

The Role of Computer Technologies in Contemporary Jewelry

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Summary

The article aims to consider the role of computer technologies in contemporary jewelry art. The importance of computer programming, 3D-modeling and 3D-printing for the process of jewelry creating, its advertising and sales is emphasized. Both the positive features of the possibility of using computer technologies in jewelry and their shortcomings are considered. The process of changing the nature of jewelry design after the start of the use of digital technologies is highlighted. The issue of changing the perception and evaluation of a work of jewelry art, the creation of which uses mechanization, has been updated.

Keywords:

Jewelry design, 3D-printing, 3D modeling, computer projecting, digital technologies, handiwork.

1. Introduction

In the modern jewelry world, over the past two decades, there has been a very tough confrontation between traditionalists, who prefer to work in the traditions of the past and create jewelry by hand, and adherents of modern trends, who prefer computer technologies. Knowledge of 3D-modeling programs, experience in this field greatly facilitates the work of the author and allows you to involve people who do not have art education and do not have special knowledge in the process. This is what became the “bone of contention” between the old and new generations, between traditions and innovations. The purpose of this material will not be a detailed analysis of the programs used to create jewelry, or resources with which for almost a decade each person can even try on jewelry before buying it remotely [2], or online stores selling jewelry. The purpose of the article is different: to consider the question of how to regard the use of computer technologies in jewelry today - as a tool that provides additional opportunities, or as a weapon that kills handiwork traditions and turns art into a craft, exclusive into consumer goods, and leveling the role of artist, allowing us to replace it with any experienced PC user who owns graphic editors, 3D-modeling programs. And as a result, a discussion is also possible about the complete transformation of the jewelry sphere and the change in the role of the artist, or rather, that the artist is losing his dominant functions, and the jewelry sphere ceases

to be art. A process is taking place that has much in common with the prerequisites for the emergence of design as an independent type of human art activity. After all, design still lies at the junction with art, and its separation into an independent phenomenon became possible only after the mechanization of production and the establishment of serial production of a number of products in the field of furniture, art metal, glass, which led to an acceleration in the pace of production of products, simplification of this process and - as a result - lower prices for such products and their availability for the majority of the population. Similar processes are taking place in the jewelry industry in connection with the appeal to the possibilities of computer technologies.

2. Literature review

The use of computer technologies for the design, practical implementation, advertising and promotion, fitting and sale of jewelry is a new topic for theoretical researchers, so the bibliography on this issue is still very poor. In a separate block, one can single out sources dedicated to a variety of programs for creating 3D-models, the 3D- printing process, however, most of them are not of a scientific character, but of an educational and methodological type, these are more often articles in periodicals or practical recommendations that have an applied function [3; 6; 10; 14; 17], but not theoretical, since they often lack the component of scientific analysis. Separately, one can single out a slightly more expanded, but still still very limited array of theoretical works on the theory of jewelry design in general, from its inception to the present day [1; 2; 4; 5; 16; 18]. Ukrainian jewelry business is not an exception from the general context. Both the theory and the history of the phenomenon are poorly covered, occasionally you can find separate articles on the problems of training future jewelry designers (R. Pasichnyk, Yu. Romanenkova). There are very few comprehensive studies on jewelry art, one might say, they are almost non-existent. To date, the encyclopedia published thanks to the efforts of the team by the author under the guidance of R. Shmagalo, who can be called one

of the most significant researchers of artistic metal [15], can be considered the most extensive in terms of geography and chronology of work on jewelry in the art history of Ukraine. The dissertation by S. Luts [7] became very valuable in content, informative and containing valuable and well-structured material. R. Pasichnyk deals with the issues of modern Ukrainian jewelry and its various aspects [8; 9], who is the author of another comprehensive work – a dissertation on the modern jewelry art of Ukraine, O. Rohotchenko, Yu. Romanenkova [11; 12; 13], I. Udovychenko – curator of a number of exhibitions of works by contemporary Ukrainian jewelers, author of articles about their creative work, etc. Interesting studies are being written by restorers of artistic metal, presenting in their works knowledge that is very valuable from a practical point of view. However, these works consider issues from the field of jewelry, but not synthesized with the problems of application in its field of computer technologies, there are still many gaps in this area.

3. Creation of jewelry: the possibility of using of computer technologies at different stages of the process

Over the past 15-20 years, jewelry art has had two very different stages. On the one hand, we can state a sharp jump in the jewelry industry – this was facilitated by the introduction of computer technologies into the jewelry industry, which began to be used at all stages of working with a product, from idea to sale. The speed of production of products has increased dramatically, in many cases their cost has decreased due to the mechanization of production, and opportunities have expanded by attracting people who may not have an artistic education, but are familiar with programs for jewelry design, 3D- modeling, 3D-printing. A sketch of an ornament and its three-dimensional model can already be made even by a person who cannot draw.

