Digital modeling and its technical variables in contemporary interior design

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Abstract

The current research sheds light on an important aspect of the great and rapid development in the field of science and technology and modern manufacturing methods as a result of the scientific revolution resulting from the accelerated cognitive development, which prompted designers in general and interior design in particular to exploit and invest in digital technology and the development of digital control in the process of designing the industrial product for the purpose of creativity and innovation through these digital programs Digital models achieve the requirements and desires of the interior designer according to the creative skill using modern software with high efficiency And extreme accuracy that is consistent with the requirements of the user, interior designer and beneficiary companies.

Therefore, the research problem can be identified by the following question: What is the nature of the variables in the modeling patterns in the stages of contemporary interior space design through the use of virtual reality techniques?, While the aim of this study was: to reveal the importance of digital models in the real internal space through virtual reality outputs, the current research included three topics The first topic: variables and their relationships Interior space design, The second topic: modeling in interior design between reality and simulation, and the third topic: digital models in interior design, and the research reached a set of conclusions, the most important of which are:

1. Digital models allow the designer, beneficiary organizations and people to explore the interior space before it is designed.
2. Designers use Digital Prototyping to design, optimize, validate, and visualize their spaces digitally throughout the design stages.
3. Innovative digital models can be created through creative designs, achieving multiple design objectives (best performance, high efficiency, space effectiveness, appropriate cost)

Keywords: Digital, modeling, interior design

Search problem:

Testing the outputs of the design process and verifying the extent to which they achieve the goals and address failures or development on the design itself is one of the first priorities of companies and design centers and is widely used in digital models since the start of the process and achieves its goals by increasing revenues, reducing cost, speed of delivery, and achieving quality conditions, and companies that use digital models achieve 86%

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superiority of their counterparts that use traditional prototypes, as well as a precedence rate from the design stages to the start of production in record time. It costs relatively less, which gives it priority in competition as well as speed of implementation (Aberdeen Group, October 2006,p. i)

The rapid development in the cognitive systems pushed designers in general and the interior designer in particular to exploit and invest in digital technology and the development of digital control in the process of designing the industrial product for the purpose of creativity and innovation through these digital programs Digital models achieve the requirements and desires of the interior designer according to the creative skill using modern software with high efficiency and extreme accuracy consistent with the requirements of the user, interior designer and beneficiary companies.

Therefore, the research problem can be identified by the following question: What are the digital modeling techniques in the design of the virtual indoor space and what are their variables?

The importance of research:

The importance of the current research lies in:

1- Addressing a topic that enriches the knowledge of modeling patterns variables in the inner space.

2- The results of the study serve the relevant institutions of designers and researchers.

Research Objectives :

The current study aims to:

Revealing the employment of digital models in the internal space and their effectiveness through design in virtual reality

Define terms:

the variable:

-He defined change as "the transformation of one or more of the qualities of a thing, or the substitution of one adjective in place of another, which is types: a change in quality and is called impossibility, or in quantity by increase and decrease, or in place and is called transition, while the change in essence is a change in the universe or corruption" (Philosophical Dictionary, 1983, p 50)

-André Laland defined the variable in his philosophical encyclopedia as: what can change, what can be made to change, and what tends to change (Laland, 2001, p1525).

Procedural definition: It is an influential force that leads to a transformation in a medium in quantity or type or both in the design of the internal space in reality or virtually.

Digital Design

Digital design is a type of visual communication that presents information, product, or service through a digital interface. It is a graphics designed specifically for use on computers (https://99designs.com/blog/web-digital/digital-design)

The researcher defined it procedurally: as the technique through which virtual spaces are designed using design programs and through computers .

Prototype

Primitive style, primitive style, primitive or predecessor form or type, original model, prototype (airplane, ... etc) are made on the basis of other models (Baalbaki, 2010, p 927)

-**Modeling**: It is the process of identifying and discovering traits, skills, practices and abilities, coding them and building the ability to repeat, transfer or show them. There is a clear difference between modeling and traditional cloning, both of which can transmit qualities and possibilities, and the difference lies in the quality Ahmed of the qualities, possibilities or skills transferred. (Mustafa,2012,p2)

-Modeling in language:

Model: - It is an example of the thing that is being done and collected (models and models) (Mustafa, 1989, p 31) as defined as: the one from which the body to be accessed is copied (Al-Alayli, 1975, p 614)

-Procedural definition of modeling: It is the imitation and simulation of a real space in order to verify its suitability and achieve the goals for which it was designed

-Assumption:

The Oxford English Dictionary defined it as "undefined or realistic, but it depicts something real or has an actual existence ".(Al-Khafaji,2001,p22)

-It means an interactive self-directed multi-path visualization produced by computer systems that shows us an artificial shape of the virtual environment .(Al-Khafaji,2001,p23)

-Procedural definition:

-Virtual reality allows you to check and move through the integrated project and feel it through a virtual world in which you look and move . (Abdo,2005, p8)

-It can be defined in a simplified way as an imaginary embodiment by advanced technological means of real reality, but it is not real, so that it gives us endless possibilities for light, extension, sensation, vision and disturbance of feelings as if we were in real reality .(Campbell, 1997,p126)

-Procedural definition of assumption: It is the process of expressing the design product derived from the designer's imagination and carrying a certain pattern.

