DOSE THE UNIVERSITY BUILT ENVIRONMENT MATTER FOR STUDENTS' QUALITY OF ACADEMIC LIFE: A CASE STUDY OF FEMALE STUDENTS IN A SAUDI UNIVERSITY

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Abstract

In recent years there has been increased concern over the quality of life (QOL) of individuals in many countries and cultures globally, including the Arab countries, specifically, Saudi Arabia (SA). SA has recently begun to improve the QOL of its population. One of the programs in the country's 2030 vision focuses on this concept is called Quality of Life 2020. Youth represent the largest proportion of the population in SA. The age group of between15 and 64 years old, for example, represents about 65.4% of the total population in SA. Furthermore, Saudi Arabian women are an important part of the sustainable development of the country, and their empowerment is vital in SA's 2030 vision. The quality of academic life (QOAL) is one dimension of an individual's general QOL, and it is specialized for academic institutions and can be an indicator of students' future professional life. University education is one of the educational stages that may affect the students' perception of themselves and their ability to feel independent and satisfied in meeting their needs; this means education impacts the quality of their lives, such as their willingness to join a job or have a family. Their satisfaction with achieving their personal and objective goals may affect their motivation for achievement and the quality of their academic performance. While many studies have investigated the concept of QOL in Western populations, including the QOAL of students in educational settings, this area of research is still in its infancy in SA. More specifically, the research on the QOAL in SA needs more attention from academics and researchers specializing in various fields. Many Western studies, for example, have examined the influence of the built environment on the QOAL and the overall perception of students' university experiences. However, none have been conducted on Saudi Arabian student populations. Thus, this study has two main objectives. The primary objective is to measure the level of the QOAL in a sample of Saudi Arabian female students. The secondary objective of the study is to examine the personal constructs (individual meanings) of the students regarding the indoor and outdoor design aspects of the university's built environment and how it, positively or negatively, affects their QOAL. The population of this study is female undergraduate students in the Department of Psychology, Faculty of Arts and Humanities at King Abdulaziz University (KAU) in SA. A total of 129 third- and fourth-year psychology students participated in the study. The study employs a mixed methods design and includes both qualitative and quantitative data within the theoretical framework of Personal Construct Psychology. The quantitative data were collected through the use of a short demographic questionnaire and the Arabic version of the QOAL. This 50-item scale consisted of four dimensions: 1) academic self-management, 2) academic self-efficacy, 3) academic affiliation, and 4) academic communication. The qualitative data, on the other hand, were obtained using rebuilt (adapted) form of the Repertory Grid Technique, which was used as an alternative instrument to the traditional questionnaire for evaluating the criteria of the built environment of the female section of KAU university from the students' point of view. While quantitative data were analyzed using R software for descriptive and reliability and factor analyses, the analysis of qualitative data was conducted using thematic analysis. The study's results revealed that the themes surrounding the university-built environment (e.g., the incoherent muddle of buildings, lighting, temperature, and colours of classrooms, and streets and paths) have a slightly moderate negative impact on the students' QOAL. The study suggests that the female students deserve attention on aspects of their QOAL, especially in improving the sufficient and adequate aesthetic, physical, and functional qualities of the indoor built environment. Findings of this study can be used to design an environment to support successful undergraduate student learning outcomes.

Key words: Built Environment; Quality of Life; Public Space; University Facilities

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XIX CTV Congreso Internacional
Ciudad y Territorio Virtual
International Conference
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1. Introduction

In recent years, there has been increased concern over the quality of life (QOL) of individuals in many countries and cultures globally, including the Arab countries, specifically Saudi Arabia (SA). The World Health Organization (WHO, 1997) defined QOL as an individual's perception of his life, including physical and psychological health and personal and social beliefs and relationships within his cultural and environmental context. SA is one of the countries that has recently begun to improve the QOL of its citizens and residents. One of the programs in the country's 2030 vision ("Vision 2030," 2019) focuses on this concept is called Quality of Life Program 2020 ("Quality of Life Program," 2019). The main objective of the program is to improve individuals' lifestyles and raise the status of the main cities in the country (e.g., Riyadh, Jeddah) so that they rank among the best cities in the world. The program also aims for three universities in the country to be among the world's top 100 universities; for example, King Abdulaziz University (KAU) is one of the largest and oldest universities in Jeddah, and it is planned to be of these universities. In Saudi society, youth represents the largest proportion of the population. The age group of between15 and 64 years old comprises about 65.4% of the total population in SA (Stats Saudi, 2016). Saudi women, in specific, are an important part of the sustainable development of Saudi society, and their empowerment is vital in the country's 2030 vision. Most Saudi universities (e.g., KAU) have special sections for female students in some fields of study, such as in the Faculty of Arts and Humanities (e.g., Department of Psychology). Measuring some aspects of the QOL of Saudi female students (e.g., academic aspects) can be a step toward reaching some of the goals of the country's QOL Program and the 2030 vision.

