Designed spaces that reflect the main identity of institutional values.	Kent & Myrick, 2003; Oblinger, 2005; Jaskari, 2009; Harrop and Turpin, 2013.
13. Accessibility and mobility Designed spaces that have good accessibility to other relevant locations and information system.	Kent & Myrick, 2003; Jamieson et al., 2005; Siddall, 2006; UNESCO, 2012; Harrop and Turpin, 2013.
14. Sense of ownership and belonging Designed spaces that make students feel as part of the institutional bodies.	Jamieson et al, 2005; Jaskari, 2009; Harrop and Turpin, 2013.
15. Maintenance Designed spaces that are maintained properly	Siddall, 2006.
16. Visual and lighting Designed spaces that have good lighting for learning activities.	Tanner, 2008; Zandvliet, 2014.
17. Proximity Designed spaces where students can easily move around across campuses.	Long & Ehrmann, 2005; UNESCO, 2012; Harrop & Turpin, 2013.

RESEARCH METHODOLOGY

This research was conducted by using both qualitative and quantitative approaches. For the qualitative research approach, researchers embarked on table research. The obtained secondary data was used to identify the most recent characters of outdoor learning setting that are significant for effective higher educational programs. For quantitative research approach, survey questionnaires were distributed to students of three (3) chosen higher learning institutions, to validate the significance of design values of Outdoor Learning Environment. The chosen institutions were Schools of Architecture in International Islamic University Malaysia (IIUM), Universiti Teknologi MARA Puncak Alam (UiTM) and Universiti Putra Malaysia (UPM). The finding of the table research was tabulated in Table 1 of the Literature Review section.

For the survey questionnaires, the assessment on outdoor spaces' attributes of a higher learning institution was derived from the seventeen (17) listed significant design values, shown in Table 1. The instrument involved in the research was divided into two parts: 1) demographic information of the respondents, and 2) the significant design values with a five-point Likert scale. The respondents of 290 students were from the Architecture and Landscape Architecture departments of IIUM, UiTM and UPM as these higher learning institutions are all in Selangor, Malaysia for the ease of retrieving the data.

The survey questionnaires were distributed by hand to the respondents. Then, the collected data were coded to ensure that they were compatible to be analysed using the statistical analysis IBM SPSS Statistical software. The One-way ANOVA analysis was applied to investigate detailed data finding. The collected data was validated using the Cronbach's Alpha reliability test. The statistical findings were interpreted where the significant values indicated the status of compliances of the 17 design attributes of Table 1, from the three institutions.

RESULTS

Table 2 shows the ANOVA post-hoc test results. Ten (10) significant design attributes out of the seventeen (17) were found to be statistically significant with the universities' variable ($p \leq 0.05$). The significant design attributes were ubiquitous, interactive, safety, comfortable, peace, technology, and identity, sense of ownership/belonging, maintenance, and proximity.

Table 2 ANOVA analysis on significant design attributes in 3 institutions.

