Improving Quality of Student's Life on University Campus
(Guidelines of New Assessment Tools)

Sara Tawfik Mohamed[1], Alaa Mandour[2], Hussam Baker[3]

Abstract:

University is considered one of the main pillars on which the advancement and growth of society is based, it has a vital role in building student's character, goals, and future, and it affects all aspects of his life, such as social, educational, and cultural. One of the key elements that influences students' life on campus is the design of outdoor spaces (student spaces) where they spend most of their day.

Several previous studies evaluated the quality of a university campus and the quality of student university life from different sides, most of which were academic, except the UI-Green Metric system that assesses the environmental quality of a campus. The current study aims to provide a new comprehensive assessment tool that evaluates the quality of student's life in all fields of life. The study reviewed many publications about quality of life and campus design requirements and based this tool on Maslow's expanded hierarchy of needs as well as Lang's functionalism theory. In order to develop a balanced index, the study adopted The analytical hierarchy process (AHP) and conducted 50 expert questionnaires to produce a balanced numerical evaluation index. An index was reached consisting of 25 quality indicators categorized into seven dimensions; physiological, social, safety & security, functional, cognitive, self-esteem & self-actualization, and aesthetic quality.

Keywords: Quality of Life- University Campus- Students' Needs.

Introduction:

Universities have an important role in shaping students' life and affecting their wellbeing, universities are places for enhancing skills and cultivating creative talents. University campuses do not include only classrooms and academic facilities, but also outdoor spaces that can facilitate creative learning, skill development, and encourage social interaction.

Several previous studies evaluated the quality of university campus, and the quality of student university life from different aspects, most of which were academic such

[1] PhD Candidate, Faculty of Engineering, Architecture Department, Helwan University, Cairo, Egypt.
[2] Professor, Faculty of Engineering, Architecture Department, Helwan University, Cairo, Egypt.
[3] Professor, Faculty of Engineering, Architecture Department, British University, Cairo, Egypt.

as Times Higher Education World University Rankings, QS World University Rankings, and Academic Ranking of World Universities (ARWU), another assessment tool is the UI-Green Metric system, which assesses green campus and environmental sustainability. Yet, there wasn't any assessment tool that focused on the quality of the outdoor spaces on the university campus from all aspects of student's life, as most of the literature on campus outdoor spaces discussed the quality of a university campuses from a planning point of view, such as the quality of campus morphology (Hajrasouliha, A. H. (2017)[1], rather than on the spaces between buildings in which students spend most of their time, despite the vital role that outdoor spaces play in student wellbeing. Perhaps the most obvious benefits are related to health and wellness. Andre, E. et. Al (2017), asserted that spending time in outdoor spaces on campus can reduce stress, enhance mood, self-esteem, reducing many negative feelings, moreover numerous physical benefits such as reducing the risk of infection with many diseases, and strengthening muscles and bones (athletic activities), as well as the positive effect on social support such as reducing social anxiety, increasing sense of community, adapting to university life, reducing levels of social engagement that may enhance a sense of life purpose[2].

This study aims to fill that gap in the literature by providing a new comprehensive assessment tool that assesses the quality of student's life in campus outdoor spaces. The researcher conducted an extensive review of the literature on student needs on campus, design requirements, attributes, and standards, and discussed various quality indicators that are used to assess student's satisfaction with the outdoor spaces on campus. The study then conducted a questionnaire for 50 experts using The analytical hierarchy process (AHP) to produce a balanced numerical evaluation index.

Quality of Life (QOL) and Quality of College Life (QCL):

There is no clear, unified, and agreed upon definition by experts and scholars in this field for quality of life (QOL). The World Health Organization considered (QOL) as a broad-ranging concept, affected in a complex way by the person's physical health, psychological state, and level of independence, social relationships, and their relationship to salient features of their environment[3]. O'Neill, D. W., Fanning, A. L., Lamb, W. F., & Steinberger, J. K. (2018), linked the definition of the concept of meeting human needs, that is the ability of people to achieve well-being such as health, welfare, freedom of choices, satisfaction of life. Those indices include the availability of food, clothing, shelter, potable water, legal aid, education facilities, health care, security, and income[4]. (Costanza, R., Hart, M., Kubiszewski, I., Posner, S., & Talberth, J. (2018)) provided an integrative definition of quality of life, that is the extent to which objective human needs are fulfilled in relation to personal or group perceptions of subjective well-being[5], (M. Joseph Sirgy. 2021) discussed the definition, foundation, and measures of human wellbeing and how it can affect many life fields health, achievement and work, social relationship. etc.[6]

