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UTILIZING A PHOTO-ANALYSIS SOFTWARE FOR CONTENT IDENTIFYING METHOD (CIM)

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ABSTRACT

Content Identifying Methodology or (CIM) was developed to measure public preferences in order to reveal the common characteristics of landscapes and aspects of underlying perceptions including the individual's reactions to content and spatial configuration, therefore, it can assist with the identification of factors that influenced preference. Regarding the analysis of landscape photographs through CIM, there are several studies utilizing image analysis software, such as Adobe Photoshop, in order to identify the physical contents in the scenes. This study attempts to evaluate public's 'preferences for aesthetic qualities of pedestrian bridges in urban areas through a photo-questionnaire survey, in which respondents evaluated images of pedestrian bridges in urban areas. Two groups of images were evaluated as the most and least preferred scenes that concern the highest and lowest mean scores respectively. These two groups were analyzed by CIM and also evaluated based on the respondent's description of each group to reveal the pattern of preferences and the factors that may affect them. Digimizer Software was employed to triangulate the two approaches and to determine the role of these factors on people's preferences. This study attempts to introduce the useful software for image analysis which can measure the physical contents and also their spatial organization in the scenes. According to the findings, it is revealed that Digimizer could be a useful tool in CIM approaches through preference studies that utilizes photographs in place of the actual landscape in order to determine the most important factors in public preferences for pedestrian bridges in urban areas.

Keywords: Preference, Digimizer, Content Identifying Method, Physical Contents

INTRODUCTION

Preference studies of landscapes have received attention in the last century and many researchers utilized this procedure to understand people's attitude towards their environments. According to the literature, the preferences of visual qualities in the landscape, as a dynamic process is the joint effect of specific physical features of the landscape interacting with relevant psychological processes in the human observerfeeding back to both, the humans and the landscape. (Brown & Daniel, 1986; Daniel, 1990; 2001; Daniel & Boster, 1976; Zube *et al*., 1982) On the other hand, Kaplan & Kaplan (1982) argued that preference

is a result of perception which related to knowledge, inherent reaction, and cognitive processing. Therefore, it can result in the unaware response of respondents to specific stimulus and force them to react in a certain manner to particular environments. Furthermore, according to Kaltenborn & Bjerke, (2002) and also according to Daniel & Vining (1983) almost all the environmental perception studies utilize the preference methods with a valid and reliable measurements to identify which kinds of landscapes are most preferable for people. As a matter of fact, people do cast judgments many times through their everyday life.

Furthermore, Kaplan, Kaplan and Wendt (1972); R. Kaplan (1977); Kaplan and Kaplan (1989) developed Content identifying method or CIM in order to understand the pattern of preference for a specific environment. This approach utilizes photographs of environment as surrogate for the actual environment and asks the respondents to rate the scenes according to their preference. As a matter of fact, photographs are used because bringing the respondents to the actual environment is a difficult or sometimes impossible task (Hull & Revell, 1988; Kaplan & Kaplan, 1989), however the validity of using photographs is confirmed by Pitt and Zube (1987) and also Shuttleworth (1980) and Wherrett (2000) show that there are no significant differences between preference rating of photographic versus actual scenes. Furthermore, Lekagul (2002) suggests that researchers should be cautious when using photograph as surrogates of landscape. He argued that, when the following consideration were used, photographs can effectively as surrogate for actual landscapes:

- All the landscape contents studied should be adequately captured.
- The contents that are not part of study should be controlled in photographs.
- Photographs should be taken with appropriate technical quality across all samples;
- Participants should be advised on their evaluation contents; they should be aware of evaluation of the environment in photographs, not the memory or experience of a particular place (Lekagul, 2002, p. 57)

After providing appropriate photographs for the photo-questionnaire survey and evaluating the preferences rating of respondents, to reduce the huge number of data during the analysis procedure, R. Kaplan (1977), Kaplan *et al*. (1972), and Kaplan & Kaplan (1989) suggest using data reduction techniques. This approach groups the scenes based on their common stimulus and characteristics to which respondents react in a similar way. It is worth to note that through this data reduction technique, scenes are not grouped by rating but rather by their common characteristics they would be grouped by. These groups or dimensions can be analyzed and interpreted to reveal the pattern of perception of respondents. S. Kaplan (1979) and Kaplan & Kaplan (1989) argued that the analysis of group of scenes can be performed according to their content and spatial quality.

This study utilizes pedestrian bridges as urban elements for the evaluation of their aesthetic qualities. These types of bridges are selected because pedestrian bridges require at least as much consideration of aesthetics as other types of bridges (Shijin & Dongzhou, 1997). However, since the comparatively lighter load of pedestrian bridges to their roadway width is relatively narrow, there is more freedom for bridge designers to choose pleasing shapes for the bridges.

This study in order to reveal the pattern of perception ofpedestrian bridges in urban areas and therefore to improve their visual aesthetic qualities, conducted a preference approach and then performed the Content Identifying Method or CIM to understand how people perceive pedestrian bridges in urban areas and also identify the factors that potentially affect their preferences. This analysis employs a descriptive analysis technique in order to determine the underlying characteristics that significantly affected the preferences in rating by the respondents for pedestrian bridges in an urban landscape. After ranking all the scenes from

the photo-questionnaire survey by their mean preference scores, five scenes with the highest means preference and five scenes with the lowest means preference were selected as the most and least preferred scenes, respectively. The analysis was expected to reveal the shared visual characteristics or visual stimuli that resulted in high and low preferences scores. Consequently, the groups of scenes were considered as the most and least preferred scenes and compared with each other to determine their differences or common visual characteristics. For the analysis of the characteristics of these groups of scenes and also to triangulate the previous findings, the scenes description survey and Digimizer analysis of the scenes has been be conducted.

This study is a new attempt to identify the role of image analysis software such as Digimizer for triangulation of the results from other content analysis procedures and it would be an useful instrument that can be introduced as an image analysis for landscape preference studies. Several studies utilized image analysis software, such as Adobe Photoshop, in order to identify the physical contents in the scenes, especially in the field of landscape preference studies. (Hagerhall *et al*., 2004; Kenwick *et al*, 2009; Svobodova *et al*., 2012) Digimizer[1] isalso an image analysis software which is user-friendly and applicable software for the analysis of images that allows precise manual measurements as well as automatic object detection with measurements of object characteristics (Version 4.0.0, MedCalc Software, Mariakerke, Belgium, 2005-2011). The main goal of this study is to reveal the need to utilise such a software to triangulate the findings from content analysis which can be sometimes criticized for the validity of evaluation when done by researcher. However utilising this software, this study focuses on the presence or intensity of physical contents and also the quadratic distribution of the contents in the scenes.