No	Items	Mean	SD	F	df	*p*	Comparison t.
1	Universal	3.58*	.853*	2.302	2,289	0.102	Not sig.
2	Supportive	3.50*	.803*	1.893	2,289	0.153	Not sig.
3	Ubiquitous	UPM=3.32 UIAM=3.56 UiTM PA=3.71 N= 3.51	UPM=.762 UIAM=.868 UiTM PA=.819 N= .829	5.421	2,289	0.005	UiTM PA - UPM
4	Flexibility	3.52*	.812*	1.891	2,289	0.153	Not sig.
5	Simplicity	3.71*	.824*	2.002	2,289	0.137	Not sig.
6	Interactive	UPM=3.26 UIAM=3.68 UiTM PA=3.74 N= 3.53	UPM=.888 UIAM=.807 UiTM PA=.879 N= .881	9.339	2,289	0.000	UiTM PA - UPM
7	Safety	UPM=3.45 UIAM=3.77 UiTM PA=3.93 N= 3.68	UPM=.879 UIAM=.718 UiTM PA=.804 N= .825	8.724	2,289	0.000	UiTM PA - UPM
8	Comfortable	UPM=3.51 UIAM=3.67 UiTM PA=3.94 N= 3.67	UPM=.920 UIAM=.843 UiTM PA=.915 N= .903	5.114	2,289	0.007	UiTM PA - UPM
9	Engagement	N= 3.57*	N= .886*	2.683	2,289	0.070	Not sig.
10	Peace	UPM=3.50 UIAM=3.71 UiTM PA=3.87 N= 3.67	UPM=.910 UIAM=.786 UiTM PA=.947 N= .885	4.095	2,289	0.018	UiTM PA - UPM
11	Technology	UPM=3.28 UIAM=3.53 UiTM PA=3.69 N= 3.47	UPM=.970 UIAM=.990 UiTM PA=1.001 N= .995	4.019	2,289	0.019	UiTM PA - UPM
12	Identity	UPM=3.29 UIAM=3.62 UiTM PA=3.43 N= 3.45	UPM=.926 UIAM=.840 UiTM PA=.941 N= .907	3.633	2,289	0.028	UIAM - UPM
13	Accessibility	N= 3.52*	N= .935*	1.868	2,289	0.156	Not sig.

	& Mobility						
14	Sense of Ownership / Belonging	UPM=3.24 UIAM=3.51 UiTM PA=3.61 N= 3.43	UPM=.893 UIAM=.881 UiTM PA=.906 N= .902	4.438	2,289	0.013	UiTM PA - UPM
15	Maintenance	UPM=3.31 UIAM=3.35 UiTM PA=3.77 N= 3.44	UPM=1.014 UIAM=1.088 UiTM PA=.887 N= 1.028	5.033	2,289	0.007	UiTM PA - UPM
16	Visual and lighting	N= 3.62*	N= .935*	13.443	2,289	2.625	Not sig.
17	Proximity	UPM=3.39 UIAM=3.64 UiTM PA=4.00 N= 3.63	UPM=.914 UIAM=.891 UiTM PA=.816 N= .910	10.196	2,289	0.000	UiTM PA - UPM
	N= 290, p <0.05, Reliability test- Cronbach's Alpha values: 0.942, *value for overall case studies- subjected to non-significant result.						

The finding for 'ubiquitous' items shows that the respondents from UiTM were found to be more significant (m=3.71, SD=.819) than the respondents from UPM (m=3.32, SD=.762) [t=5.421, df=2,289, p=.005]. Finding for 'interactive' item showed that the respondents from UiTM were found to be more significant (m=3.74, SD=.879) than the respondents from UPM (m=3.26, SD=.888) [t=9.339, df=2,289, p=.000]. Finding for 'safety' item showed that the respondents from UiTM were found to be more significant (m=3.93, SD=.804) than the respondents from UPM (m=3.45, SD=.879) [t=8.724, df=2,289, p=.000]. Finding for 'comfortable' item showed that the respondents from UiTM were found to be more significant (m=3.94, SD=.915) than the respondents from UPM (m=3.51, SD=.920) [t=5.114, df=2,289, p=.007]. Finding for 'peace' item showed that the respondents from UiTM were found to be more significant (m=3.94, SD=.915) than the respondents from UPM (m=3.51, SD=.920) [t=5.114, df=2,289, p=.007].

Meanwhile, the finding for 'technology' item showed that the respondents from UiTM PA were found to be more significant (m=3.87, SD=.947) than the respondents from UPM (m=3.50, SD=.910) [t=4.019, df=2,289, p=.019]. Finding for 'identity' item showed that the respondents from IIUM were found to be more significant (m=3.62, SD=.840) than the respondents from UPM (m=3.29, SD=.926) [t=3.633, df=2,289, p=.028]. Finding for 'sense of ownership/belonging' item showed that the respondents from UiTM PA were found to be more significant (m=3.61, SD=.906) than the respondents from UPM (m=3.24, SD=.893) [t=4.438, df=2,289, p=.013]. Finding for 'maintenance' item showed that the respondents from UiTM PA were found to be more significant (m=3.77, SD=.887) than the respondents from UPM (m=3.31, SD=1.014) [t=5.033, df=2,289, p=.007]. Lastly, the finding for 'proximity' item showed that the respondents from UiTM were found to be more significant (m=4.00, SD=.816) than the respondents from UPM (m=3.39, SD=.914) [t=10.196, df=2,289, p=.000].

