Evolution of the Artistic Image in the Interior Design

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Received: November 11, 2022 Accepted: December 9, 2022 Online Published: December 17, 2022

doi:10.5430/jct.v11n9p11 URL: https://doi.org/10.5430/jct.v11n9p11

Abstract

The industrial design is one of the ways to express one's own ideas, to embody images; however, for this, one should possess a complex of knowledge and skills in the field of theory and history of design. This has determined the relevance of the presented scientific work. The purpose of the academic paper lies in establishing the effectiveness of the introduction of training courses dedicated to the evolution of the artistic image in the interior design; describing the experience of studying the evolution of artistic images in design, which helps to create design projects according to a certain style and genre; determining the attitude of students to educational and content innovations. The learning algorithm was presented in the form of 3 stages, namely: theoretical; creating a design from the textual description of Dynamic Memory Generative Adversarial Network (DM-GAN); defining genre and style compatible with genre using WikiArt; creating stylization in the interior design. The hypothesis of the research lies in the fact that the end-to-end solution for the practice of creating artistic images in the appropriate genre and style of design is the introduction of creative projects according to a well-defined algorithm. The result of the research is the successful introduction of a step-by-step method of a creative project based on using an artistic component in the interior design. In the perspective, research projects will be introduced, which on a deep theoretical basis will make it possible to correctly generate the desired artistic image in design practice, according to a specific genre, artistic stylization.

Keywords: learning process, artistic stylization network, artistic image, interior design

1. Introduction

Integration and management of architectural projects and interior design is a multifaceted profession that requires deep theoretical knowledge, the ability to communicate with all project participants, management and design execution (Synorub & Medynska, 2019). The interior design involves the process of forming an emotion, the expected reaction from the interior space through the correct use of this space, as well as the surface treatment. The art of the interior design often also involves the ability to combine it with the exterior of the premise. The search for the most effective ways to systematize the entire complex of design knowledge and the ability to apply them in practice is one of the most urgent issues of the design teaching methods.

At the beginning of the formation of the society, the interiors of buildings were created naturally, during the construction process. The art of interior design has originated with the development of civilization and complex architecture, in accordance with the development of progressive industrial processes. Effective use of space, the desire to create a comfortable space and functional design has influenced the evolution of the modern interior design. It is the process of evolution that should be the basis for developing stylization skills and determining the genre specificity of interiors.

Future designers should be aware of the fact that interior design is a separate profession, different from the job of a decorator (Ulyanov et al., 2016). In XVII-XVIII centuries, work with the interior was done by the master of the house, hired craftsmen, who gave pieces of advice on the choice of artistic style, organization of the interior space. Architects also hired master craftsmen to create interior designs for their estates. Since the middle of XIX century, the industrial economies of the West have created a demand for the services of interior designers. The middle class of North America and Europe had the opportunity to nurture their own status, create new images and brands. Primarily, the interior design was done by furniture companies; however, later, at the beginning of XX century, independent designers appeared who presented their activities as artistic ones with a wide variety of genres and

styles. And the very ability to streamline and show as clearly as possible the evolution of the artistic image and styles is one of the main tasks of art education, which constitutes the research issue of a number of works (Golnaz et al., 2017; Salgur et al., 2013).

In today's interior design, great importance is given to modern digital technologies. A trendy direction of research in the field of digital technology development is the creation of realistic images based on accurate images. A number of social media and specialized sites on architecture and software were used for this purpose (Vanslambrouck et al., 2019; Ivanova et al., 2020). However, a few programs and algorithms for developing creative projects are fixed on creating artistic images and stylizations. Work is underway to design a number of programs that create a high-quality image and transmit it in a certain style. Based on the resulting image, a range of compatible art styles can be recommended to the consumer and selected for them. There can be several stylizations; one can apply additional styles to create an image.

In the perspective of research, work should be done on the development and implementation of pedagogical technologies that contribute to the creation of artistic images in interior design, as well as give the opportunity to develop creative design projects and allow applying the entire knowledge package in practice.

2. Aims

The purpose of the academic paper lies in establishing the effectiveness of the introduction of training courses dedicated to the evolution of the artistic image in the interior design; describing the experience of studying the evolution of artistic images in design, which helps to create design projects according to a certain style and genre; determining the attitude of students to educational and content innovations.