METHODOLOGY

Study design and population

A case study was chosen to fulfill the goal of this study and the residents of Tehran were chosen to be a suitable survey population however due to practical problems, this study used a non- random sampling techniques. On the other hand, in order to obtain a reasonable statistical power during the survey procedures, a large sample size of respondents was be required. Tehran population based on the last census in 2010 (Tehran's statistical yearbook) was 8.5 million distributed within the city. Therefore, according to Krejcie & Morgan (1970) for sampling activities based on the sampling table, we need at least 384 cases as the research respondents with proportionally-distributed in gender. As a matter of fact, to conduct the survey on selected sample size, due to some practical issues (such as taking the time of people in urban areas and also lack of convenience and facilities to answer the questions) the survey respondents, selected from students in four famous governmental universities in Tehran: the Tehran University, Shahid Beheshti University, Science and Industry University and Tarbiat Modarres University. Kaplan & Herbert (1986) also selected students as their respondents in preference studies. On the other hand, Yu (1995) and many other researchers believed that the respondents with general education instead of landscape expertise and environmental experience respond in a significantly different way. Therefore, to limit the influence of other factors in the preference study, it seems suitable to conduct the survey on students with general field of study with the exception of architecture, landscape architecture, industrial design, urban design, forestry, agriculture, environmental studies and other related subjects. Finally, 384 students who live in Tehran, as representative of the residents of

[1] Digimizer is compatible with Windows XP, Windows Server 2003 & 2008 and Vista

Tehran, from four famous universities in Tehran in general field of study, with a normal distribution of gender (approximately 50% male and 50% female) are the respondents of the survey for this research.

Measurement tool

To measure respondent's preferences for pedestrian bridges, a survey through photo-questionnaire seems to be an appropriate method. In fact, a survey represents one of the most common types of quantitative methods in social science researches. Survey is utilized to gather public preferences for scenes portrayed in photographs. The use of photographs to elicit scene evaluations has been successfully accomplished and tested in numerous studies including the comparison of results of photo based and on-site based ratings (Schafer & Brush, 1977; Shuttleworth, 1980; Law & Zube, 1983; Stewart *et al.*, 1984; Hull & Stewart, 1992; Stamps, 1999; Bernaldez *et al*., 1998). A more complex validity question is whether theviewing of a photo, computer image or actual landscape provides a valid indication of true landscape aesthetic quality. However, the validity of utilizing the photographs according to the literature is confirmed.

For this research, preference for pedestrian bridges in urban area, measured by showing 34 scenes containing similar structure of bridges in different urban areas, to the respondents and asking them to rate the scenes based on their preferences by using a four point Likert scale, indicating how much the respondents preferred each scene (1= not preferred, 2= preferred a little, 3= preferred, and 4= very much preferred). Four point Likert scale was utilized in this study because Sarmad *et al*. (2000) concluded that this scale is an appropriate one for Iranian respondents omitting the middle point. To identify factors that may influence people's preference against the pedestrian bridges in urban areas, the characteristics of pedestrian bridges and their surrounding environments, were evaluated based on the following categories (Lekagul, 2002):

1. *Structure of the bridges* (structural characteristics of bridges including their colour, slenderness, simplicity, proportion of shape, roughness of structure)
2. *Physical content* (the elements present in the scenes including vegetation, buildings, urban elements, natural features, cars or people)
3. *Organization and display of physical elements* (the way that physical elements were arranged and displayed including: location of buildings and vegetation, diversity of vegetation, connection of buildings and vegetation to each other, the harmonious height of plants, the quality of vegetation, building face and age condition, harmonious urban elements)
4. *Spatial configuration* (the way that spaces, structures, and enclosure were organized including spaciousness of the area, amount of sky-view, harmonious orientations of lines in the scene, width of roads, overall assessment of spatial arrangements), and
5. *Environmental condition* (temporary characteristics of the scene including air pollution, safety situation, population and neatness of the scene)

On the other hand, to ascertain that respondent's brief opinions of the scenes and also to ensure that no information was omitted from the research, the process of scene description by the participants to gain interpretation of the selected scenes was based on each respondent's opinion to understand the main reasons of the preference, whenever the researcher's bias in interpreting the contents of the dimensions was probable and also to make it possible to triangulate the results from the content analysis of the scenes. This survey format was used several times in previous research to reveal the common characteristics of the scenes (Miller, 1984; Woods, 1995). The process of preparation of the scenes for the surveys utilized three interrelated stages: Scene collection, scene selection, and scene presentation.

Scene collection: Since the study of differences in people's preferences for a similar form of pedestrian bridge in different urban landscapes is the main focus of this research, providing photographs of several pedestrian bridges of almost similar structure and form in different urban areas is important. As a matter of fact, during this process, there was an attempt to examine people's reactions to similar structure of bridges in different contexts with varied visual characteristics. In order to cover all the urban areas of Tehran city in this survey, the city was divided into four sections - north, south, west and east and photographs was taken in all of these sections almost equally. In this way, over 200 colour photographs of bridges in urban areas were collected, using a Canon digital camera with 16.0 mega pixels and a lens with 5× optical zoom. It provided images of high quality for each scene. To obtain a typical view of pedestrian bridges, as stated through the literature, these bridge can be seen from a different distance and view angle; however, for this study to represent a fixed view for all the scenes, the photos were taken at eye level and from viewpoints located along walkways and distances between 10-15 meters away from the object (pedestrian bridge). In addition to this, all photos were taken between July and August and between 10 to 12 am to control the light condition of the scenes. This viewpoint was selected because it is commonly and easily perceived even by those people who do not want to use the bridges.

Scene Selection: From the 200 photographs that were taken with the aforementioned characteristics, the current process selects those photos that are suitable for the survey.

Though this process, as Rapaport (1990) claims, the physical environments comprise fixed features such as spatial enclosure, semi- fixed features such as vegetation, and non-fixed features such as people and activities. Therefore, the process of selecting the scenes for this survey was prepared to include the full range of environmental features, especially non-fixed features such as cars and people that are very common in urban areas. For this procedure, a team of experts in FRSB in UPM[2] selected the scenes accordingly. However, any elements that may induce bias of participants were excluded from the photographs. Also, scenes with low photographic quality, close-ups of people in focal points and other negative or unusual features and activities (like accident scenes in streets etc.) were excluded. At the end of this process, using a stratification procedure to be sure of covering the adequate variety and repetition of different features and stimuli, 34 scenes were selected, containing pedestrian bridges in urban areas with a full range of features, so their effect could be detected clearly.