While many studies have investigated the concept of QOL in Western populations, including the quality of academic life (QOAL) of students in educational settings, this area of research is still in its infancy in SA. QOAL is defined as the students' positive sense of satisfaction with the level of academic, administrative, and social services provided by the academic institution (Maraghi & Zoghbi, 2017). Some Arabic studies, for example, have investigated the relationship between QOAL and academic achievement (Ali, 2013), educational systems, and learning strategies (Hasan, 2007 as cited in Maraghi & Zoghbi, 2017). Most of these studies concluded that QOAL is fundamental in predicting the students' academic achievement (Maraghi & Zoghbi, 2017). Such relationships between QOAL and other academic factors is beyond the scope of this study. On the other hand, some Western studies have examined the influence of the built environment on the QOAL and overall perception of students' university experiences. Generally speaking, findings from Western studies, such as data from a survey conducted in a large national and longitudinal study at the University of California in the United States, show that the influence of the built environment on undergraduate and graduate students is heterogeneous (Astin, 1993). The study included data on 500,000 undergraduate students. It was reported that environmental variables, such as the institution's size, research emphasis, commitment to students' development, faculty characteristics, and peer groups, have the most direct effect on students' development. Astin (1993) noted that institution type is not as critical as these variables when it comes to students' development. Regarding the influence of the built environment on graduate student perceptions of their education experiences, a study from the United States by del Puerto (2011) concluded that universities with a tactical concentration on professional graduate education may be better informed to invest scarce resources in program improvements and marketing career benefits than in promoting the built environment. According to del Puerto (2011), while most graduate students are employed and often live off campus, undergraduate students spend more time and use more resources on campus (e.g.,

dormitories, food services, and recreation centers). Thus, the built environment may play a crucial role in the educational experience of undergraduate students. In another study conducted at Texas State University-San Marcos, McFarland, Waliczek, and Zajicek (2010) found that graduate students are the less users of the campus green spaces. The study also found that there is no statistical relationship between graduate students and the perception of QOL and green user scores. Other studies (e.g., Ivankova & Stick 2007; Rautopuro & Vaisanen, 2000; Thomas & Galambos, 2004) concluded that academic experience, social experience, built environment, and occupational attainment have the strongest influence on students' university experiences. In SA, none of these studies have been conducted on the Saudi student populations. The research on the QOAL in SA needs more attention from academics and researchers in various fields.

Based on our knowledge, this study could be one of the first studies of its kind in this area of research in SA. The study has two main objectives. The primary objective is to quantitatively measure the female students' perception of the QOAL. The secondary objective of the study is to qualitatively examine the personal constructs (individual meanings) of the students regarding the design aspects of the university-built environment and how it positively or negatively affects the quality of students' academic life. For the design aspects of the university, the study focuses on the indoor (e.g., size, distribution, structure, condition, and spaces of buildings and classrooms), and outdoor aspects (e.g., the landscapes and roads leading to the university) of the built environment.

Because the concept of QOAL is new in the Arabic literature, specifically in SA, there no theoretical framework for assessing the students' perceptions of their QOAL nor for explaining the positive or negative impact of the built environment on their academic experience within the Saudi cultural context. Because of this, the study uses personal construct theory (PCT), derived from Personal Construct Psychology (Kelly,1955), as its framework. The theory is recommended for use in studies of specific cultural contexts because it take into account the inner world (personal meanings) of each individual using his own personal perspective. The researcher using this theory can also generate common cultural constructs used by specific groups (Hamad & Lee, 2013).