Based on the purpose outlined, it is planned to fulfil the research tasks as follows:

- to determine the impact of the introduction of a new academic discipline on the academic performance and attendance of students studying interior design;
- to describe the algorithm of pedagogical technology in the history of interior design;
- to determine to what extent approvingly the participants of the educational process feel about the introduction of innovations in the process of developing the creative project, whether they are interested in further studying the history and content of the components of the artistic image in the interior design.

3. Literature Review

Particular attention has been paid to creation of educational materials for innovative courses (Ba & Abrahamson, 2021; Strawhacker, et al., 2021; Ko et al., 2013), the search for new pedagogical technologies in education (Mtebe & Raisamo, 2014; Kiki-Papadakis & Chaimala, 2016), models of effective management of educational processes and introduction of project activity (Ivanova et al., 2020), psychology of modern education as an impetus for innovation (Prince 2020 et al., 2020; Smeijers et al., 2020).

In current design studies, the issue of digitization of the direction was actively developed; proposals were put forward for using various methods of processing and generating images of interiors (Goodfellow et al., 2014). A number of researchers considered various opportunities and prospects for the development of specialized software (Reed et al., 2016; Johnson et al., 2016), which allowed modernizing the vision of interior design by professionals. These methods showed astonishing results; the generation of images based on textual images and the active use of a wide range of stylizations have attracted the interest of the research community (Chen & Schmidt, 2016). Some researchers have noted difficulties with certain complex images and various solutions to the problem have been proposed (Han et al., 2016). The issues of stylization, the definition of genre affiliation, the complex of knowledge on the formation of an artistic image have also been studied in recent years (Kaiming & Sun, 2015). Textures and images, ways of preserving the style and content of images have been considered (Johnson et al., 2016). Along with this, efforts are underway on ways of effective methods of assimilation of new software, separate ways of transferring styles, using secondary networks (Sugiyama & Yanai, 2019).

In the future, it is worth considering work with design programs in the process of creating educational projects, where innovative teaching methods are combined with modern technologies.

4. Materials and Methods

The principal research method is the pedagogical experiment method. The research team had collected and analysed the data, which were later used as answers to the questions that revealed the substantive component of the research. The descriptive method, methods of analysis and synthesis were used in working with theoretical material. Working with a pedagogical experiment involves the use of observation and survey methods.

The experimental research was conducted during 1 semester of 2021/2022 academic year. 40 students of the Cherkasy State Technological University, Faculty of Computerized Engineering Technologies and Design were involved in the experiment, who had been studying at the 2nd year of the first (bachelor) level of education in the specialty 022 "Design", the field of knowledge "Culture and Art".

All students, who agreed to participate in the research project, were divided into 2 groups (EG1 (experimental group) - 20 people, CG2 (control group) - 20 people). EG1 was chosen as an experimental one, where a creative project was introduced that involved working with different genres and styles of interior design within the academic discipline "History of Interior Design". In CG2, within the framework of the academic discipline, the traditional (last year's syllabus) was used with minor amendments, without the use of innovations in the preparation of the project work.

The research experiment provided for the implementation of the project in III stages. At the first stage, the main theoretical fundamentals of the evolution of the artistic image were determined, as well as work was carried out on training the teaching staff to implement the course software; educational materials adapted to the new content were created; the necessary material and technical base was prepared. Permanent work of technical consultants was organized; work was carried out with software (design with a text description of Dynamic Memory Generative Adversarial Network (DM-GAN).

At the II stage, an active educational process on the theory of practice was conducted. At the end of each thematic block, the level of knowledge of the students - respondents was measured (the overall average score of students' learning outcomes was determined according to the 100-point system). The result was a demonstration of interior design projects that would take into account evolutionary processes in the creation of artistic images of the interior design.

At the III stage, a final analysis of the obtained results took place; the research data made it possible to determine the effectiveness of the introduced technology. The results of the experiment are presented in the form of a description of statistics; the survey data have been taken into account, and all of them are the answer to research questions. At the final stage of the project (III stage), a questionnaire was organized for EG1, CG2, where students' answers were collected regarding their attitude to innovations in the course curriculum, attitude to project activities and the feasibility of their continuation. Throughout all stages of the experiment, there was constant monitoring of attendance of students in all study groups.

