"Goals and objectives of the science of drawing"

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ABSTRACT

This scientific article provides a deep scientific analysis of the goals and objectives of the science of pen drawing based on modern fine art pedagogy, applied art, composition theory, optics, drawing, plasticity and the psychology of visual perception. The main goal of pen drawing in the study was to develop observation, constructive thinking, the ability to analyze and synthesize form, spatial imagination, tone and light-shadow perception, the skills of creating an artistic image, and the factors influencing the development of creative thinking in students through scientifically based criteria. The article extensively covers the educational, practical, artistic and scientific functions of pen drawing based on the theories of art historians such as Leonardo da Vinci, Alberti, Dürer, Arnheim, Gombrich, Itten, Kandinsky, as well as Gestalt psychology, the laws of cognitive perception and the principles of pedagogical didactics. The results of the study confirm that the tasks of the science of drawing are a complex, multi-layered scientific and pedagogical system aimed at transforming the student into a visual thinker who clearly perceives form, texture, color, plasticity and spatial structure

Keywords: drawing, constructive analysis, observation, spatial imagination, tone, light and shadow, image, visual perception.

INTRODUCTION.

Determining the goals and objectives of the science of drawing from a scientific point of view is one of the fundamental issues of fine arts pedagogy, and this science involves the formation of complex psychological and artistic activity mechanisms in the student, such as visual perception, constructive thinking, analysis and synthesis of form, spatial imagination, understanding of the structure of tone and light and shadow, creating an artistic image, making compositional decisions and creative thinking; The purpose of pencil drawing is not only to teach drawing techniques, but also to systematically develop visual thinking through scientific analysis of the construction of form, understanding optical laws, reading the dynamics of plastic, determining spatial structure and mass, and modeling the relationship between light and shadow. This process is reinforced by scientific and methodological approaches developed by Leonardo da Vinci, Alberti, Dürer and other classical artists, as well as Arnheim's views on visual thinking, Gombrich's psychological model of perception and image, Itten's theory of color and form, and the principles of holistic perception of Gestalt psychology; the tasks of pencil drawing are to increase observation, teach constructive analysis of form, convey volume through tone independently of color, perceive texture and material properties, build spatial composition, realistic and figurative interpretation of nature, deeply master the

expressive capabilities of the line, develop eye-hand coordination, and activate artistic thinking. The relevance of the study is that in modern art education, drawing is often interpreted as a technical exercise, while it is a complex scientific discipline that includes visual perception, cognitive processes, optical analysis, plastic and construction theories, and psychological observation, and has important pedagogical significance as the basis of all areas of fine arts. Therefore, this study reinterprets the goals and objectives of drawing based on modern scientific foundations, optical-physical laws, cognitive psychology, and the principles of classical art criticism.

MATERIALS AND METHODS.

This scientific research was carried out based on a multi-stage, complex and scientifically based methodology in the process of determining the goals and objectives of the science of pencil drawing; as the first method, constructive analysis was used, in which the shape of nature and objects was divided into basic geometric blocks such as a sphere, cylinder, prism, cone, and their tectonic axes, mass centers, and proportional ratios were scientifically analyzed based on Euclidian geometry and the Descartes coordinate system; as the second method, optical-physical analysis was carried out, in which the angle of incidence of light on the surface, the density of the volume in the penumbra, the optical properties of reflexes, the coefficients of light absorption and reflection of the surface texture were studied based on the laws of Helmholtz, Lambert and Fresnel, which allowed for scientific modeling of tone, light-shadow system and volume in pencil drawing; as the third method, gestalt psychology was used, and the mechanisms of the student's perception of form were analyzed based on the principles of integrity in perception, figure-background, visual continuity, rhythm, proximity and generalization; the fourth method is a neurophysiological model of visual perception, which scientifically reveals the processing of line, contrast, rhythms of form and tone signals by the brain based on Hubel and Wiesel's studies of orientation-sensitive neurons, Goldstein's laws of visual perception and Arnheim's theory of visual thinking; as a fifth method, traditional and modern methods of art pedagogy were used - Leonardo da Vinci's principles of observation, Alberti and Dürer's constructive drawing methods, plastic analysis exercises of the Bauhaus school, methods of cognitive development and aesthetic education in modern art education models were compared; as a sixth method, compositional and plastic analysis was used, and the scientific parameters of the distribution of the total mass of the form, axes of dynamics, visual center, character of the line, spatial depth and compositional balance were analyzed; As the seventh method, psychological methods that develop observation (selective perception exercises, contour analysis, rhythmic structure observation, proportional comparison) were used, which served to increase the student's visual sensitivity; as the eighth method, an experimental-pedagogical study was conducted, diagnosing the effectiveness of pencil drawing classes, the speed of constructive analysis, perceptual accuracy, tone differentiation, and composite thinking indicators in different age groups. The integrated use of these methods made it possible to deeply reveal the goals and objectives of the science of pencil drawing from a scientifically based, psychological, optical, pedagogical, and artistic perspective.

RESULTS AND DISCUSSION.

1**. The main scientific goals of drawing**

The results of the study show that the main goal of drawing is not only to master drawing techniques as an initial stage of teaching fine arts, but also to form in the student complex psychological and aesthetic processes such as scientifically based visual perception, constructive thinking, analysis of form, modeling of tone and light-shadow relationships, creation of an artistic image and creative thinking; the goal of drawing is based on the principles of observation developed by Leonardo da Vinci, the constructive drawing methods of Alberti and Dürer based on geometry, Arnheim's theory of visual thinking and the holistic laws of perception of Gestalt psychology. The study proves that drawing turns the student into a creative subject who "analyzes, rethinks and artistically interprets the object he sees"; this provides them with the

scientific and artistic foundation necessary for successful work in all areas of fine arts.