In 2007, Sirgy, et.al discussed the term "quality of college life", and focused on positive and negative aspects of student experiences with respect to academic and

social aspects, both are influenced by satisfaction with university facilities and services [7] . This concept constituted the base for the Quality-of-College-Life standardized survey that has been administered at many colleges and universities in the U.S and other countries to assess the level of quality of college life in educational institutions. This model assesses the quality of university in terms of academic aspects, social aspects. The survey, however, did not take quality of outdoor spaces into consideration.
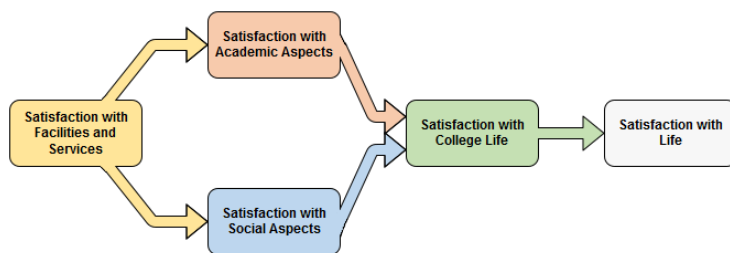

Figure (1) The conceptual model of quality of college life
Reference: (Sirgy, M. et, Al. 2007) [7]

It can be concluded from the previous discussion that there is a lack of indexes that assess students' needs fulfilment at university campus open spaces, as most of the previous indexes were based on fulfilling human basic needs such as feeling secure, having good health, or having a suitable living condition. Thus, the current study aims to develop an index that assesses the fulfilment of human needs in outdoor open spaces on university campuses, where students spend much of their time.

Human needs in urban spaces:

Human needs in urban spaces were repeatedly discussed from different points of view. However, three main theories can be identified; Carr and Francis (1992) discussed the importance of public spaces in people's lives, and emphasized the importance of designing public spaces according to users' needs. They asserted that public spaces should accommodate five types of human needs: comfort, relaxation, passive engagement, active engagement, and discovery [8] . Smith, et.al (1992), identified principles of users' needs in public areas, in order to enhance community quality in the public spaces, derived from different social and psychological theories., which were composed of livability, character, connection, mobility, personal freedom, and diversity aspects[9], these principles were mainly relied on Lynch's theory of good city form (1981) as an organizing principles for their framework. On other hand, John Lang (2010) provided his theory of functionalism, based on Maslow's expanded hierarchy of human needs[10]. He recognized the complexity and interconnectivity between human needs in the built environment. The theory includes most life aspects and consists of six need categories; physiological, safety, affiliation, esteem, self-actualization, and cognitive needs, which makes his theory the most comprehensive.
It is worth noting that the three discussed studies were based on Maslow's expanded hierarchy of needs, suggesting that there are two sets of needs: the first are called "deficiency needs" including basic needs such as physiological, safety, social, and esteem needs. The second set called "growth needs", including advanced needs such

as cognitive, aesthetic, self-actualization, and self- transcendence needs. (Maslow,1954)[11]. Table (1) include a comparison of these three theories.

	Carr's Principles	Smith et. al Approach	Lang's Functionalism Theory
Theory base	Previous researches and case studies	Social and psychological theories; jarvis, lang, lennard, lynch, maslow, etc.	Maslow's hierarchy of needs
Needs in urban spaces	•comfort, •relaxation •passive engagement • active engagement •discovery	•livability •character •connection •mobility •personal freedom •diversity	Physiological, Safety, Affiliation, Esteem, Aesthetic, self-actualization, cognitive needs

Table (1) a comparative table between three mentioned needs theory in the built environment

It can be concluded that Carr's principles focused on the functional and different activities that bind the community for different purposes (private or public) that the space was designed for, the theory focused on spaces' settings for different activities to provide well-used spaces that fit all users. Smith's approach focused on social and psychological aspects only. Lang's functionalism theory adapted Maslow's expanded hierarchy of needs and thus is the most comprehensive among the discussed theories. Accordingly, the current study will be using Lang's theory as a base for the proposed assessment tool.

Study Methodology:

The study followed a three steps methodology to develop a quality of student's life assessment index:
1. The study conducted extensive review of literature on student needs on campus, design requirements, attributes, and standards, and discussed various quality indicators that are used to assess student's satisfaction with the outdoor spaces on campus and proposed 25 selected quality indicators.
2. The study conducted an expert questionnaire to identify the importance of the proposed indicators according to expert's opinions and assessments, Experts sample included 50 experts who were selected according to a specific criterion; Specialist in the urban design field, possess at least a master's degree, have technical and academic experience in this field.
3. The study follows AHP method to identify the relative weights of the proposed indicators to propose a balanced assessment index, that was based on pair-wise comparisons between quality dimensions and another pair-wise comparison between quality indicators instead of sorting (ranking), voting to reach an optimum group decision, in which all participants evaluate pairs and the group result is determined as the mathematically optimum consensus.

