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# STAGES OF FORMING A DESIGN CULTURE FROM SCHOOL TO WORLDSKILLS RUSSIA

Julia Sergeevna Antonenko (a)*, Anna Vladimirovna Ekaterinushkina (b), Andrey Dmitrievich Grigoriev (c), Julia Vladimirovna Lymareva (d), Maxim Vladimirovich Sokolov (e)
*Corresponding author

(a) Nosov Magnitogorsk State Technical University, 38, Lenin Ave., Magnitogorsk, Russia, antilopa632@mail.ru,
(b) Nosov Magnitogorsk State Technical University, 38, Lenin Ave., Magnitogorsk, Russia, savsof@mail.ru,
(c) Nosov Magnitogorsk State Technical University, 38, Lenin Ave., Magnitogorsk, Russia, g_ad77@mail.ru,
(d) Institute of Education Development of Krasnodar Territory, 167, Sormovskaya Str., 350080 Krasnodar, Russia julyme@yandex.ru,
(e) Novosibirsk State Pedagogical University, Institute of Arts, 79, Sovetskaya str., 630126 Novosibirsk, Russia maxma63@mail.ru

### *Abstract*

Today, there is no such types of human activity, wherever we meet the ability to navigate in space (. This is a prerequisite for life, successful knowledge and an active transformation of reality. Free manipulation of spatial images is a fundamental skill that combines various types of high school students' activities. We consider it as one of the most important qualities of future designers. It is no coincidence that teaching has as its main tasks the development of spatial thinking and the ability to independently solve varied creative tasks in schoolchildren. It is the most important component in preparing for practical activities in various specialties, such as architect, engineer, builder, topographer, artist, draftsman, designer. Some schools in Magnitogorsk still have specialized classes, whose students are guided by professions in the field of design, it was there that the initial training in the basics of design was preserved. The student's self-determination in the process of studying "Technical Graphics" is possible only if there is a high level of cognitive interest. Therefore, in the 9th, 10th and 11th grades elective drawing courses are conducted. During them, in the process of continuous and successive learning, high school students are becoming determined with the choice of a future profession. While studying in college, students go through the second stage – the integration of training – the systematic formation of a project culture, enhanced information and computer training, which ends with participation in the WorldSkills Russia Championship.

**Keywords:** Design culture, WorldSkills Russia, model, design.

## 1. Introduction

The basis for the formation of the student's design culture is laid back in school. It is in graduation classes that professional self-determination is already underway, therefore, it becomes important for the teacher to develop special graphic skills in schoolchildren, such as:

1) spatial and abstract thinking;
2) theoretical generalization;
3) interest-focus on graphic activity;
4) creativity;
5) the ability to work in computer programs to carry out a design project.

In our study, we used the modeling of the educational process, which allowed us to identify and predict the dependence of the level of design culture on graphic learning and its manifestation in various subjects. In the model we use, a visual structure is created in which the reflection of object properties through the conventions of the notation allows us to identify their significant relationships and dependencies hidden from the observer. When modeling the development process of students' cognitive interest in graphic activity, we determined the subject and purpose of modeling.

The subject of modeling is the process of students' cognitive interest development by means of drawing graphics. The purpose of the model is to design this process in educational activities to increase the level of cognitive interest development and the level of graphic preparation of schoolchildren to form the basis of project culture. The goal setting is determined by the social order of society and education, connected with the need for a diverse and highly educated personality, with the realization of this need at the stage of school education.

The structural components of our model were:

- the subject of the cognitive interest development in graphic activity (level approach);
- graphic tasks and tasks on the technical schedule as a means of achieving the goal;
- didactic conditions for the gradual formation of a project culture;
- criteria and indicators for determining the design culture;
- The result achieved in the implementation of the research model.

The integration of didactic conditions into a certain interconnected complex is nothing but the integration of the educational process (Hongmin, 2018; Zhdanova et al., 2018). Integration combines disparate parts into a single whole, which requires the teacher to develop a unified pedagogical "strategy", that is, a unified graphic mode in the school (Ainley & Ainley, 2011).

For our study, the most interesting are the didactic conditions (Ekaterinushkina, 2003; Nemtseva, 2005) associated with the development of project culture, the students' activity and the individualization of the learning process in school. The authors investigated the cognitive interest and activity of students in the learning process (Belikov, 1995; Nemtseva, 2005; Schukina, 1984). The individualization of the learning process in the school was considered by researchers (Ingekamp, 1991; Zhdanov, 1998). Among the studies devoted to teaching graphics at school, one can note successes in works (Makarova & Zhdanova, 1991; Mishukovskaya, 2002). He studied the development of creative abilities and creative activity in the process of graphic learning (Burnetsken, 1990).

