

## **A Proposed Study to Measure the Impact of Buildings Functions On Their Architectural Facades**

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### **ABSTRACT:**

This research paper contributes to the investigation of the contribution of proposing and designing a measurement method that can determine the extent of the reflection of the impact of buildings' functions on their architectural facades, and to measure the ratios and rates of reflection and reading of the building's function in advance from looking at its architectural facade by conducting a survey. This applied research study is an important step in The direction of a deeper understanding of the types of architectural facades and the mutual influence between them and the function of the building, and to what extent the indication of the function of buildings is clear and legible in their architectural facades. The research methodology is based on defining the research problem, then presenting the importance of the research field, defining the objectives, then studying the previous literature related to the research, defining applied study cases, choosing the proposed measurement method, and the reasons for choosing the applied study samples, then making questionnaire forms to conduct the research survey. The research study sample was selected from 100 people from Architects, designers, specialists in the field of architecture, and students of the architecture department in a number of universities in different schools and architectural orientations. Interchangeability with the function of the building for the public or lack of understanding of the criteria presented in the questionnaires, then monitoring the results, and the most prominent in the results is that it was found from the statistical analysis that the academic facades of religious buildings got the first place in the arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function where It is characterized by the greatest effect of function reflection on the facade of the building from the point of view of the selected research sample, with an average score of (2.3), with a percentage of 17%. While it was found from the statistical analysis that the facades of the fantasy got the ninth place in the ranking of centers for the types of architectural facades for buildings, according to the strength of the indication of the function, as it is characterized by a very weak amount of the impact of the function's reflection on the facade of the building from the point of view of the selected research sample, as its average score is (0.7), with a percentage of 5%. The research paper recommends applying the applied research study on a wider scale and on a larger scale to all segments of society in order to better understand the public's feelings and interpretations of the types of architectural facades and the impact of function reflection on them in the different functions of buildings to measure the extent of their awareness and identify the understanding and awareness of the general users, which has been proven from previous studies that it often differs. About the understanding, analysis, interpretation and

preference of architects and specialists in this field, as well as the need to increase cultural and scientific awareness among designers and society about what is being developed of new types of architectural facades for buildings in order to keep pace with contemporary architecture around the world.

### **Keywords:**

Expression of building function, classifications of contemporary architectural facades, architectural statistical measurement method.

### **Research problem:**

Today it has become a basic requirement in the design that the architectural facades express the function or functions of the building and the development of this trend in the current era is much from the previous eras and times in architecture throughout civilizations, where the facades of buildings were similar despite their different functions, and the designers paid attention to this problem And they worked on solving it by studying, researching, experimenting, and using the statistical measurement method to determine the extent of the success of the impact of the building's functions on its architectural facades, and to arrange this compatibility of strength and weakness based on the viewpoint of designers and researchers specialized in the field. The clarity of the image also in measuring the extent of its impact on the occupants of the spaces, this has become one of the biggest obstacles in the way of studying and analyzing the components and vocabulary of the architectural environment, and therefore the research aims at the necessary need for a proposal to measure the extent of the reflection of the impact of the buildings' functions on their architectural facades.

### **Objectives:**

- Analysis and evaluation of building facades and the success of the building's exterior in expressing its internal function.
- Eliciting and analyzing the distinctive philosophical relationship between the extent to which man is affected by the function of the building and the extent to which he is affected by the external composition of the building and its architectural facades.
- Presenting a critical and analytical study of the types of architectural facades (technological interactive media interfaces - academic facades - technical facades - structural facades - facades with philosophical significance - ... etc.) that helps in finding a scientific, philosophical and academic classification for the types of facades of architectural buildings.

### **Research methodology:**

To achieve the main objective of the research, the research study relies on the following methodology:

- Determine the research problem
- The importance of the research field of study.
- Setting goals
- Studying the literature and previous theoretical studies related to the research topic.
- Introducing the applied study cases and choosing the proposed research measurement method.
- Reasons for selecting applied study samples

- Making and designing questionnaire forms to conduct a survey in the field of research.
- Monitor results.
- Interpreting and analyzing the results in the light of theories and previous theoretical and analytical studies.
- The necessary scientific recommendations.

### **1- Introduction:**

The facades of buildings are the first view of the outside world and give the initial reflection of the building, and they are the first thing to look at and express the taste and personality of the designer. Because it is the visible part of the architectural work, so the façade must be of sophisticated and philosophical beauty that is not artificial, which expresses the designer in the first place and the occupants of the building in the second place. As it was in ancient historical times, the design of buildings focused on the facades and was concerned with their decoration, then the matter changed, so the focus was on the projections first, especially after the development of architectural education. To consolidate the dialectical relationship between the architectural facade of the building and its internal function, as the building is a living being in its structure, and a mass of sensations and feelings reflected in its facades, as something can be expressed by taking a preliminary look, so we describe it. Scientific and academic aspect.

### **2- Theoretical background:**

#### 2-1-Definition of architectural facades:

The architectural façade is the mirror that reflects the apparent state of the building and expresses its internal function with a certain inspiration. The façades of the buildings do not express the artistic side of the building only, but rather embody the prevailing style and culture of the place and even the era to which it belongs. [1]

#### 2-2- The concept of functionalism:

Functionalism as a theory in architecture began in the nineteenth century. Le Corbusier was the most prominent one who applied this theory in all his buildings and one of the most important developers and supporters of functionalism in all its principles. Therefore, this theory is associated with the name of the architect Le Corbusier, but it is not unique to him alone. One of the first to appear with this theory was the American Horatio Greenough, who concluded that the architectural form must be a natural reaction to the benefit, as it happens in all creatures. Then came Louis Sullivan, who advocated that form should follow function. [2] The concept of the architectural function of the building is that it is not limited to mere consideration of movement paths, lighting outlets, spatial ventilation, elements of communication, movement, etc., but rather goes beyond it to include all biological, psychological, cultural and social human needs.

