



Development of Artistic and Creative Activities for Design Students

Lin Zhu^{1✉}, Jiachang Lu²

¹Dhurakij Pundit University, Thailand

¹Beijing Normal University-Hong Kong Baptist University United International College, China

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Abstract

The main purpose of this scientific study is to identify key areas for the development of the artistic and creative activity of students studying the basics of design in higher educational institutions, which contributes to improving their creative abilities and developing the ability to create an innovative product design. The basis of the methodological approach in this scientific study is a combination of methods of systematic analysis of the key principles of teaching design in modern higher educational institutions with a comprehensive study of the real prospects for the introduction of innovative solutions in the process of teaching design in order to develop artistic and creative activity among future specialists in this profession. The results are the importance of developing modern students' artistic and creative activity for design departments of higher educational institutions to improve their skills in creating artistic product design and the ability to develop innovative design were obtained. Also, the results illustrate the success of applying specific methods of training designers to implement the tasks. The practical significance of the results obtained in this research work lies in the possibility of their application in the process of teaching students of design departments of modern higher education institutions to develop their understanding of the principles of artistic design and the ability to transfer such skills to the creation of modern products with innovative design.

Keywords: art design, innovative product design, innovative teaching method

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INTRODUCTION

The problem of this scientific research lies in the urgent need to search for and implement the latest technologies in teaching modern design students in higher educational institutions. Such a need is determined by the growing need for highly qualified specialists in the field of design technologies, who are able, in the context of the development of globalization pro-

cesses in the world economy, to make non-standard decisions in the design and creation of innovative design products that can subsequently attract significant demand.

Pipinato (2021) draws attention in his handbook on innovative bridge design to the fact that modern approaches to creating the design of created architectural structures require non-standard design solutions that meet the design requirements established worldwide. Therefore,

✉ Corresponding author:
E-mail: linzhu744@gmail.com

according to the researcher, creating such projects requires, in addition to purely engineering training, developed skills of non-standard design thinking, which are laid down at the stage of specialist training in an educational institution (Pipinato, 2021).

For his part, Taura (2016) drew attention in his study of the principles of creating modern creative design projects to the fact that as modern technologies develop, the consumer no longer has an urgent need for certain products, which causes the designer's problem in creating a product that is really in demand in the current situation. According to the author, the solution to this kind of problem lies in the application of an engineering approach to the current situation, which, in turn, implies that designers have significant skills in artistic and creative activity, the ability to develop and implement non-standard solutions in the course of their activities, and this kind of activity is being developed still at the stage of studying at a higher educational institution (Taura, 2016).

At the same time, Thompson & Jaque (2017) concluded in a scientific study of the principles of the development of creativity in the context of the role of an individual performer in this process that the degree of influence of a particular performer on creativity in a certain area as a whole is largely determined by his ability to bring innovative, creative ideas and justify their usefulness and viability. According to the authors, the development of the creative activity of performers is possible if there are prospects for implementing their innovative ideas and concepts, which open up significant prospects for the implementation of one or another creative idea (Thompson & Jaque, 2017).

Buck (2020) noted in an independent study of the problematic aspects of the design and development of the finished product that the process of creating the design of the finished product is quite laborious and requires the display of outstanding design and engineering abilities. The designer should be well aware of the product itself, its characteristic properties,

and distinctive features, which should be favorably emphasized in the design elements. At the same time, such skills are not always present in a design specialist initially - they can be developed in the process of studying at an educational institution, especially if there is a special emphasis on their development by the provisions of the curriculum (Buck, 2020). This requires the manifestation of creative activity on the students' part, their interest in obtaining high-quality skills in creating design projects, and mastering the basics of design skills.

Corazza et al. (2021) conducted a joint scientific study of the principles of the formation of creative activity in the educational space, during which it was found that the process of formation of specific creative developments with regard to students has a clear dependence on the level of creative tasks assigned to them and specific efforts aimed at their implementation. At the same time, the development of students' artistic and creative activity is less related to their natural abilities since, in this context, the main emphasis should be placed on the efforts of the students themselves to implement a particular creative task and master the specific skills and techniques, which are necessary for its successful implementation (Corazza et al., 2021).