Scene Presentation: From the selected photographs using the selected criteria, and then finding an appropriate way to present the photos to the participants of the survey became an important task. A table with random number which assigns each photo to one number was used, applying the following criteria:

1. No more than two consecutive scenes with the same characteristics and stimulus were assigned next to one another.
2. Sequential scenes from the original order were not placed together.

These procedures reduced the bias by ensuring that participants did not have a prior experience rating the scenes based on any familiarity with their order. This process prevented them from attempts to consistently rate particular places. After setting the presentation order based on the stated criteria and familiarizing the participants with the rating scene survey, before the participants rated the real scenes, three extra scenes were added to the presentation set at the beginning. Then, in order to prevent the anticipation of the end of the scenes by the respondents, three more scenes were added at the end of the presentation. Thus, in the presentation booklet, six extra scenes (3 at the beginning and 3 at the end) were added, which were not accounted for in the data analysis. They were placed there to omit any probable bias

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in this regard. Finally 40 color scenes were arranged in A4 size (21×29.7 cm) in landscape-oriented sheets. Each page contained one scene with corresponding numbers printed on a laser jet printer and bound.

From 34 scenes selected during the described procedure, 9 scenesrepresenting various features and stimuli of the pedestrian bridge scene were selected for this survey and randomly arranged for the presentation. They were presented in the same format that was used for the preferences survey and placed at the end of the scenes booklet. The survey format for this procedure was used to make it an easier to analyse the respondent's description of the scenes, through a pilot study[3] that just asked them to provide the best description of each scene in their own words. These descriptive words that the respondents offered in the pilot study were categorized and counted, and the same description meaning was filed into a group to create tentative categories based on the comments across the scenes and then separated into positive and negative comments.16 final categories were created; *Safety*, *cleanliness, peace, order, simplicity, openness of the scene, high quality of elements, proper shape of bridge, proper colour of bridge, variety of elements, greenery of scene, happiness, beautifulness, freshness* ,and *goodness*. For each of these terms a negative pole was also defined. All of these terms were arranged into a table with two positive and negative poles. The participants were asked to rank the terms according to their preferences between 1 (completely positive) and 5 (completely negative). The results of this survey were free from personal opinions of the researcher and used to help clarify the analysis of common characteristics within the derived dimensions.

Statistical analysis

To analyse data collected through the survey questionnaire, alldata were entered into the statistical program SPSS (Statistical Program for Social Science), version 19. All the analysis procedures utilizeddescriptives from the preference survey. Descriptive statistics included means, standard deviations and frequencies. The processes for data analysis were as follows:

1- Analysis of the Most Preferred and Least Preferred Scene
2- Analysis of Respondent's Scene Description
3- Content Analysis of the Scenes by Digimizer[4]

1. Analysis of the Most and Least Preferred Scene

This analysis employs a descriptive analysis technique in order to determine the underlying characteristics that significantly affected the preference rating by the respondents for pedestrian bridges in an urban landscape. After ranking all the 34 scenes from the photo-questionnaire survey by their mean preference scores, five scenes with the highest means preference and five scenes with the lowest means preference were selected as the most and least preferred scenes, respectively. The analysis was expected to reveal the shared visual characteristics or visual stimuli that resulted in high and low preference scores. Consequently, the groups of scenes seen as the most and least preferred scenes were compared with each other to determine their differences or common visual characteristics. For the analysis of the characteristics of these groups of scenes and to triangulate the previous findings, the scenes description survey and Digimizer analysis of the scenes were conducted.

[3] The pilot study with 100 participants

[4] An image analysis Software

2. Content Analysis of Respondents' Scene Descriptions

As discussed in the scene description survey, according to the conducted pilot study for this survey, 16 dipole terms (negative and positive) identified the most common participants' comment on the 9 selected scenes. These comprised safety, cleanliness, peace, fear, order, simplicity and openness of the scene, high quality of the elements, proper shape of bridge, proper colour of bridge, variety of elements, greenery of the scene, happiness, beauty, freshness, and goodness. For this survey, the participants were asked to rate the terms between 1 (completely positive) and 5 (completely negative). The data extracted were utilized in a frequency analysis to determine the consensus for each term of the scenes. The mean score for these terms were calculated to examine the degree of positive or negative pole for each in the participant's opinion.

3. Content Analysis of the Scenes by Digimizer

As discussed earlier, Digimizer is as user-friendly and applicable software used to analyze images. It allows precise manual measurements as well as automatic object detection using measurements of object characteristics. The software supports images with file formats such as: JPG, GIF, TIFF, BMP, PNG, WMF, EMF, DICOM and DGZ (the original format of a Digimizer file). This study utilized this software, when triangulation of the results from content analysis was done by the researcher.

This research utilized the Digimizer software to determine the percentage of physical contents presented in the whole scenes and the percentage of physical content in quadratic parts of the scenes. The first step detects various content in the scenes, such as sky, bridges, buildings, plants, urban elements, natural features[5], cars and people manually in Digimizer, then measures the area for each object and calculates the percentage of that object on the entire scene.

In the second step, the software divides the scenes into two major parts, top and bottom, and then divides each part into left and right sides[6]. After this quadratic partition of the scenes, the same procedure is conducted in the last step, employed to calculate the percentage of each object in each part. Through this analysis, the research seeks to understand the location and distribution of physical content in each scene.

RESULTS

Analysis of the Most and Least Preferred Scenes

As stated before, the most and least preferred scenes were derived by ranking the scenes according to their preference mean scores. Consequently, from the total 34 scenes, five top and the five bottom scenes from the ranking order, were considered as the most and least preferred scenes respectively in order to identify the factors affecting preferences. As previously mentioned, the analysis focused on five groups of criteria in the scenes such as bridge structure, physical contents, organization and display of physical contents, spatial configuration and environmental conditions. The results of this analysis reveal the reason for high and low preferences of the most and least preferred scenes respectively. Therefore, the

[5] Natural features also include significant land or water features that are natural. They can include mountains, plateaus, rivers, lakes, islands, waterfalls, monoliths, escarpments, ravines etc. In this study, the terms generally refer to mountains in the scenes.

[6] We named this procedure *Quadratic Distribution of Physical Contents* to refer to the distribution of physical contents in the four parts of the scene

following discussion was conducted for the analysis of common characteristics in each group separately.

1. Analysis of the Most Preferred Scenes

Through the preference survey, the scenes that contained pedestrian bridges in various urban areas were rated according to their mean scores and the five top scenes in this ranking were 31(Mean=2.61), 32 (Mean=2.56), 33 (Mean=2.44), 18 (Mean=2.41), and 30 (Mean=2.39) (see Fig. 4.1).