#### 2-3- The relationship between the architectural facade of the building and its function [3]:

The relationship between the architectural façade of the building and its function is represented in the extent of flexibility in the expression of the outer envelope of the building for its internal function, and from a modern perspective, is it necessary to achieve its functional goals more or not? In light of this question, the functions of the architectural facades of modern buildings always appear and are embodied as follows:

- Protection from the negatives of the surrounding environment: This includes thermal and sound insulation, wind, rain and various pollution.
- Achieving the Attraction Factor: There are buildings that need to be in appearance or formations that attract the public to them, such as commercial, recreational or cultural buildings, such that the facades are completely transparent to allow identification of the commercial or entertainment inside them, or they can be facades of public libraries or museums that aim to attract passers-by and raise the cognitive and cultural level of the population.
- Connection or isolation between the inside and the outside: It includes providing lighting, natural ventilation, a view of the outside, living in the natural environment, and communication between residents. It can also provide visual and acoustic privacy when needed.
- Distinction of the building: There are buildings with sublime or important functions such as religious buildings or with national functions, or that need to distinguish themselves in the area in which they are located, or to be distinguished from the surrounding buildings.
- Expression of a function: the facades began to express the function or functions of the building and the development of this trend so that today it has become a basic requirement in the design.
- Moving away from the ornamentation and abundance of details, and replacing it with work on the principle of simplicity in shapes, whether for the whole building or the façade. Here, the famous geometric shapes are clearly used, which shows the beauty and distinction of the space in terms of the materials used in the windows and doors.
- The novelty of materials and techniques used in construction and building, for example relying on iron columns in building the structure, while concrete blocks are used as finishing materials, and also the use of iron supports in the middle of the columns, in order to leave open spaces between the columns to be used later easily.
- Relying on the idea of visual communication between each of the interior space of the building, the façade and the external site, and here the glass is used extensively and includes vast areas on the one hand to form a wonderful view, especially if it contains landscapes, and the second reason is to provide the largest amount of natural lighting. In terms of the interior, emphasis has been placed on making the interior spaces open to each other, and reducing the use of walls, especially in companies, and dispensing with the division of spaces and interior spaces in order to become one space and a practical, coherent and open mass. Therefore, here it is necessary to rely on the glass type of the facade to reflect this engineering unit.
- Not using the old engineering principles, the first of which is the principle of symmetry, whether in the design of the facades or the internal division of the building itself.

### 3-Analytical study:

#### 3-1- Classification of types of architectural facades:

These classifications and types are multiplied by the multiplicity of overtones and expressions. By studying the interfaces, we can classify these interfaces as follows:

##### 3-1-1- Interactive media interfaces:

##### 3-1-1-1- Defining Interactive Media Interfaces:

Media interface is a term for integrating digital displays into a building facade[4], and it is the beginning of transforming dynamic digital information into a building material for architecture in shaping social interaction between people and perceptions of urban space as said by Scott McGuire.[5] According to Manovich, media interfaces are considered A means of mass communication to create an environment in which information is circulated and helps to make the urban space more enjoyable and participatory by allowing users to interact with it, which leads to transforming the urban area into a more attractive area[6].

##### 3-1-1-2- Examples of interactive media interfaces:

##### Organic Mode Interfaces:

This model adopted that the interface be in the form of a smart shell of luminous elements, which works through artificial intelligence, where the shell consists of a dynamic surface of these luminous elements that develops its own system, by collecting various indicators from the surrounding environment and keeping these indicators in a memory managed by intelligence The artificial building, for example: the National Library building, Belarus, as in Figure (1), about 4,646 PIXE RGB LED lighting bulbs have been installed behind the facade of the building, the lighting is controlled in a dynamic way through A specially designed program that runs on the computer, and the designer can create, modify



and schedule custom lighting scenarios. [7]. In this type of facade, we find that predicting the function of the building in advance is weak by looking at the external facades.

Figure (1): The interactive media interfaces in the National Library building and the use of (PIXE RGB LED). Source: <https://www.google.com-unique-building-national-library-of-belarus-symbol-of-minsk>

##### Mechanical Facades:

They are facades that are automatically managed by electric motors and work to change the outer surface of the building by hydraulic or pneumatic forces, and the movement is controlled by software dedicated to this purpose, where the feature of reflection of natural lighting falling or projected on the facade day and night was exploited, to obtain dynamic shapes when moving it, for example: Project Aegis by dECOi Architects, as shown in Figure 2. Developed for an interactive artwork competition outside the foyer of the Birmingham Hippodrome, the project consists of an interactive mechanical surface that changes based on various environmental stimuli, including sounds. The movements of people passing around the building are also affected by weather and electronic information.



The lower surface of the array consists of actuators, which are given objective information via a highly efficient conveyor system in addition to a set of electronic sensors. [8]. We also find in this type of facades that predicting the function of the building in advance is weak by looking at the external facades.

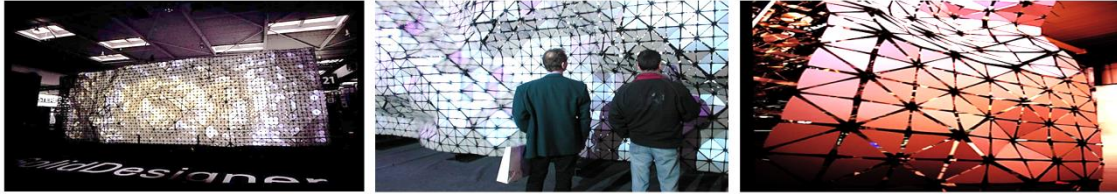


Figure (2): Interactive media interfaces in the (Aegis) project from dECOi Architects,  
Source: <https://transmaterial.net/aegis-hyposurface/>

### 3-1-2- Academic Architectural Facades:

#### 3-1-2-1-Definition of academic architectural facades:

They are the facades of buildings that include the spaces in which the educational process takes place, such as classrooms, auditoriums, laboratories, and educational gathering places such as multi-purpose halls and libraries. About the function of the building, so that we can read in the façade of the building its internal sections where they are located inside the building without entering it, such as (classrooms, administrative, service, cultural, entertainment sections), and there are some buildings' facades that contain some meanings that once seen in the building's facades are Knowing the internal function of the building and it also falls within the classification of academic facades, even if their functions are not educational, such as administrative buildings, residential buildings, religious buildings, and factories, where the element in the architectural facade clarifies its functional significance, such as the minaret in the mosque, the chimney in the factory, and the balcony in residential buildings. [9], [10]. In this type of facade, we find that predicting the function of the building in advance is very strong by looking at the external facades.

#### 3-1-2-2- Examples of academic architectural facades:

- Educational academic architectural facades:

##### 1- College of Technology, Southern University - Denmark (Southern University - Denmark (SDU), Odense):

Designer: C. F. Moller Architects, Location: Denmark, Total area: 20,000 square meters, Completion of implementation: 2015

The external design of the facades of the college aims to express the scientific activity that is practiced inside the building through the design of facades with openings whose shapes with full circles of various sizes express the creativity that the technical education aims for, but at the same time they protect the building from sunlight and provide a view and abundant natural lighting internal. From the inside, the building was distinguished by the high flexibility needed by this type of education, a flexibility that allows for easy expansions or changes in the components of the building such as laboratories and workshops. Common services and spaces to facilitate the redistribution of its activities to keep pace with the various developments in technical education in terms of study methods and scientific equipment. [11].