2. Methodology and Methods

2.1 Study Participants

The participants of this study are female undergraduate students enrolled in the Department of Psychology, Faculty of Arts and Humanities, at KAU in Jeddah, SA. A total of 129 third- and fourth-year psychology (female) students, aged 21 to 31 years old, participated in the study. The study was conducted with permission from the Department of Psychology and the Deanship of Scientific Research at KAU.

2.2 Study Design and Theoretical Framework

The study employs a convergent parallel (mixed methods) design (Creswell & Plano Clark, 2011). The convergent design uses concurrent timing for quantitative and qualitative data collection methods during the same phase of the research process but keeps both types of data separate during the analysis and combines them again when the researcher interprets the

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study's results. In this study, the design includes both a quantitative data (using a quantitative measurement scale) and qualitative data (using a constructive process for data collection), within the framework of PCT (Kelly, 1955). As mentioned earlier, the framework focuses on each person's world of view and individual language (personal construct system) to explore their experiences and understanding of current situations and their anticipation of future life events (e.g., academic or university experiences) within a group and cultural context (cultural construct system). These personal constructs were also related to the dimensions of the quantitative scale during the analysis and when explaining the results of both data types.

2.3   Study Methods

The quantitative data in the study were collected using a short demographic questionnaire and the Arabic version of the QOAL scale (Maraghi & Zoghbi, 2017). This 50-item scale consisted of four dimensions: 1) academic self-management (from item 1 to 12), 2) academic self-efficacy (from item 13 to 23), 3) academic affiliation (from item 24 to 38), and 4) academic communication (from item 39 to 50). The 50 items and their responses are situated around situations of students' academic experience as related to each dimension. Items are answered on a 3-points Likert scale, the answers to which are reverse-coded for each dimension.

The qualitative data, on the other hand, were obtained using an rebuild (reconstructed or adapted) version of the Repertory Grid Technique that was initially designed by Kelly (1955). This technique was used as an alternative instrument to the traditional questionnaire to evaluate the criteria of the university's built environment (indoor and outdoor) from the students' point of view. The form includes ten short questions about the main areas of the built environment. These questions (e.g., size, distribution, structure, condition, and spaces of buildings and classrooms, and the landscapes and roads leading to the university) were structured based on the author's experience and familiarity with the female section of the university and the university's environment; in-class discussion with the students; and conversations with some expert colleagues from the architecture and urban design fields. The ten questions required textual content (participants' positive and negative words, phrases, or expressions for each question) and responses ranked on a 4-point Likert scale, where 1 meant "very positive," 2 meant "positive," 3 meant "negative," and 4 meant "very negative."

2.4   Study Analysis

The quantitative data (measuring responses of scale items) were analyzed using R software (version 3.6.1) to perform descriptive statistics and factor and reliability analyses for the scale items. The analysis of the qualitative data was conducted using a thematic analysis with predetermined themes or questions (Braun & Clarke, 2006) to explore students' personal and common constructs (thematic maps or word clouds of students' textual responses) on aspects of the university-built environment.

2.4.1   Factor and Reliability Analyses of Quantitative Data

A factor analysis (FA) was carried out on the quantitative data from the 50 items of the QOAL scale (Maraghi & Zoghbi, 2017) to measure the overall concept of QOAL and its dimensions (constructs or factors) among 129 participants. The exploratory FA was performed using R and was carried out using principle component analysis. Cattell (1966) suggested that a Scree plot

should be used to determine the number of factors during the FA. The point of inflexion should be the indicator of the number of factors. According to Stevens (2002), a Scree plot usually gives an accurate result with a sample size more job computing the number of factors. Kaiser (1960) suggested an extraction method whereby factors that have an eigenvalue greater than 1 are extracted. The disadvantage of this method is that it overestimates the number of factors to be extracted. In this study, we used a fixed number of four factors to extract factors (constructs), as suggested in the original version of the QOAL scale (see Figure 1).

