

Innovating a design methodology to produce artistic flame-work glass products

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Abstract:

Methodologies are an integrated part of the design process, the methodology is the way to reach a goal, i.e. it is a set of tools that are used to provide evidence, evidence and arguments to confirm the validity or incorrectness of a particular hypothesis, so the design methodology is an organized plan for many processes through a set of procedures that can be used for observation and investigation in order to gain knowledge, reach results and facts and develop solutions to problems. The design of artistic glass products formed by lampworking depends on the expression of the designer's sense of self-vision that tries to appear to reality in the form of a product with a variety of aesthetic values, hence the methodology of designing such products has a kind of privacy that distinguishes it from products of a user nature, and the technology of lampworking has special specifications in the methods of formation affect the methodology of designing the product to its implementation. The problem with research is that the stability and rigidity of the design systems used to develop design ideas for glass products formed by lampworking technology have reduced the diversity of products posed by lampworking locally. The aim of the research is to develop a design methodology that contributes to various innovative alternatives to the formation of new glass art products implemented by lampworking. The research assumes that the development of a design methodology achieves innovative variations for the production of artistic glass products formed by lampworking. The importance of the research lies in the fact that it contributes to the innovative lifting of the glass formation designers with flameworking technology. The research is determined by the development of a methodology for technical products formed by the flameworking. The research addressed several topics: (clarifying the methodology proposed in the design for the production of artistic products of glass formed with lampworking, the most important methods of production of glass formed by lampworking, activating the proposed design methodology in the design of models of artistic glass products, design ideas and applications for models of artistic glass products), and the research has reached some results, including: (the contribution of new design systems to the realization of diversity in the design alternatives of glass artistic products formed by lampworking, activating the self-experiment-based design methodology in the design and implementation of artistic glass products formed by lampworking).

Keywords:

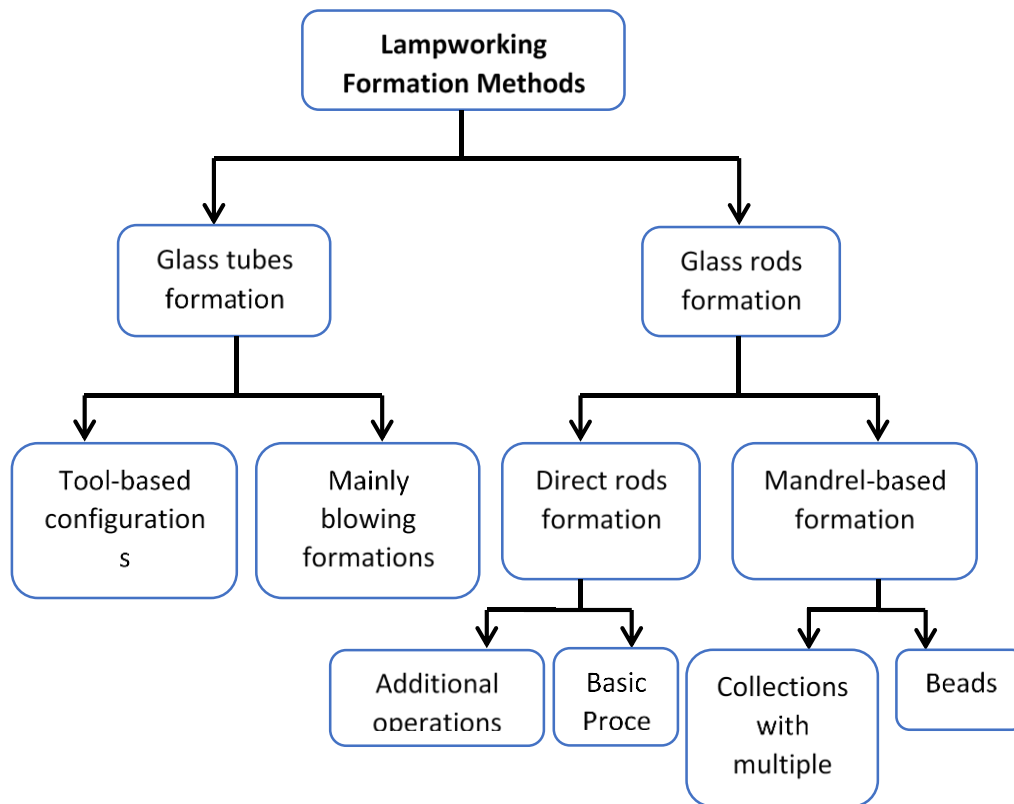
Design methodology – lampworking/flameworking Modulation Methods and techniques - Artistic Glass Products.

