



FORMATION OF DESIGN AND TECHNOLOGICAL COMPETENCE OF PUPILS THROUGH THE TRANSFORMATION SYSTEM

Submission Date: January 06, 2024, **Accepted Date:** January 11, 2024,

Published Date: January 16, 2024

Crossref doi: <https://doi.org/10.37547/pedagogics-crjp-05-01-08>

Journal Website:
<https://masterjournals.com/index.php/crjp>

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ABSTRACT

In this article, the interpretation of transformation in technology lessons, the use of the transformation system in the organization of material processing technology classes, and the introduction of the capabilities of the Gemini CAD program through the transformation system, as well as the use of the transformation system in the formation of design-technological competence in pupils is thought about.

KEYWORDS

Transformation system, Gemini CAD program, Gemini Pattern Editor module, design-technological competence, pupils, basic structure, patterns.

INTRODUCTION

In our republic, serious attention is being paid to the development of the light industrial production sector based on new techniques and advanced technologies. The technical potential of specialists plays an important role in the development of production. The basic technical skills of specialists working in the field of production are formed in the technology classes of general education schools.

In this regard, the decree of the President of the Republic of Uzbekistan dated April 29, 2019 "On approval of the concept of development of the public education system of the Republic of Uzbekistan until 2030" provides for the introduction of modern information and communication technologies and innovative projects into the field of public education. implementation was set as a priority [1].



In order to fulfill this task, we put forward the opinion that it is possible to form the design-technological competence of pupils in technology classes of general secondary education school through the transformation system. First, we found it necessary to give general definitions of the term transformation system.

Transformation comes from the Latin *transformatio*, which means re-change, re-formation, transfer. The word "transformation" also means spreading and gathering in technology.

A transformation system is a collection of interacting or interrelated elements that act according to a set of rules to form a whole.

Based on the definitions given above, it can be said that the transformation system is the process of moving the product from one place to another. That is, if the pupil previously performed the design-technological processes in the preparation of the product by hand or with the help of some technique, we defined it as the ability to perform the sequence of the same process using modern techniques and technologies.

It is possible to form pupils' design-technological competence in sewing training using the transformation system. For this purpose, we recommend the use of information and communication technologies that meet the requirements of the time during the technology lessons of the general secondary school. It is possible to prepare highly qualified personnel with scientific and technical knowledge in the future if the initial skills of ICT (specialist program) are formed in schoolchildren.

An example of the Gemini CAD program is cited from the modern technologies used in production to achieve this goal. In the Gemini CAD program, the pupil should know how to: enter the necessary dimensions,

draw the basic structure, change the location of the pieces, perform simple modeling methods, estimate, check, change, plan the cut, base from the template to cut

The Gemini CAD (Computer Aided Design) program is one of the latest technologies that meets the requirements of the time, which is currently used in light industrial production enterprises. This program can be used to form basic skills of pupils on the subjects taught in the department of technology, service service, material processing technology of general education schools, elements of modern technical equipment.

In the technology lessons of the general secondary education school, the basic drawing of clothing is studied by pupils by drawing it on cardboard paper. Template gradation (multi-dimensional reproduction of templates) is made on cardboard based on previously prepared templates and multiplied to dimensions. This method has some disadvantages. For example, it may encounter obstacles in correctly calculating the change of point when moving from one dimension to another. Pupils manually place the garment rack (position of patterns) on the gauze. This leads to an increase in gas consumption and excessive time consumption. When using Gemini CAD software, automatic template placement saves time and avoids unnecessary waste of gas. Through the system of transformation of pupils' existing knowledge, skills and competences in drawing the basic structure, it is possible to accurately and quickly carry out clothing design in the Gemini CAD program. If the use of Gemini CAD program is started in technology classes of general secondary schools, it is possible to develop the design-technological competence of pupils at an optimal level [2].