Fig. 1: The Most Preferred Scenes

Scene 31, Mean 2.61

Scene 32, Mean 2.56

Scene 33, Mean 2.44

Scene 18, Mean 2.41

Scene 30, Mean 2.39

Content Analysis for the Most Preferred Scenes

The common characteristics of the scenes in this group that delivered the high preferences of the participants are as follows:

In terms of bridge structures, all the scenes in this group represented bridges with bright colours. All bridges were considered as slender to moderately slender and finally in all the scenes, the stairs of the bridges were fully visible except for scene 18 where only a small proportion of the stairs appeared. This phenomenon makes the bridge to take a different form in the scenes.

In terms of the physical content, the scenes generally contained vegetation, buildings, and urban elements and finally in the most preferred scene (scene 31) we can see that there is a large proportion of mountainous landscape there.

The common trait of all the scenes was the presence of vegetation in high proportions (except for scenes 32 and 33, which contained moderate amount of vegetation), the location of plants in front of the bridge and also as a background for the scenes (except for scene 32). Another common characteristic of the plants in the scenes was that they were all good quality. Other elements in these scenes included buildings (except for scene 31, which contained no buildings). The buildings were mostly ordered based on their appearance (It means the vast proportions of the buildings are not too various in shape, colour and form).

Urban elements were another common content in the scenes and comprised advertising signs, bus and gas station, traffic lights, etc. These elements all appeared in the scenes as background elements.

In terms of spatial configuration, all of the scenes generally showed not-spacious areas (they held a closed view) and a moderate width of roads. On the other hand, the availability of viewing the sky was low to moderate in all the scenes, and generally the scenes were evaluated as ordered with the exception of scenes 33 and 30.

As a result, we can conclude from this part of the analysis that the bright colour of the top part of the bridge, the different form of bridges, and the presence of good quality vegetation made those scenes the most preferred ones.

Analysis of Respondent's Comments on the Most Preferred Scenes

Content analysis of participant comments as a scene description survey was performed for 2 scenes from this group. (Scenes 18 & 32) These two scenes come from the 9 scenes that were selected randomly from the 34 scenes used for this part of the analysis. The means and percentage of the frequencies for the participants' comments for both, positive and negative themes[7] are presented in Table 2. From the content analysis of participants' comments provided for scene 32, people most preferred cleanliness (Mean=2.13,66.1%) and safety (Mean=2.15,68%), followed by calmness (Mean=2.33,56.7%), then they valuated the scene as beautiful (Mean=2.44, 55.5%), and they appreciated the real colour of the bridge in the scene (Mean=2.45,58.7%) and finally approved of the goodness of the scene overall (Mean= 2.49,53.4%).

For the second scene,r scene 18, according to the results from the above tables, the participants mostly aappreciated the cleanliness (Mean=1.91,76.8%), safety (Mean=1.98,77.9%), the colour of bridge (Mean=2.35,49.6%), calmness (Mean=2.37,55.8%), order (Mean=2.39,57.7%), goodness of the scenes in general (Mean=2.42,57%), beauty of the scene (Mean=2.44,56.4%), openness of space (Mean=2.46,55.9%), good shape of the bridge and high quality of elements (Mean=

[7] The mean score for each theme illustrates the magnitude of the positive or negative pole of that term. (1 shows completely positive meaning, and 5 shows completely negative meaning)

2.47,52.1%), happiness (Mean= 2.48,61.1%) and finally greenery of the scene (Mean= 2.49,52.6%). The other themes were valuated as negative or were rated as "no idea" by the participants. Therefore through these positive themes which participants gave for the scenes, the higher preference scores for the scenes in comparison to other scenes/preferences can be justified.

Table 2: Respondents' Comments on the Most Preferred Scenes (Scenes 32 & 18)

Scene No. 32, Mean 2.56, SD. 0.94					
Positive Themes	**%**	**Mean**	**Sd.**	**%**	**Negative Themes**
Clean*	66.1	2.13	1.02	10.2	Dirty
Safe*	68.0	2.15	1.11	12.2	Unsafe
Calm*	56.7	2.33	1.03	12.7	Crowded
Beautiful*	55.5	2.44	1.13	18	Ugly
Colour of bridge*	58.7	2.45	1.23	19.3	Improper colour of bridge
Good*	53.4	2.49	1.07	16.9	Bad
Good shape of bridge	54.7	2.55	1.16	22.8	Bad shape of bridge
Happiness	52.0	2.55	1.09	18.6	Unhappiness
Order	50.3	2.56	1.02	17.6	Disorder
Freshness	50.3	2.57	1.08	20.6	Fatigue
High quality of elements	44.4	2.67	1.07	20.2	Low quality of elements
Peace	49.4	2.68	1.09	17.6	Fear
Variety of elements	42.6	2.70	1.05	21.5	Uniformity of elements
Simple	38.4	2.89	1.10	29.5	Complicated
Openness of Space	37.9	2.92	1.18	32.3	Closed Space
Greenery of the scene	36.8	2.94	1.09	31.6	Aridity of the scene

Scene No. 18, Mean 2.41, SD. 0.85					
Positive Themes	**%**	**Mean**	**Sd.**	**%**	**Negative Themes**
Clean*	76.8	1.91	0.83	23.1	Dirty
Safe*	77.9	1.98	0.90	5.5	Unsafe
Colour of bridge*	61.1	2.35	1.10	16.7	Improper colour of bridge
Calm*	55.8	2.37	1.01	13.9	Crowded
Order*	57.7	2.39	0.92	10.2	Disorder
Good*	57.0	2.42	0.83	8.6	Bad
Beautiful*	56.4	2.44	0.93	13.8	Ugly
Openness of Space*	55.9	2.46	0.95	13.4	Closed Space
Good shape of bridge*	54.2	2.47	0.95	13.6	Bad shape of bridge
High quality of elements*	52.1	2.47	0.98	14.6	Low quality of elements
Happiness*	61.1	2.48	0.94	16.7	Unhappiness
Greenery of the scene*	52.6	2.49	0.98	15.3	Aridity of the scene
Peace	54.9	2.53	1.00	17.7	Fear
Freshness	51.3	2.53	0.88	12.0	Fatigue
Variety of elements	50.4	2.58	0.95	16.8	Uniformity of elements
Simple	49.6	2.61	1.04	18.3	Complicated

Note: A mean above 3.5 was considered as negative and below 2.5 was considered as positive
*Note: *shows the accepted theme for the scene*

Content Analysis of the Scenes by Digimizer

As discussed earlier, software called Digimizer was used for the analysis of the scenes based on the percentage of physical content and their distribution in the scenes. The result of this procedure was triangulated with the content analysis conducted in the last sections.