Introduction:

Devising or developing a design methodology is a way to provide solutions to innovative ideas so that they become enforceable, and one of the good advantages of this development is that it opens roads and sets controls and markers that help implement many systems of development and innovation of technical products in the fields of glass design and production with lampworking, in addition to that the research develops a methodology that contributes to the development of this field in Egypt, This methodology is based on innovative methods to lay the foundations for the development of this artistic field in order to increase its competitiveness and continuous development, so this research has tended to develop a design methodology that leads to various innovations for the production of artistic glass products with lampworking.

Methods of forming glass with lampworking:

The methods of lampworking formation vary so widely that they are difficult to account for or to develop a precise regulatory framework; this stems from the absolute freedom of formation conferred by lampworking method, as well as the method of dealing directly with the material of glass, especially at its most fusion (softer) stages, The fundamental difference in the methods of formation derives from the fact that the glass ore formed by either a hollow tube or a solid rod, although the lampworking formation methods vary, there are some basic processes to be followed in the formation processes, and form (1) shows one way of organizing and dividing the lampworking formation methods.



Form (1) methods of Lampworking formation

The formation methods are usually associated with the products to be implemented, they may depend solely on the formation by glass rods or blowing with tubes, and some forms of products may use them both, and artistic glass products are usually characterized by employing all the possibilities available to the artist or the lampworker to reach the required body in accordance with the requirements of the product design.

Here is an explanation of the most important configuration trends suitable for the implementation of artistic glass products:

Table (1) The most important configuration trends suitable for the implementation of artistic glass products

Formation Methods
<u>Networking flamwork technique</u> : The style is characterized by its aesthetics based on the simplest design elements, the "Line" and the simplest aesthetic values, transparency, and is formed from glass tubes (borosilicate) using a hand-held torch.
<u>Formation within blocks of glass molten</u> : the basic idea in this direction is to form small glass works of art in the form of a glass mass, Inside it contains a collection of roses or natural shapes formed with colored glass rods, where the collection of roses or natural shapes is initially performed in the form of compositions, and then placed within a mass of glass molten
<u>combination of heat-based construction</u> : a collection and paste of small-scale works of art by torch for a large piece of art, where the works formed are assembled, either by blowing using tubes or forming using the solid glass rods, and then all shapes are grouped together using a hand-held torch ^(R.4) .
<u>Kinetic sculpture in glass</u> : which is to move works of art formed from glass, by making a system of movement of parts using glass gears, or motion systems derived from the movement system of joints and muscle ligaments of the human skeleton, and sometimes motors are used for movement or the use of steam energy.
<u>Decorative composition</u> : It is more a method of shaping the appearance of the surface of the product than a form of the product itself, and many materials are used in this method such as glass break, glass enamel, mica powder and other materials, and this method is very famous for the decoration of the surface of glass beads, but it can also be used in other artistic glass products ^(R.3) .
<u>Composite-built formation</u> : A method of fitting pieces of artwork together to get the full finished shape, often cold installation or installation methods that do not include the use of flame heat of torch to paste the pieces together.
<u>The formation of Hollow- Glass products</u> : This method depends on the formation of products from glass tubes by blowing, with the possibility of using formation tools to give required artistic effects.
<u>The formation of Hollow- Glass products using lathe</u> : This method relies on the formation of hollow glass products using glass tubes, in order to implement artistic products such as vases, or functional products as lighting units.

Basic concepts and terminology on the proposed methodological stages of design for the production of artistic products from lampwork-shaped glass:

- **Design methodology**: the method or path to reach the goal associated with solving the design problem.
- **Configuration**: Is the first phase of the proposed design methodology, in which various building systems are developed that are influential in achieving innovative variations in the design of the art product.

- **Shape:** At this stage, various innovative forms of surfaces and component dimensions of the product are developed. The forms through which design ideas can be developed vary, including^(R.1, p.134):

- Natural and organic forms: formations that carry in their content the trend towards nature.
- Abstract shapes: Abstraction is intended to simplify the shapes to be stripped and hide some of their original contour lines.
- Engineering shapes: All elements of geometric shapes.

- **Study, analysis and evaluation of ideas:** a design phase in which a study of aesthetic values is conducted with design ideas to determine how to develop aesthetic value with the design idea.

- **Design idea selection:** The design idea selection process is linked to the results of the evaluation of ideas, where the idea is chosen according to the requirements of achieving design objectives, and the selection methods used to determine the best idea vary.

- **Product design under formation technology:** At this stage, the design specifications of the selected idea are developed within the framework of the implementation technology, where a system is developed for the stages of product implementation.