All respondents expressed their own desire to participate in the experiment; the research team has guaranteed the anonymity of the surveys, as well as the fact that personal information obtained during the research will not be made public.

5. Results

The algorithm for generating an artistic image in interior design has been used in the research project. Students should be aware of the evolutionary processes that took place in design art over many centuries, understand the purpose and ways of using genres and corresponding styles, as well as to learn to single out the most suitable ones from the possible options.

At the first stage of the project, which coincides with the beginning of the 1st semester, teachers and students participating in the experiment were trained; additional consultations were held with technical personnel. Moreover, training plans were formed, and training materials were prepared taking into account the specifics of blended learning technologies. The place of independent processing of educational material has been determined, as well as reviews of materials on the practice and theory of interior design according to an individual plan for developing a creative project identified by the student and the teacher. In the conditions of working on a creative project, a particular attention has been paid to students who have a high level of self-organization, the ability to master new material, and the ability to plan. All respondents should learn the ropes in the genre and stylistic systems, take into account the evolution of artistic images, and they should be well-adjusted to business communication. Students focused on self-improvement should be ready to achieve educational goals.

During training in the EG1 course, an algorithm for developing a creative project was proposed, which would show the ability of respondents to navigate the transformations of an artistic image in interior design.

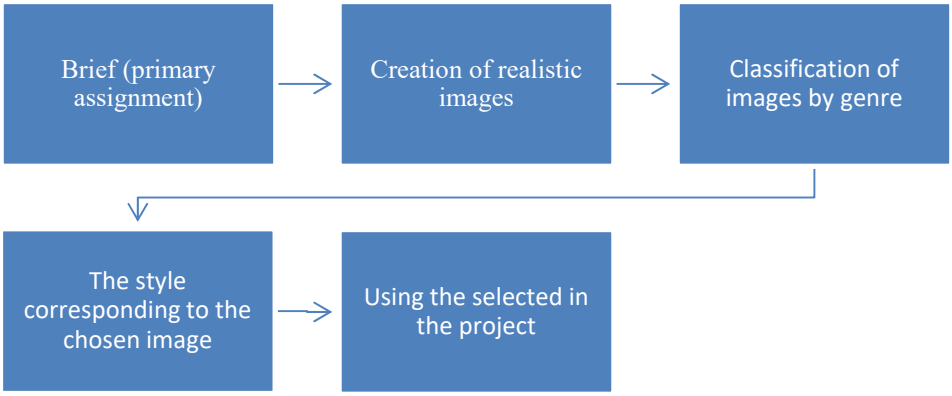

Figure 1. Algorithm for Creating an Interior Design Project

Source: author's development

Primarily, at the initial stage of project formation, it is necessary to create an idea, concept and technical task together with the customer. In order to do this, it is worth completing a special questionnaire (brief). Further, the designer performs work on the selection of a number of artistic images that form the basis of the interior; he should be well versed in the history of design, genres and style of work, use the methods of image stylization, accurate transmission of the image. Using Dynamic Memory Generative Adversarial Network (DM-GAN) software (arXiv: 1904.01310), the project of defining the genre and corresponding stylistic solutions compatible with the genre is being formed; the choice is made with the help of WikiArt. Consequently, from among the complex of stylizations that better correspond to artistic images, the most suitable one is selected.

At the second stage of the experiment, students were familiarized with the theoretical material and the algorithm for creating creative design projects. After the completion of the first module, a control work was carried out to measure the level of general success of the respondents.

Table 1. Evaluation of the Level of Academic Performance in the Experimental and Control Groups (II stage)

	Unsatisfactory	Satisfactory	Good	Excellent
G1	8 %	32 %	48 %	12 %
G2	7 %	36%	47%	10 %
Average indicator	7,5%	34%	47,5%	11 %

Source: author's development

As one can observe, the academic performance in the experimental group after completing half of the discipline "History of Interior Design" differs slightly from that of the control group by an average of 3% percent. The largest number of positive evaluations is revealed in G1 - 60%, in G2 - 57%.

Stage II provided the continuation of the application of design technology and software in the field of interior design. The results of writing the theoretical part and defending the project work have revealed changes in the academic performance of students.

