

## **Interactive interior design and its impact on improving the performance of libraries**

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### **Abstract:**

In order for the design being appropriate to the environmental and cultural conditions, the Interior Designer has many challenges in the design process, whereas modern technology has a great impact on causing successive architectural transformations in response to the many developments in Communication and Information Technology. As well as many new concepts emerged in the field of interior design, which meet the human needs and its future requirements, including but not limited to, the interactive interior design, which made the interior designer reconsider the traditional design methods to integrate them with digital technological design, because the interactive design gives a new meaning for each of the form, space and function and makes the spaces interact with the human being, taking into consideration the respect of the internal and external environment.

The Research presents the interactive interior design and its impact on improving the performance of libraries, by using the interactive design in interior space aimed at meeting the needs and requirements of users, in addition to maximizing the benefit from the available spaces and improving the performance of libraries, whereas the use of the interactive design in the determinants of the interior spaces of libraries works on achieving the function, and contributes to linking users to the library spaces and ensuring their interaction with it, It works on solving the prevailing problems in it, as interactive technologies can be used as a guide or to attract the attention of library visitors, and these technologies can also be used as a means for browsing and reading books, and it reduces the negative aspects in design by providing an innovative, purposeful and easy to learn and use design, and it works to enhance the positive aspects. In design, by providing an entertaining and fun design that the user can enjoy by employing different senses.

The Research adopted the descriptive and analytical approach by studying the concept of interactive interior design, and the techniques of the interactive design that contribute to forming interior spaces (floors, walls, and ceilings, etc.) in libraries.

### **key words:**

Interior Design, Interactive Interior Design, Libraries, Performance Improvement.

The interior design is a process of interaction between human being, place, time and culture (5: Page 1). As a result of the technological development witnessed by the World recently, especially in the field of technology used in interior design works, many concepts emerged in design, including interactive interior design, in which the interaction between the user of the place and the design is achieved through the use of computer technology integrated within it (2: Page 13). This technology contributes significantly to meeting the human needs and its future requirements, through computer-related information technology and its applications in different spheres of life.

Interactive space is an environment that interacts with the users within it, responds to their activities and interacts with them, through various displays such as visual, auditory, kinesthetic and tactile. Whereas interactive design began to spread in the preparation and formation of interior spaces significantly as it works to change the tasks and forms of interior spaces in a manner that is reflected in the service performance of libraries, as it affects the shape of their interior spaces while maintaining the achievement of the function and the process of interaction between the user and the space in a positive way. There is no doubt that this change greatly affects the interior spaces, as it is based on the required function and responds to the needs of the users. It is possible that a unique paradigm shift will occur in the concept of functionality, by making the determinants of the interior space able to sense the user, recognize him, interact with him and adapt to his desires (5: Page 1).

**Research problem:**

The problem of the research is presented in trying to solve the following question:  
How to improve the performance of libraries through modern interactive technology to develop and improve their internal service activities and to meet the requirements and needs of their visitors?

**Research goal:**

Highlighting the role of interior designer in developing and addressing the interior spaces of the libraries, in order to achieve the requirements and needs of users within them in an interactive way that improves their performance and develop guidelines for the way of providing the optimal solution in addressing and forming the interior space for them.

**Research Hypotheses:**

Taking advantage of the interactive design technology in libraries greatly helps to achieve the function and contributes to linking users to library spaces and ensuring their interaction with them.

**Research importance:**

Observing the positive aspects of the interactive design in developing library spaces, and the mechanism for getting its benefit in developing appropriate future proposals that meet user's needs and improve the performance of libraries.

**Research Methodology:**

The Research adopted the descriptive and analytical approach by studying the concept of interactive interior design, and the techniques of the interactive design that contribute to forming interior spaces (floors, walls, and ceilings) in libraries.

**Research Subject:**

Libraries have a great Pedagogical and educational role in providing knowledge resources and supporting curricula, in addition to providing a large amount of information, supporting research activities, developing reading and knowledge, and developing skills and abilities that help in rapid learning. Also, they have a pivotal role in promoting education and scientific research, as libraries actively participate in the educational process.

Whereas the main purpose of establishing libraries is to increase the culture of community and its familiarization to various books due to the great value of the book, as well as they play an important role in collecting books and preserving them from damage.