The above findings could be interpreted that 3) Ubiquitous, 6) Interactive, 7) Safety, 8) Comfortable, 10) Peace, 11) Technology, 12) Identity, 14) Sense of ownership/belonging, 15) Maintenance, and 17) Proximity; were associated to the three universities in the design of outdoor spaces. This finding indicated that the ten (10) design attributes were the most significant in influencing the outdoor learning environment quality. On the other hand, seven other attributes

were shown as non-significant, which are 1) Universal, 2) Supportive, 4) Flexibility, 5) Simplicity, 9) Engagement, 13) Accessibility and Mobility, and 16) Visual and Lighting. This finding suggested that these seven design attributes were the least significant in influencing the outdoor learning environment qualities for the three institutions.

Figure 1 presents a bar chart on the overall significant findings for the three higher learning institutions. The design attributes of "safety" reports the highest mean value among all significant values (m=3.68). This report indicates the most concerning attributes for outdoor learning spaces is safety. Among the ten significant attributes, "sense of ownership and belonging" design attributes is found to have the lowest mean value (m=3.43). This result entails that attribute of "sense of ownership and belonging" is the least concerning issue for the development of outdoor learning spaces.

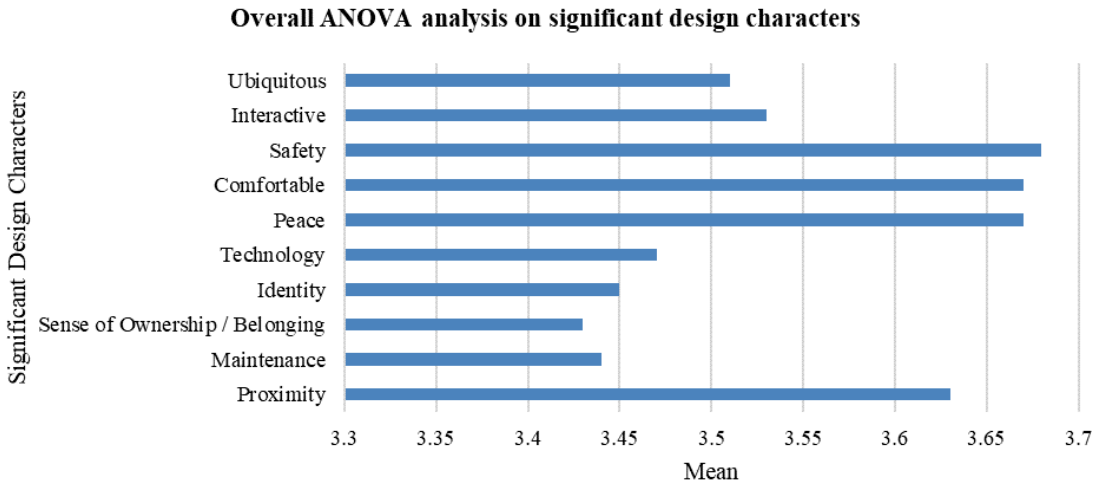

Fig. 1 The Bar-chart shows the overall ANOVA analysis upon significant design characters