Figure 1. **A Scree plot indicating the optimum number of factors to extract from factor analysis**
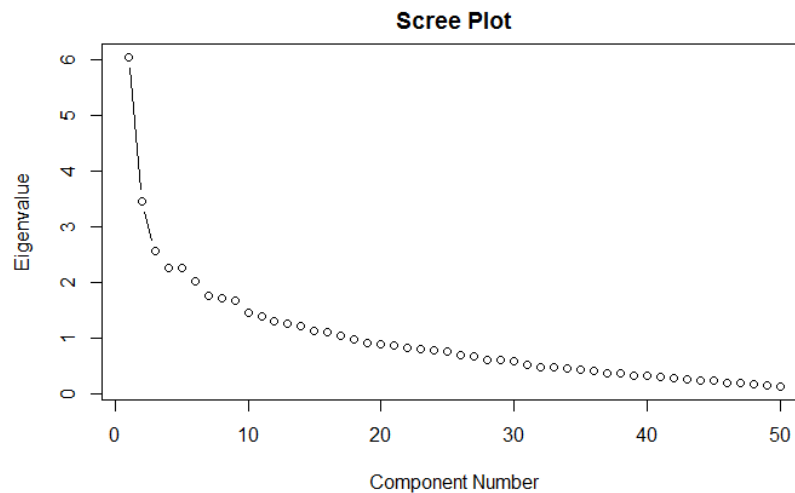
Source: Own elaboration.

For factor rotation, we used orthogonal rotation using the Varimax method and oblique rotation using the Oblimin method. According to Field, Miles, and Field (2012), orthogonal rotation should be included in circumstances where the underlying factors are unrelated, whereas the oblique rotation should be used in circumstances where the underlying factors are correlated. In this FA, we used a lower absolute value of 0.30 as a criterion for deciding which item can be attributed to which factor. However, Stevens (2002) suggested that a factor loading with an absolute value of 0.40 should be considered because it accounts for 16% of the variance in the item. Field (2009) noted that some researchers use 0.30 as a threshold. To measure sampling adequacy, we used the Kaiser–Meyer–Olkin measure (KMO). The KMO value ranges from 0 to 1. According to Kaiser (1974), the KMO should be greater than 0.50 for the FA to produce distinct and reliable factors. Bartlett's test of sphericity was also used to test whether there is enough correlation between items for FA to be a success. The *p* value of this test needs a significance level of less than 0.05 (Field, 2009).

After factors were extracted using FA, a reliability analysis (RA) was performed using R. The measure that was used to gauge the reliability of each subscale item (dimension or factor) was Cronbach's alpha, α, proposed by Cronbach (1951). It is commonly known that a Cronbach's alpha value of 0.70 or 0.80 is the acceptable for indicating internal consistency reliability in a scale measure. A Cronbach's alpha value of less than 0.70 indicates that a scale measure is unreliable (or questionable). However, according to Nunnally (1978), a Cronbach's alpha value of 0.50 or greater in the early stages of research suggests a reliable subscale. If the Cronbach's alpha value is less than the cut-off value of 0.50, it indicates an unreliable subscale. Kline

(1999) noted that when dealing with psychological constructs, the Cronbach's alpha value can be less than 0.70 because of the diversity of the constructs. According to Ferketich (1991), the corrected item-total correlations of a scale should be from 0.30 to 0.70 for a scale to indicate internal consistency and reliability. A corrected item-total correlation of less than 0.30 indicates that the item poses a potential problem and may result in internal inconsistency and unreliability. According to Field (2009), the Cronbach's alpha value of a deleted item should not be greater than the overall Cronbach's alpha value. This is an indication that removing the item from the *scale will improve the internal consistency and reliability of the scale's measure. The results of the FA and RA are presented in the results and discussion section.*

2.4.2   Thematic Analysis of Qualitative Data

For qualitative data, a thematic (qualitative) analysis (TA) was used in multiple phases, as suggested by Braun and Clarke (2006). The TA included three main phases, 1) familiarizing the researcher with the data and generating common responses (reading students' responses to the predetermined themes or questions of the indoor and outdoor aspects of the university-built environment), 2) reviewing responses (re-reading the responses by the researcher/author), and producing an initial report (to orally present the preliminary TA of the data at the XIII International Conference on Virtual City and Territory, "CTV"), and 3) writing the final report of the common constructs and generated themes in the submitted manuscript. Interpretations of the TA and generated thematic maps (word clouds) of students' responses are presented in the next section.

3.   Results and Discussion

3.1   Results of Quantitative Data

Before performing FA, we scanned the correlation matrix of all items to determine whether there was any correlation above 0.90 between two items. No items were found to be highly correlated with each other. Thus, the data has no multicollinearity in the data. The KMO test was conducted to check whether the sample size and data are adequate for FA to be successful. It was established that the sample size was adequate for performing FA because the KMO statistic was greater than 0.50 (KMO statistics = 0.61, $p < .05$). Results from Bartlett's test of sphericity show that the correlation between the variables is significant enough to conduct FA because the p value is less than 0.001 (χ^2 (1225) = 2041.88, $p < .001$). As shown in Table 1.