This research aims to determine the main directions and methods for developing design students' artistic and creative activity at the stage of their education in a modern higher educational institution.

METHODS

The basis of the methodological approach in this research work is a combination of methods of system analysis of the fundamental principles of teaching design in modern educational institutions with a comprehensive study of the objective prospects for introducing innovations in the process of learning designers to form and develop their artistic and creative activity. The method of comparative analysis of the

results obtained in this scientific study was also used with the results and conclusions of a number of scientific papers on related topics. The main research is preceded by the creation of a theoretical base, which includes an analysis of a number of scientific works by modern scientists who have studied the problematic aspects of the development of the artistic and creative activity of students in the design departments of modern higher educational institutions.

The application of the system analysis method of the main aspects of teaching design in modern higher educational institutions made it possible to determine the basic principles for developing artistic and creative activity among students of modern educational institutions. In addition, real methods of its development were identified, one of which should be considered the method of infographic projects. The specific stages of the implementation of innovative product design using the infographic method are determined; it is recommended for use at the stage of training design students in a modern higher educational institution.

Conducting a comprehensive study of the real prospects for the introduction of innovative solutions in the process of training a modern student-designer made it possible to formulate the key principles for creating an educational and cognitive environment that can provide all the required conditions for the development of students' creativity and increase the general level of their artistic perception. At the same time, specific factors must be taken into account in order to introduce the infographic method into the process of teaching design students in order to develop the proper level of artistic and creative activity in them, which is necessary for the future of the development and practical implementation of products created on the basis of artistic ideas design solutions have been formulated.

The selected combination of scientific research methods determined the presence of certain stages of scientific work.

At the initial stage of this scientific

research, the main aspects of the development of the artistic and creative activity of students of design departments of modern higher education institutions were considered, which are of fundamental importance in terms of improving their skills in perceiving artistic design and subsequently creating products with innovative design. In addition, competencies are identified that are of key importance in developing the skills of design students to develop innovative designs for finished products.

At the next stage of the research work, the prospects for introducing the infographic method into the training program for design students in a higher educational institution were considered to develop their artistic and creative skills. Some student works are also presented with a description of the methods of their creation, which are of key importance in solving the problems of activating students' artistic creativity and revealing their ability to create.

At the final stage of this scientific study, an analytical comparison of the results obtained with the results and conclusions of several scientific papers on related topics was carried out. This made it possible to clarify the results obtained and to formulate, on their basis, the final conclusions that serve as their logical reflection and to sum up the entire complex research work performed.

RESULTS AND DISCUSSION

In modern conditions, with the current development of industrial, economic, and social relations, there is a real need to make changes in the educational process of modern higher educational institutions to develop the artistic and creative activity of design students. This is required for students to develop the ability to create technological innovations that provide the products which are subsequently produced, with their participation a real advantage in today's competitive environment (Björklund et al., 2020). In addition, the process of teaching students the principles

of creating artistic designs of products is important in terms of the development of creative innovation and artistic and creative activity of students in general.

The development of the artistic and creative activity of students of modern higher educational institutions requires increased attention to the following aspects: (1) stimulation of independent work of students in the classroom and extracurricular activities (outside activities); (2) formulation of tasks that require non-standard approaches to the solution for their implementation; and (3) creation of an educational and cognitive environment conducive to the development of artistic and creative activity of design students.

Independent work of students in the classroom and extracurricular activities contribute to the development of their competencies, which should be considered key from the point of view of the prospects for the formation of artistic and creative activity skills in the future. These should include the following: (1) the ability to make independent decisions when choosing a specific concept for the implementation of a task issued by a professor; (2) the development of skills in creating an artistic design of the finished product, using innovative solutions; (3) development and improvement of creative abilities, stimulated by developing the skill of finding non-standard solutions in the course of performing program tasks.

Preparation and issuance of assignments to students, the solution of which requires the use of non-standard approaches, involve their subsequent independent work with specific search tasks that stimulate the creative activity of students. When organizing independent work of students, the professor monitors all stages of such work and also controls the process of completing tasks and obtaining new knowledge and competencies for students. For this, it is necessary to set specific tasks, the qualitative solution of which requires a creative approach to the application of all the information received.

