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Training future jewelry artists in technical skills through practicing a series of exercises in artistic engraving

Abstract. The article examines the pedagogical process of teaching technical skills in jewelry techniques, specifically artistic engraving. The author analyzed and reviewed the syllabus of the course "Artistic Metalworking (Jewelry Art)," summarized publications focused on the application of exercises in the training of artists in the field of traditional applied arts.

A practice-oriented set of learning assignments for artistic engraving was developed and experimentally tested in classroom settings. The sequence of steps to enhance the pedagogical process of teaching technical mastery to future jewelry artists was also proposed.

Keywords: metal art, jewelry artist, engraving, performance skills, jewelry art, graver, teaching, skill development.

Jewelry art is a form of traditional applied art concerned with the creation of jewelry pieces.

High-quality jewelry items are manufactured using manual techniques, which allow for the creation of works featuring original artistic designs, ornate decorations, and delicate craftsmanship using precious alloys, base metals, and other materials.

Techniques utilized in jewelry production include hammering, dipping, stamping, and engraving.

Engraving is a method of artistic metalworking that involves etching linear or relief designs onto the material with specially designed tools called gravers, made from high-quality steel. Artistic engraving stands out for its expressiveness, as it creates clear and deep lines of varying thicknesses and depths, sometimes incorporating decorative elements such as floral motifs.

Graving is one of the fundamental techniques in jewelry making, playing a crucial role in adding aesthetic appeal to jewelry pieces.

Graving is one of the fundamental and easily acquired techniques in jewelry art, contributing significantly to the technical proficiency of future jewelry artists.

Technical mastery involves the acquisition of various basic operations in manual metalworking, including artistic engraving.

Technical mastery is developed through repeated exercises (motions, gestures, or their combinations), establishing the foundation for the transition to advanced skills.

Mastering technical skills is a crucial step in a student's journey, laying the groundwork for their future professional performance. It incorporates learning the basics of jewelry production, understanding the properties of materials, and developing proficiency in engraving, decorating, and finishing jewelry pieces.

The earlier defined concept of "performance skill" [7, p. 27] describes the realization of acquired knowledge, skills, and abilities in technical training and the technology of jewelry making, as well as the finishing and artistic processing of jewelry, adhering to quality standards, which enables efficient professional work with high functional integrity.

The acquisition of professional knowledge, skills, and abilities by future jewelry artists takes place within the framework of the academic discipline "Performance skill in artistic metalworking (Jewelry Art)." The objective of the course content is to train highly skilled professionals in the jewelry industry, founded on principles of integration between theory and practice, systematic progression, clarity [6], durability of learning, and individualized instruction.

Within the learning process, engraving enhances the aesthetic appeal of jewelry pieces by:

- Engraving flat and relief designs onto metal surfaces;
- Creating mirror-like finishes around jewels;
- Preparing drill holes for embedding stones;
- Forming corners (metallic pins) for securing small jewels;
- Providing precise work with a stichel in hard-to-access areas of jewelry items.

The developed methodology for teaching technical skills in jewelry engraving outlines a road map for the learning process, specifying the sequence of tasks needed to achieve technical mastery in artistic engraving.

The pedagogical experience of the author has shown that the entire educational process—including the completion of academic tasks—is determined by the instructor, specifically:

- The development of knowledge, skills, and abilities;
- The selection of metal for practical work;
- The preparation of tools and equipment for engraving;
- Monitoring the execution of practical assignments.

The outcome is the acquisition of technical proficiency in artistic engraving.

Before commencing practical sessions, students undergo an introductory safety briefing on handling sharp cutting tools. Taking into account individual learning styles, the instructor determines:

- The preparedness of the metal surface (lack of defects and roughness);
- The choice of engraving tools and their preparation (the size of the tool, the angle of blade sharpening, the presence of burrs on the cutting edge, and the polish quality of the cutting surface);
- The correct placement of the engraver in the hand;

- The depth of engraved lines;
- The use of special tools (punches, engraver's cushions);
- Understanding the causes of failures in engraving and methods to remedy them.

The learning of artistic engraving is connected with the theory of material science in artistic metalworking, which covers the physical and mechanical properties of metals (hardness, elasticity, plasticity) [2], the peculiarities of materials used in engraving (their machinability), and the technology of producing jewelry items manually—methods, techniques, and sequences of technological operations performed with jewelry tools to achieve the desired result.

Familiarization with this jewelry technique begins with studying the principles of using the stichel, the main types and uses of cutting tools, their manufacture and sharpening, the application of special tools in engraving, the correct holding of the tool, and safety precautions when working with sharp-edged instruments [8].

The stichels vary in profile depending on their intended use. For instance, a spitzstichel features convex sides for drawing crisp, deep lines, whereas a facettenstichel has a trapezoidal shape suitable for engraving flat designs and smoothing them. The use of different profiles of engraver's burins determines the clarity of lines, expressiveness of strokes, strictness, and laconicism of the executed engraving work.

As part of the teaching process, a practice-oriented set of exercises was developed to guide students through sequential stages of acquiring knowledge, skills, and attitudes towards healthy living.

The practice-oriented set of exercises [3] for artistic engraving comprises three sections, each targeting a specific stage of skill development.

Each part includes specific types of engraving work aimed at developing technical skills in artistic engraving: mastering the learning abilities to transfer theoretical knowledge into practical activities—applying skills and techniques; automating simple movements when working with cutting tools and refining them—developing creative skills and techniques, and ultimately achieving professional independence.