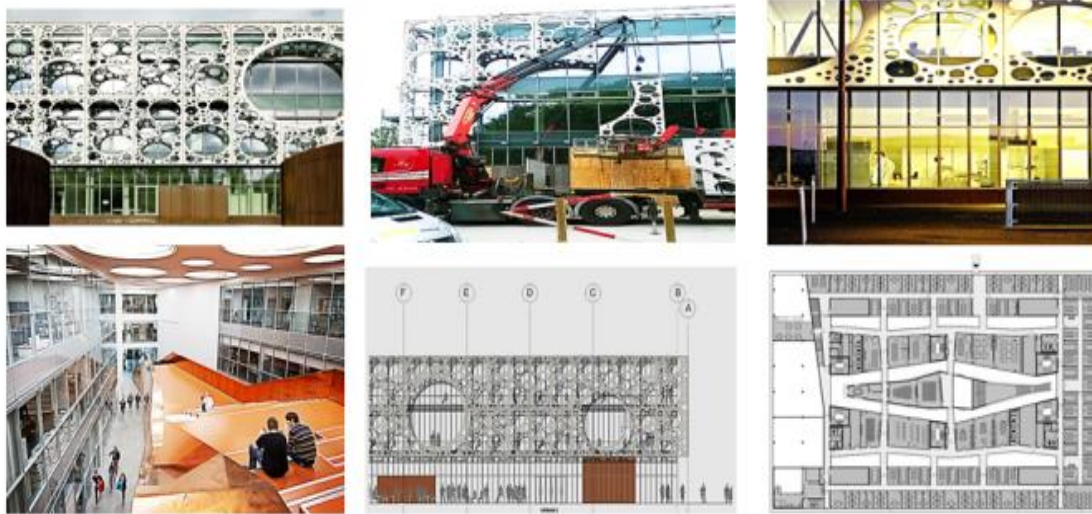


Figure (3): Architectural facades and buildings of the College of Technology, Southern University – Denmark ‘Source: <https://www.sdu.dk/en>

2- Beni Suef National University - Arab Republic of Egypt:

It is located in the new city of Beni Suef, east of the Nile - Beni Suef Governorate, designed by: The Engineering Authority of the Armed Forces. An area of about 42 acres has been allocated for the colleges to be established at the National University, including buildings, main and secondary roads, some playgrounds for sports activities and spaces, cafeterias and pergolas for students. Parking spaces, green spaces, and gardens, and by analyzing the facades of the project, it was noticed that the facades of the buildings at Beni Suef National University express from the outside, to a large extent, the spaces in which the educational process takes place, such as classrooms, auditoriums, laboratories, and educational gathering places such as multi-purpose halls and libraries. [12].



Figure (4): Architectural facades and buildings of Beni Suef National University - Arab Republic of Egypt:, Source: <http://www.nu.bsu.edu.eg/>

- Administrative Academic Architectural Facades:

- Baku White City Building Project:

Country: Azerbaijan, City: Baku, Street: 25 Noble, Architect: ADEC - Azerbaijan Development Company, Total Area: 20,000 square meters, Baku White City office building is located at the entrance to the Baku White City scheme, and enjoys a strategic location at the intersection of the largest highway in the capital of Azerbaijan. Among many international architecture and design awards, the first-class white Baku City Office Building has achieved the distinction of being the first property in Azerbaijan to be awarded the BREEAM certificate with a high degree of quality. The White Baku City Office Building contains administrative offices and a commercial area. This project includes a square Beautiful in front of the building that contains the main stone of the building of the white city of Baku, the building consists of 10 floors and occupies an area of 2 hectares of land and has a height of 50 meters. It appears from the facades of the building that it contains repetitive formation elements and small longitudinal or transverse



openings (inside or outside the building), which enables the viewer to predict the location of the administrative offices and the nature of the function of the administrative building. [13]. In this type of facade, we find that predicting the function of the building in advance is strong by looking at the external facades.

Figure (5): Architectural facades and components of the Baku White City administrative building. Source: <https://www.systemair.com/by/o-kompanii/obekty/baku-white-city-office-building/>

- Residential Academic Architectural Facades:

- Project: (Mountain View New Cairo):

Project location: mountain view2- New Cairo- Egypt.

Housing type: luxurious and distinguished - residential villas, as shown in Figure (6) Description of the project services: Residential villas are surrounded by many luxurious services such as: entertainment clubs, gyms equipped with the latest sports equipment, conference halls, a spa, jacuzzi, many health clubs, large green spaces, water lakes and fountains Industrial covering all parts of the project, swimming pools and a private car park, and it appears from the facades of the residential buildings in this project that they



contain repetitive formation elements such as balconies and small longitudinal or transverse openings (inside or outside the building), which enables the viewer to predict the location of living rooms, services and other The nature of the function of the residential building. [14]. Where we find in this type of facades that predicting the function of the building in advance is very strong by looking at the external facades.



Figure (6): Description of the villa, Fifth Square, Source:  
<https://mountainviewegypt.com/projects/2-mountain-view-ii>

• Industrial Academic Architectural Facades:

Project: (Suez Cement Factory) Cairo - Egypt:

The Suez factory was established in 1979 and has two production lines. The factory and its two quarries are located on an area of 3,095,000 square meters. By analyzing the architectural facades of the Suez Cement Factory project, we find that they contain some meanings that, once seen in the facades of the building, the internal function of the building is known. factory [15]. Where it can be said that this type of facades, the ability to predict



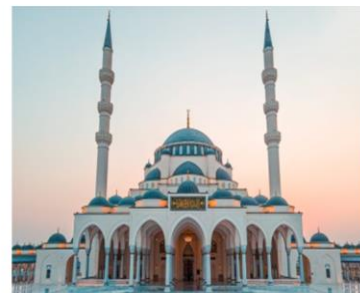
in advance the function of the building is very strong by looking at the facades.