The educational and cognitive envi-

ronment, which is conducive to the development of the artistic and creative activity of design students, must meet the following criteria: (1) represent a certain complex of socio-cultural, psychological, and pedagogical conditions that ensure the effective interweaving of the cognitive, personal, emotional and volitional beginnings of each student; (2) have a set of special pedagogical conditions, which are required to create and maintain the student's interest in the development of his artistic and creative abilities; (3) be able to fully ensure the development of the processes of cognition of the individual and their adjustment, in accordance with the provisions of the program of the higher educational institution.

To create an effective educational and cognitive environment that can contribute to the development of the artistic and creative activity of students of design departments of modern higher education institutions, a number of key tasks need to be solved, namely the proper provision of the educational, methodological and material base, which is required for the implementation of a wide range of tasks set in the curriculum; introduction of modern computer technologies into the educational process, which contributes to a visual illustration of creative solutions developed in the learning process; a rational combination of software products used with traditional forms of education allows developing innovative design solutions when creating a finished product and illustrating them using modern computer technology's capabilities.

One of the most effective ways to develop artistic abilities and creative activity of students of design departments of modern higher education institutions is the project method aimed at creating an innovative, artistic design of the finished product using the principles of infographics. The creation of an iconographic project involves the mandatory independent work of students, developing their skills of creative, artistic activity by creating an innovative design of the finished product,

which has a pronounced artistic component (Nguyen & Mougenot, 2022).

The infographic is a variant of the graphic presentation of information, with the aim of the fastest, most objective, and most reliable presentation of data of any complexity. This method has found wide application in the field of education and journalism when submitting a variety of technical information. The infographic method allows not only to transmit information in large volumes but also demonstrates specific trends and the real relationship of facts and objects in space and time.

The development of the artistic design of the finished product using the infographic method requires the obligatory consideration of a whole range of factors, namely historical, artistic, scientific, and logistical.

In this context, the personal characteristics of the project developer are of primary importance: his perseverance, the level of development of the creative activity, the ability to feel the images of artistic design and display them in the completed project, the presence of artistic taste, practical experience in the development of the innovative design of finished products, the desire to develop their own artistic, creative activity.

The process of developing the artistic and creative activity of design students through the development of projects in the style of infographics can be represented as a sequence of certain stages, namely (1) Definition of the final task of the project. Formulation of the terms of reference for the creation of the project, taking into account the general concept of its artistic design; (2) Preliminary design study. Artistic search for an innovative design concept; (3) Preparation of sketches, taking into account the addition of innovative solutions to the

proposed design; (4) Final fine-tuning of the finished material in graphic editor programs, with subsequent implementation in the material;

Output the finished project in infographics

Achieving ultimate success in the development of the artistic and creative activity of design students through the use of the infographic method is possible if there is a favorable combination of a number of factors that directly impact the construction of the educational process. These should include (1) the presence of a sufficient level of professionalism in the teaching staff, who is responsible for the organization of training sessions and the selection of methodological material, the study of which will lead to the development of students' skills in creating samples of artistic design; (2) a high-quality technological base, which is sufficient for its use in the process of creating an innovative product design during practical exercises, using modern computer technology; (3) development of independent work skills among design students at the stage of training at a higher educational institution, sufficient to develop the artistic design of an innovative product; (4) direct desire of students to master the method of infographics in order to develop the competencies in question; and (5) students' understanding of the essence of innovative design solutions and the features of their practical creation.

Figures 1-2 show the work that could be done by design students using the infographics method in the process of studying at a higher educational institution. At the same time, the possibility of their special development is allowed in order to develop students' perception of artistic design as a result of the activation of the process of their artistic creativity.