Before the advent of computer-aided jewelry design, the process of jewelry creating was very laborious and often lengthy, involving many stages and requiring from the master good professional training as high-professional artist. Now this path is no less time-consuming and complicated, but the emphasis is shifted towards process automation. The main role is played by software, 3D-printer, 3D-scanner. Of course, it is necessary to clarify that casting technologies have long been used in jewelry. And if it was a product for which casting was used, then the model was also made by hand. And in the future, computer technologies will be able to facilitate the process of jewelry creating in the event that we are talking about casting according to the model. A person who produces jewelry by hand, previously creates

a sketch (drawn), embodies his idea in metal, fastenes gems (if their presence was supposed), carries out the final work – grinded, polished. it was necessary. But even today, the production of jewelry entirely by hand retains an important role, handicraft is increasingly appreciated, since fewer and fewer craftsmen both the skills of professional artist and the jeweler's craft. A sketch is created by a universal author, who is an artist, has the skills of a chemist, because he must understand the essence of all the processes that metals undergo, a gemologist who knows the properties of gems, a stylist, because he often creates jewelry to order and selects the design of the product individually for the specifics of a person, taking into account his age, appearance, lifestyle, character. Of course, handiwork, a product created entirely manually, is highly valued. If casting was used in its manufacture, the pricing policy changes slightly towards democratization, but this difference is not so critical. These are the main disadvantages of handiwork jewelry. But there are also many advantages. Handiwork is very time-consuming, time-consuming, but it involves the creation of a work of ART with unique qualities (Fig. 1). Such a product is unique, it is not subject to replication, it is part of the image of its owner, an indicator of its status. It is difficult to imagine the existence of Easter eggs, the work of masters of the House of Faberge, in many copies, because there was a ban on copying masterpieces created by order of certain persons. Even the author himself could create repetitions only with obligatory differences. The handiwork of a jeweler implies accuracy, scrupulousness, virtuoso subtlety and the presence of taste in the artist-creator.

A couple of decades ago, computer technologies began to be applied in jewelry. In this, experts see both positive and negative sides. Almost all stages of jewelry creation can now be done without the use of manual work. Starting from a sketch. The advent of computer-aided design programs has made it possible to develop sketches and show what a future product will look like, immediately three-dimensional, in color. Programs designed for modeling jewelry can vary in complexity from quite simple to very complex, their cost ranges from free simple options to very expensive ones.



Fig. 1. Pendant, handiwork. Gold, silver, mother-on-pearl, zircons, engraving. Author: Viktor Romanenkov.
Source: author's personal collection

However, they are all united by one feature - they very quickly become obsolete, lose their relevance and go out of use, such as JewelCAD, RhinoGold, Autodesk ArtCAM, JewelSmith, from the first programs for modeling jewelry [14], which are also used in the Ukrainian jewelry market. Not all programs are designed purely for the jewelry industry, there are those that are used for this purpose, among others (SolidWorks, Fusion 360). Rhinoceros, the software for three-dimensional NURBS-modeling, is most often cited as the favorite in this row (Fig.2). However, there are a number of specialized programs, although even today there are not so many of them. Among the most used are MatrixGold [14], 3Design, Firestorm, JCD (Jewelry CAD Dream), Maya, Modo.

Is often not easy to learn how to use these programs, the most convenient of them are very expensive, require special skills and experience. Also, 3D-printing based on a 3D-model is also very expensive. There are many types of 3D-printing today. Various models of jewelry 3D-printers are now used not only to create inexpensive serial jewelry, but also serve the business of large jewelry houses in Europe and the USA. From a number of machines that can be used to output a 3D-model, we mention a milling machine, SLA and DLP (laser stereolithography) and layer-by-layer deposition [14].

