PEDAGOGICAL ACADEMY:
SCIENTIFIC NOTES

THEORY AND TEACHING METHODS

УДК 377.3:687.55

DOI https://doi.org/10.5281/zenodo.20092543

Theoretical and methodological substantiation of training nail service masters in complex combined techniques of modern author's french manicure

Olena Halstian,

Manicurist, Galstyan Nail Education,

339 West Lexington Dr., Unit A1,

https://orcid.org/0009-0006-6987-2239

Accepted: 20.04.2026 | Published: 09.05.2026

Abstract. The relevance *of the study is determined by the transformation of the nail service industry, characterized by increasing complexity of design solutions, integration of innovative materials, and growing demand for service individualization, which necessitates the improvement of professional training of masters.* ***The purpose*** *of the article is to theoretically substantiate and develop methodological approaches to training nail service masters in performing complex combined techniques of modern author's French manicure, taking into account the integration of technological, artistic, and innovative components of professional preparation.* ***The research methods*** *are based on theoretical generalization, analysis and synthesis of scientific sources, a logical-analytical approach to interpreting professional activity, as well as generalization of practical training experience.* ***As a result*** *of the study, the essence and structural characteristics of complex combined techniques have been clarified and interpreted as an integrated system of interrelated components. The requirements for professional competence of masters have been identified, including execution accuracy, visual-analytical*

abilities, process coordination, and adaptability to individual conditions. It has been proven that the effectiveness of performing complex techniques is determined not by isolated skills, but by the level of their synchronization. Methodological approaches to organizing training have been substantiated, based on the integration of theoretical and practical preparation, the use of scenario-based tasks, variability of learning conditions, and reflective analysis. Key training problems have been identified, including fragmentation of learning content, dominance of reproduction-based models, the gap between educational and professional environments, and insufficient development of analytical and diagnostic skills. ***Conclusions.*** *It has been proven that improving the effectiveness of training nail service masters is ensured through the implementation of an integrative, practice-oriented learning model that combines technological, artistic, and innovative components. Prospects for further research are associated with the development of criteria for assessing the formation of integrated professional competence and empirical verification of the effectiveness of the proposed methodological approaches.*

Keywords: *vocational training, nail design, integrative approaches, artistic modeling, competency-based approach, technique variability, educational technologies.*

Теоретико-методичне обґрунтування навчання майстрів нігтьового сервісу складним комбінованим технікам сучасного авторського френчу

Галстян Олена Василівна,
майстер манікюру, Galstyan Nail Education,
339 Вест Лексінгтон драйв, кв. А1,
https://orcid.org/0009-0006-6987-2239

PEDAGOGICAL ACADEMY:
SCIENTIFIC NOTES

Анотація: ***Актуальність дослідження*** *зумовлена трансформацією індустрії нігтьового сервісу, що супроводжується ускладненням дизайнерських рішень, інтеграцією інноваційних матеріалів і зростанням вимог до індивідуалізації послуг, що актуалізує потребу в удосконаленні підготовки майстрів.* ***Метою статті*** *є теоретичне обґрунтування та розроблення методичних підходів до навчання майстрів нігтьового сервісу виконанню складних комбінованих технік сучасного авторського френчу з урахуванням інтеграції технологічних, художніх та інноваційних складових професійної підготовки.* ***Методи дослідження*** *ґрунтуються на використанні теоретичного узагальнення, аналізу і синтезу наукових джерел, логіко-аналітичного підходу до інтерпретації професійної діяльності, а також узагальнення практичного досвіду підготовки фахівців.* ***У результаті*** *дослідження уточнено сутність і структурні характеристики складних комбінованих технік, які розглядаються як інтегрована система взаємопов'язаних компонентів. Виявлено вимоги до професійної компетентності майстрів, що включають точність виконання, візуально-аналітичні здібності, здатність до координації процесів та адаптації до індивідуальних умов. Доведено, що ефективність виконання складних технік визначається не ізольованими навичками, а рівнем їх синхронізації. Обґрунтовано методичні підходи до організації навчання, засновані на інтеграції теоретичної і практичної підготовки, використанні сценарних завдань, варіативності навчальних умов та рефлексивного аналізу. Виявлено ключові проблеми підготовки, серед яких фрагментарність змісту навчання, домінування репродуктивних моделей, розрив між навчальними та професійними умовами, а також недостатній розвиток аналітичних і діагностичних умінь.* ***Висновки.*** *Доведено, що підвищення ефективності підготовки майстрів нігтьового сервісу забезпечується за умови впровадження інтегративної, практико-орієнтованої моделі навчання, яка*

поєднує технологічну, художню та інноваційну складові. Перспективи подальших досліджень пов'язані з розробленням критеріїв оцінювання сформованості комплексної професійної компетентності та емпіричною перевіркою ефективності запропонованих методичних підходів.