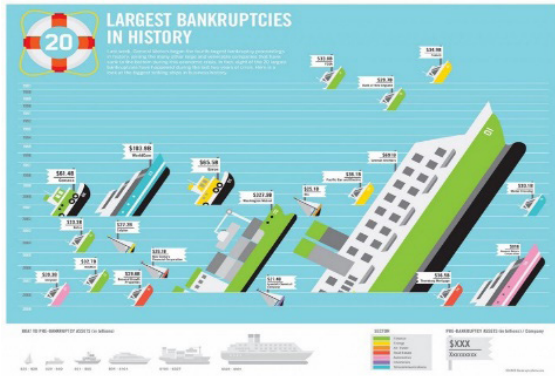


Figure 1. Work in the style of infographics
 “Size Comparison of Vessels”
 Source: Braquelaire and Strandh (2004)

In developing the infographic shown in Figure 1, a comparison of different types of ships was made, and methods were used to combine different colors and styles of color combinations in the image. Such tasks are aimed at developing the perception of the principles of constructing the artistic design of the finished product among design students through the activation of artistic creativity

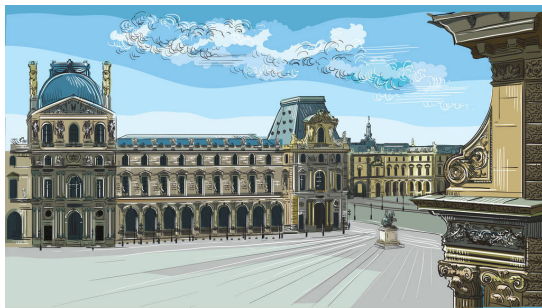


Figure 2. Work in the style of the “Louvre Museum” infographic
 Source: Braquelaire and Strandh (2004)

The work presented in Figure 2 was created using vector and raster graphics methods. In the first case, the drawing includes separate geometric objects: lines, points, and polygons. As a rule, vector graphics allow the creation of relatively simple infographic images in SVG format. In the second case, in order to create an infographic image, a system of pixels is used, the colour difference of which creates a certain graphic image, which the human eye perceives as a single picture. The main

bitmap formats are PNG, JPEG, TIF, GIF, and BPM.

The considered methods for creating ready-made images suggest using proprietary libraries containing many options for creating various types of images (Roy and Warren, 2019). To ensure that students can access them, the professor should use paid and free repositories during classes.

Using the above possibilities for creating art design patterns using iconography methods is a clear example of developing innovative product design by activating the artistic creativity of students of design departments of modern higher education institutions. In this case, the design’s innovativeness is expressed through the color-coding method, which allows visual determination of the differences between the individual pieces of information in the text.

The development of ability to develop an artistic design, which is necessary for the preparation of an innovative design concept for a finished product, is fully consistent with the preparation of terms of reference for the development of an iconography sketch, which includes the following mandatory steps: (1) Alignment of the finished composition on the area, which is limited by specific geometric parameters; (2) The typical character of the silhouettes of figures placed on the final composition is created in a form that is as close as possible to the simplest geometric shapes; (3) It is necessary to maintain a complete static or dynamic balance for all the constituent elements of the composition; and (4) Two key options for displaying figures on a sheet are used - the dominant figure is located in the center of the composition, while all the others are perceived in approximate relation to it; all figures completely lose their own identity, being located in the established rhythmic alternation of final forms.

The stage of developing a finished model contributes to the formation of skills for creating innovative product design. At this stage, students are tasked with independently searching for the final form of

the finished product and designing its final proportions. At the same time, the professor monitors the rationality of the methods used by students and their ultimate effectiveness in implementing the general concept of artistic design. The selection of a more rational model is mandatory at this stage in terms of educating students' ability to find and implement non-standard methods for solving a typical problem, which in the future will be crucial if it is necessary to develop an innovative product design already in solving problems of professional activity (Kumar et al., 2021).

The organization of practical classes on the creation of infographics and products based on innovative graphic design should be implemented by professors using an activity approach, which involves the sequential implementation of the stages of preparing and issuing technical specifications, creating a sketch of a future product project, modeling it using the available software and creating a finished product model. Teaching future designers the basics of infographics is very relevant at this stage since it contributes to the consistent formation of their competencies necessary to effectively create various combinations of artistic images that form the concept of the innovative design of the finished product (Booker et al., 2001). At the same time, design students are activating the desire to continue learning in the chosen direction, which, in turn, ensures an increase in overall creative activity in the process of learning activities as a whole.