The first topic: variables and their relationships to the design of the internal space

Both the change and the variable overlap, the change is the fact that the thing was not his before that, which is the transfer of the thing from one side to the other (from the quadruple verb change and its source change). Change is a subjective feature of the phenomenon outside any intentional act of the individual or society.

While change is an intentional act that requires awareness and its reference is either objective knowledge in the analysis of need, or a unique mood attitude calling for excellence only.

While the balance between need and technology represents unintentional change, the individual represents intentional change through two sources of change: objective knowledge and mood attitude .

Change is a conscious intentional act (from the quadruple act is and its source is a change) through human intervention to change one or more elements of a particular cultural structure or cultural form and the design of industrial products is one of the goals of this change, a causal act based on an intellectual base that believes in deviating from the prevailing norms of culture and that the advantage of change is one of the features of the creative production, but it is the one that achieves creativity when this change in the system leads to a change in the perception of the recipient Venturi associated the effective system as the result of changes and differences to previous systems, enrichment of meaning and vitality of industrial product designs, and difference is change.

But the variable on the other hand suggests that its causes are not in it, and that it came with the above and that it is in a series of conditions, the different is distinguished by the fact that it may suggest the same properties of the variable, but it does not stop then and remains characterized by the nature of the unverified or latent, which will explode, which is an achievable standard project

- .Variable types:
- Configurable variable
- Technical variable

The change according to Al-Jurjani is the fact that the thing in the case did not have it before, or is the transition of the thing from one state to another It is the change that is in the

essence, which is called the absolute universe, and from it what is in the quality, which is called impossibility, and from it what is in quantity, which is called growth and shortage, and from it what is in place, which is called a transition and from it what is in time, which is called a sequence, if The change in the thing itself at once was changed batch and if it changed in quantity or quality little by little was gradually changed,(Salib,1979,p311) the change can be classified according to social studies into four main levels of renewal and change of culture.(Razouki,1996,p81)

- Variation
- Cultural borrowing
- Invention
- Temptation

A – Variation:
They are sequential changes and modulating operations on the model presented in order to improve the specifications or modify the system in successive steps with a deliberative recursive character, representing a simple modification in the usual behavior, and a gradual change, and the repetitive feature is present in a large proportion and the differences in it are simple and few.

B- Cultural borrowing:
It means the process of changing and embodying historical and heritage landmarks in a contemporary template or transferred literally, and may take ideas from sources and references outside the field of industrial products and from different and divergent cultures for the purpose of expanding the range of semantics and the possibility of several readings of these superimposed texts from diverse cultures, but the realization of this type of change is clear because there are no radical changes on the one hand and easy identification of the reference of metaphors on the other hand, Borrowed elements have been dealt with in a variety of ways such as overlay, stratification or condensation.

C- Invention:
It is a renewal that includes the conversion or arrangement of elements in a new form while maintaining the previous system and its organized principle, and with this direction there is a new reference based on the original old reference (original pattern), by changing the relationships of the parts after re-installation in a new way, so a distinct displacement of possible relationships is achieved within the rules of that system and new interconnections are achieved.

D- Temptation:
It is the last level of change in which the prevailing norms are violated and the main laws of the system are challenged, and a new system is established where new elements arise that did not exist previously, and it may be difficult for the interpreter to understand the dimensions of the new form or meaning.

The second topic: modeling in interior design between reality and simulation
The model is considered one of the rich words complex, it refers to mental patterns that help to understand reality, and natural and mathematicians, for example, can study shapes in themselves regardless of their scientific applications, the model is the structure that includes a set of perceptions and symbols, which does not exist except in human thought, but in other sciences, including design, it happens on the contrary, where the model is determined by realistic elements, which makes it apply to the structure as the essence Hence we can distinguish in the use of the term structure two trends that are often suspected:

•A trend that calls structure a set of mental elements that provide specific perceptions of reality.

•Another approach calls structure the set of relationships that exist between things in the same reality.