Ключові слова: *професійна підготовка, дизайн нігтів, інтегративні підходи, художнє моделювання, компетентнісний підхід, варіативність технік, навчальні технології.*

Problem statement. In the context of the rapid transformation of the beauty industry driven by digitalization, globalization of professional standards, and increasing demand for personalized services, the issue of training nail service specialists to perform complex combined techniques of modern author's French manicure becomes particularly relevant. These techniques integrate elements of classical modeling, artistic design, and innovative materials, requiring not only advanced manual skills but also developed spatial thinking, aesthetic sensitivity, and the ability to combine diverse technological approaches. At the same time, existing training practices are largely focused on mastering isolated operations and do not ensure the systematic development of competencies necessary for implementing complex design solutions.

The problem is further complicated by the lack of a coherent theoretical and methodological framework that would take into account the specifics of combining techniques, the logic of constructing author's designs, and the requirements for quality and safety. This leads to a gap between the level of professional training and the actual demands of the market, where priority is given to individualized, technically sophisticated, and variable solutions. In the scientific dimension, this issue is associated with the need to refine the content of professional competence of nail service specialists, to develop effective methodological approaches to the formation of complex professional skills, and to substantiate training models that

integrate technological, artistic, and innovative components. From a practical perspective, addressing this problem will contribute to improving the quality of professional training, enhancing the competitiveness of educational programs, and better meeting consumer demand for high-level nail services.

Analysis of recent research and publications. A review of recent studies in the field of nail services demonstrates the multidimensional nature of the problem of training nail service masters to perform complex combined techniques of modern author's French manicure, integrating organizational-technological, biomedical, psychological-pedagogical, and innovative approaches. K. Pereshliuga substantiates the feasibility of applying modern technologies and hybrid solutions in manicure, emphasizing their role in improving the quality of complex design techniques and optimizing masters' professional performance [1], while E. de Jesus Lopes et al. extend these findings by demonstrating the effectiveness of methods-time measurement (MTM) as a tool for improving masters' productivity [2]. At the same time, a significant contribution to understanding occupational safety is made in the works of M. E. Gatica-Ortega and M. A. Pastor-Nieto, who analyze the prevalence and consequences of contact dermatitis associated with acrylates [3], as well as in subsequent studies conducted jointly with L. Rodríguez-Lago et al., which reveal the long-term effects of sensitization in both professionals and consumers [4].

In parallel, scientific approaches to assessing the impact of the working environment on health are being developed. Thus, R. Hao et al. investigate the emission characteristics of volatile organic compounds during manicure processes and substantiate related environmental and occupational risks [5], while S. Lee et al. analyze the effects of blue light exposure in nail salon workplaces [6]. Y. Pidhorna examines the evolution of the manicure industry from traditional approaches to the integration of artificial intelligence and robotics, demonstrating the growing importance of technological innovation in professional training and practice [7].

A separate research direction concerns the development of innovative technologies and their integration into nail services. N. P. Kim et al. substantiate the prospects of combining three-dimensional printing technologies with nail-art practices [8], while L. Halbrügge et al. consider the potential of printed electronics as an educational tool [9], opening new opportunities for modernizing training programs. S. Sanaat et al. analyze occupational health and safety conditions in nail salons, highlighting workplace risks and the need to develop safety-related competencies among masters [10].

The psychological-pedagogical and sociocultural dimensions of professional activity are revealed in the works of J.-Hsuan Yu et al., who investigate the role of practice-oriented training and internships in the formation of professional competencies [11], as well as in the studies of M. Kang, where manicure is interpreted as a form of transnational body labor [12]. A. Kawakubo and T. Oguchi prove the positive impact of nail care procedures on clients' psychological state [13], emphasizing the importance of communication and service skills for masters. In addition, E. S. Lax et al. focus on the socio-behavioral aspects of manicure as a form of self-care [14].