Creating an innovative product design requires a design professional to develop the ability to build art forms within a given design concept. A characteristic example of creating an innovative product design is the use of a color-coding method that allows highlighting colour fragments with various kinds of information. This is fully facilitated by the development of the artistic and creative activity of students of design departments of modern higher educational institutions at the stage of preparation for mastering the profession. At the same time, conducting independent

practical exercises aimed at developing innovative designs for finished products within the framework of creating projects in the style of infographics contributes to the development of skills in creating graphic images of any degree of complexity using modern software tools (Cather et al., 2001). This helps develop the spatial imagination of future designers, as well as a number of other skills and competencies necessary to develop a wide variety of design innovations.

Thus, the development of the artistic and creative activity of design students through the introduction of practical tasks for the development of product models using the iconography method in the program of higher educational institutions proves its practical effectiveness due to the presence of a wide range of opportunities for improving the skills of creating samples of the artistic, innovative design of finished products. The skills acquired during practical training will be very useful for future designers in their professional activities and will determine their significant competitive advantages in the labour market.

MacLean-Blevins (2017) notes in a scientific study to review the general principles for constructing effective plastic products that any design decision made at each stage of creating a finished product allows the designer to optimize and verify the finished design thoroughly. In this context, the author pointed out that to bridge the fundamental gap between the industrial designer and the finished product developer, the designer should apply creativity at every stage of designing the finished product. This requires thorough training aimed at developing the creative abilities of a design specialist, as well as his personal efforts at all stages of the learning process. In general, the researcher's conclusions are fully correlated with the results obtained in this scientific study, significantly supplementing them in the context of assessing the areas of application of the creative abilities of a modern designer in practice (MacLean-Blevins, 2017).

For their part, Ashby and Johnson (2009) came to the conclusion that materials are the basis of any design project in a joint scientific study of the features of the use of various materials in the process of implementing a design project. Today there is a wide variety of different materials for all possible forms and contemporary design trends. In addition to it, scientists note that the problem of choosing materials for creating a design project is unique in its own way since a technical designer has access to any information related to all the nuances of the project. The question is the level of training of the designer himself and his ability to select the required information from all the available variety, which, in turn, necessitates high-quality training of specialists in this field. The researchers' conclusions can be challenged on the grounds that a designer with a developed creative ability should not have problems finding information on issues of interest to him in the implementation of any project (Ashby & Johnson, 2009).

The topics raised are developed by Lu et al. (2021) in a joint study of the key principles of joint planning, design, and installation of finished products. According to the authors, implementing a certain design concept involves taking certain steps to prepare a draft of this concept and its consistent implementation, using all available opportunities for assembling and picking finished products. It is also noted that with the development of modern computer technology, there has been an evolution of traditional methods for assembling and designing finished products, which in general, has contributed to the acceleration of their development process. The methodology of combining the principles of planning, designing and assembling finished products should be taught to future designers at the stage of preparation for future professional activities (Lu et al., 2021). The researcher's conclusions complement the results of this scientific work in the context of the importance of the practical application of modern computer technologies in creating a finished innovative de-

sign of the finished product.

Becker (2016) examines this subject from a slightly different angle; he raised a number of problematic aspects of choosing a colour scheme for creating a finished product design in his scientific research. The scientist expressed the opinion that colour sets the key mood when evaluating the finished product, which necessitates carefully selecting its colour scheme when creating a design concept. Product design innovation is largely determined by the designer's ability to choose a palette of colours that not only distinguish the product from competitors and creates a unique experience for the end user (Becker, 2016). A designer needs to have a good understanding of the world of colour makers, while a formula needs to have a better understanding of design concepts. The researcher's conclusions require additional clarification regarding the interaction between the designer and the developer of colours to create a high-quality and effective artistic design of the finished product.

In turn, Best (2012) noted in his study of the features of colour selection in the implementation of the design concept of the finished product the fact that colour design is the basis for the perception of the product, emphasizing its advantageous competitive advantages and creating a truly innovative design of the finished product. According to the researcher, the ability to select a colour scheme to create real creative innovations should be brought up in a future designer at the stage of learning a profession since, in practice, it may not always be possible to improve the skill of selecting the optimal colour combination when creating a finished product (Best, 2012). In general, the conclusions of the researcher fully coincide with the results obtained in this scientific work in the context of assessing the importance of choosing a colour scheme for creating an innovative design of the finished product.