Let's examine in detail the logical sequence of stages within each part of the practice-oriented exercise complex [5]:

- Initial engraving of parallel straight lines, curved lines, and concentric circles of uniform thickness;
- Creating simple ornaments based on geometric and floral patterns using lines of varying thicknesses and depths;
- Executing a complex floral design based on acquired skills and techniques (performed according to an artistic composition).

The content of the complex ensures the transfer of acquired theoretical knowledge and skills to practical activity while working with cutting tools.

At this initial stage, the learner acquires primary skills for performing engraving exercises involving lines of equal thickness and depth on a metal plate surface. The algorithm for performing these initial exercises is as follows:

making an engraver's tool – preparing the metal plate – marking out parallel straight lines – using the engraver's tool and accessories for engraving – determining the correct position of the graver in hand – executing straight lines with the graver [8].

This exercise is performed on a brass plate. Using a metal ruler and scribe (a sharpened steel rod for marking on metal), parallel lines are drawn at distances of 2-3 mm apart. The marked metal sheet is secured onto a wooden stand using small metal nails.

To facilitate engraving work, a sand-filled leather cushion or swivel vise can be used as support. Training in cutting straight engraved lines should begin with short strokes, gradually combining them into one continuous line. Pressure applied by the hand on the graver should be gentle and even, resulting in an evenly cut line.

After mastering the engraving of parallel lines, learners proceed to engrave intersecting, angular, and wavy lines. For creating concentric circles, markings are made with a metal compass with uniformly increasing radii. The first circle is cut clockwise, the next counterclockwise, and so forth. After mastering the basic exercises of cutting individual lines of various configurations, students move on to carving simple ornamental figures. At the initial stage, exercises are performed using only one type of graver profile—a V-shaped spitzstichel—which cuts a fine and deep line.

In the second stage, the future jeweler-artisan develops skills and determines the accuracy achieved in the action being learned (coordination of movements, dexterity, compliance with technique and quality requirements); establishes a certain speed in their work (tempo, rhythm, productivity of completed work). Two types of gravers and different metals (brass, cupronickel) are utilized. The algorithm for automated skill development involves: preparing the engraver tool for a particular type of metal – transferring the image from paper to the metal plate – outlining the drawing contour with a V-shaped spitzstichel (thin, deep-cut line) – highlighting expressive lines in the engraved drawing using a graver with a different profile (facettenstichel – shallow, widened cut line). Learners create two types of ornaments—geometric and floral. Engraved ornamental images are clear, with tonal and shadow transitions. Ornaments are executed using three main types of lines—contour, expressive, and shading (strokes).

The third stage of exercises focuses on developing professional skills and fostering a creative approach to the work. This allows for actualizing, reproducing previous exercises from memory, transforming them—transferring them to new conditions, changing the type, level, or operation process.

The final exercise in learning the technical mastery of artistic engraving integrates knowledge, skills, and technical expertise. The culmination involves creating an ornamental pattern based on one's own creative composition, utilizing various types of engraving tools to achieve expressive lines and incorporate multiple planes into the image. Multiplanarity in the engraved image is achieved through the application of different profiles of engravers' burins: the flat-grained stichel for hatching and matting surfaces; and the ball-stichel for rounded lines and deep points.

The third part of the practice-oriented exercise set is characterized by the student's responsibility since it involves the formation of professional competencies

aimed at producing high-quality, effective work, enhancing the aesthetics of jewelry pieces, and perfecting technical mastery, all of which motivate professional growth.

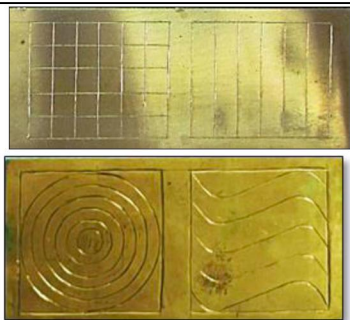
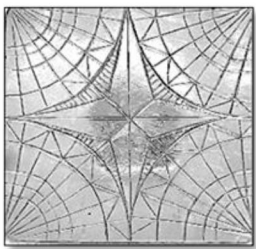

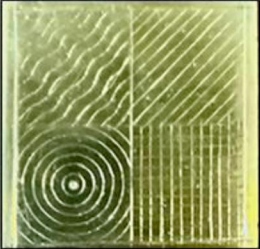


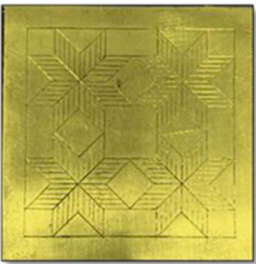


Examples of completed works from the practice-oriented complex are presented in Table 1.

When teaching technical skills, the instructor creates organizational-pedagogical conditions [1], including an art-educational environment:

- Professional-technological creative activity of the teacher [9, p.127];
- Demonstration of samples of technical-technological operations. To ensure the development of motor and creative skills, examples of previously completed practical assignments from the methodological fund of educational works are demonstrated.
- Interrelation between the technological and creative activities of the teacher and the creative activities of the students [4].

Table 1.

Practice-oriented exercise complex
in artistic engraving

<i>Examples of practical exercises</i>		
<i>Part 1</i>	<i>Part 2</i>	<i>Part 3</i>
		
		
		

The presented practice-oriented exercise complex in artistic engraving, experimentally tested during classes in the academic discipline "Performing skills in art metal (Jewelry Art)," enables the improvement of practical training in technical skills for future jewelers due to the strict technological order in acquiring knowledge, skills, and techniques in the studied jewelry technique of artistic engraving. It also enhances the effectiveness of the educational and creative activities of future jewelers.

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