First, by calculating the percentage of each physical content in the scenes as a whole and secondly by splitting the scenes into four sections:top, bottom, left, and right sides,[8] and calculating the percentage for each physical content distributed in each section, the scenes could be analyzed. The physical contents that were evaluated using this analysis were sky; bridge structure, vegetation, urban elements, mountain, cars, people, and ground surface[9] (see Table 3). According to this table and the table for quadratic distribution of physical contents (see Table 4), common characteristics of these most preferred scenes were revealed.

Table 3: Physical Content of the Most Preferred Scenes

Scenes	Physical contents (%)								
	Sky	bridge	building	vegetation	Urban elements	mountain	Cars-People	Ground surface	**Total**
31	22.9	18.0	0	19.4	8.9	3.8	0.9-3.0	22.9	**100**
32	13.1	19.6	15.3	3.1	15.5	0	0-0	33.4	**100**
33	34.7	14.0	1.7	6.5	5.07	0	0.4-8.3	29.3	**100**
18	15.6	22.7	9.5	12.9	10.6	0	0-0	28.8	**100**
30	5.1	19.3	12.4	25.1	8.6	0	0.3-2.3	26.9	**100**

The largest amount (main item) of physical content of scenes 31 and 33 was represented by the sky with, respectively, 22.9% and 34.7% for sky occupancy of the whole surface of the scene. However, for scenes 32 and 18, the largest amount of physical content was represented by the bridge structure at 19.6% and 22.7%. In scene 30 the main content with the large percentage was the vegetation at 25.1%.

In most of the scenes in this group, we can see the percentage of vegetation is almost equal to the bridge proportional percentage, except for scene 32. The brighter colour of the top part of the bridge and other spatial or environmental condition make it one of most preferred scenes. The most important thing learned through this analysis is that in the most preferred scene (scene 31) we can see that the buildings are replaced by natural features suc as mountains, cars, and people.

For the distribution of physical content, based on the quadratic distribution analysis performed by Digimizer, in all of the scenes in this group, the main part of the sky was located in the top section of the scenes. However, with the exception of scenes 18 and 31, where this item was distributed in the left and right side almost equally, and in these scenes (scenes 18, 31) the sky is located more to the left. For the down section also, in all of the scenes, the sky content was located in the right side more often.

In terms of the bridge, more than 75% of the bridges' structure was located in the top section of the scenes. For all of them, this amount was distributed to both sides equally except for scene 30 where more than 90% of the bridge structure in the top section was located on the left side.

[8] Quadratic division

[9] The ground surface was not considered for content analysis in this study, because it doesn't make sense for this analysis.

In terms of buildings as physical contents in the scenes, with the exception of scene 31 containing no building, the large proportion of the buildings were located in the top section of the scenes, and further still, this amount was distributed more to the left side except for scene 18 (where buildings were located on both sides equally). It is interesting that for the bottom section, the distribution of building in the scenes was very similar to their distribution in the top section, on the left side.

The distribution of vegetation in this group of scenes, except for scene 30 (where vegetation was represented on the top section more by around 76%), the large amount of vegetation was located in the lower section. In addition, these scenes had approximately equal distribution of vegetation on both, left and right sides.

In terms of urban elements, the largest amount (more than 80%) were located in th bottomsection in all scenes, and all of these were distributed almost equally on both sides. For the top section, the distribution of urban elements was more on the right side, except for scenes 33 and 30, leaning towardsthe left side more. Cars and people were another content that appeared in these scenes. They were located in the bottom section and distributed mainly on the left side, except for scene 30, where cars and people appeared on the right side more. Natural features presented in scene 31 from this group were distributed equally in both the top and bottom sections, but in both sections, they appeared on the left side more often (see Table 4).

Overall, the most important findings from this part of the analysis were high percentages of vegetation, moderate percentages of sky view, and also the more common position of buildings in the scenes on the top and left side.

According to the results gathered from all the afore-mentioned analyzes, including the content analysis of the scenes, analysis of participants' comments and also analysis of the scenes by Digimizer, triangulations of the results were performed, and people most preferred the pedestrian bridges because of their *bright colour* of their top part (proper colour of the bridge, as stated by the participants), *various form of bridges*, and the presence of *vegetation of good quality* (greenery of the scenes, as stated by the participants*).* Finally, they preferred scenes where buildings were *distributed on the top and left side* and the scenes were evaluated generally as *clean, safe* and *calm, beautiful and good*. In addition, the presence of mountains as natural features in the scenes might have affected the preferences as well. In summary, the colour of the bridges, the presence of vegetation, the presence of buildings on the top and left side, and the feeling of cleanliness, safety and calmness in the scenes affected public preferences positively.

Table 4: Quadratic Distribution of Physical Contents for the Most Preferred Scenes

Scenes	Quadratic Distribution of Physical Contents (%)																											
	Sky				Bridge				Building				Vegetation				Urban Elements				Natural Features				Cars/ People			
	top		bottom		top		bottom		top		bottom		top		bottom		top		bottom		top		bottom		top		bottom	
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
31	**100**		**0**		**77.9**		**22.1**		**0**		**0**		**42.3**		**57.7**		**12.7**		**87.4**		**52.1**		**47.9**		**0**		**100**	
	37.1	62.9	0	0	58.2	41.7	67.4	32.6	0	0	0	0	61.0	39.0	33.8	66.2	6.9	93.1	53.0	47.0	93.6	6.3	100	0	0	0	85.7	14.3
32	**93.5**		**6.5**		**74.4**		**27.6**		**88.1**		**11.8**		**2.8**		**97.2**		**41.1**		**58.9**		**0**		**0**		**0**		**0**	
	43.2	56.8	0	100	52.2	47.8	46.1	53.9	74.2	25.8	71.2	28.8	0	100	48.7	51.3	5.0	95.0	68.1	31.8	0	0	0	0	0	0	0	0
33	**97.7**		**2.3**		**88.5**		**11.5**		**51.4**		**48.6**		**26.7**		**73.3**		**11.8**		**88.2**		**0**		**0**		**0**		**100**	
	49.2	50.4	0	100	43.7	56.3	60.1	39.9	100	0	100	0	48.7	51.3	50.8	49.2	88.8	11.9	38.5	61.5	0	0	0	0	0	0	82.9	17.3
18	**100**		**0**		**93.3**		**6.7**		**85.7**		**14.3**		**21.6**		**78.4**		**18.3**		**81.7**		**0**		**0**		**0**		**0**	
	74.9	25.0	0	0	36.0	64.0	0	100	40.0	60.0	30.9	69.1	79.6	20.3	48.1	51.9	18.5	81.4	54.4	45.6	0	0	0	0	0	0	0	0
30	**100**		**0**		**80.3**		**19.7**		**77.2**		**22.6**		**76.1**		**23.9**		**15.0**		**85.0**		**0**		**0**		**0**		**100**	
	70.1	29.9	0	0	93.2	6.8	100	0	51.2	48.8	52.9	47.1	11.7	88.3	36.6	63.4	81.0	18.9	64.2	35.8	0	0	0	0	0	0	22.2	77.8

2. Analysis of the Least Preferred Scenes

The five bottom scenes based on the ranking order of preference rating as the least preferred scenes were scenes 14, 16, 17, 35 and 37, as their mean rating scores ranged between 1.65 to1.83 which is considered as low (see Fig. 2).