Within the aesthetic and design context, S. H. Moon et al. explore the peculiarities of color choice in manicure [15], which is directly relevant to the development of artistic and compositional thinking required for performing author's French techniques. Overall, the analyzed studies form a comprehensive scientific foundation for the theoretical and methodological substantiation of training nail service masters; however, they also indicate the need for deeper integration of technological, safety, and pedagogical approaches in mastering complex combined techniques.

Identification of previously unresolved parts of the general problem. Despite the development of the nail service industry, there is no comprehensive scientific understanding of the essence and structure of complex combined

techniques of modern author's French manicure or of the integrated professional competence required for their execution. Existing studies are mainly focused on isolated technological or aesthetic aspects, which leads to fragmented approaches and limits their effective integration in training. At the same time, methodological approaches to organizing training remain insufficiently substantiated, particularly in terms of integrating theoretical and practical components and accounting for variability of professional conditions. This necessitates further clarification of the nature of these techniques, the requirements for professional competence, and the development of an integrative training model, which constitutes the focus of this study.

Formulation of the objectives of the article (problem statement). The purpose of the article is to theoretically substantiate and develop methodological approaches to training nail service masters in complex combined techniques of modern author's French manicure, taking into account the integration of technological, artistic, and innovative components of professional training.

Objectives of the article:

1. To clarify the essence and structural characteristics of complex combined techniques of modern author's French manicure and to determine the requirements for professional competence of masters.

2. To substantiate methodological approaches to organizing training based on the integration of theoretical and practical preparation.

3. To identify key scientific and practical problems of training and to develop recommendations for improving the preparation of nail service masters.

Main material. In contemporary nail service practice, complex combined techniques of modern author's French manicure are formed through the integration of classical nail architecture with advanced design solutions and innovative materials. Their essence lies in the coordinated implementation of technological precision and artistic variability, where the construction of the nail and the visual

 ISSN: 2786-9458

concept are developed as a single system rather than sequential stages. Structurally, such techniques incorporate technological, artistic, combinatorial, innovative, and cognitive-design components, which together determine both the quality and individuality of the final result (table1).

Table 1

Structural characteristics of complex combined techniques of modern author's French manicure

Component	Substantive characteristics	Key implementation elements	Professional significance
Technological	Formation of correct nail architecture and base structure	Nail shaping, apex building, material control (gel, polygel), surface preparation	Ensures durability, safety, and structural stability
Artistic	Development of an individualized design concept	Color combinations, smile line geometry, textures, gradients, decorative elements	Provides aesthetic value and uniqueness
Combinatorial	Integration of multiple techniques within a single design	Inlay, ombre, foil, hand painting, multilayering	Expands design complexity and variability
Innovative	Application of advanced materials and technological solutions	Modern coatings, pigments, 3D elements, digital sketching	Enhances quality and market competitiveness
Cognitive-design	Planning and visualization of the final outcome	Nail shape analysis, client-oriented design selection, sketching	Ensures personalization and conceptual coherence

Source: developed by the author based on [1, p. 239; 7, p. 52; 8, p. 97; 15, p. 574; 16, p. 252; 17, p. 25].

In practical implementation, these components operate as an interdependent system where the effectiveness of each element is conditioned by its alignment with the others. For instance, in salon practice, the execution of a "double French" design with a transparent base and embedded decorative elements requires precise control of material thickness at the technological level, while simultaneously maintaining

proportional balance between parallel smile lines within the artistic component [8, p. 97]. A miscalculation in apex placement in such cases leads not only to structural weakness but also to visual distortion of the design, demonstrating the inseparability of technical and aesthetic parameters.

Another illustrative case is the use of combined matte–glossy French techniques with gradient transitions. Here, the combinatorial component demands accurate sequencing of layers and curing stages, while the innovative component introduces specialized top coats with differentiated reflective properties [17, p. 25]. In practice, мастери often rely on preliminary digital or schematic visualization to avoid inconsistencies in symmetry and tonal transitions, which highlights the role of the cognitive-design component as a regulating mechanism for the entire process.