Identifying Quality indicators:

The study based the main quality dimensions on Lang's Hierarchy including; physiological, safety, social (affiliation), aesthetic, cognitive, self-esteem, and self-

actualization needs. These needs were discussed in detail and accurately through a review of many publications that discussed students' needs and summarized in table (2):

1. **Physiological quality:**

Lang's theory provided that the physiological needs of the individual in the built environment lie in achieving his physical comfort and wellbeing, when the user's surrounding condition is agreeable, and comfortable for them to carry out their activities without hindrance. Comfort include biological (or physical), thermal, visual, and acoustic comfort[9].

Thermal comfort: Many studies provided outdoor design considerations such as using vegetation and green spaces (Gherraz, H et.al 2018) [12], (Lai, D.et.Al (2020))[13], and designing streets and sidewalk widths, shading structures, materials, landscaping, building heights (Zhang, L. et. Al 2020)[14], (Lau, K et.Al 2019)[15] , and using shades in open space to decrease sunlight radiation (Abdallah, A ET, al 2020) [16] . Accordingly, the study identified three indicators for fulfilling student thermal comfort; providing well protected spaces from bad weather conditions, providing adequate landscape in student spaces, and provision of well-ventilated student spaces.

Acoustic comfort: Many acoustic considerations were discussed such as designing the space between noise resource and the open spaces, and locating different types of barriers(Sheikh, M. et. Al 2018) [17], The study classified them into two main categories; control of external , and internal noises.

Visual comfort: (Christophe Marty et.al 2003) defined visual comfort as the state in which a clear and unobstructed reception of visual messages from the visual environment is possible without affecting the person's well-being or health (Houel, N. et. Al 2021)[18], he identified glare, luminance's and luminance ratios as affecting factors , as well as the amount of light, some studies discussed the impact of shades in improving visual comfort (Valitabar, M 2021)[19], (European standard EN 12665) [20], beside the impact of good views on campus[21], the study identified two main indicators to fulfil this comfort; using visually comfortable finishing material, and providing student spaces with pleasant views.

Biological (physical) needs: Lang referred to the importance of meeting the basic needs in the built environment that includes food services and rest rooms[10], (Wilkins, S. 2022) discussed the "service-scape model" which emphasizes the impact of the physical settings in which a service process takes place that explains user's behavior within the service environment [22], In university life, service-scape includes the physical facilities such as restrooms, kiosks, outlets. The study identified four indicators to fulfil this needs; providing drinking water facilities, adequate service zones (food kiosks and outlet shops), adequate Ramps for disabled students, and Adequacy of toilets in terms of distribution and maintenance.

2. **Safety & Security Quality:**

That's related to how student perceive safety while using their spaces, how they feel secured on campus. "Jon Lang" described the security in the built environment as the protection from natural and artificial threats. Many design attributes considering the sense of being safe by the physical features and maintenance of the surrounding built

environment, including space configuration, land uses, the modifications made to the built environment (Mehta 2021)[23], and the importance of natural and artificial surveillance (Sun, X et. Al 2021)[24], and CPTED[25] and how to design the "the defensible space"(Newman. O 1997)[26]. The Planning Institute of Australia referred to the importance of space heights, edges, distinction between pedestrian paths and vehicular paths, obstructions that hinder walking (drilling, cracks, and gravel), the provision of signs and alerts, avoiding dark spaces and dead ends, and well-let places at night[27]. Four quality indicators were identified and classified into two dimensions; the first dimension is safety including quality maintenance of space and facilities, and providing safety from traffic accidents on campus. The second dimension is security including; avoiding dark, isolated or dead ends, etc. and presence of active surveillance elements (cameras, security guards, guides, ushers, etc.)