In the first case it is a mental model and in the second case a realistic essence

The model is represented as the practical applied part that memorizes designs in general and can be imitated, and from it the formal relationships appear more clearly, the model is a clear and well-defined image of the pattern for the required design, which carries with it the intellectual and symbolic dimensions inherent in the mind and can be achieved physically by the model.

The idea of the model is related in three directions and can be considered model levels
(Silk .J, 1997, P 137)

•**The first level:** (abstract) means the set of beliefs, myth, vision, metaphysical meditation.

•**The second level:** It is considered a scientific achievement that depends on a set of scientific contexts.

• **The third level:** the fixed is a real work (simulation).

The model provides room for individual reflection, encouraging creative displacement and communicative difference by creating a difference between distinctive work and repetitive deliberative work.

In addition, the acquisition of basic prototypes that present a set of problems and solutions for a particular design topic to facilitate access to ideas and to solve new problems through similarity, where the unknown problem is clarified within a known and familiar idea and research is carried out to reach an appropriate link to it. The transformation is not complete in the beginning, as the good model retains many useful characteristics of the old but puts it in a new framework in a new form and a new meaning.

Analogy and simulation :

Simulation is used in many contexts, such as technology simulation or development, occupational safety safety, testing, training, games and other fields (Banks, 2001, p 3), as well as the scientific modeling of natural systems or human systems to gain a clear view of the phenomenon and its performance as in economics. Simulations can be used to show the potential real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be handled, because it may not be accessible, it may be dangerous or unacceptable to share, it has been designed but not yet built, or perhaps it simply does not exist .

Key issues in simulation include obtaining valid information about the selection of key characteristics and behaviors relevant to the model, the use of simulation estimates and assumptions, and drawing simulation results.

Historically simulations used in different fields have evolved largely independently, but twentieth-century studies of systems theory and cybernetics along with the widespread use of computers in all those fields have led to some standardization and a more systematic view of the concept.

Physical simulation refers to simulation in which physical components are replaced by the real product through computer simulation (Sokolowski,2009,p 6), To describe the simulation and how close it is to the realistic analogue accuracy is broadly classified as one of three categories: low, medium and high. Specific descriptions of similar levels are subject to the required design and are(Sokolowski,2009, p 8)

.1Low - minimal simulation required for design

.2Medium - highly responsive to design requirements, with limited accuracy

.3High - almost indistinguishable or as close as possible to the real system

Human simulations of a model can involve through a virtual artificial environment, simulation in failure analysis refers to simulations in which we create an environment. (Bruzzone ,2003,p 315)

Digital simulation:

Digital simulation has become a necessary part of the modeling of many natural systems and in physics, chemistry and biology, and human systems in economics and social sciences (such as sociology) as well as in design and architecture as a means of demonstration that allows decision-making and determination of design efficiency and the use of digital programs as well as the impact of the simulation process according to the set of information available for the design environment.

Through the digital model, the designer seeks to find analytical solutions that allow predicting the design as well as the behavior and efficiency of the internal space user, which in turn led to computer-based simulation modeling programs that are divided into (Davidovitch, 2008,p 86)

"Live" simulation: where the designer uses the actual model with real systems in a real environment.

"Virtualization" simulation: The designer uses a model with simulation systems in an artificial environment.

Structural simulation: where the designer uses simulation of simulation systems in an artificial environment.

Simulation "live: models uses standard tests, and its characteristics are high accuracy
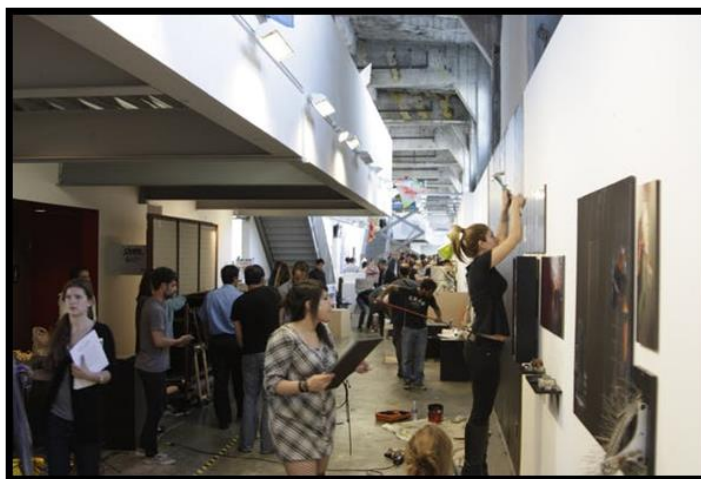
The figure shows the simulation of the realistic environment virtually
https://archinect.com/schools/release/88/sci-arc-

The third topic: digital models in interior design

The concept of digital models spans more than a decade, especially as software companies have started introducing computer-aided design (CAD) software capable of creating accurate three-dimensional models.