## 2. Problem Statement

Today, the problem of mastering a high level of design culture in training is relevant. Understanding the factors of its formation by the means and capabilities of technical graphics as a means in an integrated education system is undeniable for the training of a future designer. The solution to this problem was not previously comprehensively considered as an independent topic. In addition, in school education, there is an annual reduction in subjects related to graphic activity, with an increasing need for the profession of designer. Thus, the relevance of the problem was determined by the following factors:

1) increasing requirements for the learning process of drawing and the inadequacy of studying the ways of intensive inclusion of a student in educational and cognitive activities through the development of a stable cognitive interest in project activities;

2) the fragmentation of goals, approaches, methods and means of developing cognitive interest in various educational subjects containing graphic activity;

3) poor connection with best practices, with the practice of educational institutions, the introduction of compulsory computer education for students from elementary school.

When setting the problem, we were guided by the resolution of contradictions between the constantly complicated process of teaching technical graphics and the current level of knowledge and skills of students; between the classroom system, a must for everyone, and the individualization of instruction.

The study of theoretical and practical questions on the topic under study provided the basis for formulating the research problem: ensuring a high level of the design culture development of schoolchildren by implementing a model for its phased development in graphic activity, taking into account a set of didactic conditions.

## 3. Research Questions

The subject of the study is the phased design culture development of schoolchildren by means of technical graphics in the learning process. In the formation of the design culture, in the educational graphic activity of schoolchildren, it is customary to distinguish the following levels of interest development: curiosity; inquisitiveness; cognitive interest; theoretical interest (Schukina, 1984). Thus, cognitive interest is the most important personality formation. It takes shape in the process of human life and its subsequent socialization. At the same time, cognitive interest forms a variety of personal relationships: a) selective attitude to various fields of science; b) cognitive activity; c) participation in various types of activities; d) communication with partners in knowledge. Undoubtedly, cognitive interest is one of the means of creating design culture in the school.
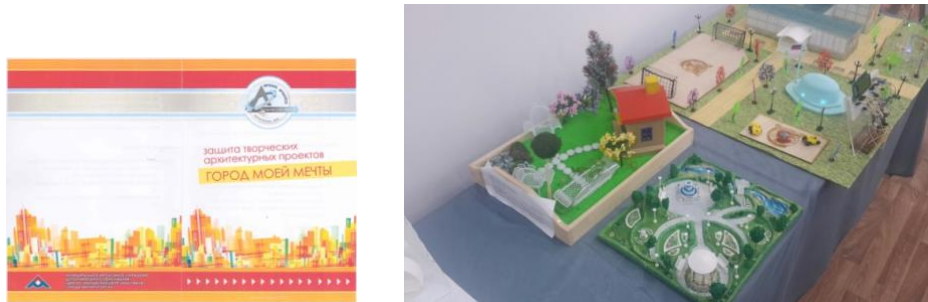
**Figure 01.** Competition of architectural projects "The City of My Dreams", Magnitogorsk, 2019

Today, the subject environment of human life, work and leisure has become one of the most important areas of the designer's activity (Chernyshova et al., 2017). Therefore, schooling must include art design, technical aesthetics and its basis – technical graphics. Technical graphics are the science of how scientific information is transmitted. It examines all types of images, the basics of visual perception of the form and its image on the plane with parallel rays – orthogonal drawing and axonometry; conical rays – perspective. High school students should understand the tasks and essence of graphic activity, as well as have some practical skills, since in his work the designer creates things, environmental objects, interiors (sociotechnical environment), the exterior of the house, etc. Teaching the basics of design is carried out in optional classes on the "Technical schedule" starting from the 9th, 10th and 11th grades. Already in high school, students participate in city competitions of architectural projects "City of my dreams" in 2019 Magnitogorsk (Figure 1), the All-Russian contest for high-speed 3-d modeling and visualization "3-d day, 3-d night" in Saratov »Both as a team and individually, defending their research projects and design projects.

This proves that the future designer must master a large complex of both artistic and aesthetic, as well as scientific and technical knowledge and skills, developing and shaping the skills of project culture

## 4.  Purpose of the Study

The modern school gives priority to the upbringing of a comprehensively developed personality. This is feasible when creating special conditions for changing the student's motivation for cognitive activity, socializing him in society and immersing himself in the world of information technology and scientific and technological progress. This result will be obtained when implementing the goal aimed at determining, developing, theoretical justification and experimental study of the model for the effective development of the design culture of schoolchildren. We understand design culture as the focus of design on cultural creation and transformation; cultural examination of design in the system of universal values and politics.