3. Social Quality:

University campus outdoor spaces have a vital role in contributing students in building their character, interests, which enhance building their society[28]. Many design considerations sought to enhance student social involvement by engaging students in meaningful activities through considering physical features of human scale, flexible organizational designs (Wilson, T. (2018))[29], discussing "settable spaces" which was coined by (Whyte. W 1980) for activating outdoor spaces on campuses that should be socially and functionally comfortable, and flexible [30]. Based on that (Carr et, al 1992) discussed the term(the physical comfort) [8] which is related to the quality of spaces' settings; using seats for individual and groups, and for different type of activities, and having high privacy, (Agrawal, P. 2021) [31] discussed many design considerations for seats and shades in university campus based on (Dober2000)[32] related to seats location, distribution, types, arrangement, as shown in figure (2), The anthropologist (Edward Hall) coined the term proxemics and classified four major proxemics zones; intimate, personal, social, and public zones[33] as shown in figure (3).
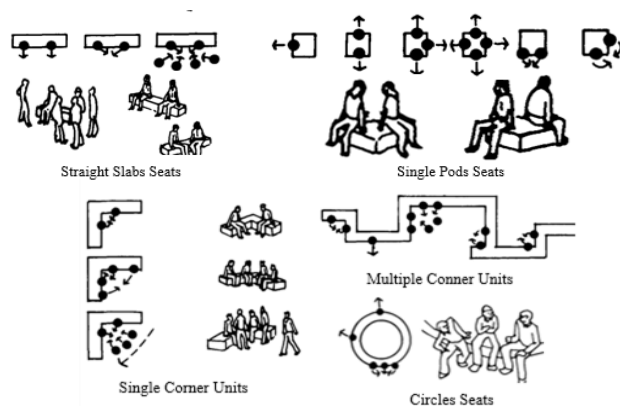

Figure (2) Different type of students' seats in campus.
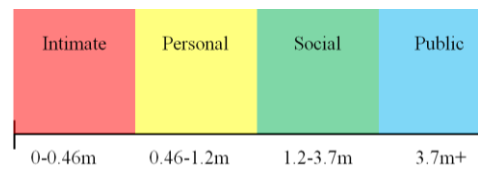References: (Dober 2000 [32])

Figure (3) the deference between four types of distinct distances.
Reference: Edward Hall [33]

The study identified two quality indicators to fulfil social quality on university campus; adequacy of space furniture that facilitates social interactions, and providing spaces for different user group sizes.

4. **Functional Quality:**

(Mathew Carmona et.al 2021) stated that functional dimension in urban spaces is related to how spaces work and how it can be better, more precisely, and more possibly be developed through considering users' movements, how the design meets space function [34]. On university scale, many studies discussed the classification of campus outdoor spaces by (Schmertz, M.F.) according to their function into a functional hierarchy; Common turfs, academic spaces, sports spaces, roads and pathways, parking and essential facilities[35], and Dober's[32] classification of campus roads and pathways network into three types; Major, Minor, and Breezeways.

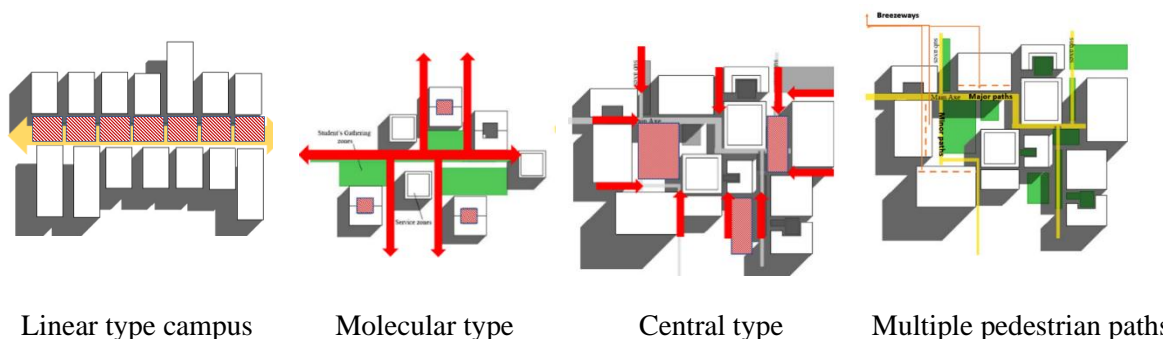Linear type campus   Molecular type   Central type   Multiple pedestrian paths

Figure (4) Campus roads and pathways types. References: (Dober 2000) [32]