Figure (7): Project: (Suez Cement Factory), Source: <https://www.suezcement.com/eg/ar>

- Religious academic architectural facades:

Project: (Sharjah Grand Mosque - Sharjah, United Arab Emirates.):

The Sharjah Grand Mosque is the largest mosque in the Emirate of Sharjah, United Arab Emirates. The city of Sharjah is distinguished by its character that embodies Arab and Islamic culture in the best way. It is considered an important destination for cultural tourism, and it took 5 years to build the mosque at a cost of 300 million UAE dirhams. The Sharjah Grand Mosque was inaugurated on May 10, 2019. This charming architectural edifice was named after the Sharjah Grand Mosque for its huge area of 2 million square feet. This area includes external gardens that give apparent beauty to this distinctive mosque. The Grand Mosque in Sharjah can accommodate about 25.5 thousand A prayer room, distributed over more than one internal and external space. By analyzing the architectural facades of the Sharjah Grand Mosque project, we find that it contains some indications that, once seen in the facades of the building, the internal function of the



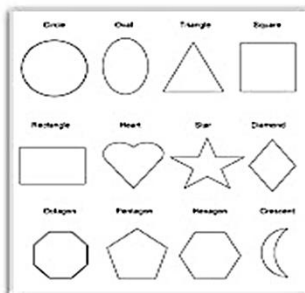
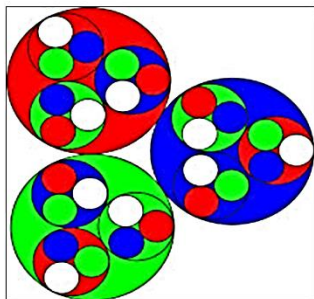
building is known, as the element in the architectural facade clarifies its functional meaning, such as the minarets and domes in this mosque, [16]. Where it can be said that this type of facade provides a very strong ability to pre-predict the function of the building by looking at the facades.

Figure (8): Sharjah Grand Mosque - Sharjah, United Arab Emirates.: Source: <https://www.bayut.com/mybayut/ar>

### 3-1-3- Symbolic Philosophical Facades:

#### 3-1-3-1-Definition of symbolic philosophical interfaces:

When the architectural formation of the façades bears the character of symbolism, and by studying these façades, the internal function of the building is expressed in a spiritual and philosophical manner that can be defined as symbolic façades. Just as numbers have expressions and symbols, geometric shapes also have philosophical symbols. There are so many shapes and structures that they cannot be counted, and each of them carries



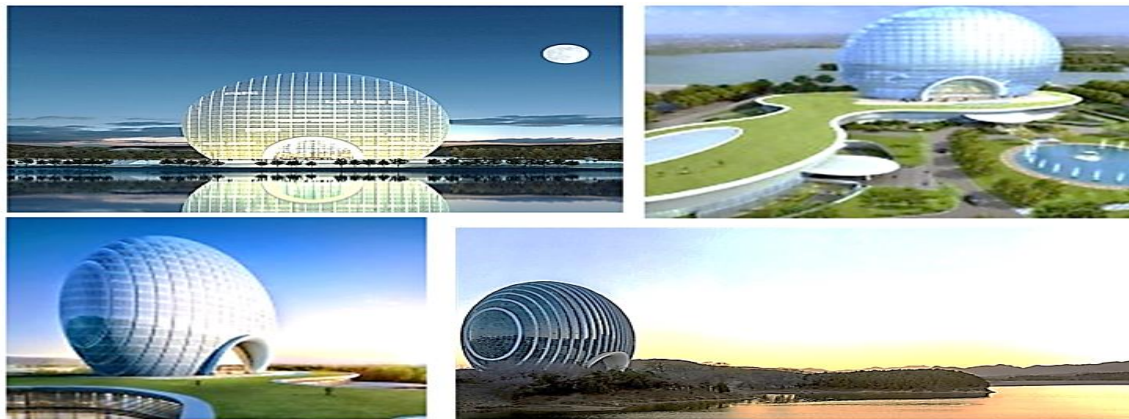
contents and messages. Especially, and expressions for geometric shapes such as: the point denotes (stillness), the straight line denotes (thought), circles have no beginning or end and refer to eternity and they refer to the sun, earth, moon and celestial bodies, and the circle is one of the familiar shapes as it refers to perfection, It is characterized by grace and free movement, squares and rectangles: it is also familiar as a circle, and suggests stability and sincerity, and its correct angles refer to arrangement, rationality, symmetry, tranquility, solidity, safety, equality, and so on.. [17].

Figure (9): Symbols for geometric shapes are philosophical symbols. Source: [https://bytna.blogspot.com/2015/06/blog-post\\_16.html](https://bytna.blogspot.com/2015/06/blog-post_16.html)

### 3-1-3-2- Examples of symbolic philosophical facades:

Project: (Yanqi Lake Kempinski Hotel, China - Beijing.):

It was built in the shape of a sun disk at sunrise to symbolize prosperity and good luck, according to the beliefs of ancient China, as it symbolizes the sun disk at sunrise to bring good luck. It took 60 designers and 9,300 construction workers to create it, and it contains 10,000 glass panels. This hotel is known as Yanqi Lake Kempinski and is located in the Chinese capital, Beijing. It was built in the shape of a sun disk at sunrise to symbolize prosperity and good luck according to their ancient beliefs. The luxurious Kempinski Hotel consists of 21 floors and includes amazing resorts, restaurants and social facilities. By analyzing the architectural facades of the Yankee Lake Kempinski Hotel project, we find that it contains some meanings that, once seen in the building facades, do not know the



building's internal function, as the element in the architectural facade does not explain its functional meaning for the building, [18]. Where it can be said that this type of facade provides the possibility of pre-predicting the function of the building acceptable to some extent by looking at the facades.

Figure (10): Yanqi Lake Kempinski Hotel - Beijing – China Source: <https://yanqi-hotel-by-kempinski-beijing.albooked.com/>



### 3-1-4- Facades of artistic fantasy:

#### 3-1-4-1-Definition of artistic fantasy interfaces:

The artistic facades in architecture are the facades that derive their formation from the schools of fine arts in their various forms (traditional, abstract, cubist, impressionist, expressionist, surrealist...etc. from the various schools). These facades must reflect the function of the building to the outside in one way or another. Such facades have the primary purpose of attracting the attention of passers-by (and are considered an element of attraction for tourists, especially if the building is of a cultural tourism nature).