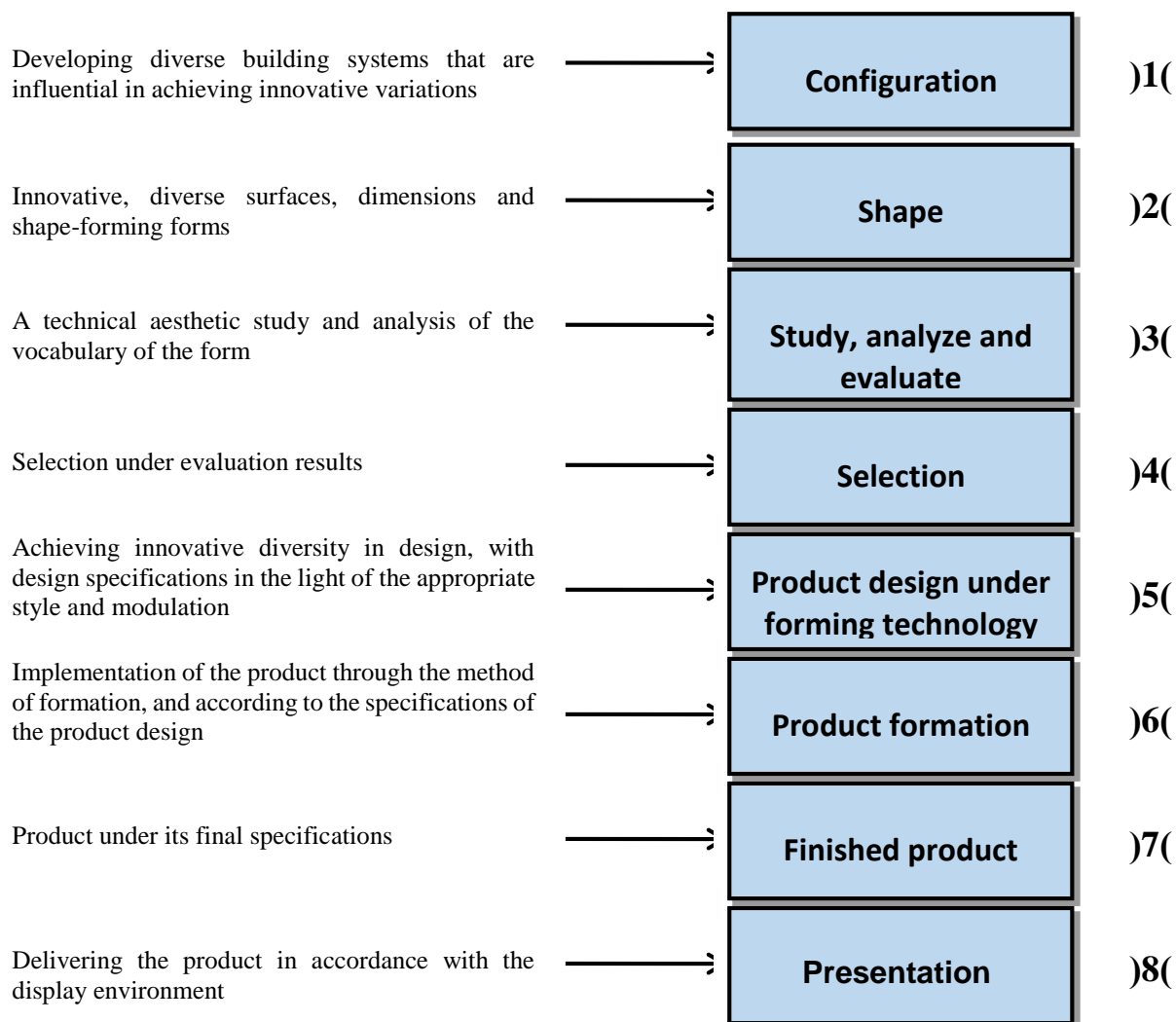
- **Product implementation:** a phase that includes the implementation of the glass product through the method of formation and in accordance with the specifications of the product design.

- **Finished product:** At this stage the final product is obtained to conform to its design specifications, and the final product is linked to the realization of the innovative idea of design in glass products formed by lampworking.

- **Presentation:** The product is presented in accordance with the display environment, where the formed product is placed in the right environment for display, with the possibility of adding other materials to the glass in some cases that require the idea of designing them to use these materials with glass to achieve design requirements.

Activating the proposed design methodology in the design of various artistic glass products in their innovations:

Through research, the proposed design methodology has been activated in the development of various innovative solutions for different artistic glass products, which has relied on how to achieve diversity in ideas in terms of composition, form, general product body and production methods, and the methodology used can be clarified through the form diagram (2) which shows the successive stages of the methodology from the general configuration of design to the implementation of the final product and its presentation in its environment.



Form (2) proposed design methodology for the design of artistic glass products formed by Lampworking.

