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The Effect of Environmental Graphics on the Attractiveness of Museums Interior Architecture*

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Abstract

This study investigates effects of environmental graphics on the museum's interior architecture. Organizing the interior of museums through the arrangement of elements in the space helps to attract more audiences as well as provides a cultural link. To reveal this connection, the study utilized a survey, which conducted by 256 visitors at the Museum of Contemporary Art in Tehran. The main issue of this study is: what is the first effect of environmental graphics on the museum's interior architecture? And what features of environmental graphics make museum interior architecture more attractive? The findings of the research were that the museum's interior architecture by interior environmental graphics make an integrating into the vertical movement of the visual elements with the horizontal arrangement of the visual elements in space, and the features of arranging the museum's interior architecture included an appropriate combination of contrasting spaces, harmonious relationships between space and light, and the artworks and dynamics of the horizontal arrangement of visual elements in space. Finally, it can be concluded that the museum's interior architecture creates a cultural connection and attraction by integrating the vertical movement of the visual elements with the horizontal arrangement of the visual elements in space.

Keywords: Museum, Interior Architecture, Environmental Graphics, Interior Design, Contemporary Art Museum.

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A. Introduction

Environmental graphic plays a major role in achieving attraction of audiences as a part of the graphics arts, and it covers a large part of the advertising and business activities. The environment we live in, the street we walk through, the greenery we walk in, the park we go to have fun for, everyone needs to establish logical rational relationships and strict organization relationships based on the principles and basics of visual expression. Environmental graphics are the visual beauty and harmony of space desirable. In fact, the purpose of all graphic designs for the interior and exterior is to create a space for a vibrant, healthy and compelling life. The use of environmental graphics in the area of the interior space of the museum is effective and essential for the proper and desirable environmental structure (Iloukhani, 2009; Ostovar, 2013).

The human being speaks with the surrounding environment through environment graphics, and communicates with others. The environmental graphic plays a role in creating a pleasant atmosphere for people in the community. An appropriate environment is the space which human can grow and flourish without the unwanted psychological pressures, and this is the rational and logical demands of every society. In the present world, graphic art is required to be part of its activities in the service of other sciences and arts, such as architecture, urban environment, and to participate in arranging and creating amenities and enriching the urban space. Nowadays, museums are more than just local places for carrying, keeping or displaying works of art, and in many cases they have become as regional, national, and religious attributes. Apart from the cultural and social role of museums, their economic role in attracting tourists, such as the effect of museums construction on the increase of tourist and development of cultural tourism in the Western countries, can be noted (Nafisi, 2001; Cesar & Lockwood, 2008).

Nowadays, with the increasing role and position of architecture, an inseparable link between the museum's architecture and its artworks has been created, and many artists and art foundations have come to the museum's architectural values and are trying to make the maximum use of arts, especially graphics and environmental graphics, in order to advance their goals (Macleod, 2012). Therefore, in this research, the contemporary arts museum of Tehran are considered and studied in the format of survey research. So the main issue of this research is: what is the first effect of environmental graphics on the museum's interior architecture?

B. Methods

1. Research questions

- What features of environmental graphics make museum interior architecture more attractive?
- What is the first effect of environmental graphics on the museum's interior architecture?

2. Research hypotheses

- The features of environmental graphics that make the museum interior architecture more attractive are included a combination of interior conflicting spaces, harmonious relationships between light and interior space and artwork, integration of vertical movement with horizontal arrangement of elements (forms) in

the museum interior space, dynamic of elements (forms) horizontal movement in the museum interior space.

- The first effect of environmental graphics on the museum's interior architecture that make the cultural belief and attachment to interior space of museum is the dynamics of elements (forms) horizontal movement in the museum interior space

3. Research purposes

The main purposes: A study on the effect of environmental graphics on the museum's interior architecture.

The secondary purposes: To achieve the principles and methods of organizing in the museum interior space for the purpose of designing modern art museums and formulating principles and criteria for the design of art museums.