Gemini CAD software package modules



Table 1

1	Gemini Photo Digitizer		enter patterns into computer memory by digitizing them
2	Gemini Pattern Editor		construction and modeling of objects and gradation of patterns (enlarging patterns to sizes).
3	Gemini Cut Plan		automatic calculation of mats, selection of the optimal width and length of the gas for each model, rejals, cutting
4	Gemini Nest Expert		perform highly efficient automatic template placement

The construction of the clothing basic drawing is the most responsible and long-lasting part of the designer's work. In the Gemini Pattern Editor module, the construction of the basic basis of clothing is done in three ways:

- in the "Art" mode, the basic construction drawing is executed as if it were built on paper;
- Input of the basic design into the computer memory by means of a photo digitizer module;
- With the help of the "Made to measure" mode, it is possible to build the basic structure of various types of clothes according to any method. If a range of dimensions is entered for the model during the design process, the base design is automatically scaled to all dimensions (automatic gradation) [3,4].

Design competence is formed in pupils by building the basic structure of sewing items in practical training in "Made to measure" and "Art" modes.

Gemini Pattern Editor is the main program in the Gemini CAD package. In this module, it is possible to build the basic structure, technical modeling and design of clothes for women, men and children in the following range: underwear, light shirts, trousers, knitwear, suits, coats, warm coats and jackets, sports uniforms, special clothing groups. Figure 1 shows the state of drawing and modeling the basic construction of classic style women's pants. After modeling the basic drawing of the clothes according to the desired model according to the new models, it will be possible to make a pattern from it. Once the templates are ready, it also serves as a gradation of templates by height and size. Item gradation can be performed parametrically (sizing at gradation points) or automatically. Gradation can be done by increasing or decreasing the size of the scale.

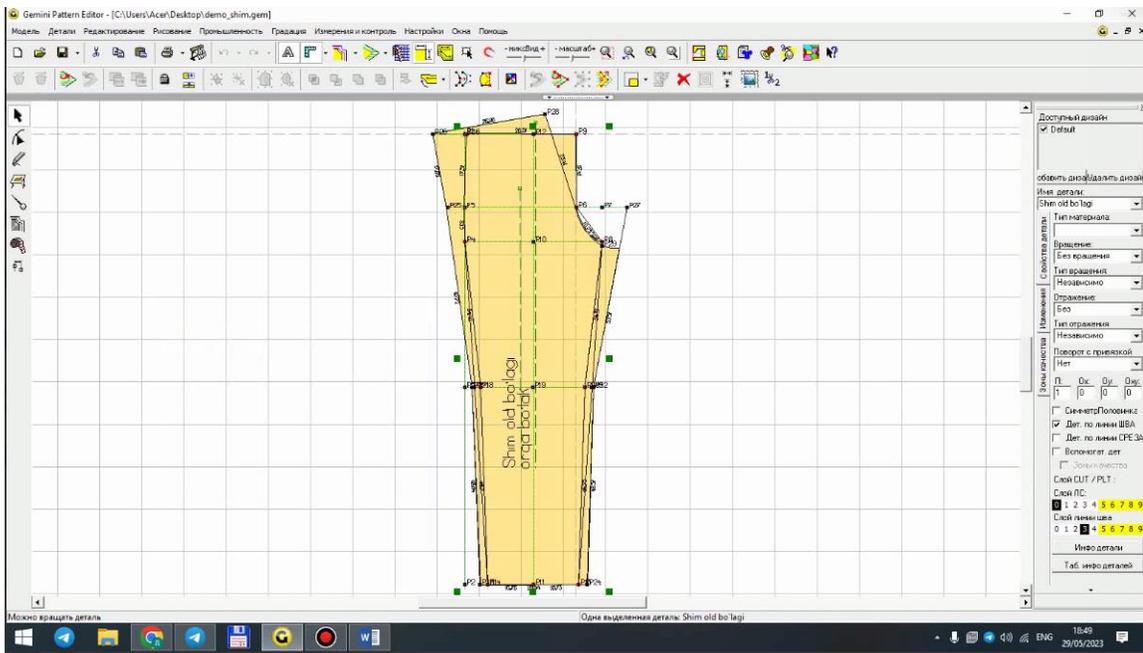


Figure 1. Modeled look of women's pants based on the Gemini Pattern Editor module

The development of a new model in the Gemini Pattern Editor module is carried out in two ways: the first method consists in choosing a basic model from the data bank, adding all the necessary elements of the new model construction to it, and preparing new model templates. In the second method, the basic structure of the model is selected from the base. By technical modeling of the drawing construction, it is possible to develop any model templates at any time [5].