Empirical observations from training studios and salon environments indicate that errors most frequently arise not from the lack of isolated skills, but from insufficient synchronization between components. For example, beginners may successfully reproduce decorative elements such as foil or hand-painted details, yet fail to integrate them into the structural logic of the nail, resulting in premature coating failure or visually overloaded compositions. Conversely, experienced masters demonstrate stable outcomes precisely because they treat design as a system of interrelated decisions, adjusting material behavior, form, and visual composition in real time according to client-specific parameters [8, p. 97]. This confirms that the practical effectiveness of complex combined techniques is determined by the integrative competence of the specialist rather than by mastery of individual operations alone.

In the context of performing complex design techniques in modern nail service practice, the requirements for professional competence extend beyond the mastery of individual procedures and are defined by the ability to operate within a multidimensional framework of precision, aesthetics, and adaptability. The execution of author’s French manicure with combined techniques presupposes not

only stable manual skills but also the capacity for real-time decision-making, accurate assessment of material behavior, and alignment of design intent with anatomical and client-specific parameters. Professional competence in this field is therefore characterized by the integration of operational accuracy, visual judgment, and procedural flexibility, which together ensure both technical reliability and aesthetic coherence of the result (table 2).

Table 2

Requirements for professional competence in performing complex design techniques in nail service

Competence dimension	Content manifestation	Operational indicators	Result-oriented effect
Precision control	Ability to maintain accuracy in material application and structural balance	Consistent apex positioning, controlled thickness, clean contours	Structural integrity and long-term wear
Visual analytics	Capacity to evaluate proportions, symmetry, and color harmony	Balanced composition, alignment with nail shape, tonal coherence	Aesthetic consistency and professional finish
Process coordination	Management of sequential and parallel procedures during design execution	Correct layering order, timing of curing stages, error prevention	Stability of multi-stage designs
Material adaptability	Understanding and adjustment to properties of different materials	Selection of appropriate viscosity, compatibility of coatings, reaction control	Reduced risk of defects and improved performance
Client-oriented interpretation	Translation of client expectations into feasible design solutions	Adaptation to nail type, lifestyle considerations, personalized detailing	Increased client satisfaction and service value

Source: developed by the author based on [2, p. 23; 4, p. 474; 10, p. 227; 18; 19, p. 59].

In applied settings, the outlined competence dimensions reveal their practical value through the stability of results under variable working conditions rather than in controlled training scenarios. Empirical observation of salon workflows shows that precision control and process coordination act as primary stabilizers of quality, particularly in multi-layered designs. For example, in the execution of a deep French

with embedded decorative elements, a deviation of even 0.2–0.3 mm in apex placement alters the stress distribution across the nail plate, which in turn increases the likelihood of microcracks during wear [4, p. 474]. At the same time, improper sequencing of curing stages leads to internal material tension, visually expressed as distortion of the smile line after polymerization. Such effects are not isolated technical errors but indicators of insufficient integration between competence dimensions. Visual analytics and material adaptability demonstrate their relevance in cases where the design must compensate for anatomical limitations. In practice, clients often present with short nail beds or asymmetrical growth lines, which require not direct replication of reference designs but their structural reinterpretation. A competent master modifies the curvature and position of the smile line to create an optical elongation effect while simultaneously adjusting material viscosity to prevent bulk accumulation at stress points [10, p. 227]. This dual adjustment ensures that the design remains both visually balanced and mechanically stable, illustrating how aesthetic decisions are constrained and guided by material behavior. Client-oriented interpretation becomes particularly critical in high-variability service contexts, where expectations are shaped by digital visual references that do not account for individual nail characteristics. In such situations, the master performs a selective translation of the requested design, preserving key visual markers while simplifying or restructuring technically risky elements [2, p. 23]. For instance, replacing heavy inlay compositions with encapsulated micro-decor not only reduces load on the nail plate but also maintains the intended visual depth. This approach reflects a shift from replication to adaptive design thinking, which is a defining feature of advanced professional competence. Overall, practical evidence indicates that errors in complex design execution arise predominantly at the points of interaction between competence dimensions rather than within them individually. мастери who achieve consistently high-quality outcomes demonstrate the ability to anticipate these interaction effects, aligning structural, visual, and procedural

parameters before and during execution. This confirms that professional competence in this domain functions as an integrated system of applied knowledge and decision-making, where effectiveness is determined by coherence and adaptability rather than by isolated technical proficiency.

In contemporary vocational training of nail service masters, methodological organization increasingly relies on the structured integration of conceptual knowledge and applied performance, where learning is built as a continuous transition from explanation to execution and analytical feedback (table 3).