Accessibility is a strong factors affecting functional quality that can be conceptualized into three components, which are physical, visual, and symbolic access according to **(**Carr et al.1992) [8]**,** (Gehl 2020) listed another factors for example, smooth transition between public and private areas, a short and manageable route, to be able to see what is going on[36]. (FARD, H et.Al 2019) discussed the outdoor distribution on campus considering the walking distance and service radius, and provided four types of open spaces distribution on campus[37]
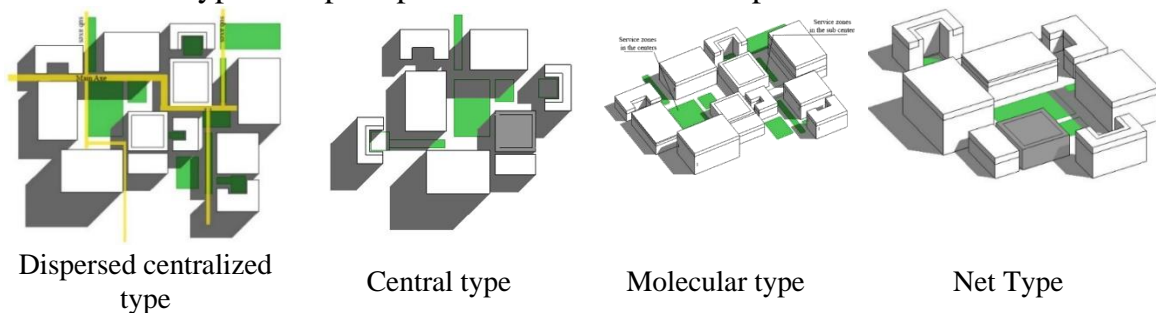

Dispersed centralized type   Central type   Molecular type   Net Type

Figure (5) Four types of open spaces distribution on campus by (FARD, H et.Al (2019))[37]

The study identified two quality indicators to fulfil functional quality on campus; the suitability of space design to its function, and accommodating various activities in outdoor spaces.

5. Aesthetic Quality:

Aesthetics is a discipline studies beauty and attributes and our perception involving sense and cognition.[38] "Lang 2010" referred to Formal aesthetics emphasizes the structure of forms. Symbolic aesthetics emphasizes the content (or meanings) of forms[10,] it's related to signs and symbols reflecting the function of the space, " Nassar 1997" agreed upon the previous classification and noted that the evaluation based on person's biology, personality, sociocultural experience, adaptation levels, goals, and expectations[39]. (Kopec, D. (2018)) defined the key attributes that affect aesthetics of the university campus; style which Represents a mentally constructed "characteristic formal organization" in relation to the system of forms, and the Historical significance which is The extent to which the viewer perceives elements in the context as historically important[40]. The study identified two quality indicators to fulfil aesthetic quality on campus; presence of Symbolic aesthetic i.e.; space style, historical significance, and cultural reference, and presence of formal aesthetic i.e.; space unity, contrast, harmony, and scale.

6. Cognitive Quality:

According to Maslow's theory; the Cognitive need is the expression of the natural human need to learn, explore, discover and create to get a better understanding of the world around them (Maslow, A. 1954) [11], in the urban context (Lang 2010)[10] defined it as the ability to read the surrounding environment and perceive its components and characteristics, he identified five points of campus mental map based on Keven lynch's theory[41]; Strong core (student spaces or campus plazas), Clear boundary (campus gates and fences), An architectural unity (campus design style and identity through elevations, and architectural vocabularies), A name (campus name), The same type of activities (activities related to academic life), and the same building use type (academic buildings) [10]. He discussed the effect of formal and informal settings in educational space in enhancing skills, awareness, and gaining experiences. Based on that (Siagian, et Al. 2020) discussed two types of students' activities on campus; formal activities usually done in indoor space (learning and studding), and informal activities such as gathering and interacting in outdoors[42], accordingly, the study identified two quality indicators; creating learning environment (presence of student spaces for educational and non-educational activities), and the ability to perceive campus morphology and create student mental map.

7. Self-esteem & self-actualization quality:

Many studies discussed design factors that could affect student self-esteem and improve their mental health, self-knowledge, and self-confidence on campus such as well-designed physical environment "Roberts, A, et. Al 2020"[43], involving students in activities in outdoor spaces (Pasek, M, el. Al (2022))[44], while. self-actualization was defined by (Lang 2010) as the realization or fulfilment of one's potentialities through intellectual behaviour settings, control over life, and fulfilling social relationship. He

linked self-actualization needs with the self-esteem needs by creating an educative environment that affords a variety of behavioural opportunities, the vicarious participation in the lives of others, and the opportunity for expressive acts, by providing activity spaces that allow self-testing opportunities such as playgrounds, and participating in a competitive activities[10]. The key difference between them is that Self-esteem is a reflection of a person's own evaluation of his or her worth. Self-actualization is the realization or fulfilment of one's talents and potentialities[45]. Accordingly, the study merged these two dimensions into one dimension including two indicators; the availability of spaces for expressive activities such as; performance/ events spaces, student clubs and recreational space, and the availability of spaces for competitive activities such as; Athletic spaces.

