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A Content Analysis of Architectural Atmosphere Influencing Mindfulness through the Lens of Instagram

Chaniporn Thampanichwat *, Suphat Bunyarittikit, Chumporn Moorapun and Prima Phaibulputhipong

School of Architecture, Art, and Design, King Mongkut's Institute of Technology Ladkrabang, Bangkok 10520, Thailand; suphat.bu@kmitl.ac.th (S.B.); chumporn.mo@kmitl.ac.th (C.M.); prima.phaibul@gmail.com (P.P.)

* Correspondence: 63602060@kmitl.ac.th; Tel.: +66-878882277

Abstract: Mindfulness is a psychological construct that enhances sustainable behaviors, environmental behavior, environmental consumption, mindful consumption, and water and energy sustainable consumption. The state of mindfulness can be affected by the determinator of the physical environment as architecture via the architectural atmosphere. The previous studies show that the discrete areas of knowledge between architecture and mindfulness are still widely unknown. However, image-centered social media platforms such as Instagram seem to be able to provide big data for studying people's perceptions of architecture. Thus, this study aims to describe the concept design and characteristics of architectural atmosphere in architecture images tagged mindfulness posted to Instagram. A coding framework developed from a previous systematic literature review was conducted for this content analysis. A total of 354 architectural images were screened, coded, and analyzed by five architects. The results highlight that the Japanese traditional architecture (59.20%) looks to be the most architectural atmosphere concept that influences mindfulness, following by Biophilic Design (33.05%), and Buddhist contemplative space (20.06%). In addition, it was found that the most common architectural atmosphere characteristic fostering mindfulness performed calm space (73.58%), focus object (54.45%), concrete material (85.71%), hue color (78.17%), hard light and shadow (78.98%), and view with a tree (60.11%).

Keywords: content analysis; architectural atmosphere; mindfulness; Instagram; sustainability

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1. Introduction

Over the past decades, the human population and economy have continuously grown rapidly [1–4]. For this reason, the exponential consumption rise has exploited and depleted natural resources that have detrimental effects on the environment [5,6]. Considering the high water and energy consumption, the sustainable use of water and energy in buildings is becoming increasingly necessary to protect the environment [7,8].

To increase sustainability in consumption patterns in buildings, there has been a growing body of research investigating the psychological underpinnings of behavior [9]. Eco-psychologists have paid significant attention to mindfulness as a psychological construct of disrupting automatic routines, reinforcing non-materialistic values, enhancing awareness, and encouraging pro-social values and behavior [10–12] as well as pro-environmental behavior [13–17].

Mindfulness is a psychological construct with a significant role in promoting sustainability in architecture, which is gaining interest in a variety of disciplines [10,18–20] due to its potential to human environmentally friendly behavior [16,21–28]. Several studies report a positive interrelation between mindfulness and sustainable behavior, environmental behavior [28–31], mindful consumption [32], sustainable consumption [5,11], environmental consumption, also water and energy sustainable consumption [33–36].

For the aforementioned reasons, a better understanding of encouraging mindfulness is essential for promoting sustainable behavior and consumption. By reviewing the literature,

it found repetitive mindfulness practice can promote mindfulness traits [37,38]. Furthermore, the determinator of the physical environment as architecture seems likely to be able to immediately distract a state of mind and increase mindfulness [39–47].

In this study, immediate support of mindfulness within buildings is of particular interest. Some studies show the potential of architectural atmosphere to influence human psychological factors such as mindfulness [48,49]. However, the systematic literature review of architecture fostering mindfulness about sustainability emphasizes that the discrete areas of knowledge between the architectural atmosphere and mindfulness are still widely unknown as previous studies [10,18,50].

In the past, studying experience in architecture was limited to visiting the actual site. However, nowadays, technology has expanded that boundary by sharing photos and opinions about architecture on social media [51–53]. Therefore, the information on social media becomes big data [54–56]. The image-centered platforms such as Instagram seem to be able to provide large-scale data for studying the perceptions of architecture [57–60].

For analyzing the content in the images posted to Instagram, several examples of research focus on conducting a content analysis [61–63]. This study needs to provide valuable information for a sustainable architectural design strategy to promote eco-friendly behavior. Against this gap and solution in the literature, the main aim of this study was to describe the most common architectural atmosphere features by analyzing the content of architectural images uploaded to Instagram that people in a state of mindfulness are likely to be exposed to. Thus, we review the architectural atmosphere that tends to encourage mindfulness for creating a coding framework for using in the analysis process. After that, architecture and mindfulness through the lens of Instagram were discussed for consideration of the appropriate data for this study.

1.1. The Architectural Atmosphere That May Influence Mindfulness

Mindfulness stems from a Buddhist idea that originated more than 25 centuries ago [64,65]. In 1994, mindfulness was formally introduced into mainstream society by Jon Kabat-Zinn [66–68]. It is a state in which people feel awake, connect, attentive, calm, and recover in that present moment [49,65,67,69–85].

Gernot Böhme and one hundred percent of mindfulness practitioners indicated that architectural atmospheres are essential for mindfulness [49,50]. Architectural atmosphere refers to the physical characteristics and properties of space that are linked to senses, emotions, feelings, well-being, harmony, and beauty [49,86–89].

Some scholars stated that architectural atmosphere consists of mass and volume, light, color, sound, and landscape [90,91], while others pointed out that materials and objects are also part of the atmosphere [50,92,93]. However, there are discrete areas of knowledge between the architectural atmosphere and mindfulness that are still widely unknown [10,18,50].