The construction of the clothing basic drawing is the most responsible and long-lasting part of the designer's work. There are a number of disadvantages that can be encountered when creating a clothing basic drawing on paper. For example, it takes a lot of time to draw a picture, it cannot be used effectively. The Gemini Pattern Editor module multiplies the efficiency of the designer's work.

Sub-systems of designing a set of templates of clothing pieces consist of the following processes: gradation of templates; formation of new model standard drawings created as a result of gradation according to the basic size; drawing up clothing model templates for all sizes using graphic data processing tools; calculates the surface area of the model templates being designed for all sizes.

The task of this sub-system is to develop a set of all standards of one size, gradation of standards, preparation of standard standards of 1:1 scale.

Gemini Photo Digitizer (English Digital means digital) is the most widely used device in the garment industry for entering graphic data into computer memory [6].

Gemini Photo Digitizer module is a program that converts images into electronic images using a digital camera. With the help of Gemini Photo Digitizer, it is possible to import ready-made patterns and drawings



from paper to computer memory, i.e. Gemini Pattern Editor module.

Gemini Cut Plan Pattern Editor takes the pattern pieces and processes them in the Cut Plan module. Using the Cut Plan module, the following tasks can be performed: automated calculation of locations; preparation of reports for the bichuv shop; automated order optimization; export locations to plotter and cutter format; exports to another ADS (automated design system) [7].

In controlling the Gemini Cut Plan module, for each model, it enters the number of items in the order, the dimensions, the parameters of the gazama and some basic instructions suitable for cutting: the required number of lengths of the mat, the maximum number of layers in the mat and the width of the gazama (wide and narrow).

In the Gemini Cut Plan module, the pupil determines the amount of materials needed for each model, and to determine the amount of material, the template surface is determined, the time spent on cutting, the efficiency of using the material, the weight of the finished product, and all the parameters listed above. will have the opportunity to receive a report on

In the Gemini Nest Expert module, the placement of templates is done automatically without any extra costs. The Gemini Nest Expert module was developed by Gemini CAD Systems to perform automatic optimal template placement in the light industry.

Gemini Nest Expert Features:

- an automated module that performs high-performance reliable pattern placement;
- there are special functions for clarifying the cell, striped gas, permeable gas;

- can effectively perform a large-scale placement in a short time.

The Gemini Nest Expert module performs the most suitable placement in a very fast time based on modern technology and practices. Templates that run for a single deployment can automatically run deployments in sequence. An average placement of 8 meters in length takes 3-5 minutes to complete. In terms of speed and efficiency, the average result is much higher than manual placement. Once the automatic pattern sheet is ready, the layout is sent to the plotter for printing.

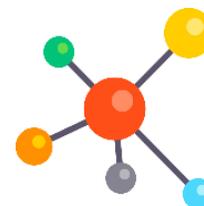
Gemini Pattern Editor is the main program in the Gemini CAD package, in which the main work, that is, the basic construction of sewing items, is carried out in this module. If training is conducted with the help of information and communication technologies in the organization of technology classes, it is possible to train highly qualified personnel with worldly, scientific and technical knowledge.

CONCLUSION

In conclusion, it can be said that if modern programs used in production through the transformation system are used to organize technology classes (materials processing technology department), pupils will be able to work with information, mathematical literacy, drawing in computer programs. helps to develop drawing, awareness and use of science and technology news, acquiring worldly knowledge, critical thinking, skills of independent search and analysis of information and other skills. In a word, design-technological competencies are formed.

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