Table 1. **Statistics of Reliability Analysis**

Factors	(Cronbach's alpha "α")	If an item is dropped
F1: Academic self-management	0.64	Item 12 (0.65)
F2: Academic self-efficacy	0.57	-
F3: Academic affiliation	0.67	-
F4: Academic communication	0.63	Item 39, 42 (0.65 to 0.70)

Source: Own elaboration.

17 factors have an eigenvalue greater than 1. However, as mentioned in the analysis section, we extracted a fixed number of four factors for FA analysis. The extraction decision was also supported because the point of inflexion was at factor four. As presented in Table 1, the results

of factor and reliability analyses on the construct items show that all factors extracted have met the acceptable threshold reliability of having a Cronbach's alpha greater than 0.50. However, reliability scores around 0.50 would still be questionable. All items had nearly the same mean (between 2.00 to 2.50) except item 16 ($M = 1.68$) and item 30 ($M = 1.50$). Items having a nearly similar mean indicates that the items measure the same concept. However, some items are problematic in their correlation with their factors, and their removal is recommended. For factor one (F1: academic self-management with 12 items), the Cronbach's alpha indicated an acceptable internal consistency and reliability ($α = 0.64$). According to the results of F1, all the items in the sub-scale except item 12 are worth retaining in the factor because their removal would lead to a decrease in the Cronbach's alpha. However, it was noted that removal of item 12 would lead to an increase in Cronbach's alpha from 0.64 to 0.65.

This is an indication that item 12 could be problematic and therefore is a candidate for removal from the construction of F1. Other problematic items in F1 are items 1, 2, 3, 5, 10, 11, and 12 because their correlation with F1 was less than 0.30; thus, they may not correlate well with the construction of F1. For factor two (F2: academic self-efficacy with 11 items), the Cronbach's alpha indicated an acceptable internal consistency and reliability ($α = 0.57$). According to the results of F2, all the items in the sub-scale are worth retaining in the factor because their removal would lead to a decrease in the Cronbach's alpha. However, when item 22 is removed, the Cronbach's alpha would increase from 0.57 to 0.59. Problematic items in F2 are items 14, 15, 18, 19, 20, 21, and 22, because their correlation with the F2 was less than 0.30; thus, they may not correlate well with the construction of F2.

For factor three (F31: academic affiliation with 15 items), the Cronbach's alpha indicated an acceptable internal consistency and reliability ($α = 0.67$). According to the results of F3, all the items in the sub-scale are worth retaining in the factors because their removal would lead to a decrease in the Cronbach's alpha. Problematic items in F3 are items 26, 27, 28, 30, 31, 32, and 33, because their correlation with the F3 was less than 0.30; thus, they may not correlate well with the construction of F3. For factor four (F4: academic communication with 12 items), the Cronbach's alpha indicated an acceptable internal consistency and reliability ($α = 0.63$). According to the results of F4, all the items in the sub-scale except items 39 and 42 are worth retaining in the factor because their removal would lead to a decrease in the Cronbach's alpha. Removing item 39 would increase the Cronbach's alpha from 0.63 to 0.65, while removing item 42 would increase Cronbach's alpha from .63 to .70. This is an indication that items 39 and 42 could be problematic and therefore are candidates for removal from the construction of F4. Other problematic items in F4 are items 39 and 42 because their correlation with the F4 was less than 0.30; thus, they may not correlate well with the construction of F4.

Table 2. **Descriptive Statistics of Factor Analysis**

Factors	Mean	SD
F1: Academic self-management	29.52	3.39
F2: Academic self-efficacy	26.21	2.99
F3: Academic affiliation	32.57	3.84
F4: Academic communication	24.33	3.84
Total score	112.63	9.58

Source: Own elaboration.