Pouzada (2021) considered in his scientific research the selection of materials and the creation of design concepts for producing plastic products on an in-

dustrial scale. The author notes that the creation of innovative products requires thorough training of designers in the development of plastic products, as well as the choice of materials and their application in the creation of design forms (Pouzada, 2021). According to the researcher, comprehensive training of qualified designers should include training in the principles of thermoplastic molding, studying the latest advances in the field of plastic tools, as well as the impact of processing options for finished molds on the subsequent performance of the finished product. The presented results are interesting in the context of the results of this scientific study by emphasizing the need for an integrated approach to creating the artistic design of the finished product.

At the same time, a group of authors represented by Frishberg & Lambdin (2015) conducted a scientific study of the principles of studying the target audience's needs when creating various innovative products. As a result, scientists concluded that creating an innovative product design requires a clear understanding of the user's needs and the practical ability to implement a product that can fully satisfy these needs. This implies the need to develop the creative activity of future designers at the stage of their training in the profession, as well as to improve their artistic taste and ability to implement the main design ideas in the finished creative concept of the product (Frishberg & Lambdin, 2015). In essence, the researcher's conclusions are fully consistent with the results obtained in this scientific work in terms of assessing the importance of developing the creative activity of future designers to develop their ability to create an innovative product design.

The topic is being developed by Staines (2012), who conducted a scientific study of the general principles of creating interiors for academic libraries, teaching, learning, and conducting various research. The author noted that the ability to create innovative design concepts allows for giving the surrounding workspace unique,

incomparable characteristics, which as a result, will positively affect the results of people working in this space. The artistic expressiveness of the workroom is largely determined by the creative abilities of the designer who has undertaken to create the interior (Staines, 2012). The researcher's conclusions can be challenged on the grounds that the designer's creativity alone cannot significantly impact the workspace's internal expressiveness without his interaction with other specialists involved in the process of creating this space.

At the same time, Leary (2019), who considered in his research work the key principles for the development of design concepts for additive manufacturing, drew attention to the fact that the creation of any design concept requires significant effort, both on the part of the designer himself and on the part of other specialists, involved in the process. According to the author, much depends on the ability of the entire team to combine creative efforts in one direction in order to obtain the final result, which is expressed in the creation of a single creative concept of additive manufacturing, which includes various options for optimizing the parameters of the entire process (Leary, 2019). Fundamentally, the conclusions of the scientist do not contradict the results of this scientific work, supplementing them in the context of assessing the importance of team interaction for creating a final high-quality product.

Thus, in general, the results of this scientific study essentially coincide with the conclusions of the reviewed scientific papers, emphasizing their objectivity and scientific validity.

CONCLUSIONS

The development of the artistic and creative activity of students of design departments of modern higher education institutions is aimed at developing the artistic perception of students, which is necessary to create competencies, sufficient for them to develop innovative designs

of finished products in their subsequent professional activities. The solution to this kind of educational task requires the fulfillment of a number of key conditions for the organization of the educational process, among which it should be noted the presence of the required level of competence of the teaching staff of the educational institution, sufficient material and technical equipment, as well as the consistent development of students' skills of independent work when performing their educational tasks.

An effective solution to this kind of problem is possible by introducing tasks for the development of design projects using the infographic method into the curriculum of the design department of a modern higher education institution. This method is highly effective in creating a visual picture of educational information and developing students' creative and artistic abilities, increasing their overall level of creative activity and developing their practical skills in creating artistic design concepts. This is facilitated by the students' performance of tasks aimed at selecting the optimal combination of colours, objects, and shapes in a given composition and choosing the option for arranging the figures in it. Furthermore, improving students' skills in independent work is of great importance in this context; it contributes to the development of creative thinking and the search for innovative solutions in building the design concept of the finished product.

The result is an increase in students' general level of artistic and creative activity, the development of artistic perception, as well as the ability to make innovative decisions when developing the concept of the design of the finished product. Such competencies are essential from the point of view of the subsequent professional implementation of future design students since the ability to find innovative, creative solutions when developing design concepts for typical products determines their significant competitive differences and acts as a certain guarantee of their future

demand as representatives of the field of design developers in any economic situations.

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