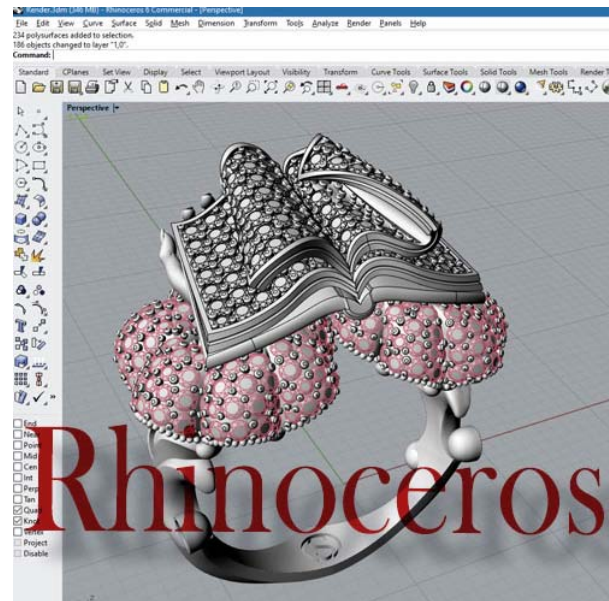


Fig. 1. Modeling of the ring in Rhinoceros.

Available at:

<https://www.sazhnev.art/yuvelimoe-3d-modelirovanie-3d-pechat.html>

Almost all stages of product creation have undergone automation. From design, sketching, to creating a model, and then - embodiment in material, investment casting in metal using 3D-printed model. The process of investment casting and burnt-out casting is also automated, as are the main stages of product assembly [14]. 3D-printers that use the technology of multi-jet modeling (MultiJet Printing, MJP) print a model from wax, which then becomes the basis for a casting master model [18]. There is very little manual labor left in the manufacturing process, although in some areas of work it is indispensable.

We see that computer technologies have already penetrated into all stages of jewelry creation and are actively used all over the world. Of course, this facilitates the creation of products, increases the speed of their release and quantity. The issue of the price can be considered as controversial - despite the fact that process automation usually makes products more affordable, but it must be remembered that such equipment and computer software is very expensive in itself and may not yet be available to every enterprise. And most importantly, what is important to consider: we are talking about the mass production of products that are manufactured in a certain circulation, by companies, firms, factories, those. about SERIES PRODUCTION. But even in this case, the use of manual labor still cannot be avoided, since computer technologies cannot replace human labor at some final stages. However, no matter how high the level of quality of the product created in this way, it is still not about the ART of jewelry creating, which is still made by hand today. Computer technologies can also be useful to the author of such a product if computer design is used, but

he carries out further processes manually. The development of computer technologies used in jewelry production today has caused an increase in demand for them, and there are much fewer jewelry artists who are able to create handiwork jewelry, they are gradually disappearing. Accordingly, their skill is increasingly appreciated.

4. Advertising, promotion, sale of jewelry: the possibilities of digital technologies

But there are a number of areas where the use of computer technologies, the Internet has positive results only. Any product needs advertising promotion in order to be favorably presented to the buyer. For this purpose, the Internet has been of invaluable help, especially since the pandemic, COVID-19 took away the opportunity for people to visit exhibitions and shops frequently. Purchasing power has plummeted, changing the value system of people, and since jewelry is a luxury item, there is very little chance of selling it if it was not originally made to order. Therefore, it is especially important to create favorable conditions for the presentation of the product in order to attract interest to it. For these purposes, individual websites of jewelry artists, websites of shops, jewelry houses, factories (Fig. 3), even social networks serve.

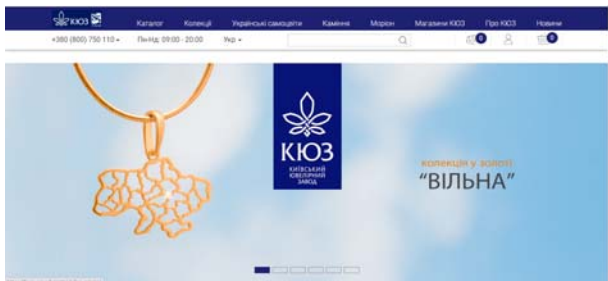


Fig. 3. Website of Kyiv Jewelry Factory.
Available at: <https://kuz.ua/>

Any jewelry brand has its own website, which functions as a catalog, where you can get acquainted with the assortment, choose a product for yourself and order it, or contact the master to order a similar product, but according to individual parameters (change the size, choose another metal, stone). Ukrainian brands Zarina, Kochut (Fig. 4), CDD Jewelry, etc. are known largely due to their presentation on the network – shop-websites, catalog-websites, pages in Instagram, Facebook.