#### 3-1-4-2- Examples of artistic fantasy facades:

##### Project: (RUN RUN SHAW CREATIVE MEDIA CENTER HONG KONG, CHINA):

-Run Run Shaw Creative Media Center is an academic building on the campus of City University of Hong Kong, which was completed in 2011. Designed by Daniel Libeskind,



the building size is 265,000 square feet, and has a sleek, low-tech design positioned at the service of high-tech invention. This nine-storey crystalline building is designed to accommodate a range of flexible environments for research and experimentation, as each space, whether free-standing or open, is unique. A dramatic central staircase spirals upward with irregular twists and curves creating unexpected gathering spaces. Asymmetrical windows punctuate the walls of lecture theatres, classrooms, and computer labs allowing natural light to fill most of the center's interior rooms. Interactive spaces flow in and around sound stages, recording studios, screening rooms, exhibition and performance spaces, multi-purpose theater, and other areas. More spacious than traditional hallways, yet more fluid than formal classrooms, the spaces are designed to encourage impromptu exchanges and spontaneous collaborations. In this project, the designer demonstrates the fact that evolving spaces can be used effectively to promote advanced learning. It breaks all norms of a traditional learning centre, thus inspiring the student to do the same... It breaks all conventions, pushes the envelope and challenges the scope of the creative mind." However, by analyzing the architectural facades of the Run Run Shaw Creative Media Center project, we find that it contains some meanings that, once seen in the facades of the building, do not know the building's internal function, as the element in the architectural facade does not explain its functional meaning for the building, [19]. Where it can be said that this type of facade provides the ability to pre-predict the function of the building is very weak by looking at the facades.



Figure (11): Run Run Shaw Creative Media Center, Hong Kong, China ,Source:  
<https://www.arch2o.com/run-run-shaw-creative-media-center-daniel-libeskind/>

### 3-1-5- Expressive Architectural Facades:

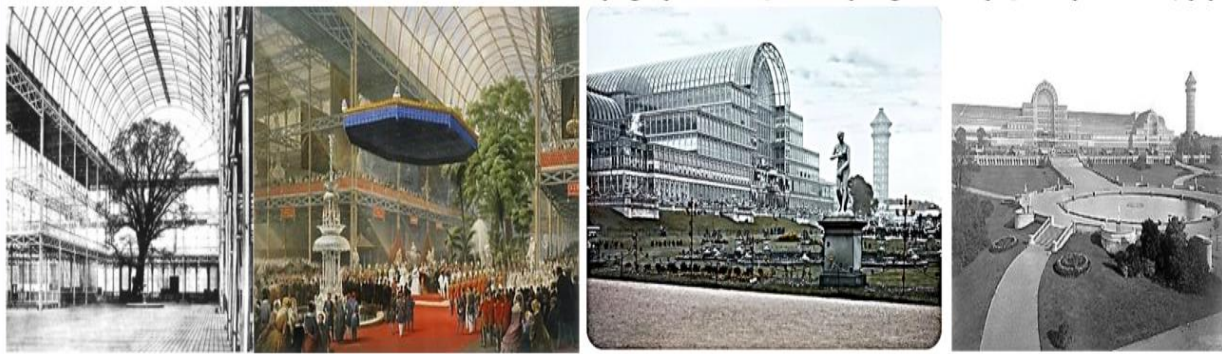
#### 3-1-5-1-Definition of expressive interfaces:

Structural expression: The expression of the building means the structural system used in the construction of the building and not necessarily the function of the building, as it is necessary that the process of architectural formation of the building show the possibility of the structural system used in the construction of the building and in this type of facades the internal function of the building can be reflected in different ways ( Construction, building materials, cladding...) is acceptable to some extent. These methods do not necessarily have the primary role to express the internal function of the building.

#### 3-1-5-2- Examples of expressive architectural facades:

##### Project: (Crystal Palace in London): London, United Kingdom

The Crystal Palace was built in 1850-1851 in Hyde Park in London for the Universal Exhibition in 1851. The project is made of glass and cast iron, and the exhibition hall has accommodated up to 14,000 people. Its height is 33 meters, and its area is more than 90,000 square meters. m, and its length was 564 m. When the exhibition ended, the building was dismantled and moved to a new location, in the suburbs of London, Sydney Hill. Construction work was carried out by 5,000 people, but by analyzing the architectural facades of the (Crystal Palace) project, we find that it contains some implications. Which, once seen in the facades of the building, the internal function of the building is known to a



very acceptable extent, as the element in the architectural facade shows its functional significance for the building, [20], where it can be said that this type of facade provides the possibility of pre-predicting the function of the building very acceptable by looking at interfaces.

Figure (12): Project: (Crystal Palace in London):

Source: <https://www.britannica.com/topic/Crystal-Palace-building-London>

#### 4- Applied study:

By designing a proposed matrix to measure the effect of function reflection on the architectural facades of buildings.

##### The objective of the applied study:

Measuring ratios and rates of effect of reflection and reading the function of the building in advance from looking at its architectural façade through conducting a survey. Therefore, the research necessity came to formulate a proposed methodology to measure the impact of function reflection in the architectural facades of buildings of different types through analyzing and monitoring some examples. Among the reasons for choosing examples:

- Examples of buildings of contemporary architecture.
- Pictures of buildings have been selected for realistic examples from (Egypt and the world) for many types of jobs.
- The most expressive examples of the selected controversial point under the applied research study were selected.
- The types of functions of the buildings under the research study were selected based on the most influential functions in the lives of the users on a daily basis for most of them (residential - educational - administrative - technical - cultural -.....)

##### The applied study was carried out in successive stages as follows:

- 1- The stage of selecting the study sample.
- 2- The stage of conducting a survey and questionnaires and designing the proposed methodology.
- 3- The stage of statistical measurement and calibration using the SPSS statistics program.
- 4- The stage of comparison, evaluation and formulation of results.

##### 1- The stage of selecting the study sample:

The research study sample was selected from 100 people of architects, designers, specialists in the field of architecture, and students of the architecture department in a number of universities with different schools and architectural orientations to which the study sample belongs. The scope of the research, such as poor culture or the spread of misconceptions about the architectural facades of buildings and their reciprocal relationship with the function of the building in the public, or lack of understanding of the standards presented in the questionnaires.

##### 2- The stage of conducting a survey and questionnaires and designing the proposed methodology:

More than 30 diverse images have been selected for multiple examples of about nine (9) types of architectural facades of buildings that were previously explained and analyzed in the analytical part of the research and what is expressed for each of the residential, educational, commercial, cultural, industrial, religious, administrative and other common functions of buildings. It was taken into account that the images include a diversity of architectural trends and a diversity of the time periods in which the building was built, then after that the questionnaires were designed in which the study sample was asked to evaluate and measure the extent to which the architectural facades express the function in each example, and it must be noted that the researcher did By limiting the types of architectural

facades used in the applied study according to the types mentioned in the previous theoretical and analytical studies in the research

3- The stage of statistical measurement and calibration using the SPSS statistics program:

A three-point scale was used as shown in the questionnaire in the appendices part and as shown in Table (1).