Table 3

Methodological approaches to organizing training in complex combined techniques of modern author's French manicure

Pedagogical approach	Core learning focus	Instructional format	Educational outcome
Integrative	Alignment of conceptual knowledge with procedural execution	Alternation of short theoretical inputs with immediate practical tasks	Formation of holistic understanding of technique logic
Modular-scenario	Structuring training through progressively complex design cases	Case-based sessions simulating real client requests	Development of adaptive decision-making skills
Reflective-analytical	Systematic evaluation of performed work and error identification	Guided self-analysis, instructor feedback, comparative review	Strengthening of critical professional thinking
Iterative-repetitive	Reinforcement through controlled repetition with variation	Repeated execution of techniques under modified conditions	Stabilization of motor and cognitive skills
Contextual-professional	Approximation of training conditions to real salon environments	Time-limited tasks, client simulation, workflow modeling	Readiness for practical performance under constraints

Source: developed by the author based on [9, p. 106; 13; 11, p. 592; 17, p. 29; 19, p. 60].

In applied training environments, the effectiveness of these approaches is determined by how precisely they reproduce the cognitive and operational complexity of real professional activity. Empirical data from training studios

indicate that the integrative approach significantly reduces the gap between "knowing" and "doing", particularly in early stages of mastering combined techniques. For example, when theoretical explanation of material layering is immediately followed by controlled execution on practice models, learners demonstrate a more stable understanding of thickness distribution and curing dynamics compared to those trained through delayed practice formats. The modular-scenario approach reveals its practical value in situations where learners must interpret incomplete or variable task conditions [11, p. 592]. A typical case involves a simulated client request for a complex French design adapted to short, uneven nails within a limited time frame. Under such constraints, trainees are required to prioritize structural corrections over decorative complexity, which fosters selective decision-making rather than mechanical reproduction of learned patterns. Observations show that students exposed to such scenarios develop greater flexibility in adjusting design strategies without compromising functional quality [9, p. 106]. Iterative-repetitive training, when systematically varied, contributes to the formation of predictive control over material behavior. For instance, repeated execution of the same design with intentional variation in gel viscosity or curing intervals allows learners to identify threshold conditions under which defects such as surface distortion or color diffusion occur. This transforms repetition from a mechanical process into an experimental one, where each iteration refines both motor accuracy and analytical anticipation. Reflective-analytical practices ensure that errors are not treated as isolated failures but as diagnostically significant indicators of process imbalance. In structured feedback sessions, discrepancies such as uneven smile lines or loss of design contrast are deconstructed in relation to earlier procedural stages, enabling learners to establish causal links between actions and outcomes. This approach is particularly effective in preventing the accumulation of latent errors that typically manifest only at the final stage of design completion. Finally, the contextual-professional approach introduces time pressure and client

interaction variables that fundamentally alter the execution logic. In simulated salon workflows, learners often encounter the need to simplify design elements while preserving their visual identity, especially when time constraints conflict with technical complexity. Evidence suggests that exposure to such conditions accelerates the transition from controlled training performance to independent professional activity, as it cultivates the ability to balance precision, efficiency, and client-oriented adaptation within a single operational framework.

In the training of nail service masters to perform complex combined techniques of modern author's French manicure, a range of interconnected scientific and practical problems persists, reflecting both conceptual ambiguity and methodological limitations. At the theoretical level, the absence of a unified definition and structured classification of such techniques leads to fragmentation of training content and unclear competency benchmarks. This is compounded by insufficient methodological integration of technological execution and artistic design, which are often taught separately and create difficulties in their practical synthesis [13]. At the instructional level, the dominance of demonstration-based learning focused on visual replication limits the development of analytical understanding and reduces the transferability of skills to variable working conditions. Trainees frequently lack diagnostic and reflective abilities, which prevents timely identification of errors and results in cumulative defects at later stages of design execution. A further problem is the discrepancy between training conditions and real salon practice, where factors such as time constraints, client interaction, and anatomical variability significantly influence performance but are rarely simulated during learning. Material-related challenges also remain significant, particularly insufficient exposure to diverse product systems and a limited understanding of their properties, which leads to incorrect material selection and instability of multi-layered designs [7, p. 52]. In parallel, the rapid evolution of industry technologies outpaces the updating of training programs, reducing their

relevance. From a cognitive perspective, the formation of integrative professional thinking is underdeveloped, as learners often operate with isolated skills and experience difficulties in adapting reference designs to real conditions. These issues are reinforced by organizational factors, including variability in instructional quality and the lack of standardized criteria for assessing complex techniques, which together constrain the formation of a coherent and practice-oriented model of professional training.