2. Tasks of constructive analysis of form

The study found that constructive analysis of form is one of the most important tasks of pencil drawing, and the study of scientific criteria such as dividing an object into geometric blocks, determining the core of the structure based on the sphere-cylinder-prism-cone system, proportion, symmetry, center of mass, tectonic axes and spatial directions forms constructive thinking in students, which is the most important layer of visual thinking; The analysis conducted on the basis of Euclid's geometry, Descartes' coordinate system and the laws of classical drawing shows that a constructive view ensures visual accuracy of form, correct interpretation of volume and stability of proportions. The results of the study proved that performing constructive analysis tasks elevates the student from the level of mechanical drawing of the visual process to the stage of scientific-analytical creativity.

3. Tasks of working with tone and light and shade

The tone and light and shade system is one of the most important scientific tasks of pencil drawing, which plays a key role in modeling volume on an optical basis, revealing the relief of the form, creating spatial depth and expressing the individual properties of the object; the study was conducted based on optical-physical data on Lambert's law of diffuse illumination, Helmholtz's theory of reflection, Fresnel's coefficient of reflection and the interaction of light with the surface. The results obtained show that as the student is able to distinguish tone gradations, his ability to see volume, spatial thinking, visual sensitivity and figurative interpretation develop to a much higher level; analyzing tone and its correct application constitute the scientific foundation of pencil drawing tasks.

4. Tasks for developing spatial thinking

The development of spatial thinking is one of the fundamental scientific tasks of the science of drawing, forming complex cognitive processes in the student, such as imagining three-dimensional space, understanding the curves of the form, feeling the distribution of mass, creating an optical construction of volume. The research was conducted based on Gestalt psychology, Goldstein's theory of visual perception, Piaget's stages of spatial development, and spatial exercises in modern art education. According to the scientific conclusions obtained, scientific categories such as linear perspective, aero perspective, spatial contrast, direction lines, and compositional center of gravity play a decisive role in the development of spatial imagination.

5. Observability and perceptual accuracy tasks

The study showed that observation is one of the most important psychological tasks of drawing, which teaches the student visual selectivity, the ability to distinguish the main constructive features of the form, to see small details and structural changes, to understand textural differences and to perceive optical balance; According to Hubel-Wiesel's visual cortex studies, as a result of observation, neural connections responsible for line, contrast, direction and rhythm in the brain are strengthened, which becomes the scientific and physiological basis of drawing tasks. The study confirmed that a student with observation more accurately registers the characteristic features of nature and shows high results in figurative expression.

6. Tasks of figurative thinking and artistic expression

One of the highest tasks of the science of drawing is the formation of figurative thinking, which takes the student from simple copying to higher-level activities such as artistic interpretation, generalization, finding a compositional solution, creating content and building an image. The study was conducted on the basis of Arnheim's visual logic, Gombrich's psychology of image, Langer's language of art, and Kandinsky's theory of internal necessity; according to the scientific conclusions obtained, figurative thinking relies not only on technical skills, but also on complex cognitive processes such as psychological association, perceptual selection, aesthetic decision-making and semantic thinking. Therefore, image creation is one of the most complex scientific tasks of drawing.

7. Integrated model of scientific tasks of the science of drawing

The final results of the study show that the tasks of the science of drawing - constructive analysis, tone-light shade, spatial thinking, observation, line expression, texture, composition and figurative thinking - are a single interconnected scientific and artistic system; each element of this system is functionally connected with the other, leading the student to a realistic image, analytical thinking, artistic interpretation and creative freedom. This integrated model summarizes the tasks of the science of drawing in pedagogical, psychological, optical, compositional and art history aspects, scientifically substantiating its strategic role in education.

CONCLUSION.

The results of this scientific study show that the science of pencil drawing constitutes the fundamental basis of fine arts education, and its goals and objectives encompass cognitive, psychological, optical, and artistic processes that are much broader and more complex than mastering drawing techniques; the main goal of pencil drawing is to bring the student to an artistic and intellectual level of an observer, an analytical thinker, capable of constructive analysis, a scientific understanding of the relationship between tone and light and shadow, spatial thinking, and figurative thinking, and this process is reinforced by the constructive theories of classical masters such as Leonardo da Vinci, Alberti, and Dürer, Arnheim's visual thinking model, Gombrich's cognitive psychology, the holistic laws of perception of Gestalt psychology, and the scientific and methodological views of modern fine arts pedagogy; The study proved that the tasks of the science of pen drawing - constructive analysis of form, working with tone and light and shadow on an optical basis, creating spatial depth, developing observation, understanding the expressive power of the line, perceiving texture and material, finding compositional balance and building an image - constitute a single integrated scientific and artistic system, because if any of these elements is lost, the scientific content of pen drawing is completely destroyed; this once again confirms the place of pen drawing as a universal scientific foundation necessary for all areas of fine arts. In general, the conclusion of this study is that the science of pen drawing should be interpreted as a complex, multi-layered and fully responsive to the requirements of modern pedagogy, combining visual perception, constructive thinking, analytical thinking, creative interpretation, image creation, aesthetics and optical logic in the student.

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