In the meantime, the design of libraries does not depend on the provision of halls and some additional services only, but, the matter has evolved over the past years, reaching high and more professional levels, in order to deal with other new areas as entertainment, hospitality, the general atmosphere, and other requirements. These are things that designers must be sufficiently aware to transform them into reality, as new paradigms emerged for libraries to accommodate new patterns and rhythms of life.

Therefore, when designing libraries, the designer must take into account the process of managing and planning the design according to a specific methodology in the chosen site, in order to ensure the achievement of appropriate functional relationships that combine planning components with their various functions, provided that the designer takes into consideration, during the design process, the user's activities and the resulting services, starting from parking spaces, entrances and exits of the library, in addition to planning the library and internal access mechanism from public and private corridors and service areas. In addition to taking into consideration the interior design process of the library through the area of the library and its suitability, the activities and equipment it contains or the materials it uses according to its size and the purpose for which it is prepared, and based on these relationships the most appropriate solution is found.

**Libraries have design principles and standards, the most important of which can be reviewed as follows:**

- Library spaces: The library spaces are divided into several spaces, the most important of which is the entrance space (whereas the entrances are clear and easy to access, and must be wide and spacious, because the entrance function is to separate the inside and outside of the library), the reading space (the reading space is determined by knowing the number of beneficiaries who will provide for potential readers, book spaces (depend on the size and area of the place that they shall serve and also the density of their population); when assessing the design for libraries, a scale is applied ranging from one to three books per person and other spaces for customized books (1), staff space (the number of employees is determined according to a standard that varies from one employee for every 2000 members of the population to 2500 individuals, according to what the American Library Association recommends, provided that one-third of the employees are qualified), and other spaces that include a multi-purpose room that is used as a children's study hour or a room for watching videos and films, also like a conference and seminars room, or a computer or training room, and even a room for special groups and exhibitions (4).
- Relationships between spaces: the relationships between spaces in any building ensure a good and effective performance of the libraries' function, without obstacles in movement or access to other spaces. Therefore, the following relationships must be taken into account: the position of the borrowing counter, the beneficiaries' registration office, the general index, and

the shelving of references and reserved books near the entrance. The beneficiary, upon entering, easily recognizes the service points meeting his immediate need. The entrance shall be costumed and easily accessible for people with special needs; displaying new additions near the entrance or near the borrowing place in a prominent place. The reference office shall be close to the reference collection; placing the reference area as part of the reading area; viewing ongoing periodicals near the reference office and reference collection; accessing the reading area is easy for the beneficiaries; the reference room and the entrance area in general shall be separated from the reading area in order to avoid noise, as it is a non-quiet area; and working on providing direct supervision for private groups who need restrictions in their use (4).

- Library furnishing elements: simplicity and comfort are the most important features of the furniture, as well as being inexpensive, which are: the chairs, tables, facilities for photocopying and reproduction machines, computers and their accessories (3).

There is also a set of environmental considerations for libraries must be taken into account, in terms of attention to them because of their great role in the integration of architectural design, with ensuring the reach of the optimal solution in design, in addition to providing comfort and conditions suitable for reading (4), and among the most important environmental considerations that must be taken into account in the design is **Voice Processors**, as the process of reading and knowledge needs to be quiet, this matter requires several measures that must be taken into consideration to reduce both internal and external noise (3). **Lighting Processors** (lighting contributes as one of the most important means in preparing a healthy framework, because it has the greatest role in the reading process, and it is one of the artistic formation methods used to enrich interior and exterior spaces, and one of the most important things that must be taken into account in the architectural design to reach the best possible and ideal environment).

**Temperature and humidity** (humidity levels recommended in libraries must be adhered to because they have an important role in the design process, as the relative humidity shall not be less than 30%, and in areas of rare collections and important documents, it ranges between 45% and 50%). Low humidity may cause book covers to crack or damage them if they are too high, so that the best temperature suitable for reading is between 20-25 degrees as proven by studies, therefore, lower temperature is better for office materials but are uncomfortable for the user, in addition to its importance. There is an importance for the air movement inside the spaces, which clearly helps in reducing the humidity and its effects such as mold) (1).

Whereas interactive design aims to shift from traditional thinking of space to thinking about it as an event (which means adding the time factor as a fourth dimension), this increased the challenges that the designer faces during the design process for interactive products that suit the needs of users, by changing the method and methodologies used in design, and innovating new mechanisms and methodologies (touching on color, texture, form, size, space, and final shape of the space) and the extent of their reflections on the user's behavior, in addition to that, the designer made an effort to create interaction scenarios, interactive aspects, and use problems in many aspects between the user and the product system (7: Page 34).