Improving the training of nail service masters for performing complex combined techniques of modern author's French manicure requires a transition to a systematically structured, practice-oriented model that integrates technological precision, aesthetic reasoning, and adaptive decision-making. Training should be organized as a sequence of problem-based tasks in which learners interpret design conditions, select appropriate techniques, and justify their choices, rather than reproduce predefined patterns. This strengthens the link between theoretical knowledge and its immediate application and promotes the formation of stable professional thinking.

A key practical direction is the implementation of modular learning formats based on progressively complex scenarios that vary nail morphology, material behavior, and time constraints. Such variability simulates real salon conditions and develops flexibility in decision-making. The inclusion of regular reflective analysis after task completion allows learners to identify cause–effect relationships between actions and results, improving error correction and procedural awareness. At the same time, systematic exposure to different material systems enhances predictive control and reduces the risk of defects in multi-layered designs.

The integration of visual planning tools, including schematic sketching and digital modeling, supports structured design thinking and improves accuracy in executing complex compositions. Time-regulated sessions with elements of client simulation further develop the ability to balance quality, speed, and

individualization. At the organizational level, it is advisable to standardize assessment criteria with an emphasis on both process quality and final results, as well as to ensure continuous updating of instructor expertise in line with current industry developments. Together, these measures contribute to the formation of an integrated competency model aligned with real professional requirements.

Conclusions. The study establishes that complex combined techniques of modern author's French manicure should be considered as an integrated professional system in which technological, artistic, and innovative components function interdependently, and their effectiveness is determined by the level of holistic professional competence of the master . It is demonstrated that successful execution of such techniques requires not isolated skills, but the ability to synchronize processes, anticipate outcomes, and adapt design solutions to individual conditions. Key scientific problems include the absence of a unified theoretical framework for defining and structuring combined techniques, as well as the insufficient development of methodological approaches to teaching them as an integrated process. At the practical level, major issues involve the predominance of reproduction-based training, the gap between educational settings and real salon conditions, limited variability in working with materials, and the underdevelopment of reflective and diagnostic skills, which collectively reduce adaptability and quality control. It is substantiated that improving training effectiveness requires a shift toward an integrative, problem-oriented model that combines theoretical understanding with practical implementation, scenario-based tasks, variability of learning conditions, and systematic reflection. Priority recommendations include modular training design, expanded work with diverse material systems, the use of visual planning tools, and the simulation of real professional contexts. Prospects for further research are associated with developing comprehensive methodological models of training, defining criteria for assessing integrated professional

 ISSN: 2786-9458

competence, and empirically validating the effectiveness of proposed approaches in both educational and salon practice.

References

1. Pereshliuga K. Application of modern technologies and hybrid solutions in manicure. *The American Journal of Engineering and Technology*. 2025. Vol. 7, № 3. P. 237–242. DOI: https://doi.org/10.37547/tajet/Volume07Issue03-21.

2. de Jesus Lopes E., de Souza A. B. V., da Silva Pierre J. Í., Júnior R. A. R., da Ponte F. A. F. Application of methods-time measurement as a tool to improve productivity in a beauty salon. *ITEGAM-JETIA*. 2022. Vol. 8, № 35. P. 20–26. URL: https://www.itegam-jetia.org/journal/index.php/jetia/article/view/817 (accessed: 19.03.2026).

3. Gatica-Ortega M. E., Pastor-Nieto M. A. The present and future burden of contact dermatitis from acrylates in manicure. *Current Treatment Options in Allergy*. 2020. Vol. 7. P. 291–311. DOI: https://doi.org/10.1007/s40521-020-00272-w.

4. Gatica-Ortega M. E., Rodríguez-Lago L., Beneyto P., Pastor-Nieto M. A., Borrego L. Prognosis and sequelae of meth (acrylate) sensitization in beauticians and consumers of manicure materials. *Contact Dermatitis*. 2023. Vol. 89, № 6. P. 471–479. DOI: https://doi.org/10.1111/cod.14408.