From the previous review, the study identified 25 quality indicators categorized into seven quality dimensions as a base for the proposed assessment index, that will be concluded in the expert questionnaire. Table (2) concluded the quality dimensions and indicators.

Basic needs			
Dimensions		No	Quality indicators
Physiological quality	Thermal comfort	Q1	Providing Well protected student spaces from bad weather conditions
		Q2	Providing adequate landscape in student spaces
		Q3	Provision of Well-ventilated student spaces
	Acoustic comfort	Q4	Control of external noises
		Q5	Control of internal noises
	Visual comfort	Q6	Visually comfortable finishing material
		Q7	Providing student spaces with pleasant views
	Biological needs	Q8	Providing drinking water facilities
		Q9	Providing adequate service zones (food kiosks and outlet shops)
		Q10	Providing adequate Ramps for disabled students
		Q11	Adequacy of toilets in terms of distribution and maintenance
Safety & security quality	Safety	Q12	Quality maintenance of space and facilities
		Q13	Providing Safety from traffic accidents on campus
	Security	Q14	Avoiding dark, isolated or dead ends, etc.
		Q15	Presence of active surveillance elements (cameras, security guards, guides, ushers, etc.)
Social quality		Q16	Adequacy of space furniture that facilitates social interactions
		Q17	Providing spaces for different user group sizes
Functional quality		Q18	The suitability of space design to its function
		Q19	Accommodate various activities in outdoor spaces.
Advanced needs			
Dimensions		No	Quality indicators

Aesthetic quality	Symbolic	Q20	Presence of Symbolic aesthetic i.e.; space style, historical significance, and cultural reference.
	Formal	Q21	Presence of formal aesthetic i.e.; space unity, contrast, harmony, and scale.
Cognitive quality		Q22	Creating learning environment (presence of student spaces for educational and non-educational activities)
		Q23	The ability to perceive campus morphology and create student mental map
Self-esteem & self-actualization		Q24	The availability of spaces for expressive activities such as; performance/ events spaces, student clubs and recreational space
		Q25	The availability of spaces for competitive activities such as; Athletic spaces

Table (2) the concluded quality dimensions and indicators from the literature review

Identifying the Relative Weights of Quality Dimensions and Indicators:

The study conducted an expert questionnaire to identify the relative importance of the proposed indicators according to expert's opinions and assessments, the survey was conducted for 50 experts and followed AHP (Analytical Hierarchy Process) method. This method was created by Thomas L. Saaty in 1970, in which subjective opinions such as feelings, preferences, or satisfaction, can be translated into measurable numeric relations, the core of AHP is calculated based on comparison of pairs instead of sorting (ranking), voting (e.g. assigning points) or the free assignment of priorities. One of AHP's great advantages is its ability to be used to reach an optimum group decision, in which all participants evaluate pairs and the group result is determined as the mathematically optimum consensus[46]. AHP has the advantages of universality, reduction of subjectivity due to the consideration of the human factor, and verification of data inconsistency.

In this study, the survey followed a linear scale evaluation method that contains the following points:

(0) equally important
(1) Slightly more important
(2) Moderately more important
(3) Significantly more important
(4) Definitely more important
(5) Extremely important

Figure (6) the linear scale used in the conducted survey
Reference: The Author

The expert answers each pair-wise comparison according to indicators importance. Then, the results were calculated through the following steps:

Step 1 Pairwise comparison: by creating a comparison matrix and comparing the criteria in the rows with the criteria in the columns, for example, in the following table (3) showed the matrix of the main dimensions:

QF1	ph	safety	social	fun
ph	1	1	1	1
safety	1	1	2	2
social	1	0.5	1	0.5
fun	1	0.5	2	1
sum	4	3	6	4.5

Table (3) the comparison matrix

Step 2: Normalization: by normalizing the matrix and totaling the numbers in each column each entry in the column is then divided by the column sum to yield its normalized score, and then calculating priority vector or Eigen vector. As shown in table (4).

QF1	Phys.	safety	social	function	Eigen vector	percentage
phys.	0.25	0.333333	0.166667	0.222222	0.243056	24.30556
safety	0.25	0.333333	0.333333	0.444444	0.340278	34.02778
social	0.25	0.166667	0.166667	0.111111	0.173611	17.36111
funct.	0.25	0.166667	0.333333	0.222222	0.243056	24.30556
sum	1	1	1	1		

Table (4) an example of calculating the comparison matrix

- **Physiological**
- **safety**
- **Social**
- **Functional**

Figure (7) Analyzing the main quality dimensions' value according to expert's opinion
Reference: The Author