4. Research Methodology

This research is purposeful, applied and in terms of studying variables, field and considering the wide range of study in theoretical foundations and theoretical framework for data processing, is a survey research type. In collecting data, library and field methods have been used. By referring to the texts of documents and books, collecting information in the form of taking notes and then deducing from the texts, by analyzing the content of the text and clarifying the texts of the principles and criteria of them The data were collected using a Morgan sampling table and a questionnaire (250 from 256 questionnaires) randomly and systematically and qualitative questions, and finally converting them into numerical and quantitative parameters of the audience and museum visitors. Finally, SPSS software was used to analyze the data obtained from field studies and to answer the research hypothesis.

5. Data collection tool

Due to the extensive research in its various stages, different tools will be used; for example, taking notes, using computer and non-computer library resources, commentators' comments, questionnaires and etc.

6. Information analysis method

By using the qualitative and descriptive method, the topics obtained from theoretical foundations and their conversion into quantitative amounts will be carried out in relation to the research samples, including the stages of recognizing the status quo, formulating the goal and analysis, and finally, based on the principles derived from the theoretical discussions.

C. Theoretical framework of the Research

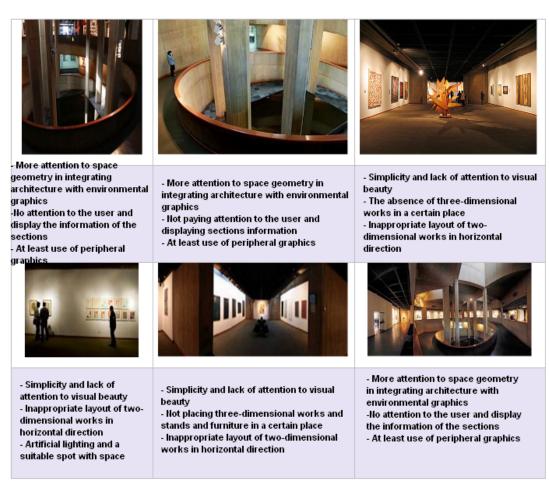
Denis Mc Quail's theories on the quality of museums' interior space, based on the classification of space indicators in the museum, and three levels of evaluation: Primary and middle and large in the museum have been selected as a basic theory of present research. Mc Quail has key works in culture and media and he is one of the most important theoreticians of identify the audience of museum. His works are known as a foundation of contemporary artistic-cultural studies. His approach to field studies is focused

on how the audience has encountered, whether it is attraction or repulsion. It means that, space whether being three-dimensional such as museum architecture or two-dimensional such as an artwork in a museum, is not passively accepted by the audience and it depends on cultural background of the individual. In fact, this is the cultural background of audience that can explain how some audiences accept a certain space of architecture while others reject it. These ideas developed later in the Mc Quail's model of space-making for the audience (Mc Quail, 1997; Mc Quail, 2006).

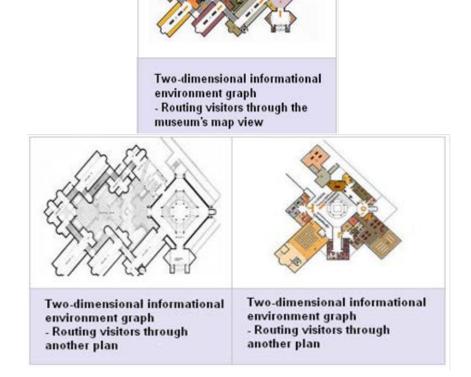
D. Discussion

1. The environmental graphics of the Contemporary Arts Museum in Tehran

In Figures 1 and 2, the researcher has investigated and analyzed image examples of the interior of the Museum of Contemporary Arts in Tehran, and, while highlighting the characteristics of the interior graphics index of the museum, has explained the most important visual and graphical attributes.



Figures 1. Interior Graphics of the Tehran Museum of Contemporary Art. (Researchers, 2016; Booker & Stone, 2009)



Figures 2. Examining the examples of applied two-dimensional environmental graphic art in the Tehran Museum of Contemporary Art (Map and Visual Symbols) (Researchers, 2016; Saremi, 1993).

Table 1. An Analytical Comparison of the Quality of the Impact of Internal Environmental Graphics on Visitors from Art Museums (Tehran Museum of Contemporary Arts) (Researchers, 2016, KO & Stewart, 2002).