As follows:

(strong): It is matched by the number (1) as its signifier

(average): it is matched by the number (2) as its signifier

(weak): it is matched by the number (3) as its signifier.

given degree	the level
1	strong
2	middle
3	weak

**Table 1: Statistical measurement and calibration levels and their equivalent as a numerical significance. Source: researcher.**

This is to identify the degree of proportions and rates of reflection effect and to read the function of the building in advance by looking at its architectural façade in the images representing buildings with different functions. The questionnaires were unloaded, the inputs were included in the SPSS statistical analysis program, the necessary data tables and graphs were made, and the results were formulated.

4- The stage of formulating the results:

First: comparison and comparison between the averages of the impact of job reflection on the building facade for the selected types of architectural facades of buildings:



From the outputs of the SPSS statistical analysis program for the questionnaire study, the researcher counted many values of the averages of the extent of reflection of the buildings' functions on their architectural facades, and the results varied and ranged from strength to weakness as shown in the following table No. (2):




M	The average value of the architectural facade expression of functionality	
1	The average expression of building facades (interactive media) about the function of the building	1.0_
2	The average expression of the facades of educational academic buildings about the function of the building	1.9
3	The average expression of the facades of the administrative academic buildings about the function of the building	1.6
4	The average expression of the facades of residential academic buildings about the function of the building	2
5	Average expression of industrial academic building facades about the function of the building	1.8
6	The average expression of the facades of religious academic buildings about the function of the building	2.3
7	Average expression of symbolic building facades about the function of the building	1.4
8	Average artistic fantasy building facades express the function of the building	0.7
9	The average expression of expressive building facades about the function of the building	1.2




**Table 2: The average value of the architectural facade's expression of functionality, source: researcher.**



After that, the researcher conducted a comparison and comparison between the averages of the effect of job reflection on the facade of the building for the selected types, their proportions and percentage indicators (%), and formulated the results with explanation and analysis as shown in the following table No. (3):

M	Architectural facade type	building function	Building image	The ratio percent % ile	The average measure of the degree of impact of the job on the facade of the building	the facades arrangement In terms of the most indicative of the function of the building	conclusions
1	Facades of religious academic buildings	Sharjah Grand Mosque UAE -		17%	2.3	the first	From the statistical analysis, it was found that the academic facades of religious buildings got the first place out of The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by the greatest amount of effect of the reflection of the function on the facade of the building from the point of view of the selected research sample, with an average score of (2.3), with a percentage of 17%.
2	Facades of residential academic buildings	Residential project: (Mount ain View New Cairo):		14%	2	the second	It was found from the statistical analysis that the academic facades of the residential buildings got the second place out of the The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by a high amount of the impact of the function's reflection on the building's facade from the point of view of the

							selected research sample, as its average score is (2), with a percentage of 14%.
3	Facades of educational academic buildings	Beni Suef National University – Egypt		14%	1.9	the third	From the statistical analysis, it was found that the academic facades of the educational buildings got the third place out of The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is distinguished by an excellent amount of the impact of the function's reflection on the building's facade from the point of view of the selected research sample, as its average score is (1.9), with a percentage of 14%.
4	Facades of industrial academic buildings	Cement factories in Suez Egypt -		13%	1.8	the fourth	From the statistical analysis, it was found that the academic facades of the industrial buildings got the fourth place out of The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by a very good amount of the impact of the function's reflection on the building's facade from the point of view of the selected research sample, with an average score of (1.8), with a percentage of 13%.
5	Facades of administrative academic buildings	White Baku City Office Building, Azerbaijan		11%	1.6	Fifth	It was found from the statistical analysis that the academic facades of the administrative buildings got the fifth place out of The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by a good amount of the impact of the function's reflection on the

							building's facade from the point of view of the selected research sample, as its average score is (1.6), with a percentage of 11%.
6	Symbolic interfaces of a philosophical nature	hotel Yanqi Lake Kempinski, Beijing, China		10%	1.4	VI	It was found from the statistical analysis that Symbolic facades of a philosophical nature got the sixth place out of The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by an acceptable amount of the impact of the function's reflection on the facade of the building from the point of view of the selected research sample, as its average score is (1.4), with a percentage of 10%.
7	expressive interfaces	Crystal Palace – London		9%	1.2	VII	It was found from the statistical analysis that Expressive interfaces ranked seventh The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by an acceptable amount of the impact of the function's reflection on the building's facade from the point of view of the selected research sample, as its average score is (1.2), with a percentage of 9%.
8	Interactive media interfaces	building Library (National Library), Belarus		7%	1	VIII	It was found from the statistical analysis that Interactive Media Interfaces ranked 8th The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by a weak amount of the effect of the function's reflection on the building's facade from the point of


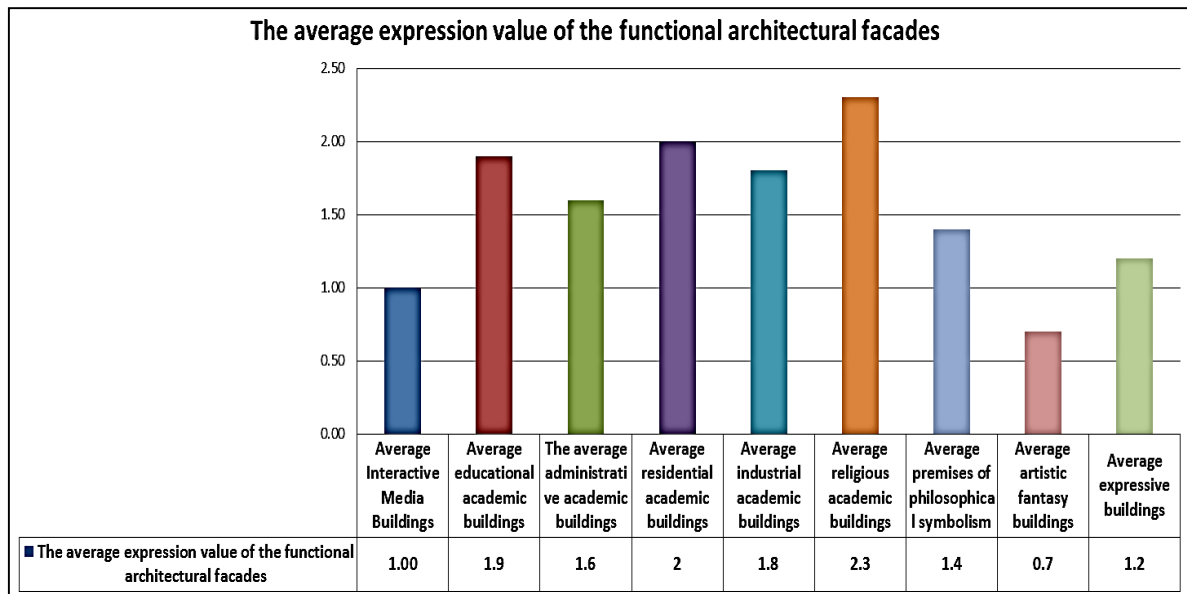
							view of the selected research sample, as its average score is (1), with a percentage of 7%.
9	Facades of artistic fantasy	An academic building on the City University campus in Hong Kong, China		0.5%	0.7	ninth	From the statistical analysis, it was found that the artistic fantasy interfaces got the ninth place out of The arrangement of the centers of the types of architectural facades of buildings, according to the strength of the indication of the function, as it is characterized by a very weak amount of the effect of the function's reflection on the building's facade from the point of view of the selected research sample, as its average score is (0.7), with a percentage of 5%