In Table 2, for the descriptive statistics of the QAOL scale (the statistics of F1, F2, F3, F4, and the total score), the total sub-score of each factor and the overall total score was computed. The description statistics of each factor and the overall total score was then compared in terms of the level of each dimension (construct) among participants. Results of these statistics indicated that F1 had an average of 29.52 (SD = 3.39), F2 had an average of 26.21 (SD = 2.99), F3 had an average of 32.57 (SD = 3.84), F4 had an average sub-score of 24.33 (SD = 3.84), and the overall score had an average of 112.63 (SD = 112.63).

3.2 Interpretations of Qualitative Data

The results in Table 3 revealed that the themes surrounding the university's built environment, such as the incoherent muddle of buildings, lighting, temperature, and colours of classrooms, streets and paths, and the general and social spaces may have a slightly moderate negative impact on the their QOAL. As shown in Figure 2, the word clouds generated from students' responses (common personal constructs) present negative words and phrases used by students (in their native language) to describe some aspects of the built environment, specifically regarding in indoor aspects.

Table 3**. Main themes of student's responses and their rankings**

Questions (predetermined themes)	Ranking	
	Low (%)	High (%)
Q1. Buildings/general description	65	35
Q2. Classrooms/restrooms (e.g., distribution and spaces)	57	43
Q3. Interior design (e.g., lighting, temperature, and colours)	64	36
Q4. Classrooms (e.g., size and structure)	57	43
Q5. Roads (e.g., from and to the university in terms of easy access and time)	53	47
Q6. Buildings (e.g., condition of the surrounding buildings and the view)	46	54
Q7. Paths (e.g., main entrance of the female section, safety, privacy, quality, and space)	38	62
Q8. Spaces/outdoor (e.g., sufficient parking space for buses, close, easy to reach, shaded)	45	55
Q9. Spaces/indoor (e.g., walking paths, spaces between buildings, shadows, floors and colours)	46	54
Q10. General and social spaces/indoor (e.g., seating areas, adequacy, furnishing shades, and food and beverage stalls)	66	34

Source: Own elaboration.

The general description of indoor social spaces, the overall rating of buildings, and the interior design, for example, had the highest percentages of students' low rankings respectively (66%, 65%, and 64%). Students used words such as *insufficient, not enough, no spaces,* and *expensive* to describe indoor social spaces.

Other words they used to describe the buildings and interior design of classrooms included *very old, dark colours, bad lighting and air conditioning,* and *crowded*. On the other hand, students moderately ranked outdoor aspects, such as the paths and spaces between buildings. Paths, the main entrance of the female section, safety, privacy, quality, and space had the highest percentage of students' high rankings (62%).

Figure 2. **Word clouds generated from students' responses**

Source: common personal constructs.

3.3 *Integration of Quantitative Results and Qualitative Interpretations*

Overall, the study results showed that students have a moderate level of overall QOAL (*M* = 112.63). For the average scores of the four factors, while students' level of academic self-management (F1) is above the average (*M* = 29.52), students' level of academic self-efficacy (F2), level of academic communication (F3), and level of academic affiliation are moderate and on the average level (see Table 1).

As suggested in the previous section, removal of some of the scale items (those items with low correlation with their related factor), would lead to an increase in the Cronbach's alpha and may reflect on better results on the average scores of each factor. Although students have a

moderate level of QOAL, they use negative personal constructs to describe some of the indoor aspects of the built environment. Generally speaking, the findings of this study are consistent with those of previous studies (e.g., Asti, 1993; Sturrcok, 2007; del Puerto 2011) which concluded that environmental variables have significant impacts on undergraduate students. However, the findings of this study differ from past studies by considering female students' perception on the quality of their academic life due to the special structure of the university community in the Saudi culture.

4. Conclusion and Recommendations

To sum up, the study suggests that a short version of the QOAL scale (Maraghi & Zoghbi, 2017) is recommended for better psychometric properties. The study also concludes that undergraduate psychology students' perceptions are influenced by the built environment in a slightly negative way, most commonly in terms of the indoor aspects of the built environment. The study suggests that the female students, in the psychology department specifically, deserve better attention in regard to aspects of the quality of their academic life, especially for creating a sufficient and adequate aesthetic and improving the physical, and functional qualities of the built environment. Findings of the study can be used to design and create an indoor environment that is more suitable (e.g., new buildings, better interior design and appropriate general spaces) for improving students' self-efficacy, academic affiliation, and academic communication in order to better tailor a university's built environment that can more positively impact students' quality of academic life and successful outcomes by contributing to their mental health and quality of life.

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