As this research explores architecture via Instagram, the architectural atmosphere studied focuses on the visual elements. Therefore, we selected and regrouped the elements of the architectural atmosphere to be suitable for this study. It can be concluded that the architectural atmosphere is the integration of space, objects, materials, colors, light, and the view that people experience at that moment.

The preliminary study found that the architectural atmosphere that may influence mindfulness is relevant to three architectural concepts. These concepts can be characterized into the six abovementioned components, as discussed below.

1.1.1. The Architectural Atmosphere Design Concept

By reviewing a systematic literature review [18], three mindfulness-fostering architectural concepts were identified. The first idea comes from Kawai Y's (2018) interview in Japan Society Talk, which mentioned Japanese traditional architecture. This notion promotes mindfulness in the meaning of the connection of body, mind, and space, like a boundary between each part is blurred [80].

Second, the biophilic design that is relevant to three studies appeared in Barbiero G (2021), which directly mentions biophilic design [65], while Hu et al. (2021) addressed the exposure to nature [82] and Sadeghi F (2021) referred to the connection with nature [83]. These concepts of architectural design may increase green mindfulness, attention, restoration, stress recovery, a connection of mind and body, focus on the present moment, and awareness of present life [65,82,83].

The last one is a concept of Buddhist contemplative space from the study of Chen et al. (2022). This theory is consistent with religious buildings which reduce distraction, calm down one's mind, reside the state of mindfulness, and facilitate mindfulness practice [84].

Therefore, it can be concluded that the architectural atmosphere designed by one of these three concepts may tend to promote mindfulness. Thus, the architectural atmosphere characteristics of three architectural design concepts—traditional Japanese, Biophilic design, and Buddhist contemplative space—will be concluded in the next section.

1.1.2. The Architectural Atmosphere Characteristics

Traditional Japanese architectural design concept refers to an adjustable form and space. The objects can be viewed differently from each side. The color can change over time. In terms of this concept of light, it often designs light and shadows in a way that people cannot see clearly. Kawai mentioned a connection between indoor and outdoor spaces, seeing the leaves change color, and changing by season [18,80].

Biophilic design is about having a space with exposure and connection to nature. The objects include word reminders of nature, sign reminders of nature, and images of nature. In addition, the materials in these spaces contain natural materials, wood, clay, stone, concrete, or highly tactile surfaces. They have hue colors and show color rays. The lighting details refer to natural light, daylight on the wall, light from outside, white light, spotlight, light line, gradation of light to shadow, and hard light with shadow. Natural views, plants, trees, river views, rainwater, and immersive water were considered to be views that foster mindfulness [18,81–83].

Last, the Buddhist contemplative space is calm and welcoming. There is an object such as a picture of nature, a nature painting, or a focus object. The color speaks of a colorful Tibetan style, is simple in a Zen style, or a cool color as meditation space. In terms of light, it refers to natural light. Landscape includes overlooking green areas, gardens, forests, nature views, unblocked views, and animals [18,84].

In summary, the review shows that the three architectural atmosphere concepts which tend to foster mindfulness can be divided into their characteristics as shown in Figure 1.

1.2. The Architecture and Mindfulness through the Lens of Instagram

In recent years, Instagram becomes a social media platform providing big data of experience in architecture [57–60,94]. An Instagram post includes creator-related features (ID and profile), contextual features (date/time and location), and content features (image, hashtags, caption, and comments) [95].

For this study, we focused on finding images that posters seem to experience a state of mindfulness through architecture. So, we first searched for images depicting architecture on Instagram. We then studied the state of mindfulness tagging on Instagram.

1.2.1. Architectural Images Posted to Instagram

Instagram is an image-centric social media [95] in which people must post an image, multiple images, or publish a recording of moving visual images, such as Videos, Reels, and Stories, to be able to publish on Instagram [95,96].

Hu et al. (2014) detected empirically by cluster analysis and qualitative analysis eight popular general Instagram image categories [97]. The categories based on their study include captioned image, selfie, friend, activity, fashion, food, pet, art, landscape, and architecture [61].