Whereas, the use scenario is represented by including activities that differ according to different categories of users and their previous experience, because the user's experience affects how he understands and deals with the various visual and sensory effects that make up the design and the consequent impact on his experience, and thus handle the quality of service in the establishment; the results of converting that experience into a reference mark for handling similar services in other establishments, by achieving several elements (7: Page 40), **which are as follows:**

- Defining and identifying the behavior of environments, systems and products.

- Presenting realistic, purposeful and ethical environments, products and systems.
- Ensuring the entertainment, fun and enjoyment.
- Easy to learn and use.
- Safety (safety in use).

**By study further the interactive interior design, and understanding the meaning of the interactive spaces, the Research reviewed some of the interior design elements in which the interactive design technology and its applications were applied, as follows:**

- **Floors:** interactive floors can be used in libraries as an extension method inside the library, such as guiding library visitors to the most important facilities, entrances and exits, or to the desired destination inside the library. The interactive floor also combines the perception of the movement of the body and the effect of this movement on the surfaces and the floor; these floors transform the spaces or areas that are not noticeable into an enjoyable experience as a result of changing the shape of the floor according to the movement of the person passing over it. It is also possible to track the visitors' movement inside the library by changing the color of the tiles according to the response systems.
- **Ceilings:** by using ceilings that depend on digital screens, to transform the ceiling into an interactive surface equipped to display pre-prepared models through it, in addition to using it to integrate sensors to measure environmental conditions (such as humidity, or temperature) and control their quantity and intensity, and light sensors, Which in turn reflects the users' visual needs inside the space, in order to ensure the quality of the internal environment in accordance with the environmental conditions (8: Page 57.63-64).
- **Walls:** interactive walls can be used, for example in meeting and conference rooms that take place remotely, in order to distinguish them by notifying users of affection and interaction as if they were in the same place, as they work on interaction between users with each other through a system consisting of information display units that aimed at interacting between users and cameras and microphones installed everywhere, so that communication and interaction is through sound and image. Interactive walls represent a special case of large screens equipped with special sensors and transducers whose mission is to identify and interact with the user and respond with programmed reactions to them, whereas this can be exploited through a group of direct projections on the walls, as a kind of virtual reconstruction of images of the shape of shelves, allowing to make storage units of the books available to visitors in digital form and in the same original location, through the multimedia integrated in the techniques of interaction and video display, in addition to the ability to browse and read books from the old originals.
- **Furniture:** Furniture is an essential element of interior design, and as a result of technological development in the field of furniture manufacturing, interactive furniture has become part of the space. This type of furniture depends on the integration of sensors and a very small data processor inside the furniture, and making it an essential part of it and is linked within central networks that interact with the user (6: Page15).

The interactive furniture can be used in libraries, in the halls specialized for lectures and meetings, and in the halls of the study through interactive tables that can be used for groups.

Based on the foregoing, we can deduce that working on the use of interactive design techniques in the interior spaces of the libraries contributed positively to the realization of the function, and contributes to linking users to the spaces of the library and ensures their interaction with them, thus increases the chances of the user's desire to repeat the visit in addition to the main goal of

his/her visit to the library to enjoy with the services provided to him/her that deal with his senses effectively.

### **The search ends with the following results:**

1. The use of interactive techniques as an extension method inside the libraries facilitates the process of reaching what the user wants without the need for inquiries and guidance from the library administration.
2. The use of interactive techniques has led to the organization of arranging and displaying books and library collectibles and reducing crowding in gathering places.
3. Interactive design can lead to a change in the perception, interaction and continuity of the surfaces that make up the interior space of the libraries.
4. The use of the interactive design in the determinants of the interior space of libraries aims to solve their prevailing problems, as the interactive techniques can be used as an extension method and a means for the attention of library's visitors as well as interacting with the ceiling while walking inside the various spaces, and these techniques can also be used as a means of browsing and reading books in addition to doing the preview process for pictures and videos.
5. The interactive design aimed at reducing the negative aspects of the design and provides an innovative and purposeful design that is easy to learn, practice and use.
6. The interactive design aimed at enhancing the positive aspects of the design by providing an entertaining and fun design that the user can enjoy by using the different senses and improves the user's experience.

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