This group of scenes was alsoanalyzed, and the results were compiled according to similar criteria applied for the most preferred scenes.

Fig. 2: The Least Preferred Scenes

Scene 14 , Mean 1.65

Scene 16, Mean 1.68

Scene 17, Mean 1.82

Scene 35, Mean 1.83

Scene 37, Mean 1.83

Content Analysis of the Least Preferred Scenes

In the least preferred scenes, the following common characteristics were found:

In terms of bridge characteristics, all the scenes in this group appeared with bland or opaque colour on the top part of the bridge. The structure of bridges in this group of scenes was generally slender, and we can see long span bridges in all the scenes except scene 37 which contains a short span bridge.

In terms of physical contents, unlike the most preferred scenes group, there was a significant lack of plants that is obvious in these scenes, with the exception of scene 37 which has the highest mean of vegetation in this group. The scenes seem arid as an overall assessment. Generally, disordered buildings were presented as a background for these scenes. The urban elements and population were low except for scenes 35 and 37.

In additionto that, the advertisement signs on bridges in scene 35 and scene 37 shows signs may have been seen as a negative point for scene preference. On the other hand, the availability of sky view, unlike the most preferred group was high to moderate in all scenes.

In summary, we can conclude that *the opaque coluor of* the top part of the bridge, *aridity of the scene* (lack of vegetation or vegetation of bad quality) and also a *high to moderate proportion of sky* may be a good point to justify the low preference means for these scenes as the least preferred group.

Analysis of Respondents' Comments on the Least Preferred Scenes

An analysis of participants' comments on this group of scenes was provided for scenes 16 and 37. For scene 16, the results show that people mostly did not appreciate this scene due to the aridity of it (Mean=3.96, 66.6%) followed by fatigue (Mean=3.78, 61.5%), unhappiness (Mean=3.76, 62.7%). They evaluated the scene as ugly (Mean=3.76, 64.3%) and bad in general (Mean=3.68, 59.6%), noted the uniformity of elements (Mean=3.65, 58.8%), and improper colour of the bridge (Mean=3.62, 57.7%). Finally, most of the respondents agreed on the simplicity of the scene (Mean=2.09, 65.4%) and its calmness (Mean=2.30, 59.6%). The results from this analysis were unlike the most preferred scene analysis and indicated that people mostly valuated the terms negatively (except for the terms of simplicity and calmness).

Table 5: Respondents' Comments on the Least-Preferred Scenes (Scenes 16 & 37)

Scene No. 16, Mean 1.68, SD. 0.84					
Positive Themes	**%**	**Mean**	**Sd.**	**%**	**Negative Themes**
Simple*	65.4	2.09	1.01	8.6	Complicated
Calm*	59.6	2.30	1.18	16.4	Crowded
Openness of Space	42.8	2.78	1.19	27.0	Closed Space
Order	38.9	2.85	1.09	26.2	Disorder
Safe	36.5	3.27	1.38	50.2	Unsafe
Good shape of bridge	26.0	3.28	1.15	45.1	Bad shape of bridge
Clean	26.3	3.29	1.14	43.8	Dirty
Peace	49.0	3.40	1.25	28.2	Fear
High quality of elements	23.5	3.42	1.13	49.6	Low quality of elements
Proper colour of bridge	21.9	3.62	1.25	57.7	Improper colour of bridge*
Variety of elements	19.0	3.65	1.15	58.8	Uniformity of elements*
Good	16.9	3.68	1.10	59.6	Bad*
Beauty	17.4	3.76	1.13	64.3	Ugliness*
Happiness	18.2	3.76	1.19	62.7	Unhappiness*
Freshness	14.6	3.78	1.11	61.5	Fatigue*
Greenery of the scene	13.9	3.96	1.17	66.6	Aridity of the scene*

Scene No. 37, Mean 1.83 SD. 0.86					
Positive Themes	**%**	**Mean**	**Sd.**	**%**	**Negative Themes**
Safe	47.4	2.65	1.12	22.4	Unsafe
Simple	39.2	2.78	1.05	24.5	Complicated
Clean	38.5	2.84	1.01	25.7	Dirty
Peaceful	34.6	2.95	0.99	30.2	Fear
Greenery of the scene	31.5	3.06	1.07	32.8	Aridity of the scene
Order	25.5	3.18	1.01	38.3	Disorder
Good shape of bridge	24.0	3.20	1.02	39.4	Bad shape of bridge
Variety of elements	19.8	3.24	0.95	37.0	Uniformity of elements
High quality of elements	23.0	3.25	1.00	40.8	Low quality of elements
Openness of Space	24.3	3.27	1.04	43.4	Closed Space
Proper colour of bridge	26.8	3.28	1.14	45.8	Improper colour of bridge
Good	20.6	3.30	0.97	42.4	Bad
Happiness	20.1	3.32	1.04	43.9	Unhappiness
Freshness	20.6	3.35	1.01	46.1	Fatigue
Beauty	17.2	3.43	1.00	48.3	Ugliness
Calm	18.8	3.57	1.12	56.0	Crowded*

Note: A mean above 3.5 was considered as negative and below 2.5 was considered as positive
*Note: *shows the accepted theme for the scene*

Similarly to the previous scene, scene 37 was evaluated by the respondents as crowded.

In fact the most important reason for participants not to appreciate the scene related to the crowdedness of the scene (Mean=3.57, 56%). In other words, crowdedness mostly caused the participants to assign a low preference score. In addition the frequency of the opinion of participants regarding these terms was generally inclined toward the negative terms, which justifies the low preference rating for this group of scenes.

Content Analysis of the Least Preferred Scenes by Digimizer

The same analysis procedures used with Digimizer for the most preferred scenes were conducted for the least preferred scenes to find any common characteristics in physical content for this group as noted in the following table.