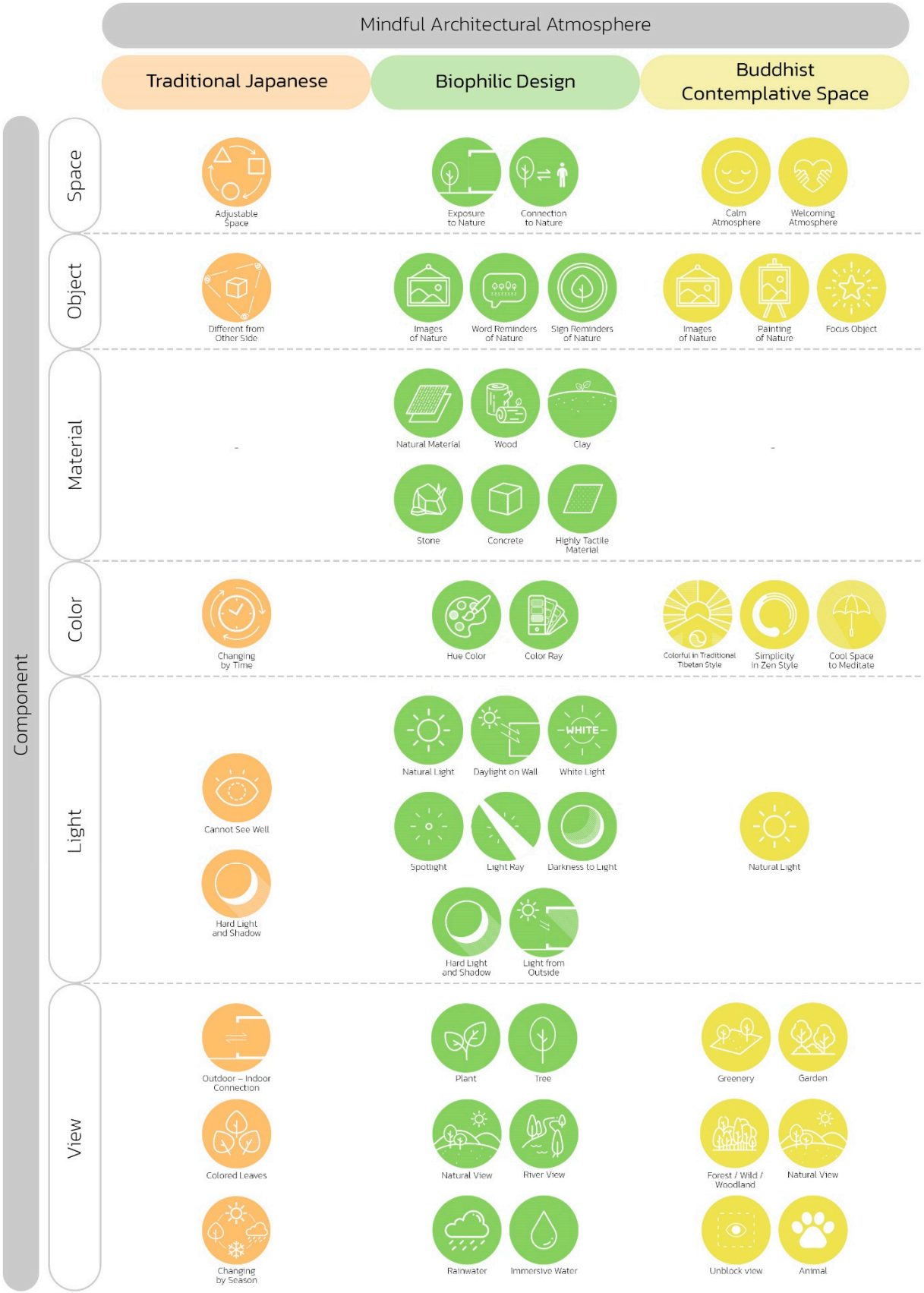

Figure 1. The architectural atmosphere influencing mindfulness.

For the sake of clarity, for this study we will only consider single images. Since multiple images or videos can be difficult to analyze, what concepts or features of architecture influence mindfulness? For the study of architecture, we only consider architectural images.

1.2.2. Mindfulness Tagged on Instagram

The hashtag is one of the message characteristics used in social networks by typing a word or phrase tagged with the character '#' [98]. Previous studies have shown that hashtags are a tool for communicating emotions, opinions, and experiences to others [99,100]. They are also searchable [101,102].

Some studies use hashtags to reach a certain audience and collect corresponding data [103–106]. The two researchers created lists of categories [60], and three themes including activities, objects/scenes, and experiences were grouped. Following the aim of this study, mindfulness-related hashtags were explored and presented in Table 1.

Table 1. The example of mindfulness-related hashtag (#) in each category.

Categories	Example
Experience	#mindfulness #love #selflove #inspiration #motivation #peace #wellness #selfcare #happiness #healing #positivevibes #gratitude
Activity	#meditation #yoga #travel #fitness #namaste
Object/Scene	#nature #art #quotes #lawofattraction #London #Life #lifestyle

As people express themselves through hashtags, this study considers #mindfulness as a proxy for finding images where the poster is in a state of mindfulness. Consider it a way of communicating mindfulness experience on Instagram, which is the word that best matches its purpose.

This study explores the most common attributes of architectural atmosphere concept design and characteristics that are illustrated in an architectural image which people in a state of mindfulness seem to be exposed to. Therefore, this study proposes a content analysis on architectural images tagged #mindfulness and posted to Instagram to answer the following questions:

Q1: Which architectural atmosphere design concepts are in line with most architectural images tagged #mindfulness?

Q2: Which architectural atmosphere characteristics are depicted in most architectural images tagged #mindfulness?

2. Materials and Methods

This study is based on the assessment of architectural images posted on Instagram with tagging #mindfulness. Judging by suitability [61–63], a content analysis was undertaken to fill the research gaps and answer the purpose of the study. In this section, the study prepared the data in the data collection process, defined the unit of analysis, developed the coding scheme with testing in the data coding process, and planned to draw the finding report in the data analysis process [107].

2.1. Data Collection

To describe the characteristics of architectural atmosphere related to mindfulness, architectural images tagged #mindfulness posted to Instagram on 17–23 March 2023 were collected. It is almost the shortest period of data collection range we have found; the shortest is 2 days [108–112].

According to the criteria from the literature review (Section 1.2), 371 image links were recorded sequentially using Google Sheets. The exterior and interior of architectural images were collected. The images that depicted content of an activity, art, caption, fashion, food, friend, landscape, and pet were excluded. Moreover, multiple images and videos were not considered.

For accuracy and precision, a researcher, an architectural research assistant, and a master's degree architectural student performed this process. To ensure the data suitability, we independently screened images to meet all the criteria.

This study did not obtain ethical approval due to it only including the collation and analysis of data available in the public domain. Instagram images were searched using a newly created user account to minimize the chance of accessing private information. This account had never followed anyone before in order to reduce undue influence. Images were not saved and captured in the process. Therefore, saved image links are accessible only when they are still public and not deleted.

2.2. Data Coding

2.2.1. Coding Framework

According to the method of qualitative content analysis [107], a codebook was developed from a previous systematic literature review (Section 1.1) for decoding the data from Section 2.1. Then, it was adjusted specifically for answering the aim of this study. This coding framework was created to consider the architectural atmosphere that describes the influence of mindfulness captured in the image.