	Written signs	Visual signs	Guide boards	Guide maps
			- Lack of proper	
	- Simplicity and lack	- Attractions for	placement in a	- Lack of attraction
	of attention to	children	particular place	for the age group
First group	beauty	- Dumb and	- Relative and	- Lack of visual guide
(Children)	-A little attraction for	ambiguity	appropriate human	maps
	children	- Failure to observe	scale	- The need for a
	- lack of readability	observing standards	- Lack of suitable	graphical
	required		attractions for	representation of
			children	information
				-No existence and
	-Available acceptable	- Unpredictable	- Lack of proper	installation of
	standard for readings	location of signs	placement in a	necessary maps
Second group	- Less Attention to	- Less Attraction for	particular place	- Lack of detailed
(Teens)	Writing Symptoms	Teens	- Relative	guide maps
	- Simplicity and lack	- No attention to	proportions and	- Not paying
	of attention to	observation	scale	attention to the user

	beauty	standards	- Lack of attraction for teens	and displaying sections information
Third group (Youth)	- Pay attention to the written signs - Take acceptable standards for readings - Simplicity and lack of attention to beauty	- Unpredictable location of signs - Less interest for young people - No attention to observation standards	- Lack of proper placement in a particular place - Relative proportions and scale - Lack of enough attraction for young people	-No existence and installation of necessary maps - Lack of guides for mapping - Not paying attention to the user and displaying sections information
Fourth group (Adults)	- Pay enough attention to writing symptoms Take acceptable standards for readings - Simplicity and lack of attention to beauty	- Unpredictable location of signs - Lack of attraction for adults - No attention to observation standards	- Lack of proper placement in a particular place - Relative proportions and scale - Lack of attraction for adults	-No existence and installation of necessary maps - Lack of guides for mapping - Not paying attention to the user and displaying sections information

Table 2. Quality of Interior Design of Museums Based on Space Indicators (Researchers, 2016 & Regidor, 2009 & Richards, 2007)

	Macro level	Intermediate level	Micro level	Considerations
Museum focuses on artwork	- Simple geometric form, purity, and simplicity of volume - Specific volumetric composition - The togetherness of Euclidean Geometry - Low tourist attraction - Simplicity and complexity of the structure - The relative costs of construction and materials - Don't have any leading architectural features	- Neutralization of interior spaces to pay more attention to artwork - Existence of specific hierarchies -Pregnancy of space in terms of form and volume in general - Similar perspectives along the way	- Arrangement of works in certain places - The division of spaces based on the types of arts - Observe the human scale in most spaces - Emphasizing the details of spaces on the importance of artwork	Such museums often follow the principles of modern architecture and are not representative of the leading architecture of the present day as new art.
Museum focuses on exhibition space	-Complex geometric form and use of modern materials - Having a continuous form and emphasizing the sculpture of the building - Non-compliance with Euclidean geometry - Having a tourist attraction for the city - The complexity of the structure - High cost of construction and materials	- Impact of the Museum's Museum on the display of artwork - A wide variety of space plans and plans - Unpredictable form and volume of each space - Various perspectives and excitement in the audience for frequent discovery of the spaces	- Not considering a definite place to display artwork - No division of any space for a particular art form - The scale of the occasional, sometimes human, spaces - Emphasizing the details of more space for self-portraiture to artwork	These museums often represent the full-fledged architectural masterpiece of their time and are themselves a new art in the field of architecture, and this feature attracts more tourists, not just to visit an art museum.

- Purity of form materials while complexity of vortice of complexity of vortice of the structure of the structuring under the structure of the structure of the structuring o	- The role of space and art equivalents - Absence of definite boundaries for any space but controllable by moving walls - Unpredictable spaces due to plan dynamics - Various perspectives and excitement for discovery while integrating the spaces	- The dynamics of space and the possibility of displaying types of new Artworks - The absence of a definitive division of space for a particular art - Multiple display features in every space - Details of spaces such as moving walls to improve the possibility View and emphasize the importance of the effect	These museums represent a leading architecture of their time and provide the right place and place for presenting and displaying new artwork, quality, and environmental facilities.
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E. Research findings