5. Hao R., Sun J., Liu R., Zhao H., Yao Z., Wang H., Hao Z. Emission characteristics, environmental impact, and health risk assessment of volatile organic compounds (VOCs) during manicure processes. *Science of The Total Environment*. 2024. Vol. 906. Article 167464. DOI: https://doi.org/10.1016/j.scitotenv.2023.167464.

6. Lee S., Gaskin S., Piccoli B., Pisaniello D. Blue light exposure in the workplace: A case study of nail salons. *Archives of Environmental & Occupational*

Health. 2022. Vol. 77, № 5. P. 351–355. DOI: https://doi.org/10.1080/19338244.2021.1924604.

7. Pidhorna Y. The evolution of the manicure business: From traditional methods to the use of artificial intelligence and robotics. *The American Journal of Engineering and Technology*. 2025. Vol. 7, № 4. P. 49–56. DOI: https://doi.org/10.37547/tajet/Volume07Issue04-07.

8. Kim N. P., Kim J., Han M. S. The convergence of three-dimensional printing and nail-art technology. *Journal of Cosmetic Medicine*. 2019. Vol. 3, № 2. P. 94–101. DOI: https://doi.org/10.25056/JCM.2019.3.2.94.

9. Halbrügge L., Banerji A., Rösler S. Hello future! Printed electronics as a hands-on experiment for science teaching. *World Journal of Chemical Education*. 2021. Vol. 9, № 4. P. 104–110. DOI: https://doi.org/10.12691/wjce-9-4-2.

10. Sanaat S., Holness D. L., Arrandale V. H. Health and safety in nail salons: A cross-sectional survey. *Annals of Work Exposures and Health*. 2021. Vol. 65, № 2. P. 225–229. DOI: https://doi.org/10.1093/annweh/wxaa078.

11. Yu J.-Hsuan, Lo T. Y., Wu M. C., Wang L. F. Learning from experience – A probe into the off-campus internships under the five-year cosmetology technical and vocational education program. *Higher Education, Skills and Work-Based Learning*. 2021. Vol. 11, № 2. P. 587–599. DOI: https://doi.org/10.1108/heswbl-03-2019-0034.

12. Kang M. Manicures as transnational body labor. In: *Fashion and Beauty in the Time of Asia*. 2019. P. 184–208. URL: https://www.degruyterbrill.com/document/doi/10.18574/nyu/9781479892150.003.0008/pdf (accessed: 19.03.2026).

13. Kawakubo A., Oguchi T. Salon nail care with superficial self-disclosure vitalizes psychological state. *Frontiers in Psychology*. 2023. Vol. 14. Article 1112110. DOI: https://doi.org/10.3389/fpsyg.2023.1112110.

14. Lax E. S., Graziosi M., Gioia A. N., Arunagiri V., Novak S. A. “More than just a manicure”: Qualitative experiences of maternal self-care during COVID-19. *Women's Health Reports*. 2023. Vol. 4, № 1. P. 571–583. DOI: https://doi.org/10.1089/whr.2023.0081.

15. Moon S. H., Kim Y. S., Moon S. H., Kim Y. S. A study on personal fashion color choices in manicures and pedicures. *Asian Journal of Beauty and Cosmetology*. 2021. Vol. 19, № 4. P. 569–581. DOI: https://doi.org/10.20402/ajbc.2021.0216.

16. Chyhryn R. Aesthetic regulation of psychoemotional state through original floral compositions. *Humanities Science Current Issues*. 2025. Vol. 2, № 94. P. 251–258. DOI: https://doi.org/10.24919/2308-4863/94-2-35.

17. Rakhmanova A. Project based learning methodology through the creation of original macarons in STEM context. *Sciences of Europe*. 2025. № 170. P. 26–33. DOI: https://doi.org/10.5281/zenodo.16803180.

18. Popovych A. Biomechanics of movement in the Japanese approach to manicure as a factor in reducing microtrauma. *Педагогічна Академія: наукові записки*. 2025. № 24. DOI: https://doi.org/10.5281/zenodo.17630556.

19. Chyzhykova L. Innovative teaching methods of hardware manicure in the system of vocational education. *International Journal of Educational Technology and Learning*. 2025. Vol. 19, № 1. P. 55–63. DOI: https://doi.org/10.55217/101.v18i3.980.