Table 3: comparison and comparison between the averages of the effect of job reflection on the facade of the building for the selected types, source: researcher.

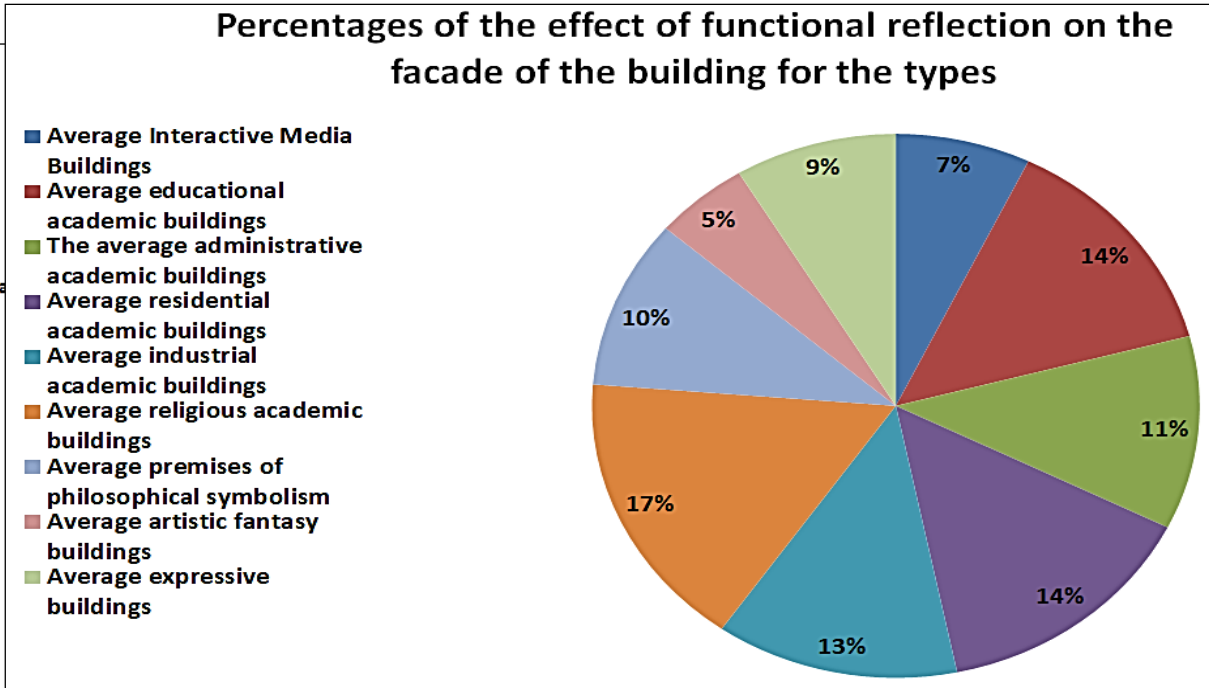
Figure 13: Comparison and comparison between the averages of the effect of



job reflection on the facade of the building for the selected types, source: researcher.



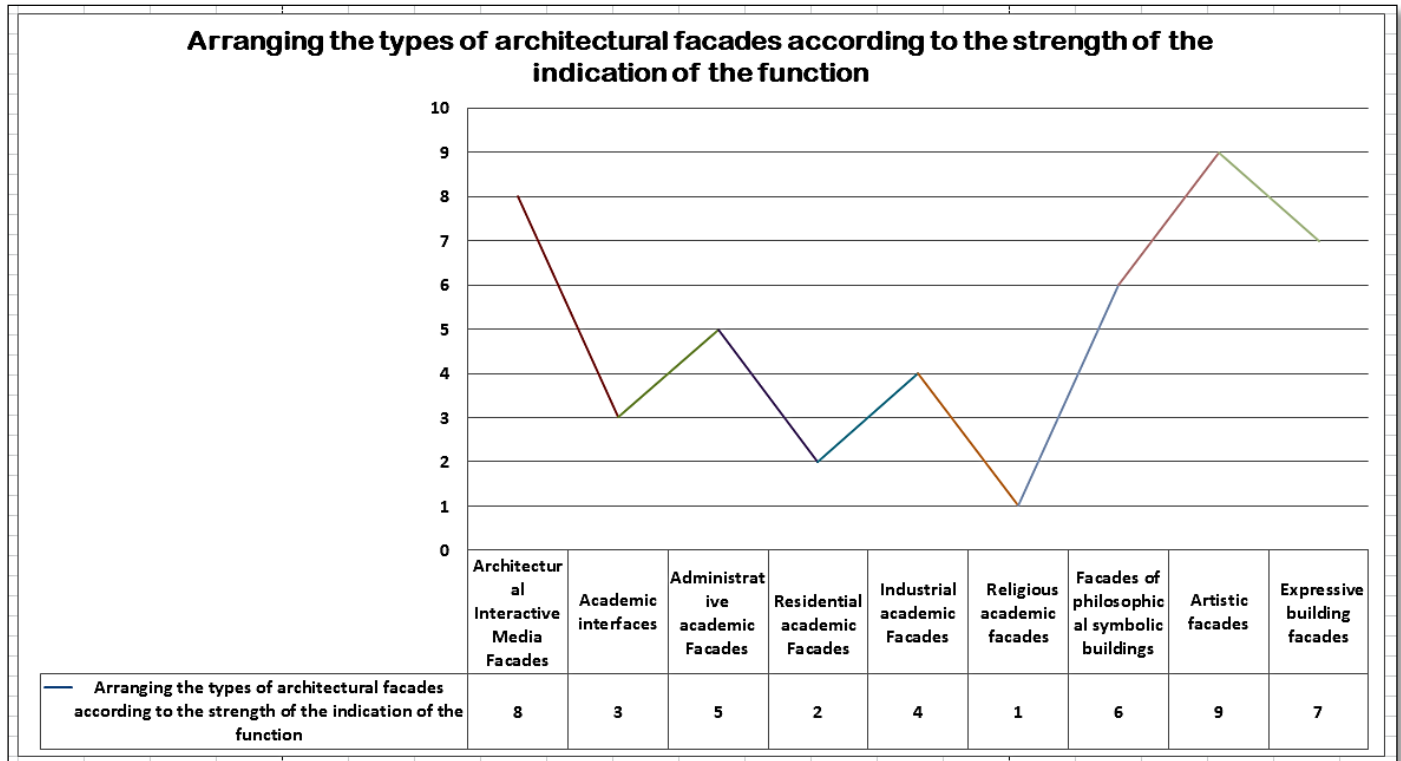
Figure 14: Percentages of the effect of functional reflection on the facade of the building for the types, source: researcher