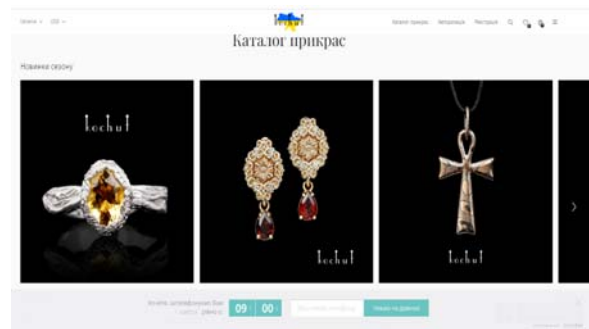


Fig. 4. Website of Ukrainian jewelry brand “Kochut”.
Available at: <https://kochut.org/uk/>

The giants of jewelry in Ukraine, known for their highly artistic works of the VIP class, include the Classic Jewelry House Lobortas, whose catalog website can also be an excellent example of the great importance of a successful presentation of jewelry, especially when it comes to exclusive works created from expensive materials, in such cases, the competent presentation of the material is an indicator of taste, quality and reputation (Fig. 5).

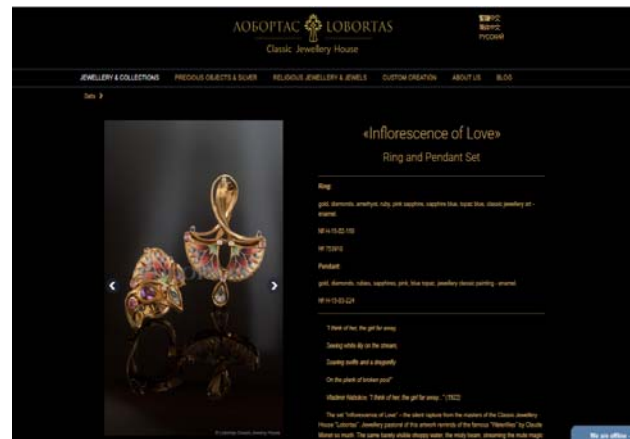


Fig. 5. Website of Classic Jewelry House “Lobortas”.
Available at: <https://lobortas.com/en/>

It is especially worth paying attention to jewelry exhibitions, which in today's realities are already in most cases a virtual format. This is possible both for exhibitions of jewelry equipment, where you can get acquainted with the latest technology and tools, and for art exhibitions, where highly artistic handiwork products of masters are presented, i.e. both for the jewelry industry and for jewelry art. Even trying on a piece of jewelry that the buyer wanted to purchase is now possible with the help of computer technologies - there is a virtual fitting function.

5. Conclusions

In Ukraine, in the context of the pandemic, and since February 24, 2022, during the full-scale Russian-Ukrainian war, the virtual format of exhibitions has become the main one, allowing artists to continue working and present their work to the viewer. Exhibitions in the off-line format are rare today, because it is expensive and dangerous, it is rare to gather artists and connoisseurs of jewelry art. From time to time, the National Union of Artists of Ukraine makes presentations and jewelry material within the framework of all-Ukrainian exhibitions, sometimes it makes quite chamber exhibitions of the Treasury of the National Museum of the History of Ukraine, they allow the craftsmen to preserve jewelry art for the viewer (Fig. 6). Under martial law, it is difficult to find time and money to create jewelry, their advertising and purchase. In this case, it is difficult to overestimate the possibilities of the Internet - even those exhibitions that take place offline are announced and presented in social networks, which allows you to maximize the circle of those who can get acquainted with works of art and find out the names of the masters who appear in the jewelry market.

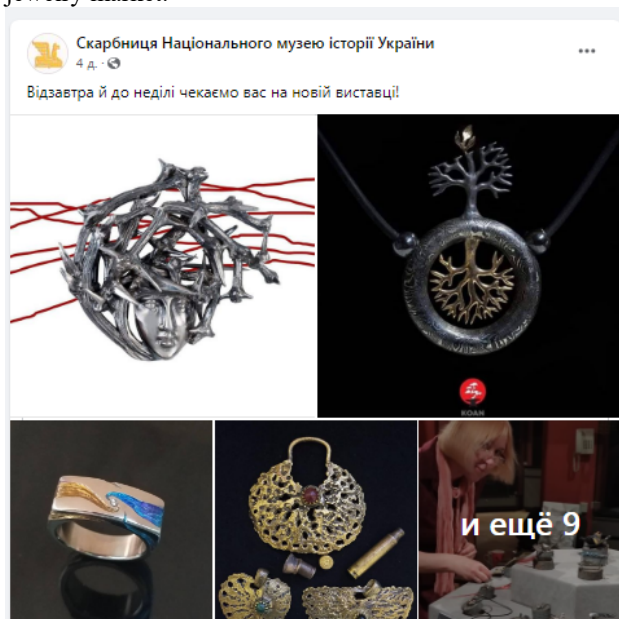


Fig. 6. Announcement of Jewelry Exhibition in Treasury of the National Museum of History of Ukraine in Facebook.