Design ideas:

The proposed methodology for designing some of the artistic products formed lampworking has been followed as follows:

Phase 1: Configuration :The idea was inspired by natural building systems, namely, "patterns of small vein branching within foliage", and how to combine them with a range of simple geometric shapes to obtain a single building-body art product.

Phase 2: Shape: Simple geometric shapes have been selected as a specific exterior frame for the shape, with a range of organic construction systems for tree leaf vein branching patterns placed within those engineering frameworks for alternatives to innovative and diverse design forms.

Phase 3: Study, analysis and evaluation: a technical aesthetic study and analysis of the vocabulary of the form by focusing on one of the alternatives resulting from the previous phase, and the alternative in which the triangle was integrated as an geometric form was chosen with one of the patterns of micro-vein branching, to study and analyze a range of alternatives to that design.

Phase 4: The choice of design idea: The exclusion of inappropriate alternatives and the best idea or alternative of the resulting design alternatives were relied upon through the use of the

Selection Matrix^(R.5), where criteria were made to evaluate design ideas including: (clarity, innovation, artistic value, surface appearance, ease of implementation), and therefore the best of these ideas were reached.

Phase 5: Product design under the formation technology: The network lampworking technique was chosen to achieve the selected design idea, and some additions to the design were made under the formation technology, where a vertical rod was placed in the middle of the pyramidal shape to be loaded the rest of the discharges on it, as well as the thickness of the lines was taken into account to fit the thickness of the glass rods to be formed.

The formation methodology is designed as follows:



- 1- Start shaping the prismatic construction by installing the external boundaries of the shape and its base by welding glass rods by hand-held torch for easy control, and then welding the overlapping discharges of each face using the network construction methodology.
- 2- Paste these groups together thermally around the inner axial rod.
- 3- Get rid of the excess parts of the glass rods by cutting them during the stages of thermal formation .
- 4- Annealing for a product that does not contain stresses that lead to breaking it




Phase 6: Product implementation: formed in accordance with the steps described in the previous phase.

Stage 7: Final product: Install the art product on a wooden base that allows it to settle in the desired position.



Stage 8: Presentation: presented it.

The following are examples of design ideas in which the proposed methodology has been activated:

<p>Theme: Design of an art product, based on the combination of engineering configuration and network-building configuration</p>	<p>First idea</p> 
<p>Design idea statement: How to use the network modulation method to fit the formation of a geometric composition while maintaining the basic idea as a commemorative art product based on achieving high aesthetic values.</p>	<p>second idea</p> 
<p>Theme: Design of an art product (Vaz), based on a composite composition of two units in two different colors.</p> <p>Design idea statement: How to use the inflatable modulation method in glass pipes to create adjacent artistic wins that complement each other.</p>	<p>Theme: Design of an art product, based on the combination of free configuration and network-building configuration.</p>

<p>Design idea statement: how to employ the network formation method to suit the formation of a free configuration, while maintaining the basic idea of a product that requires high aesthetic values</p>	<p>third idea</p> 
<p>Theme: Design of an artistic product, based on the combination of free composition and decorative composition of the surface appearance by applying colors on the surface of the glass</p>	<p>fourth idea</p> 
<p>Design idea statement: how to employ the method of decorative composition to suit the formation of a composition of a single building with a free body derived from the shape of the globe while maintaining the basic idea of the artistic product.</p>	<p>Fifth idea</p> 
<p>Theme: Design of an art product, based on the combination of free composition and heat-based assembly structure (forming solid pieces and vicious pieces and glued together)</p>	
<p>Statement of design idea: How to employ the method of composition with heat assembly construction to suit the formation of a composition of a free body building derived from the form of the pharaonic lotus flower, while maintaining the basic idea of the artistic product.</p>	

Implemented models of practical applications:

	<p>Model (1) Integration between the engineering configuration body and the decorative formation method with direct drawing technology on the surface of the product</p>
	<p>Model (2) Combining the free formation body with the method of forming with the heat assembly structure with the technique of pasting the shape of a blowing product with product shaped with solid rods</p>

Result and recommendations:

First: Results:

- 1- A design methodology has been developed that contributes to the diversity of design alternatives to glass art products formed by lampworking to meet customer requirements.
- 2- The design methodology based on self-experience has been activated in the design of artistic glass products formed by lampworking.
- 3- The effectiveness of the proposed design methodology has been confirmed by developing a variety of design ideas for glass art products, to apply some of these ideas.

Second: Recommendations:

- The need to develop specialized design methodologies that help to achieve non-traditional design alternatives.
- The need to pay attention to the application of the proposed design methodology because of its positive impact on the development of the lampworked glass industries locally.

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