10

	Architectural Interactive Media Facades	Academic interfaces	Administrative academic Facades	Residential academic Facades	Industrial academic Facades	Religious academic facades	Facades of philosophical symbolic buildings	Artistic facades	Expressive building facades
■ Arranging the types of architectural facades according to the strength of the indication of the function	8	3	5	2	4	1	6	9	7

**Figure 15: Arrangement of the centers of the types of architectural facades according to the strength of the indication of the function, source: researcher**



**5- Discussion and general conclusions:**

1- After conducting a comparison and comparison between the averages of the impact of the function’s reflection on the facade of the building for the selected types at the level of each function of the buildings separately, they can now be arranged from the point of view of the selected study sample in descending order from highest to lowest in presence in buildings as follows:

- Academic facades of religious buildings got an average of (2.3).
- Academic facades of residential buildings got an average of (2).
- The academic facades of the educational buildings got an average of (1.9).
- The academic facades of the industrial buildings got an average of (1.8).
- The academic facades of the administrative buildings got an average of (1.6).
- Symbolic interfaces of a philosophical nature got an average of (1.4).

Expressive interfaces got an average of (1.2).

- Interactive media interfaces got an average of (1).
- Artistic fantasy interfaces got an average of (0.7).

2 - After conducting a comparison between the percentages of the impact of the function reflection on the facade of the building for the selected types at the level of each building function separately, it can now be arranged from the point of view of the selected study

sample in descending order from the strongest to the weakest in presence in buildings as follows:

- Academic facades of religious buildings got a percentage of 17%.
- Academic facades of residential buildings got a percentage of 14%.
- Academic facades of educational buildings got a percentage of 14%.
- Academic facades of industrial buildings got a percentage of 13%.
- The academic facades of the administrative buildings got a percentage of 11%.
- Symbolic facades of a philosophical nature got a percentage of 10%.

Expressive interfaces got a percentage of 9%.

Interactive media interfaces got a percentage of 7%.

- Facades of artistic fantasy got a percentage of 5%.

3 - After conducting a comparison between the arrangement of the centers of the types of architectural facades according to the strength of the indication of the function at the level of each function of the buildings separately, it can now be arranged from the point of view of the selected study sample in descending order from the strongest to the weakest in presence in the buildings as follows:

- The academic facades of religious buildings got the first place.
- The academic facades of residential buildings got the second place.
- The academic facades of the educational buildings got the third place.
- The academic facades of the industrial buildings got the fourth place.
- The academic facades of the administrative buildings got the fifth position.
- Symbolic facades of a philosophical nature got the sixth position.

Expressive interfaces ranked seventh.

Interactive Media Interfaces ranked eighth.

- Facades of artistic fantasy got the ninth place.

## **6- Future studies and suggested recommendations:**

1. The research suggests applying the applied research study on a wider scale and on a larger scale on all segments of society in order to better understand the public's feelings and interpretations of the types of architectural facades and the impact of the function's reflection on them in the different functions of buildings to measure their awareness and identify the understanding and awareness of the general users, which has been proven from previous studies that it often differs. It is about understanding, analyzing, interpreting and favoring architects and professionals in this field.
2. The need to increase cultural and scientific awareness among designers and the community about what is being developed of new types of architectural facades for buildings in order to keep pace with contemporary architecture around the world.

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## 8- Appendices:

### questionnaire form

:Personal data

Name: (Optional), Degree:, Occupation:

[1] By looking at the following images, in your opinion, express the extent to which interactive media interfaces express the function of the building?



1- Strong  2-middle  3-weak

[2] By looking at the following pictures, in your opinion, express the extent to which the educational academic facades express the function of the building?



1- Strong  2-middle  3-weak

[1] By looking at the following pictures, in your opinion, express the extent to which the administrative academic facades express the function of the



1- Strong  2-middle  3-weak

building?

[2] By looking at the following pictures, in your opinion, express the extent to which the residential academic facades express the function of the building?



1- Strong  2-middle  3-weak

[3] By looking at the following pictures, in your opinion, express the extent to which the industrial academic facades express the function of the building?



1- Strong  2-middle  3-weak

[4] By looking at the following pictures, in your opinion, express the extent to which the religious academic facades express the function of the building?



1- Strong  2-middle  3-weak

[5] By looking at the following pictures, in your opinion, express the extent to which the symbolic facades (of a philosophical nature ) express the function of the building?



1- Strong  2-middle  3-weak

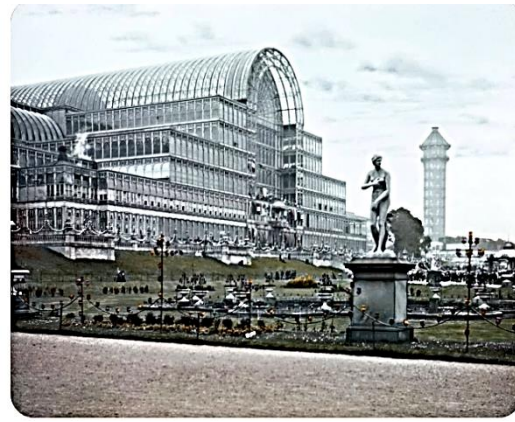
[6] By looking at the following pictures, in your opinion, express the extent to which the artistic fantasy facades express the function of the building?





1- Strong  2-middle  3-weak

[7] By looking at the following pictures, in your opinion, express the extent to which the expressive facades express the function of the building?



1- Strong  2-middle  3-weak