The codebook is divided into three columns: component, concept, and characteristic of the mindful architectural atmosphere. The component of a mindful architectural atmosphere comprises six categories: space, object, material, color, light, and view. The concept of the mindful architectural atmosphere includes three architectural design concepts, which are traditional Japanese, biophilic design, and Buddhist contemplative space. Finally, the characteristics of the mindful architectural atmosphere included 46 items, which can be seen in Table 2.

Table 2. Codebook.

Mindful Architectural Atmosphere			
Component	**Concepts**	**Characteristic**	**Agreement**
Space	Traditional Japanese	Adjustable Form/Space	68.36%
	Biophilic Design	Exposure to nature	66.95%
		Connection to nature	73.45%
	Buddhist Contemplative Space	Calm Atmosphere	74.01%
		Welcoming Atmosphere	69.77%
Object	Traditional Japanese	Different from other side	69.49%
	Biophilic Design	Word reminders of nature	85.03%
		Sign reminders of nature	92.94%
		Images of nature	83.05%
	Buddhist Contemplative Space	Painting of nature	96.61%
		Focus object	70.34%
Material	Biophilic Design	Natural material	61.86%
		Wood	71.19%
		Clay	91.81%
		Stone	75.42%
		Concrete	77.12%
		Highly tactile material	83.90%

Table 2. *Cont.*

Mindful Architectural Atmosphere			
Component	**Concepts**	**Characteristic**	**Agreement**
Color	Traditional Japanese	Changing by time	66.67%
	Biophilic Design	Hue color	55.08%
		Color rays	76.55%
	Buddhist Contemplative Space	Colorful in traditional Tibetan style	74.86%
		Simplicity in Zen style	72.32%
		Cool space to meditate	71.75%
Light	Traditional Japanese	Cannot see well	72.88%
		Hard Light and shadow	73.16%
	Biophilic Design	Darkness to light	72.60%
		Light ray/line	74.01%
		Spotlight	66.67%
		White Light	63.28%
		Light from outside	75.14%
		Daylight on wall	65.25%
	Buddhist Contemplative Space	Natural light	77.40%
View	Traditional Japanese	Outdoor–indoor connection	74.29%
		Colored leaves	89.55%
		Changing by season	72.32%
	Biophilic Design	Immersive water	90.40%
		Rainwater	98.87%
		River view	88.42%
		Tree	77.40%
		Plant	68.64%
		Natural view	79.66%
	Buddhist Contemplative Space	Greenery	83.62%
		Garden	84.75%
		Forest/Wild/Woodland	75.71%
		Unblock view	67.80%
		Animal	99.72%

For coding reliability, 10% of the first 37 images were coded by three research assistants and randomized to test. While the data of this study were collected in a dichotomous response set (yes/no), Kuder–Richardson Formula 20 (KR-20) values were calculated [113]. By using SPSS, Kuder–Richardson 20 indicated good reliability (KR-20 = 0.6506) according to the reliability index of Miller, Linn, and Gronlund (2009) [114,115].

Finally, the main researcher reviewed all coding and disagreements, then reached the discussion and definitions development for mutual understanding. Then, the image was decoded by the method in the next section.

2.2.2. Coding Procedure

To confirm validity and fairness, this study was performed using triangulation by an investigator with multiple researcher methods [116]. Moreover, to fill the research gap between architecture and mindfulness, the opinions of professionals were required [50]. Hence, three research assistants (master's degree architectural students) were trained on data access, code definitions, and recording methods.

The coders reviewed the screened architectural images based on the coding framework and coded all images independently. The decoding of the images on the subject of architectural design concepts mentioned earlier will be considered through the features of the architectural atmosphere appearing in each image by considering which characteristics of the architectural concepts are similar. For architectural features, the decoder will consider whether the characteristics of the architectural atmosphere are found on the image or not. Each component may be considered to align with multiple characteristics. Similar or overlapping features, such as natural materials and wood, will be identified as exhibiting both characteristics in that image.

All coding was checked for missing values, with any missing values being filled by the use of information from the majority. The entire process was conducted on a limited-access Google sheet. To compose the final dataset, the main researcher made the decision based on the result of the three research assistants. The consideration started by looking at the majority opinion; all conflicts were resolved by discussion. The final dataset reported the percentages of agreement between coders as another statistical representation of reliability [117], which can be seen in Table 2.

2.3. Data Analysis

All codes in the final dataset were transformed into numerical data: defying "1" if the coders specified "Yes", they found that characteristic, and "0" if they assigned "No", they considered that feature was absent. Statistical analyses were performed by using Google Sheets, an online spreadsheet. The frequencies and percentages were calculated to answer both of these research question as follows, shown in Figure 2.

2.3.1. Thematic Analysis

Thematic analysis was used to answer the first question (Q1): Which architectural atmosphere concepts are in line with most architectural images tagged #mindfulness? On the inductive characteristic, the three concepts of architectural atmospheres: traditional Japanese, biophilic design, and Buddhist contemplative space were used for image classification by the data coding method in Section 2.2. Finally, the number and percentage of images that were considered consistent with each design concept are reported in Section 3.1.

2.3.2. Descriptive Analysis

Descriptive analysis was used to answer the second question (Q2): Which architectural atmosphere characteristics are depicted in most architectural images tagged #mindfulness? A deductive approach was applied to allocate the architectural atmosphere characteristics by each component: space, object, material, color, light, and view according to Section 2.2 methodology. Eventually, the frequency and percentage of images that are considered consistent with the characteristics of the architectural atmosphere are reported in Section 3.2.