Although the concept of Digital Prototyping has been an endeavor of companies and designers for a long time, it has only recently become a reality for design organizations and designers alike that cannot afford to implement complex and expensive solutions.

Default forms:

Prototyping is an effective means in the product development process. The use of computer-aided design to validate the design before conducting a physical prototyping involves creating geometric shapes (usually three-dimensional) that are generated by the computer and testing the designs under different usage conditions and verifying their

functionality and aesthetic performance by simulating the behavior of the space user in reality (Schaaf , 1997, p 941).

The process of designing and developing the product is primarily used to the designers' experience and judgment in producing a hypothetical prototype, then building and testing the physical prototype in order to evaluate its performance, it is often unlikely that the prototype will meet expectations, designers usually had to redesign the initial several times to address the weaknesses revealed in the tests. (Thomas ,2014,p82).

The figure shows all the details that can be verified simultaneously and shared by others   https://www.archdaily.com/948832/hga;g

Companies are under pressure to reduce the time required to design and implement interior spaces and bring them to higher levels of performance and reliability through virtual model designs in which engineering simulation software is used to predict performance Before embarking on the implementation process, designers can quickly explore the performance of thousands of design alternatives and invest the time and money needed to build physical prototypes, the ability to explore a wide range of design alternatives leads to improvements in performance and design quality through what virtual models can achieve. Physical primacy (Ghazaleh, 2004,p47).

The early availability of these physically realistic virtual models allows testing and performance confirmation when making design decisions, as well as enabling accelerated design phases and providing more visibility into the space-user relationship than can be achieved through building and testing physical prototypes. Benefits include lower costs in both design and implementation as physical prototypes are significantly reduced and tested, and uncomplicated and appropriate implementations are chosen (El- Khaldi, 2010, p78)

Digital models go beyond just creating three-dimensional designs, but they give design development teams a way to evaluate and evaluate designs in all

Its space elements and details, to determine the extent to which the design conforms to the required standards, and to know how the different design components interact with the architectural structure and subsystems, by simulating the real-world performance of the interior space design and digitally validating it, which reduces the cost and time required for physical prototypes, so digital models change the traditional product development cycle (Rowe. 2006.p89)

The figure shows the design team evaluating the design throug immersive /virtual techniques   https://www.nstands.com/moscow

The designer can also perform simulations in the early stages of the design development cycle, avoiding failure situations during testing or implementation stages. (Aberdeen Group, 2008 February,p 11.)

Design Phase:

The design stage includes general concepts, user requirements and data for detailed drawings of the design, and the designers accompanies digitally starting from the first scheme, during the conceptual design stage, then they share this data with the engineering team from other disciplines involved in the design architecturally and engineering, then the design data is standardized in the digital model to ensure feasibility and technology.

The figure shows the design of a digital interior space for a source ttps://www.pinterest.com/pin/326722147940257815/

Designers prepare high-quality digital images or presentations to make appropriate decisions about the design of the space in general and its constituent spaces and their spatial relationships, where they are flexible and adjustable, and make the best possible design

decisions and avoid costly mistakes, using the digital model, and provide the stage of designing the digital model Digital, and provides the design phase of the digital model.(Hallerbach, 2018, p91)

1. Perform integrated calculations and simulate motion within the inner space and validate designs.
2. Test the relationship of the parts with each other and the parts in the whole and the interaction between them.
3. Evaluate different solutions to sensory stimuli problems in the inner space.
4. Test how design works under real-world conditions.
5. Stress analysis and selection of appropriate materials in the components of the inner space.

Conclusions:

1. Promotes rapid and continuous changes in change in parallel formally, which allows unspecified options for the designer to show in his design and find appropriate solutions.
2. Digital models allow the designer, beneficiary institutions and people to explore the interior space before designing it.
3. Designers use Digital Prototyping to design, optimize, validate, and visualize their spaces digitally throughout the design stages.
4. Innovative digital models can be created through creative designs, achieving multiple design goals (best performance, high efficiency, space effectiveness, appropriate cost)
5. 8. Designers and companies alike use digital prototypes to create realistic image renderings and animations of spaces before they are implemented.
6. 9. Provide prior reasons for the relations between space with all its components and users, as well as appropriate fields of movement.
7. 10. Allows the best possibilities of space distribution among the options that can be easily selected and changed.
8. 11. Companies often adopt digital models with the aim of improving communication between designers, experts and clients benefiting from projects, by providing innovative designs and speed in their completion.
9. 12. Many companies use digital prototyping instead of physical prototyping or as a complement to them.
10. 13. Digital virtual models allow communication with designers or beneficiaries in remote areas through communication via the network at each stage of the design.

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