Table 6: Physical Contents of the Least Preferred Scenes

Scenes	**Physical contents (%)**								
	Sky	bridge	building	vegetation	Urban elements	mountain	Cars-People	Ground surface	**Total**
14	46.0	11.3	10.3	0.2	3.8	0	0-0	28.3	**100**
16	32.8	16.6	10.2	1.4	9.3	0	0-0.7	29.0	**100**
17	43.7	12.1	4.2	2.8	6.1	0	0-1.1	29.9	**100**
35	22.5	17.6	8.4	5.2	17.3	0	0-0.5	28.4	**100**
37	26.0	19.5	2.0	13.6	3.7	0.2	1.1-7.7	26.1	**100**

In all of the scenes in this group, as the least preferred scenes, sky is one of the physical contents that have the largest proportion among other content. In the least preferred scene (scene 14) this amount was 45.98% of the whole area of the scene, the largest amount compared to other scenes. After sky, the main item presented in the scenes was the bridge structure followed by buildings and urban elements. In all of the scenes in this group, except for scene 14, cars presented and occupied up to7.75% of the scene area. In terms of vegetation, it is interesting that of all of the scenes in this group, vegetation had the lowest

proportion compared to other contents (lower 5%) except for scene 37 which had 13.64% of the proportion of whole area of that scene.

In terms of quadratic distribution of physical contents, the largest proportion of sky in this group (more than 90%), in all scenes, was represented in the top section, and generally in this section, the bridges were distributed equally on both, left and right side. However, in the bottom section of scenes, sky was mostly present on the right side.

In terms of the bridge structure, almost 80% of them were located in the top section and equally spreadon both sides, although in the bottom section a large amount of bridge structures were located on the left side.

Buildings in this group of scenes were more often represented in the bottom section, except in scene 37 where more than 92% of the buildings were located in the top section. It is interesting that in all of the scenes, buildings in the bottom section were located more towards the right side. Urban elements, the other physical contents in the scenes, were located in the bottom section more often, except in scene 37 where nearly 67% of these items were located in the top section. In addition, the bridges located in the bottom section were distributed somewhat equally on both sides in all the scenes.

In terms of vegetation as content with the lowest proportion of the whole scene area, the scenes presented vegetation in the bottom section more often, except in scene 35 where more than 90% of vegetation was located in the top section and on the left side.

As the most important finding of this part of analysis, the physical contents in these scenes wasdistributed on the right side more often.

In summary, as triangulation of the results from the three content analysis procedures suggests, including contents analysis of the scenes, analysis of the scenes by respondents' comments and Digimizer ofthe least preferred scenes, people least preferred the scenes that contained long span bridges (simplicity of form of bridges) with an opaque colour of the top part of the bridge (improper colour of thebridge), low amount of vegetation (arid environments) with a high amount of sky view and spacious area, buildings distributed on the bottom and right side more, and finally when the participants felt there was disorder, the view appeared unsafe, and fatigue occurred in the scenes.

Table 7: Quadratic Distribution of Physical Contents for the Least Preferred Scenes

Scenes	Quadratic Distribution of Physical Contents (%)																											
	Sky				Bridge				Building				Vegetation				Urban Elements				Natural Features				Cars/ People			
	top		bottom		top		bottom		top		bottom		Top		bottom		top		bottom		top		bottom		top		bottom	
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
14	**88.2**		**11.8**		**77.2**		**22.8**		**1.0**		**99.0**		**0**		**100**		**17.3**		**82.7**		**0**		**0**		**0**		**0**	
	54.5	45.5	26.3	73.7	23.5	76.5	60.4	39.6	100	0	23.5	76.5	0	0	0	100	100	0	56.2	43.8	0	0	0	0	0	0	0	0
16	**98.7**		**1.3**		**90.4**		**9.6**		**30.5**		**69.5**		**0**		**100**		**0**		**100**		**0**		**0**		**0**		**100**	
	58.5	41.5	47.9	52.1	53.9	46.1	100	0	7.5	92.5	39.9	60.1	0	0	62.4	37.6	0	0	44.5	55.5	0	0	0	0	0	0	39.5	60.5
17	**89.4**		**10.6**		**89.5**		**10.5**		**0**		**100**		**0**		**100**		**0**		**100**		**0**		**0**		**0**		**100**	
	52.0	48.0	50.0	49.9	54.9	45.1	100	0	0	0	10.3	89.7	0	0	89.9	10.1	0	0	58.4	41.6	0	0	0	0	0	0	66.0	34.0
35	**98.5**		**1.5**		**85.0**		**15.0**		**36.4**		**63.6**		**93.0**		**7.0**		**29.0**		**71.0**		**0**		**0**		**0**		**100**	
	47.8	52.2	0	100	27.1	72.9	45.5	54.5	34.6	65.4	43.9	56.0	100	0	51.5	48.4	83.2	16.8	56.5	43.5	0	0	0	0	0	0	100	0
37	**97.6**		**2.4**		**88.0**		**12.2**		**92.8**		**7.2**		**42.3**		**57.7**		**67.2**		**32.8**		**0**		**0**		**0**		**100**	
	39.2	60.8	0	100	53.8	46.2	100	0	94.0	6.0	0	100	73.2	26.8	56.0	44.0	4.6	95.4	63.5	36.5	0	0	0	0	0	0	0	100

DISCUSSION

An analysis of the most and least preferred scenes reveals the common characteristics of the scenes based on such attributes as a bridge structure, presence of physical contents, arrangement of physical content, spatial configuration, and environmental condition of scenes did affect participants' preferences for pedestrian bridges in urban areas.

In summary, people most preferred the scenes that contained an unusual form of bridge with brightly coloured top section of the bridge. The preferred scenes contained a high amount of good quality vegetation, ordered buildings mostly located in the top section and left side, low to moderate amount of sky view, which generally indicated the scenes were not spacious, but ordered scenes. These scenes were described as clean, safe, calm, beautiful and good in a general view in the opinion of the respondents. In contrast, people least preferred scenes that contained simple form and long span bridges with opaque colour of the tpo, arid scenes (lack of or low amount of vegetation), disordered and indistinctive buildings in the background, mostly in the bottom section and right side, high sky view in a spacious area, and generally disordered or messy environments. According to Digimizer, generally, in the most preferred scenes, the sky occupied less of an area compared to the least preferred scenes. Furthermore, vegetation show as a greater percentage in the most preferred scenes (see Table 8).