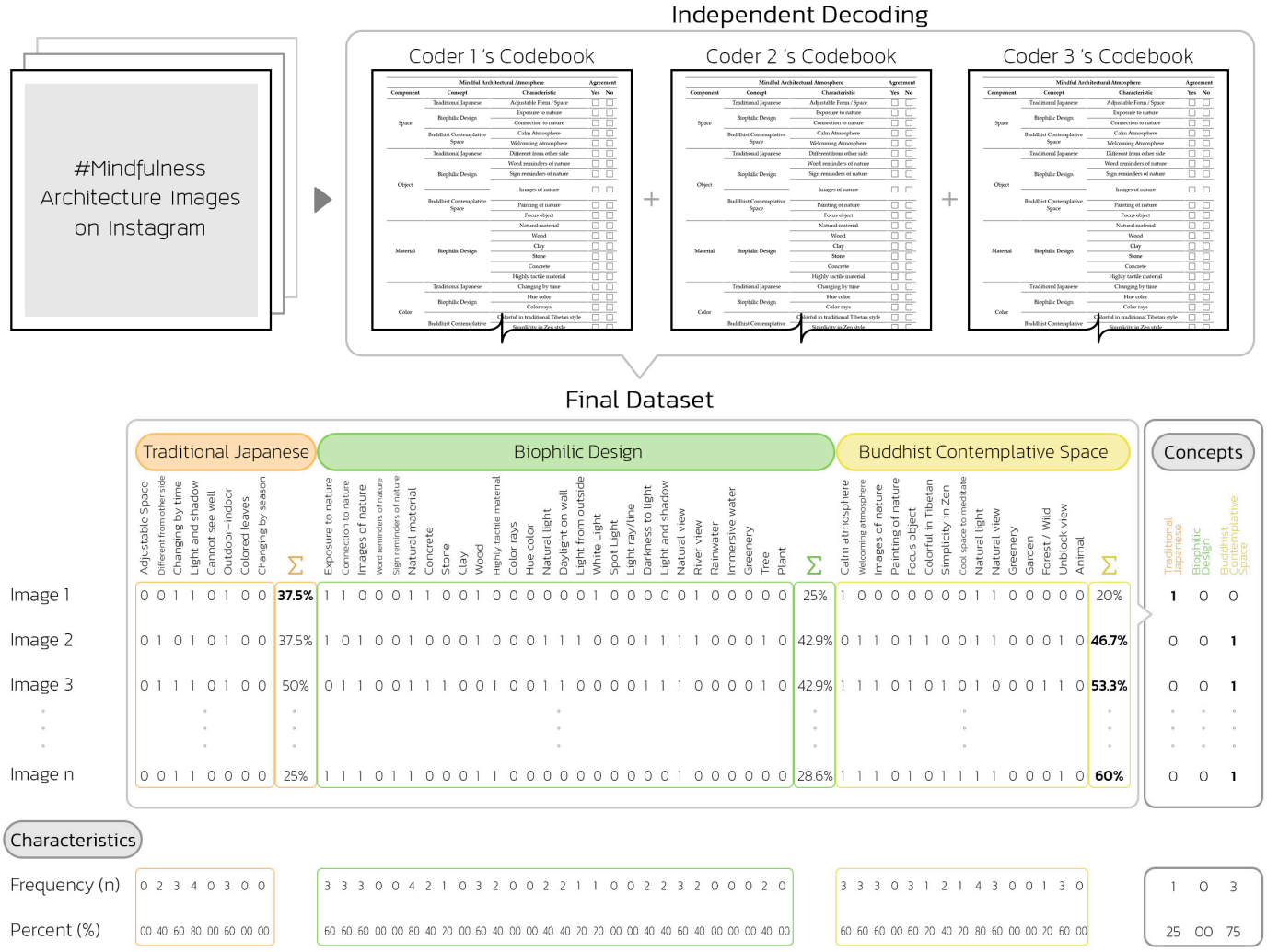

Figure 2. The data analysis process.

3. Results

At the time of the data collection period, there were a total of 371 architectural image posts on Instagram linked to #mindfulness. There are a small number of images that cannot be concluded from the analysis by discussion. Due to the ambiguity of the architectural atmosphere depicted in the images, which is difficult to interpret, we decided to leave them out of the conclusion. Thus, ultimately a total of 354 images were reported and 17 were eliminated without mention.

In the first part, we report the cultural background of the images in the final dataset, which comprises 354 images. This includes the countries where the images were uploaded, the language used in the posts, and the nationality of the posters. In terms of image uploads, the majority (40.40%, n = 150) did not specify the country, while 28 images (7.50%) were from the UK, 27 images (7.30%) were from the US, and the remaining 149 images (44.80%) were from various other countries. In the second part, the majority of 259 images (69.80%) were posted in English, followed by 32 images (8.60%) in Spanish. There were 21 images (5.70%) with no specified language, and the rest were in various other languages. Lastly, the nationality of the posters was mostly unspecified (n = 265, 71.40%). The next highest number of posts were from the UK with 16 posts (4.30%), followed by the US with 15 posts (4.00%). The remaining posts represent various other countries as shown in the images, shown in Figure 3.