With a survey of a total of 250 from 256 visitors at the Museum of Contemporary Art in Tehran, which has been evaluated, 41% are women and 59% are men, based on different types of audience classification (gender, age group, level of education, field of education, type of job, specificity, etc.) can be directed toward research, and each one needs an independent and separate research. The researchers achieved statistical data by dividing the two indicators of the age group and the level of education, with the percentage of the target audience, 8% between 10 and 20 years, 36% between 20 and 30 years, and 38% between 30 and 40 years, 14% between 40 and 50 years old and 4 percent above the age of 50 years. The age group of 20-30 years and 30 to 40 years old with the slightest difference in the number and the age group over 50 years old included the lowest number of museum visitors. From the viewpoint of education, 4% of the visitors were sub-diplomas, 6% had diplomas, 10% had collage degrees, 40% had undergraduate degrees, 30% had mastered, and 10% had doctoral degrees. In this indicator, visitors with a bachelor's degree of 40 percent and a sub-diploma with 4 percent were the lowest (Table 3 to 6). Then, the rate of attraction of the audience in each of the indexes of interior design with numerical and numerical abundance was investigated and graphically verified and believability and attachment to space and the horizontal positioning dynamics of the elements have the highest rate and the cultural link with the works and objects and the contiguity of the opposite spaces have the lowest that based on the relationship between the indicators of the organization of space with two levels of education (Table 7) and quantitative absorption rates (Table 8), the quantitative amount of adsorption in the graphic chart 1 with purple color as the highest and the least amount of absorption of the audience and the 2nd graphic chart is displayed in yellow, the highest and the red color is the least attracted to the audience.

Table 3. The Process of Indicating Variables in the Research Survey (Researchers, 2016; Richards & Munster, 2010)

Variable	Index of study
	-Recreation and leisure
The motivation to visit the museum	-Familiarity with culture and art
	-Artistic research
	-Appearance (space, form, color, etc.)
	-Satisfaction of the museum facilities
	-Satisfaction with organizing the interior of the
	museum including:
	Arrangement of objects, artwork, color, light, and etc.
	-Satisfaction with access to the museum (guides, signs

Visitor satisfaction from the museum	and signs, access routes, etc.) Satisfaction with the color scheme of the interior of the museum Satisfaction with the selection and arrangement of light in the interior of the museum
	Satisfaction of the charm of the interior environment
	of the museum

Table 4. Frequency percentage of incentives to visit the museum in the audience (Based on age group) (Researchers, 2016)

	Incentives to visit the museum								
Age group	Recreation and leisure	Familiarity with culture and art	Artistic research	Appearance (space, form, color, etc.)	Other cases				
10-20 years	8	2	1	7	2				
20-30 years	21	16	18	25	10				
30-40 years	16	19	23	21	16				
40-50 years	11	6	5	10	3				
>50 years	4	1	1	3	1				
Total	60	44	48	66	32				
Percentage (%)	24	17.6	19.2	26.4	12.8				

Table 5. Frequency percentage of visitors according to the satisfaction of organizing the interiors of the research museum (Researchers, 2016)

Very much		Much		Moderate		Low		Very low	
Frequency	percentage								
18	7.2	25	10	87	34.8	71	28.4	49	19.6

Table 6. Frequency percentage of satisfaction indices and attracting audiences in visit of Tehran museum of contemporary arts (Researchers, 2016)

	Audiences satisfaction in visit of museum						
	Satisfaction of	Satisfaction with	Satisfaction with	Other cases			
	the museum	organizing the	access to the				
	facilities	interior of the	museum (guide				
Age group		museum	maps, signs,				
		including:	access routes,				
		Arrangement of	etc.)				
		objects, artwork,					
		color, light, and					
		etc.					
10-20 years	6	4	5	5			
20-30 years	18	25	20	27			
30-40 years	20	21	24	30			
40-50 years	8	5	8	14			
>50 years	3	2	2	3			
Total	55	57	59	79			
Percentage (%)	22	22.8	23.6	31.6			

Table 7. Frequency percentage of audience attraction based on education in each of the effective indicators in the museum interior space organizing of research sample (Researchers, 2016)