The object of study is the process of training students in technical graphics. Hypothesis – the phased development of the design culture of students in grades 9–11 by means of technical graphics will be more productive if it proceeds within the framework of a model whose effective functioning is ensured by the following set of didactic conditions:

- the implementation of the continuity of graphic education through the establishment of a unified graphic mode in the school;

- the variety of types of independent graphic and practical activities of schoolchildren, relying on information technology and knowledge of graphic programs;
- realization of the possibilities of in-class individualization of learning;
- the creation of an educational and methodological complex that stimulates the gradual development of cognitive interest of schoolchildren in graphic activity, increasing computer literacy to form the basis of project culture;
- study of basic computer programs needed to create your own design projects.

Research Objectives:

1) the rationale for the phased development of the design culture of schoolchildren in graphic activity;
2) the allocation of the structure of the model and the establishment of communication between them;
3) definition and testing of a set of didactic conditions conducive to the implementation of the model;
4) determination of criteria and indicators of the level of cognitive interest development in graphic activity among students;
5) determination of the stages of the formation of design culture.

## 5. Research Methods

The study was carried out by a team of professors of the department of Design of MSTU named after G.I. Nosova in collaboration with schools and colleges of Magnitogorsk, Krasnodar and Novosibirsk. Describing the conditions conducive to the productive training of students in graphic literacy, scientists emphasize the need to consider the specific cognitive processes of a student – memory, imagination, thinking, motivational-volitional sphere, the ability of self-control and introspection of their project activities. The study is based on a comprehensive study of theoretical and design materials to identify the features of the formation of the design culture based on graphic activity. It is aimed at developing interest-oriented design activities, according to the developed methodology. In the process of modeling the learning process, the main structural components were identified. Initially, we identified criteria for the cognitive interest of schoolchildren (Table 01).

**Table 01.** Criteria for the development of cognitive interest of students

| Levels | Criteria |
|---|---|
| 1. Interest-curiosity; unconscious interest in the subject of knowledge | Unfocused desire to understand material based on external attributes |
| 2. Interest – curiosity, episodic awareness of interest in the subject of knowledge | Purposeful desire to know an object, its properties, connections and causes of occurrence, but occasionally |
| 3. Volatile interest. Cognitive actions are focused, the need for knowledge of the material is recognized | Sustained interest in educational material, the desire to understand it. Sustainability is situational |
| 4. Steady interest. Interest in the systematization of knowledge, its subordination, value orientations | Purposeful, constant striving to deepen knowledge; independent cognitive activity, the establishment of intersubject communications, integration |

In accordance with the selected criteria, we determined a set of methods (Table 02).

**Table 02.** Research Methods

| Research Methods | Description |
|---|---|
| 1. Theoretical | – analysis (functional, comparative, systemic, ergonomic)<br>– hypothesis construction;<br>– essential classification |
| 2. Sociological | – conversation<br>– survey;<br>– questioning;<br>– content analysis (statistical methods);<br>– measurement |
| 3. Empirical (practical) | – observation;<br>– linear experiment;<br>– diagnostic procedures;<br>– design graphic modeling |

Next, we developed the stages of scientific research (Table 3).

**Table 03.** Stages of research on the formation of design culture

| Research stages | Formation |
|---|---|
| 1. The first stage – basic – familiarity with design activities, work in graphic programs. | the formation of the basic level of the design culture of the student (Olympiad on the technical schedule) |
| 2. The second stage is systematic – schoolchildren have already systematized graphic knowledge, skills in computer programs. | at this stage, a steady level of graphic activity, cognitive interest and cognitive activity for independent activity develops (adoption of design activities, participation in creative contests). |
| 3. The third stage is in-depth: mastery of the theoretical foundations, the conviction of the need for self-development and self-improvement of their project activities and cognitive interest, which develops into an interest-focus on graphic activity and the study of graphic programs. | awareness of the value of cognitive interest and project activities, their theoretical understanding and creative approach to self-study of design activities and graphic programs; participation in WorldSkills Russia projects. |

Partially, the model passed its testing at The 6th Regional Championship of the South Urals "Young Professionals" of WorldSkills Russia in the competence "Graphic Design" in 2018. The modules developed by the experts (draft assignments) were quite complex; 4 hours each were given for their implementation. They included: module 1 – corporate identity development and brand book products; module 2 – information design; 3 module – multi-page design; 4 module – packaging. Without a sufficiently high level of design activity, prototyping, orientation and deep knowledge of graphic programs, it was impossible to complete these tasks, in addition, the contestants had to have knowledge of printing finished products on a printer. Evaluation criteria included: the creative process; final design; technical parameters of product creation; printing and prototyping; knowledge of technical parameters for printing; save options and formats; Soft skills. The results prove the need to improve the design culture of students.