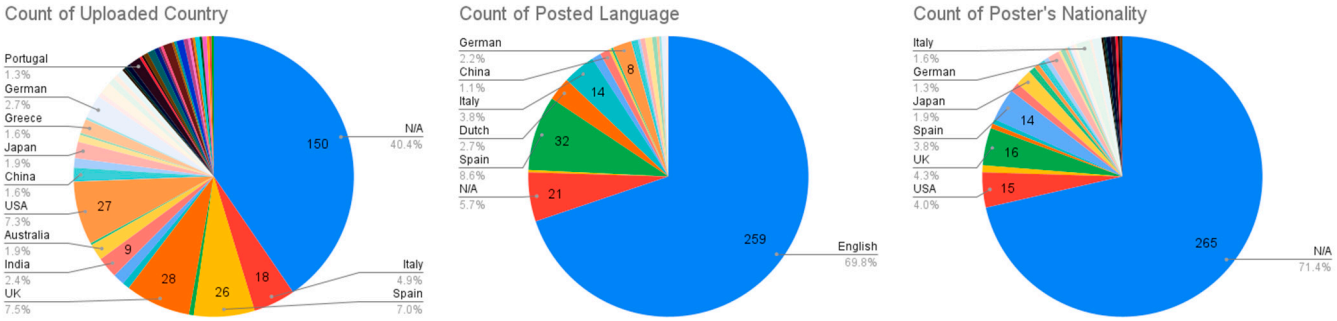

Figure 3. The final dataset's cultural background.

3.1. The Theme of Architectural Atmosphere Design Concepts

As mentioned in Section 2.3, one of the aims of this study was to find the most architectural atmosphere concepts in line with most architectural images tagged #mindfulness. Three themes of the architectural design concept from previous studies were used as standard considerations, mentioned in Section 1.1. These include traditional Japanese, biophilic design, and Buddhist contemplative space.

From the final dataset, it was found that 166 (46.89%) of 354 images were associated with the traditional Japanese concept. Subsequently, 117 (33.05%) images were identified as more consistent with the biophilic design than the other two design concepts. The concept that is considered the least common is Buddhist contemplative space design (n = 71, 20.06%). The foregoing results can be summarized in Table 3.

Table 3. The architectural atmosphere design concept.

Architectural Atmosphere Design Concept	n	%
Traditional Japanese Architecture	166	46.89
Biophilic Design	117	33.05
Buddhist Contemplative Space	71	20.06

3.2. The Description of Architectural Atmosphere Characteristics

Another objective of this study was to describe the most common architectural atmosphere characteristics depicted in most architectural images tagged #mindfulness, as discussed in Section 2.3. Six components from a previous systematic review were used to clarify. Thus, the architectural atmosphere in this study was divided into space, object, material, color, light, and view, as discussed in Section 1.1. The results of the aforementioned elements from the final dataset will be reported in the next section.

3.2.1. Space

In the 354 images in #mindfulness sample, most of these images were of the calm atmosphere (n = 273, 73.58%) more frequently than exposure to nature (n = 256, 69.00%), with 226 (60.92%) images showing a connection to nature, 189 (50.94%) images representing adjustable space, and 175 (47.17%) images illustrating a welcoming atmosphere. As shown in Table 4.

Table 4. The result of space characteristics.

Concepts	Characteristics	n	%
Traditional Japanese	Adjustable Space	189	50.94
Biophilic Design	Exposure to Nature	256	69.00
	Connection to Nature	226	60.92
Buddhist Contemplative Space	Calm Atmosphere	273	73.58
	Welcoming Atmosphere	175	47.17

3.2.2. Object

Of 354 images, there were 202 (54.45%) images that contained focus objects. The object was most commonly depicted as being seen differently from another side (n = 162, 43.67%) and presented an image of nature (n = 128, 34.50%). Word reminders of nature (n = 71, 19.14%), sign reminders of nature (n = 28, 7.55%), and paintings of nature (n = 12, 3.23%) were uncommon. As shown in Table 5.

Table 5. The result of object characteristics.

Concepts	Characteristics	n	%
Traditional Japanese	Different from Other Side	162	43.67
Biophilic Design	Word Reminders of Nature	71	19.14
	Sign Reminders of Nature	28	7.55
	Images of Nature	128	34.50
Buddhist Contemplative Space	Painting of Nature	12	3.23
	Focus Object	202	54.45

3.2.3. Material

The majority of material characteristics featured either concrete (n = 318, 85.71%), natural material (n = 240, 64.69%), or wood (n = 228, 61.46%). Half of the images were perceived as stone material (n = 170, 45.82%), followed by approximately one-fourth with highly tactile material (n = 87, 23.45%), and 47 (12.67%) images with clay-like material. As shown in Table 6.

Table 6. The result of material characteristics.

Concepts	Characteristics	n	%
Biophilic Design	Natural Material	240	64.69
	Wood	228	61.46
	Clay	47	12.67
	Stone	170	45.82
	Concrete	318	85.71
	Highly Tactile Material	87	23.45

3.2.4. Color

Overall, the colors characterized were mostly of hue color (n = 290, 78.17%). This characteristic is followed by a color appearance that changes with time (n = 203, 54.72%), cool-colored space to meditate (n = 182, 49.06%), and a simple color in Zen style (n = 164, 44.20%). Color rays (n = 119, 32.08%) and colorful traditional Tibetan style (n = 113, 30.46%) colors were used less frequently. As shown in Table 7.

Table 7. The result of color characteristics.

Concepts	Characteristics	n	%
Traditional Japanese	Changing by Time	203	54.72
Biophilic Design	Hue Color	290	78.17
	Color Ray	119	32.08
Buddhist Contemplative Space	Colorful in Traditional Tibetan Style	113	30.46
	Simplicity in Zen Style	164	44.20
	Cool Space to Meditate	182	49.06

3.2.5. Light

The light characteristics were presented primarily as hard light and shadow (n = 293, 78.98%) and natural light (n = 289, 77.90%). Secondarily, three-fourths of the images represented daylight on the wall (n = 262, 70.62%) and white light (n = 256, 69.00%). Half of them displayed light from outside (n = 177, 47.71%) and a spotlight (n = 173, 46.63%), and 38.54% (n = 143) of all had light that makes it hard to see well. Equally, 38.01% (n = 141) demonstrated darkness to light while 35.04% (n = 130) showed light rays. As shown in Table 8.