Table 8: Comparison of the Most and Least Preferred Scenes

Analysis Procedure	**The Most Preferred**	**The Least Preferred**
General Content Analysis	-bright colour, medium to short span, -unusual form of bridge -High veg. of good quality, in front -Visible and different form of urban elements (bus station, gas station) -Ordered & connected building beside bridge -Low sky view -Closed area -Ordered scenes	-Opaque colour of the bridge, long span -Simple form of bridge -No & low veg., bad quality -Low presence of urban elements -Disordered and indistinctive buildings at background -High sky view -Spacious area -Disordered scenes
Participants 'Comments	**Scene 32**= clean, safe, calm, beautiful, the proper colour of the bridge and good **Scene 18**= clean, safe, proper colour of the bridge, calm, order, good, beautiful, open space, good shape of bridge, high quality of elements, happy, green scene	**Scene 16**= arid, fatigue, unhappy, ugly, bad uniformity of elements, improper colour of bridge, simple, calm **Scene 37**= crowded
Digimizer Analysis	**sky view=** between 5-34% **bridge=**between 13-22% **building=**0-15% mostly on Top-Left **urban elements=**between 5-15% **Veg.=** between 3-25% **Presence of mountain in most preferred scene** **cars** =between 0-0.9% **people=**between0-0.9%	**sky view=**between 22- 46% **bridge=**between 11-19% **building=** between 1-10% mostly on Down-Right **urban elements=** between 3-17% **Veg.=** between 0.1-13% **No distinctive mountain** **cars =** between 0-8% **people=**between 0-0.1%

From the findings of these three analyzes, we can conclude that the visual attributes of an urban landscape can influence the aesthetic preferences of pedestrian bridges, and, it can also be concluded that the most important factors that influencing the preferences of pedestrian bridges generally relate to the colour of the top parts of the bridge, length of bridge span, presence and amount of vegetation, location of buildings in the scenes, amount of sky view, spaciousness and cleanliness of the scenes, safety, and finally the overall order of the bridge scenes.

Further from the revealed results for the aforementioned analysis, the following discussion is presented:

In terms of colour, according to Garcı´a *et al*. (2003) and Magill & Litton (1986) colour is one of the variables that can define the visual and aesthetic aspects of any object. Also Bishop (1997) and Ca˜nas (2009) argued that there is a strong positive association between preference and certain landscape attributes esspecially the colours in the landscape. In addition, they believed that the visual quality of an object in the landscape is influenced by the factors related to the object and one of the main factors related to the object is its colour. It is presumed that colour provides contrast within the visual scene, thus, creates an attractive environment. Garcıa *et al*. (2003) and Espanol (1995) also argued that bright colours and shining surfaces tend to attract the attention of people more. These findings are also supported by Zuk (1973); Reese (1976); Listavich (1997); Leonhardt (2001) and Gottemoeller (2004), who argued the importance of consideration of colour as a potential factor in aesthetic qualities specifically for pedestrian bridges. Nevertheless, Minnesota Department of Transportation (1995) in their report "Aesthetic Guidelines for Bridge Design" argued that creating harmony or contrast between the colour of bridges and their environment should depends on the purpose of the project and should also consider seasonal changes and day lighting situation.

In terms of vegetation, according to R. Kaplan (1983); Herzog (1989); Schroeder (1986); Hull & Harvey (1989); Sheets & Manzer (1991) and Nasar (1997) vegetation is strongly preferred in urban areas. The authors found a significant positive impact of vegetation on environmental preferences. Many other scholars in the field of bridges aesthetics such as Leonhardt (1984), Gottemoeller (2004) and others found that the presence of vegetation and landscaping in surrounding environments can add to the aesthetic qualities of the bridges. Therefore the results from this part can support the theories regarding the importance of vegetation in aesthetic qualities and concluded that it can affect people preference for the pedestrian bridges.

In terms of mountains, in addition to Arriaza *et al*. (2004), Beza (2010) also considered mountains as a benchmark of a beautiful landscape and argued that they have a positive influence on preferences. In the field of bridge aesthetic C. Menn (1986) concluded that the bridge scenes in which mountains act as a background can create a contrast with the bridge structure and the aesthetic values dramatically increased. We found interesting similarities between the results of other related studies in the way of aesthetic qualities of pedestrian bridges in urban areas.

In terms of the sky view, the results are in line with the studies of Shafer *et al*. (1969); Buhyoff *et al*. (1984); Anderson & Schroeder (1983) and Hammitt *et al*. (1994) that found the "area of sky" is a negative predictor for visual preference of landscape. According to Hammitt *et al*. (1994) this occurs because the area of sky is a surrogate for other features, specifically in the absence of attractive features such as ridges, rolling plateaus and water, therefore, when there are a high proportion of sky view the probability to see other features consequently decreased and therefore appearsless preferable for people. Anderson and Schroeder (1983) stated that a high amount of sky view always come along with the view of

overhead poles and wires and as a result reduced tree cover, thus, affecting preferences in negative direction. Therefore ifhe sky is considered to be a background for landscapes it seems to be perceived disassociated from the landscape and it may occur due to three potential reasons which are lowering the scene complexity, potential visibility of urban facilities which are not interesting and finally the sky might be perceived polluted.

In terms of building face and age and also their position in the scenes, some studies concluded interesting findings in line with the findings of this study. According to Stamp and Miller (1993) the presence or absence of buildings doesn't make sense for visual preferences in landscape, however, Sayadi *et al*. (2009) argued that presence of buildings in landscapes influences landscape aesthetic appreciation, therefore, the amount of buildings and preference of landscape show a negative relationship. These findings can support my results especially for scenes with lower preference points, because in the least preferred scenes the presence of buildings is very low. On the other hand Groat (1984) found that faced characteristics of buildings such as age; ornaments, cleanliness, ordering and etc., may have a stronger influence on people preferences in urban areas. Similar to the previous analysis also this analysis found that position of buildings in the scene can be considered to be an affective factor of preference of pedestrian bridges in urban areas in which the buildings that located in the top section and left side of the scenes are more preferable than the buildings that located in the bottom section and right side. Also similarly, because there is no other argument in this regard to support this phenomenon, further research is needed to validate these findings.

CONCLUSION

Through the preference survey, in the 5 highest rated scenes that contained pedestrian bridges in different urban areas, the mean scores ranged between 2.61 to 2.39 however the mean scores for the 5 lowest rated scenes ranged between 1.65 to 1.83. For the most preferred scenes, content analysis the scenes revealed that bright colours of the top part of the bridge, various form of bridges, and the presence of vegetation of good quality made those scenes the most preferred ones.

Finally, as the most important finding of this study, it can be revealed that utilizing Digimizer software can potentially triangulate the results from content analysis approach. As the results form content analysis and respondent's description apparently is in line with the results from Digimizer's analysis. Other studies have evaluated the physical attributes by analyzing landscape structures and attributes through utilizing Adobe Photoshop software (Hagerhall *et al*., 2004; Kenwick *et al*, 2009; Svobodova *et al*., 2012) Our study, by contrast, investigates the aesthetic preferences for pedestrian bridges in urban landscape on the basis of an analysis of photographs by utilizing a new software Digimizer as an effective approach for analyzing the scenes for intensity of physical contents and also their quadratic distribution in the scenes and also triangulate the findings from Content Identifying Method (CIM).

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