Available at: <https://www.facebook.com/treasuryua>

The choice between traditions and innovations in the field of jewelry creation is impossible, these are different areas - it is impossible to choose between an exclusive author's jewelry and a product and a serial product. The only correct answer to this question is the coexistence of different options for creating a piece of jewelry, when the artist-jeweler, individually approaching each work, uses, if

necessary, computer technology as a tool to help him complete a number of processes. But this is a TOOL only, and not an end in itself, which must be remembered so that handiwork and automation, mechanization of a number of stages in the creation of a product, can coexist in jewelry art. In this case, there will be no question of preserving traditions and rational use of innovations, and not about the destruction of one due to the abuse of the other.

References

- [1] Abbasov, I., Barvenko, V., Voloshchenko, V., Grivtsov, V., Doroshenko, S., Zemlyanaya T., Kalashnikova, T., Koretskaya, S., Krasnovskaya, N., Li, V., Orekhov, V.: Design projects: from idea to implementation. Moscow: DMK Press, (2021)
- [2] Barabanshchikova, V.: Jewelry design methods using modern computer technology (on the example of the graphic package 3D studio max) (2007). <https://cyberleninka.ru/article/n/metody-dizayna-yuvelirnyh-izdeliy-s-ispolzovaniem-sovremennyh-kompyuternyh-tehnologiy-na-primere-graficheskogo-paketa-3d-studio-max/viewer>
- [3] Computer modeling of jewelry. https://jewel-design.ru/izgotovlenie_yuvelirnih_izdeliy/kompyuternoe_modelirovanie_yuvelirnykh_izdeliy/
- [4] Gruzdeva, I., Ilves, O., Denisova, E.: digital technologies in jewelry design: present and future. In: *All-Russian (with International Participation) Scientific and Practical Conference "Culturological Readings - 2020. Cultural Code in the Era of Globalization: Digitalization of Society and Education"*, 42-46 (2020)
- [5] Gruzdeva, I.: Modern technologies in jewelry. In: *Foundry worker of Russia*, 10, 35-37 (2017).
- [6] Jewelry 3D modeling in industry as a fine art <https://www.sazhnev.art/yuvelirnoe-3d-modelirovanie-3d-pechat.html>
- [7] Luts, S.: Creativity of artists to "Lobortas" in the context of Ukrainian Jewelry art of the end of the 20th - beginning of the 21st century: *PhD Thesis, Lviv, Lviv Natl Acad of Fine Arts* (2017).
- [8] Pasichnyk, L.: Peculiarities of formation and development of jewelry industry of Ukraine of the 20th-21st centuries. In: *Folk-lore notebooks*, 6, 1529-1539 (2014).
- [9] Pasichnyk, L.: Jewelry art of Ukraine of the 20th - early 21st centuries (history, stylistics, personalities): *PhD Thesis, IMFE named after M. T. Rylsky National Academy of Sciences of Ukraine*. Kyiv (2015).
- [10] Programs for jewelers. The best CAD/CAD for 3D jewelry design. <https://3dradar.ru/post/54771/>
- [11] Romanenkova, J.: Jewellery in modern realities: a chronicle of triumph or a chronicle of survival? In: *Art-platforme*, 4, 60-85 (2021)
- [12] Romanenkova, J.: Jewelry sketches as a tool for the analysis of the style characteristics of jewelry art of the Northern Renaissance and Mannerism. In: *Young Scientist*, 7(59), 45-53 (2018)
- [13] Romanenkova, Yu., Bratus, I., & Gunka, A.: Historical jewels in the museums of the world. In: *Agathos: An International*

- Review of the Humanities and Social Sciences*, (11), 131-144 (2020).
- [14] Sazhnev, A.: Jewelry 3D modeling in industry as a fine art. <https://www.sazhnev.art/yuvelirnoe-3d-modelirovanie-3d-pechat.html> (2020).
- [15] Shmagalo, R.: Encyclopaedia of art metal. Lviv: Apriori, (2015).
- [16] Timokhina, T.: Artistic design methods of Jewelry. Formation and development: *PhD Thesis*. Moscow (2017)
- [17] Three whales of jewelry 3D modeling. <https://3d-jewel.ru/poleznye-sovety/tri-kita-yuvelirnogo-3d-modelirovaniya.html> (2020)
- [18] 3D printing in the technological process of jewelry enterprises. https://uvelir.info/articles/3d-pechat_v_tehnologicheskom_processe_yuvelirnyh_predpriyatii/
- [19] Ho D., Carlotto, A.: Latest Developments in Selective Laser Melting Production of Gold Jewelry. In: *Santa Fe Symposium*, 537–562 (2012).