At the final stage, at the end of the 1st semester, the collection, systematization and analysis of students' academic performance took place using grades for the defence of a creative project on interior design, where the theoretical part was combined with the defence of the work.

Table 2. Evaluation of the Level of Academic Performance in G1 and G2 at the end of the Project

	Unsatisfactory	Satisfactory	Good	Excellent
G1	4 %	26 %	51%	19%
G2	6 %	34%	49%	11 %
Average indicator	5%	30%	50%	15%

Source: author's development

After completing the training course "History of Interior Design", more "good" and "excellent" marks were received by students of the experimental group (G1). The success rate of academic performance of G1 (experimental) group has increased by 7%, while the success rate of G2 increased by 4%.

At the final (III) stage, an analysis of the results of students' attendance of classes was conducted. The results of visits in EG1 and CG2 were compared.

Table 3. Dynamics of Attending Classes by Respondents

	The beginning of the semester	The middle of the semester	The end of the semester	Session
EG1	72 %	63 %	76%	89%
CG2	68 %	54%	69%	86 %
Average indicator	70%	58,5%	72,5 %	87,5%

Author's development

As can be seen from the results of EG1, stable attendance turned out to be the most active. It does not have sharp peaks of increase in attendance at the beginning and end of the semesters, but it is constant and sufficiently high. EG1 on average is 70,3%, while in CG, the average attendance was 63,6% and there is a big difference between the periods (the middle of the semester differs by 15% from the end of the semester).

At the final stage, the research group asked all respondents to fill out a questionnaire, which contained several questions related to assessing the project activity technology introduced for students, research participants. Closed-ended responses required a "yes" or "no" choice.

The final assessment consisted of a number of indicators. These included the results of the academic performance; control tests allowed measuring the level of knowledge. The active involvement of respondents in the implementing a successful design project in practice was also considered as the criterion of academic performance. All in all, this made it possible to analyse the parameters of motivation, ability to self-analysis and self-control, digital literacy and dexterity.

At the final (III) stage, all respondents were asked to fill out a questionnaire, which contained a number of questions related to the assessment of the technology of project activities introduced for students, participants of the research. Closed-ended responses required a "yes" or "no" choice. The results were presented in percentages. 6 questions were presented to the respondents for consideration.

In the course of the research, at the final stage of training course, students had to focus on the achievement of a number of skills and abilities, the ability to work with interior design projects, as well as to evaluate how important, useful and interesting the obtained opportunities and prospects turned out to be for the respondents.

Based on the results of the survey conducted, it can be argued that the following components of the experiment are important for the majority of respondents, namely: to constantly learn to use modern design programs; it is necessary to introduce modern pedagogical technologies in teaching. There is also awareness that interior design, the evolution of the industry, involves the readiness to use high technologies and software capabilities. An important component of the creative process is also a demanding attitude towards oneself and motivation to acquire knowledge and skills; this is evidenced by the high indicators of defining project activity as difficult, requiring a lot of effort. Design skills and knowledge in the field of the evolution of design art provide an opportunity to implement the educational potential, increase the professional level, the skills of independent creative work and the ability to be self-critical.

Table 3. Questionnaire Regarding the Evaluation of the Experiment by the Participants

	G1 Yes	G2 Yes
The use of software in design requires constant improvement of digital literacy	56%	52%
Theoretical knowledge of design history is essential	58%	49%
The use of modern design programs requires educational technologies	88%	83%
The use of software contributes to the improvement of the quality of education	48%	41%
The creation of a design project requires considerable efforts	71%	60%
It is worth continuing to use project technologies in training	71%	56 %

Source: author's development

6. Discussion

Studies in the field of innovative pedagogy (Muldrew & Miller, 2021; Scarpellini et al., 2021) showed the need for constant introducing new content of education, claiming that this has a positive effect on reducing aggressiveness, increasing attendance and success. In fact, our research revealed that introducing new modern teaching material also contributed to attendance (70,3%) and success (increased by 8%).