Table 8. The result of light characteristics.

Concepts	Characteristics	n	%
Traditional Japanese	Cannot See Well	143	38.54
	Hard Light and Shadow	293	78.98
Biophilic Design	Darkness to Light	141	38.01
	Light Ray	130	35.04
	Spotlight	173	46.63
	White Light	256	69.00
	Light from Outside	177	47.71
	Daylight on Wall	262	70.62
Buddhist Contemplative Space	Natural Light	289	77.90

3.2.6. View

The most common view characteristics were concurrently assigned to trees (n = 223, 60.11%) and natural view (n = 217, 58.49%). Of 354 images, 175 (47.17%) contained plants, 174 (46.90%) represented an unblocked view, 173 (46.63%) depicted an outdoor–indoor connection, and 168 (45.28%) portrayed a view that was able to change by season. Indefinitely, one-third depicted a forest, wild space, or woodland (n = 110, 29.65%), greenery (n = 93, 25.07%), garden (n = 83, 22.37%), river view (n = 73, 19.68%), immersive water (n = 54, 14.56%), and colored leaves (n = 54, 14.56%). Depicted rainwater (n = 4, 1.08%) and animal images (n = 2, 0.54%) barely appeared. As shown in Table 9.

Table 9. The result of view characteristics.

Concepts	Characteristics	n	%
Traditional Japanese	Outdoor–Indoor Connection	173	46.63
	Colored Leaves	54	14.56
	Changing by Season	168	45.28
Biophilic Design	Immersive Water	54	14.56
	Rainwater	4	1.08
	River View	73	19.68
	Tree	223	60.11
	Plant	175	47.17
	Natural View	217	58.49
Buddhist Contemplative Space	Greenery	93	25.07
	Garden	83	22.37
	Forest/Wild/Woodland	110	29.65
	Unblock view	174	46.90
	Animal	2	0.54

And finally, we present a graph showing the number and percentage of each feature of the architectural atmosphere in Figure 4.

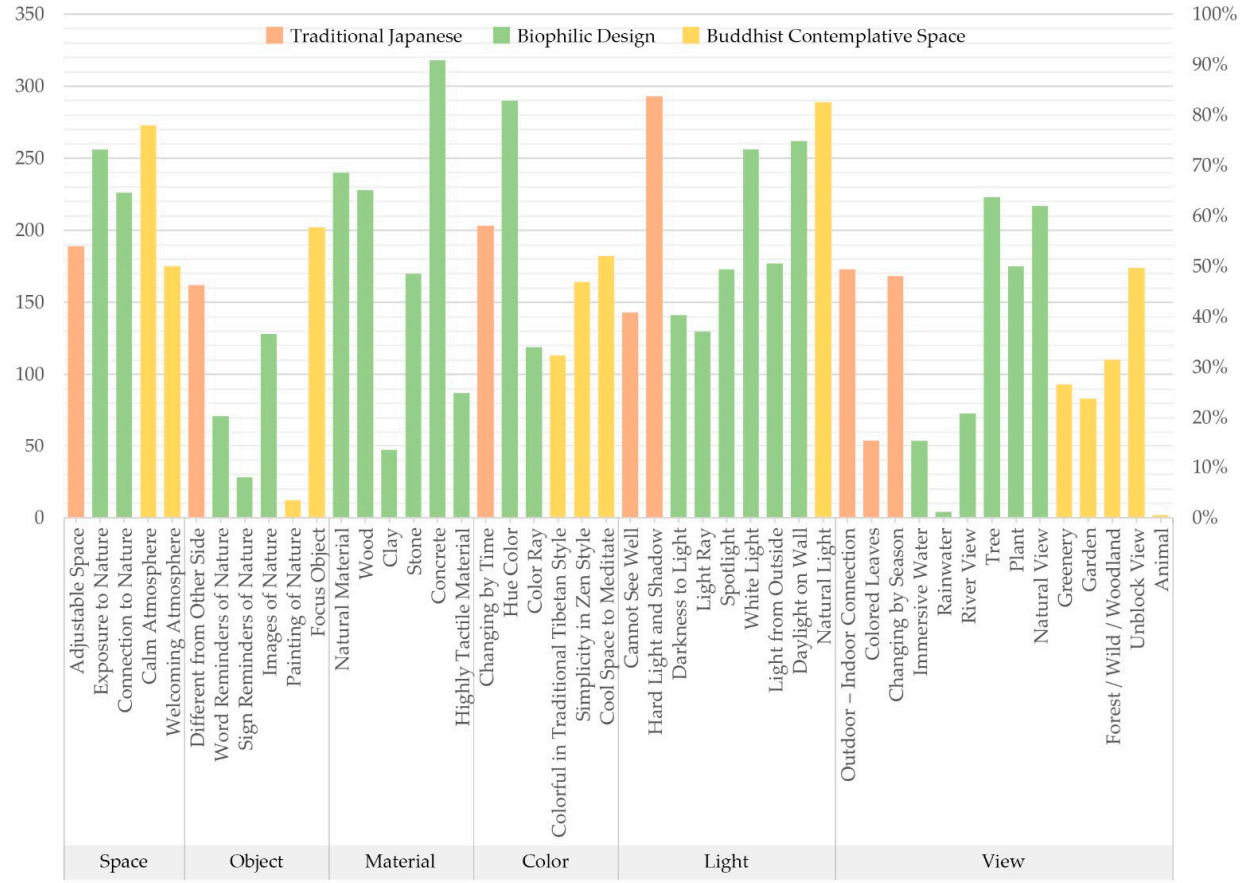

Figure 4. The result of architectural atmosphere characteristics.