Step 3: Checking consistency ratio: The purpose for doing this is to make sure that the original preference ratings were consistent, through calculating consistency measure, consistency index (CI), and consistency ratio CR= CI/ RI where CI= $\frac{kmax-n}{n-1}$, and RI is the random index given by (L. Saaty 1970)[46]

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	.58	.9	1.12	1.24	1.32	1.41	1.46	1.49

Table (5) the random index

Since (n) is number of indicators in the table of comparison, if the ratio is very large (Saaty suggests > 0.10), then the comparison is not consistent, if the comparison is perfectly consistent, then the consistency measures will equal n and therefore, the CIs

will be equal to zero and so will the consistency ratio. The expert questionnaire identified relative weight (R.W) of each quality dimension and the relative weight of every quality indicator as shown in table (6). The study considered an assessment index that consists of 100 points divided into the proposed indicators according to their relative weights and importance that can be illustrated in the following table (6).

		R.W	Points
Basic needs		0.66667	67
Physiological quality		0.20776	14
Thermal comfort		0.30447	4
Q1	Providing Well protected student spaces from bad weather conditions	0.34617	1.5
Q2	Providing adequate landscape in student spaces	0.274202	1.5
Q3	Provision of Well-ventilated student spaces	0.379628	1
Acoustic comfort		0.2055	3
Q4	Control of external noises	0.53606	2
Q5	Control of internal noises	0.46394	1
Visual comfort		0.2124	3
Q6	Visually comfortable finishing material	0.373939	1
Q7	Providing student spaces with pleasant views	0.626061	2
Biological needs		0.27764	4
Q8	Providing drinking water facilities	0.139675	0.5
Q9	Providing adequate service zones (food kiosks and outlet shops)	0.223268	1
Q10	Providing adequate Ramps for disabled students	0.287163	1
Q11	Adequacy of toilets in terms of distribution and maintenance	0.349895	1.5
Safety & security quality		.25842	17
Safety		0.5042	9
Q12	Quality maintenance of space and facilities	0.361818	3
Q13	Providing Safety from traffic accidents on campus	0.638182	6
Security		0.4957	8
Q14	Avoiding dark, isolated or dead ends, etc.	0.442121	3.5
Q15	Presence of active surveillance elements (cameras, security guards, guides, ushers, etc.)	0.557879	4.5
Social quality		.25139	17
Q16	Adequacy of space furniture that facilitates social interactions	0.536666	9
Q17	Providing spaces for different user group sizes	0.463334	8
Functional quality		.28242	19
Q18	The suitability of a space design to its function	0.491212	9
Q19	Accommodate various activities in outdoor spaces.	0.508788	10
Advanced needs		0.33333	33
Aesthetic quality		.14427	10
Q20	Presence of Symbolic aesthetic i.e.; space style, historical significance, and cultural reference.	0.477576	4.5
Q21	Presence of formal aesthetic i.e.; space unity, contrast, harmony, and scale.	0.522424	5.5
Cognitive quality		.16533	10
Q22	Creating learning environment (presence of student spaces for educational and non-educational activities)	0.447273	4.5
Q23	The ability to perceive campus morphology and create student mental map	0.552727	5.5
Self-esteem & self-actualization		.19039	13

Q24	The availability of spaces for expressive activities such as; performance/ events spaces, student clubs and recreational space	0.573939	7.5
Q25	The availability of spaces for competitive activities such as; Athletic spaces	0.426061	5.5
Total number of quality points			100

Table (6) the proposed numerical assessment index

Table (6) showed the relative weights of different quality indicators and dimensions which reflect expert's opinion in terms of the relative importance of each dimension and indicators.

These weights suggest a different hierarchy of human needs in university campus open spaces. A new basic functional needs was introduced representing the need to meet to accommodate the different functions or the purposes that the space was designed for. The following figure (10) illustrates the proposed hierarchy of needs in university campuses.

Figure (8): The new proposed heiararchy of students' needs
Refrence: The Auther

Discussion and Conclusion:

The study compared three previous studies that discussed human needs in urban spaces, namely, Stephen Carr (1992), Tara Smith et, al (1992), and John Lang (2010), and concluded that Lang's theory of functionalism in the built environment is the most comprehensive, detailed, clear, and relevant, as it adapted Maslow's expanded hierarchy of needs in the built environment including most life aspects. The study adopted Lang's theory as the base for the proposed assessment tool.