## 6. Findings

Thus, in the process of mastering the design culture, the development of imaginative thinking of the student is carried out in the following areas:

a) the transition from single, subject-subject images to abstract, conditionally schematic and vice versa;

b) the possibility of fixing in the image of theoretical relationships and dependencies (spatial, structural, functional, temporal);

c) the development of the dynamism of the image, which is expressed in its mobility, multi-aspect;

d) mastery of various ways of creating an image and operating with it, which is characterized by the interchangeability of these methods, their arbitrary and free choice, depending on the goals and objectives of the design activity, specific conditions for its implementation. These indicators of the level of formation of the project culture are significantly higher in the EG (experimental group) than in the CG (control group) (Figure 02).
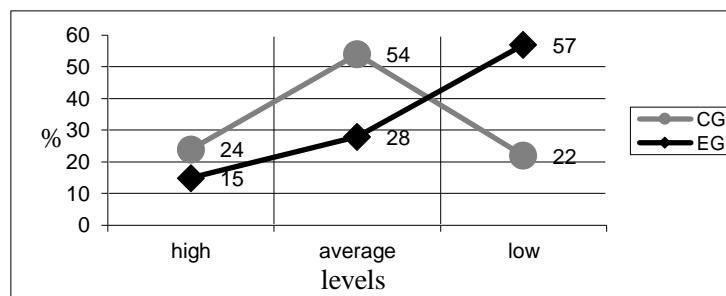


**Figure 02.** Formation levels of the project culture in the experimental and control groups

The used model of teaching schoolchildren clearly demonstrated that this method of teaching technical graphics in the school allows you to create a steady interest-focus on graphic activity and creates a fertile ground for increasing the level of student's design culture.

## 7. Conclusion

The growth of industrial and information technologies, universal computerization requires a high level of graphic knowledge, human skills. Currently, the requirements for mastering technical graphics have risen sharply, which has placed teachers in front of the need to comprehensively develop the deep knowledge, skills of students that are inextricably linked with the motives of learning and the level of cognitive interest which are the components of the design culture.

The introduced model included an educational and methodical complex aimed at the phased formation of the design culture of schoolchildren by means of drawing graphics. The developed materials can be used by teachers and teachers of colleges in teaching disciplines of the graphic cycle, both in the system of general and additional education. The study does not exhaust the entirety of the problem of the formation of the design culture of schoolchildren in the educational process, it is necessary to study and adjust each stage.

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The 6<sup>th</sup> Regional Championship of the South Urals "Young Professionals" WorldSkills Russia 2018

## References

Ainley, M., & Ainley, J. (2011). Student engagement with science in early adolescence: The contribution of enjoyment to learners' continuing interest in learning about sciences. *Contemporary Ed. Psychol., 36(1)*, 4–12.

Belikov, V.A. (1995). *Personal orientation of educational and cognitive activity (didactic concept).* Monograph. Chelyabinsk, publ. house ChSPU Torch.

Burnetsken, I.Z. (1990). *The development of ideas about the formation of details in the process of graphic activity of students. Art and graphic faculty* (Cand. dissertation). Moscow: Prosvyascheniye Publ. House.

Chernyshova, E.P., Grigorev, A.D., Antonenko, Yu.S., & Narkevich, M.Yu. (2017). Design as professional design and art activity type. the Turkish online journal of design art and communication. vol. 7, no S-APRLSPCL. Pp. 482-487.

Ekaterinushkina, A.V. (2003). *Didactic conditions for the phased formation of professional and pedagogical interest of students in graphic activity* (Cand. dissertation thesis). Magnitogorsk: Publ. house of MaSU.

Hongmin, M.A. (2018). *Influence of interaction of usual affective attributes and learning environments in the classroom for students Situational affective experience in teaching science: Stories of Primary Pre-Service* Teachers. Research in science Education vol. 12.- https://doi.org/10.1007/s11165-018-9800-1

Ingekamp, K. (1991). *Pedagogical diagnostics*. Transl. from German, Moscow: Pedag. Publ. house.

Makarova, M.N., & Zhdanova, N.S. (1991). Group form of training in drawing lessons. *School and product., 12*, 66–69.

Mishukovskaya, Yu. I. (2002). *Self-realization of schoolchildren in creative graphic activity* (Cand. dissertation). Magnitogorsk: Publ. house of MaSU.

Nemtseva Yu.S. (2005). *The development of cognitive interest of students in grades 7–9 by means of drawing graphics* (Cand. dissertation). Magnitogorsk: Publ. house MaSU.

Schukina, G.I. (1984). Actual issues of interest in learning. Moscow, Prosvescheniye Publishing House.

Zhdanov, A.A. (1998). *Didactic conditions for the individualization of students' independent graphic activities* (Cand. dissertation thesis). Magnitogorsk: Publ. house of MaSU.

Zhdanova, N., Gavrytskov, S., Ekaterynushkina, A., Mishukovskaya, J., & Antonenko, J. (2018). Comprehensive integration as an effective way of training future designers at technical (integration as a way of training designer). *J. of Appl. Engineer. Sci., 16 (3)*, 542.