4. Discussion

Mindfulness is the key to the success of sustainable buildings [10,18]. At the same time, the architectural design strategy itself influences the mindfulness of building occupants [39–47]. Previous studies have found that the key architectural element is the atmosphere [48,49]. To bridge the educational gap between architecture and mindfulness, data from social media like Instagram were used [57–60]. Therefore, the main aim of this study was to describe the most common architectural atmosphere features by analyzing the content of architectural images on Instagram tagged #mindfulness [61–63].

4.1. Discussion of the Architectural Atmosphere Concepts

According to literature reviews, the architectural atmosphere can be divided into six components including space, object, material, color, light, and view [48,49,92]. The above six elements can be considered in three design concepts, namely traditional Japanese, Biophilic design, and Buddhist contemplative space [80–84]. However, of the eight studies from which the above three concepts mentioned, traditional Japanese and Buddhist contemplative space concepts were discussed by one publication, whereas the biophilic design concept was associated with three studies (Section 1.1). Thus, it seems that biophilic design concepts and biophilic architectural characteristics appear predominantly in architectural images tagged #mindfulness.

In addition to the previously mentioned eight publications, there are several studies showing the relationship between biophilic design and mindfulness. For example, in order of publication year, the 2017 study referred biophilic design and mindfulness

practices [50]. A 2019 study said the biophilic design showed professional mindfulness and responsibility [118]. A study in 2022 showed that integrating biophilic design with spaces can be able to foster self-care practices such as mindfulness meditation [119]. Moreover, the grey literature of the Journal of Biophilic design also included several mentions of biophilic design and mindfulness [120]. In addition, Coalesse, a furniture company, said that biophilic design could promote a mindful office [121].

Notwithstanding, the findings of this study show differences from the trends seen in the review. This is because most of the images are considered to be in line with the characteristics of traditional Japanese architecture, while the biophilic designs only appear in one-third of the images. However, the above-mentioned results may still not be a clear indication of which design concepts have greater potential for promoting sustainability mindfulness in buildings, because the most common concept, such as traditional Japanese architecture, was considered to be relevant to less than half of the picture. This discrepancy should be tested again with other periods, data sources, or methods in future research.

4.2. Discussion of the Architectural Atmosphere Characteristics

As discussed in Section 4.1, if the results of this study are in line with trends from literature reviews and other studies, the most common architectural characteristics should be attributes of biophilic design. Those characteristics include spaces that are open to and connected to nature, objects that are word reminders of nature, sign reminders of nature, and images of nature, materials that include natural materials, wood, clay, stone, concrete, or highly tactile surfaces, color that are hue or rays, light like natural light, daylight on the wall, light from outside, white light, spotlight, light line, gradation of light to shadow, and hard light with shadow, natural views, plants, trees, river views, rainwater, and immersive water [18,81–83].

Subsequently, to consider the characteristics of the architectural atmosphere depicted in the picture by component, the results are different from the conceptual design topics and are also different in each component. In terms of space, the calm atmosphere derived from Buddhist concepts was found the most. Two of the less common architectural features are the exposure to nature and the connection with nature in the biophilic design concept. This suggests that Buddhist concepts and biophilic design also seem to have potential as architectural spaces.

When considering the objects that appear within the picture, it is found that the objects that are in focus according to the Buddhist concept appear the most. The second most common objects are objects that can be viewed differently from different angles. Natural images, which are subjects of biophilic design and Buddhist concepts, are found in up to one-third of the images.

For materials that come from just a biophilic design concept, it is difficult to compare in this respect. Materials from other concepts suitable for constituents of the architectural atmosphere to promote mindfulness may therefore be explored by future research.

In terms of colors, hue colors from the concept of biophilic design appear the most. This is followed by a time-changing color from Japanese concepts. The third appears in cool tones from Buddhist concepts. These three traits come from different concepts and are found in almost half and more than half of the images. It is therefore difficult to say which concept has a greater effect on mindfulness.

Images with heavy light and shadow from the Japanese concept and biophilic design were most identified, while natural light on the wall and white light from the biophilic design concept appeared equally as frequently. Therefore, in terms of light, it seems that biophilic design tends to have a greater or equal influence on mindfulness than Japanese concepts.

Finally, the scenery seen most in the selected images was a tree view from the biophilic design concept, followed by a natural view, which is in line with biophilic as well as Buddhist concepts. Next was unobstructed scenery, according to Buddhist concepts. Thus, in terms of view, the ideas of biophilic and Buddhist design seem to have more potential.

5. Conclusions

This study sought to support the achievement of sustainability in architecture through the promotion of sustainable behavior by influencing mindfulness through architecture. Although literature reviews show a positive trend of biophilic design concepts toward mindfulness, analyses of mindfulness-tagged architectural images on Instagram are inconsistent. The architectural atmosphere in pictures largely corresponds to the traditional Japanese architectural design concept. When considering each component of the architectural atmosphere, instead, it shows the potential of each concept differing in each component. Therefore, we consider that the study gaps mentioned above and the findings of this study should be further explored in terms of design concepts and the characteristics of architectural atmosphere. Future research should focus on empirical investigations to explore the characteristics of architectural atmospheric components that enhance mindfulness, utilizing alternative methodologies and diverse data sources, resulting in more globally applicable findings. Other elements of the architecture not mentioned here may also be worth exploring in future research.

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