It's worth noting that human needs are complex, and are unlikely to be fulfilled in one type of space, rather, these needs are fulfilled at several indoor and outdoor spaces, and that is exactly the reason why we have many specialized building and space types, as each fulfills some needs that other types would not.
The study then conducted an extensive survey of the literature in order to come up with a list of design attributes, or quality indicators to assess student's satisfaction of the outdoor spaces on campus. 25 assessment attributes were determined via the literature review that assess the quality of the university campus, and concluded with seven quality dimensions based on Maslow's expanded hierarchy of needs and Lang's theory, they are physiological quality, safety & security, social, functional,

aesthetic, cognitive, self-esteem and self-actualization. The study then conducted an expert questionnaire to identify the relative importance of the proposed indicators according to expert's opinions Using AHP method.

Through comparing Maslow's Expanded hierarchy of needs adapted by Lang's hierarchy of needs in the built environment and the proposed hierarchy of students' needs on university campus some similarities and differences were clarified as follows: The expanded hierarchy of needs arranged human needs according to their importance, Maslow's expanded hierarchy was based on physiological needs and ended with transcendence needs. This survey proposed a new hierarchy of student needs on a university campus, which differs in needs importance and priorities according to students' priorities and activity types daily in the outdoor spaces.

The proposed hierarchy represents experts' evaluations of needs and importance in university student's life, from the point of view of the experts, the functional quality came at the base of the pyramids according to its importance as there is no value for the space without meeting the purpose that was designed for, then safety and social needs are in the same position as Maslow's hierarchy, The physiological needs rose to become the fourth place above the social needs.

Self-esteem and self-actualization needs were combined as a result of their agreement on the same design criteria represented in providing spaces for competitive and expressive activities to enhance self-fulfillment and self-appreciation, this need was moved down as it's more important than cognitive and aesthetic needs but it's worth noting that self-esteem need wasn't any more in the basic needs.

The arrangement between cognitive and aesthetic needs was the same in Maslow's hierarchy but both were less important than other needs that they rose self-actualization and self-esteem needs and aesthetic needs became the top of the needs
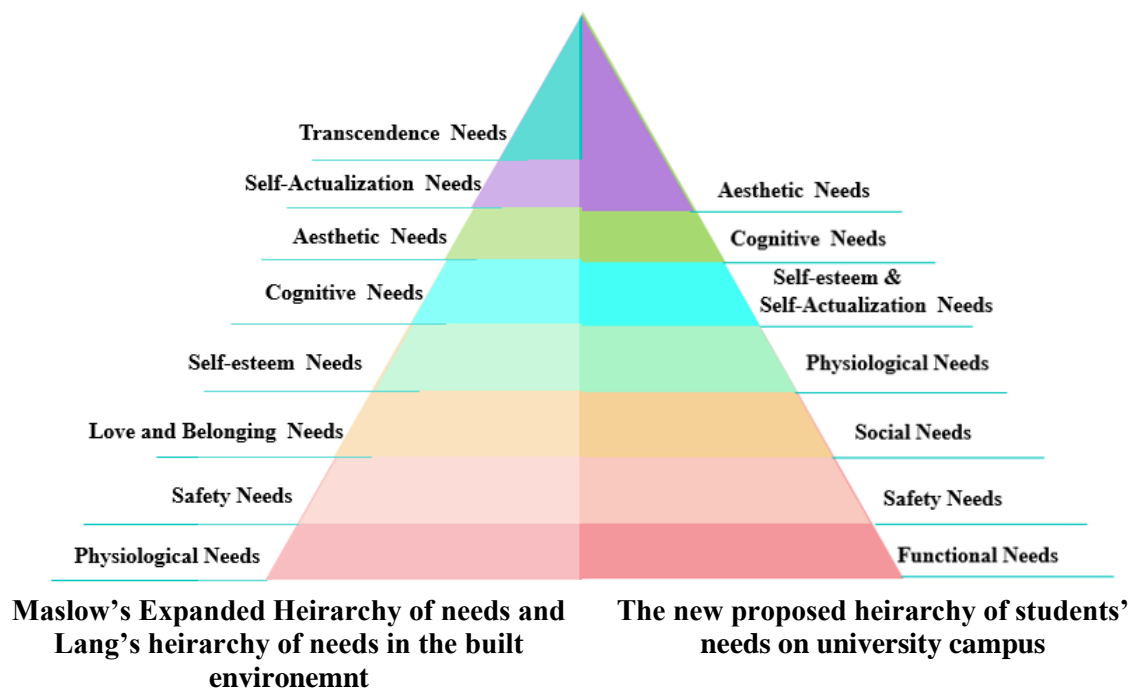

Maslow's Expanded Heirarchy of needs and Lang's heirarchy of needs in the built environemnt

The new proposed heirarchy of students' needs on university campus

Figure (9) the proposed hierarchy of needs in urban spaces (university campuses)
Reference: The author

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