Audiences based on education	The effective indicators in the museum interior space organizing								
	The conjunction of opposite spaces	Believability and attachment to space	Cultural link with artworks and objects	Coordinated relationships between space and light and artworks	Vertical movement of the audience's view in space	Dynamic horizontal arrangement of elements in space	Integration of the vertical movement of the audience's view and the horizontal arrangement of the elements in space		
Sub- Diploma	-	2	-	-	1	2	1		
Diploma and Associate Degree	-	8	-	-	1	15	10		
Bachelor Degree	6	25	-	18	7	22	19		
Master Degree	5	20	5	16	10	12	7		
Doctoral Degree	3	8	2	3	3	4	2		
Total	14	63	7	37	22	55	39		
Frequency (%)	5.6	25.2	2.8	14.8	8.8	22	15.6		

Table 8. Frequency percentage of audience attraction in the indicators for the museum interiors space organizing (Researchers, 2016)

Rate of the a						
Very much	Much	Moderate	Low	Very low	Quantitative statistics	Indicators of interior design of the museum
34	21	37	57	101	Total number (people)	The conjunction
13.6	8.4	14.8	22.8	40.4	Frequency percentage	of opposite spaces
80	60	55	34	21	Total number (people)	Believability and
32	24	22	13.6	8.4	Frequency percentage	attachment to space
22	14	69	58	87	Total number (people)	Cultural link with
8.8	5.6	27.6	23.2	34.8	Frequency percentage	artworks and objects

52	44	30	75	49	Total number (people)	Coordinated relationships	
20.8	17.6	12	30	19.6	Frequency percentage	between space and light and artworks	
43	31	23	91	62	Total number (people)	Vertical movement of the	
17.2	12.4	9.2	36.4	24.8	Frequency percentage	audience's view in space	
72	54	39	45	40	Total number (people)	Dynamic horizontal	
28.8	21.6	15.6	18	16	Frequency percentage	arrangement of elements in space	
58	49	31	62	50	Total number (people)	Integration of the vertical	
23.2	19.6	12.4	24.8	20	Frequency percentage	movement of the audience's view and the horizontal arrangement of the elements in space	

Chart 1. Frequency of audience attraction in each of the indicators for organizing the interiors of the research museum (Researchers, 2016)

Frequency of audience attraction in each of the indicators for organizing the interiors of the research museum

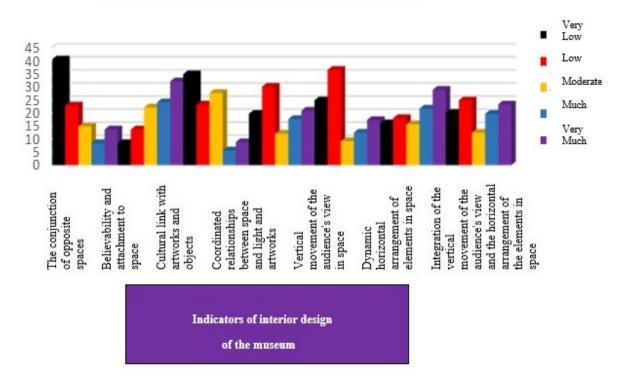
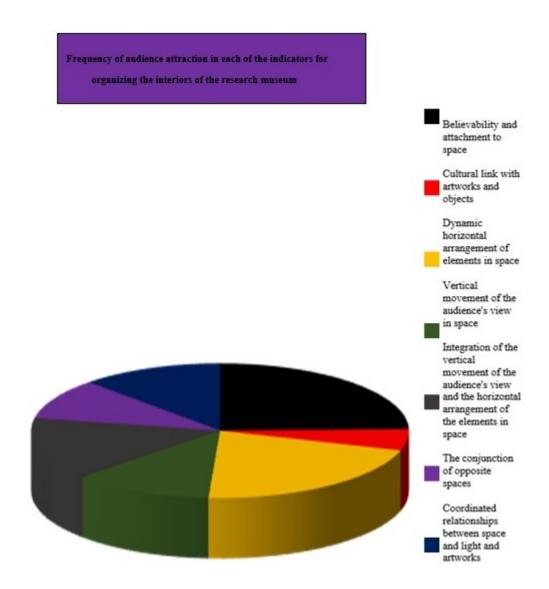


Chart 2. Volumetric abundance of contact absorption based on the indexes of the interiors of the Museum of the Sample (Researchers, 2016)



F. Conclusion

According to Mc Quail's theory, the interior space of museums are classified according to the quality indices of space. Because he believed that each of these indicators included a particular group of audiences, which included either general or special audiences, or a combination of both. Based on his approach to how the audience is exposed to space, this breach depends on the background of the individual's cultural background. In fact, this is the cultural field of the audience that can be explained; how some audience accept the particular space, while others reject it. However, in many countries, museums are designed in such a way that different parts of the museum play the role of culturally using visual attraction. Before considering the results of the research, the following key points are necessary:

- The basic element of each museum is the object-audience relationship, and graphics are like a bridge for this relationship.
- Designer art in the design of the museum will be a suitable companion to complementary or complementary activities through the use of various arts such as graphics.