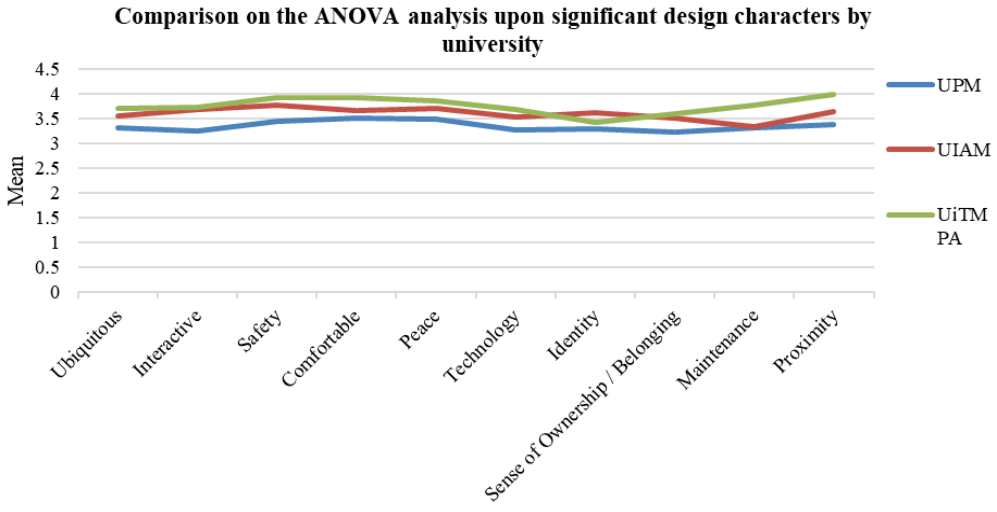

Fig. 2 Comparison of the ANOVA analysis upon significant design attributes of the 3 institutions

Figure 2 illustrates the comparison results on the ANOVA analysis upon the significant design characters by UPM, IIUM and UiTM. The mean value pattern among the three higher learning institutions shows that UiTM has the best performance as compared to IIUM and UPM. This result could be due to that UiTM is a new campus development built in 2009, as compared to UIAM and UPM, which were established in 1996 and 1931, respectively. Therefore, with new and better infra-structure, UiTM was inferred to have the best performance in terms of the provision of outdoor learning spaces within their peripherals. The ANOVA analysis showed that the different background and year of establishment have high possibility to influence the result.

DISCUSSION

The finding of this research shows similarities with the works of Jaskari (2009) and Harrop & Turpin (2013) in their learning spaces design research. These research findings reconfirmed that safety, comfortable, peace, proximity, interactive, ubiquitous, technology, identity, maintenance, and sense of ownership, are relevant for outdoor learning environment to the current instant. Design characters of safety, comfortable, peace and proximity are among the top scorers as these design characters are the basic design attributes for any designated outdoor space.

However, this study could not demonstrate the high value of the design character on the sense of ownership and belonging. This research finding is in contrast with the works of Norhati, Hafisah & Masran (2013), and Farrington (2013), who stated that a learning environment with the value of ownership and belonging influences students' academic mindset and academic behaviors. The difference in the sense of ownership and belonging may be due to other outdoor learning spaces that are regarded as more significant, such as cultural, environmental, and geographical conditions. In comparison between the three universities, as shown in Figure 2, it was observed that each institution showed different results. It is with high possibility that the institutions' physical context and environment can influenced the results.

The institutions' learning environment should be functional to support students' learning activities and achieve the learning goals and outcomes. This could be achieved by providing a conducive outdoor learning space as well, besides the existing indoor facilities. Therefore, it is significant to consider designing learning spaces at higher learning institutions that include designed outdoor spaces too, as part of the learning environment. Without effective outdoor spaces in higher learning institutions, students would lack exposure to various kinds of learning experience and interaction that are important for their academic and future career development.

CONCLUSION

This study has identified the most recent and significant attributes for outdoor learning settings for tertiary educational level. The findings of this study suggest that outdoor learning of higher learning institution is an important subset of the ecosystem of the learning environment. However, these findings are only valid for the chosen institutions. More studies are needed to be conducted at other universities for further review if the study is to produce a generalization of the results. The information generated from this study may benefit the higher education authorities, policy makers, planners, designers, academicians, and students. This study could provide the stakeholders of tertiary education with a greater understanding on how to design and utilize successful outdoor learning spaces at the higher learning institutions.

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