The existence of various research directions in the field of design creates a certain terminological vagueness and blurring. Bopche (2017) believes that the professions "decorator" and "interior designer" are different jobs. The interior design is a combination of art and understanding of human behaviour, and as a result, the creation of functional spaces of a building. Decorating is just a way of arranging and decorating space with fashionable, beautiful things. Interior designers project and plan, and decorators decorate. In the course of our research, the concept of "interior design" was also considered as the science of creating functional spaces in a building and the art of understanding a person through the creation of artistic images. The concept of "decor", by comparison, is associated with the activity of arranging and decorating space with things. The interior design project activity is structured in such a way that it required an understanding of technical issues (acoustics, location of windows and doors, lighting) and the rules for constructing the main plans of the space inside the building, which are united by a single genre and style context for the implementation of the artistic image. It should also be taken into account that the designer's work requires his knowledge of art, architecture, construction, etc.

In a number of studies (Tian & Franchitti, 2022), devoted to the development and implementation of software for working with design projects, artistic images described the need to create algorithms on the basis of which it is possible to create artistic images based on given parameters (Tian & Franchitti, 2022). Realistic images were created using Dynamic Memory Generative Adversarial Network (Minfeng et al., 2019). This project turned out to be a success. It was possible to create an image based on a text description. With the help of Resnet (Zhu et al., 2017) tools, the genre and stylistic solutions were determined; the image was generated using neural networks of artistic stylization (Dumoulin et al., 2016). In the course of our research, it has been revealed that the creation of a modern interior design project is impossible without the use of digital technologies and software. The majority of respondents during the experiment (88% - G1, 83% - G2) identified the need to use modern design software, innovative educational technologies. Along with this, the majority of respondents (G1 – 71%, G2 – 60%) determined that working with a design project, forming an artistic image is a difficult task and requires a lot of effort.

7. Conclusion

In general, positive results were obtained in the course of the research.

During the quasi-experiment it was established that the training course on interior design, involving the use of the evolution of the artistic image, is effective for mastering the skills to create a design project. This approach is an educational and substantive innovation for Ukrainian university art education.

The research group has revealed that the introduction of a new academic discipline has a positive effect on the students'' success. The learning outcomes of respondents from EG1 showed an overall increase of 8%, while G2 increased success by an average of 4%.

Analysis of data on students' attendance studying interior design showed that it was stable in EG1, constituting 70,3%, while attendance in CG2 was 63,6%. In CG2, there was a large difference between periods (15%). In EG, a

constant level of attendance was observed, indicating a stable interest in the educational process.

Changes in the artistic image according to a certain style and genre, means and forms of stylization associated with the digitalization of the industry are positively evaluated by respondents. 71% of students want to continue using project technology with the use of stylizations and the ability to change the artistic image of the design. The survey showed that applying innovations in teaching interior design is successful. 71% of students in the control group have a favorable attitude to educational innovation.

The algorithm of educational and practical activities was based on a number of stages as follows: creating an idea, a concept and developing a technical task; processing and selection of a number of artistic images that form the basis of the interior with a focus on the laws of evolution of the artistic image; determining the genre and style of the work; creating a project where the artistic image would be harmoniously implemented.

The results of the quasi-experiment showed that introducing innovative methods of teaching disciplines in the history of design are relevant for ensuring the quality of education, training young specialists in the field of interior design. Studying evolutionary changes at the level of the artistic image showed that the success level in the group that developed such projects increased by a total of 8%.

The preparation of a creative project, which gave an opportunity to navigate the evolution of design methods of creating an artistic image, to define a genre, to generate several stylistic combinations, is a difficult, but necessary and interesting educational activity. 65% of respondents considered the work of forming an artistic image through its evolution a difficult but interesting technique.

The constantly evolving genre and stylistic system of design requires professional approaches. This is precisely why the introduction of innovative methods of teaching disciplines in the history of design are relevant to ensure the quality of education and training of young specialists in the field of interior design. Preparation of a creative project, which gives an opportunity to navigate the evolution of design methods of creating an artistic image, define a genre, generate several style combinations, is a difficult, but necessary and interesting educational activity. Thanks to the introduction of innovative pedagogical technologies and modern software, the quality of education is improved, specialists, whose knowledge and skills will be relevant in the labour market, are trained.

In the prospect, it is necessary to continue the development of research projects in the field of theory and history of interior design, as well as to constantly improve the software and algorithms for creating design projects.

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