- The interior architectural features of the museum should be in accordance with the harmonious relationships of form, space, light, and art that forms the internal environment of the interaction and communication.
- The architecture of the museum should be such that its social mission direct contact with the audience
- is taken into account and the aesthetic issues are observed.
- In the realm of the show, no space can be considered to be absolutely communicative. The smallest level of the museum should also serve to provide information and display works for the audience.
- In the architecture of the museum, the circulation circle of the visitor and the route of the staff and the route of the works should be separated.

Question 1: What features of environmental graphics make museum interior architecture more attractive?

Hypothesis 1: The features of environmental graphics that make the museum interior architecture more attractive are included a combination of interior conflicting spaces, harmonious relationships between light and interior space and artwork, integration of vertical movement with horizontal arrangement of elements (forms) in the museum interior space, dynamic of elements (forms) horizontal movement in the museum interior space.

The answer to hypothesis 1: Considering what was described in the main body of research and findings, policies for increasing the number of visitors and attracting them are not limited to the expansion of space features, including the proper combination of conflicting spaces and coordinated relationships between space and light and artworks and another items are effective. On the other hand, field observations and the use of questionnaires in accordance with Tables 6, 8, 9, and 10 as well as Figures 1 and 2 and the statistics obtained from the sample size of 250 people indicate that the first hypothesis of the research is approved. To test the hypothesis shown in Table 11, Cramer's correlation coefficient, is used.

Table 9. Cramer's correlation coefficient testing the museum interior architecture and attraction and satisfaction of the audience by environmental graphics (researchers, 2016)

Independent variable	Dependent variable	Correlation Coefficient	Significance level
Museum interior architecture	Attraction and satisfaction of the audience	0.037	0.004

Considering the above table and the probability calculated, since the resulting cultivars are smaller than the refractive index at the alpha level of 0.05, it can be concluded that the museum interior architecture according to environmental graphics and structural features of space, including the assumed features in the hypothesis of a research, can be a requirement for attraction and satisfaction of the audience and then to make museum interior architecture more attractive.

Question 2: What is the first effect of environmental graphics on the museum's interior architecture?

Hypothesis 2: The first effect of environmental graphics on the museum's interior architecture that make the cultural belief and attachment to interior space of museum is the dynamics of elements (forms) horizontal movement in the museum interior space

The answer to hypothesis 2: According to the findings and conclusions of the research, according to Tables 6, 8, 9 and 10, as well as Figures 1 and 2, and the statistics obtained from the sample size of the current research, it is suggested that the second hypothesis of the research and, in fact, the final theory is approved. Research has shown that there is a close relationship between the museum interior architecture and the effect of environmental graphics, and the quality of this relationship is how these indicators are influenced by the attraction of the audience to the museums and its environmental graphics.

Table 10. Phi and Cramer's coefficients between the museum interior architecture and effect of environmental graphics

Independent variable	Dependent variable	Correlation Coefficient	Significance level
Museum interior architecture	Effect of environmental graphics	0.468	0.021

As can be deduced from Table 12, according to the visitor's viewpoint and with the probability rate calculated to be smaller than the rejection area at the alpha level of 0.05, it can be concluded that there is solidarity between the museum interior architecture and the effect of environmental graphics. In addition to the above statistical analysis, the hypothesis can be examined through Table 9 and Table 10. According to the information of this table and the final data obtained from the survey with a questionnaire, of which 250 visitors were visited, features: Combining the vertical movement and the horizontal arrangement of the elements in space, and the dynamics of the horizontal arrangement of elements in space, including the best practices for attracting audiences to the museum from the duct of arranging in the interior.

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