**THE DESIGN OF SCHOOL UNIFORM IN THE CONTEXT OF TRANSFORMATIVE SHAPING**

**The aim.** To study and to define the main design components and principles of design of school uniform, to determine the methods of transformation used in the development of such range of products. To study the optimal composition of school uniform for boys and girls of the junior school group, to identify the main elements of transformation of school uniform and the ways to use them.

**Methods.** The complex approach, which provides for the analysis of scientific sources, related to the issues of design of school uniform and uniform clothes for children, as well as the system and structural and the morphological analysis of the research object, is applied.

**Results.** The basic components used in the design of uniforms, school uniforms and children’s clothes are theoretically worked out and summarized. It is found that the idea of a school uniform-transformer corresponds to the modern functional needs for school uniforms. The composition of the optimal assortment of school uniform is determined. The researches on the main principles of transformation, on the constituent elements and the types of connections of parts of school uniforms for children determine the basic principles of designing of school uniform-transformer. The principle of the formation of the assortment of school clothes-transformers for girls is proposed.

**Scientific novelty.** On the basis of analytical researches, the information on the principles of designing of school uniform-transformer is determined and systematized. The elements of the transformed school uniform, as well as structural connections between them are distinguished.

**Practical significance.** The actual assortment range of the school uniform, and its silhouette forms are identified. The obtained results determine the possibility of a more profound understanding of the components of designing of school uniform, which consists in using the obtained results in further scientific researches.

**Key words:** school uniform, design, principles of transformation, psychophysiological features, comfort of the clothes.

**Introduction.** School uniform is traditional and most appropriate outfit of schoolchildren in the modern school, which is in demand in the modern Ukrainian market. However, the attitude to the range of these clothes is ambiguous both in Ukraine and in the world. Today, school uniform is not mandatory and not regulated by the state. And even though in Ukraine school uniform is not compulsory in general education schools, most parents of pupils of junior and middle school still prefer this type of clothing.

The tasks of the modern school uniform are the maximal psychological and physiological comfort, the identification (dress code of the school), the discipline of the pupils, their sensitizing to the educational process, and so on.

The concept of the comfort of school uniform should be considered in both physiological and psychological aspects. The physiological aspect of the comfort is, first and foremost, the ergonomic conformity of the uniform to the pupil’s body. The problems of design-projection of the trending school uniform of high quality relate to the solution of many issues, one of which is ergonomic compliance. Such problem is related to the rapid growth and change in the proportion of the child’s body at certain age intervals, which quickly makes the uniform clothes inconvenient, inappropriate in size, and
reduces the use time of the product. In addition to the abovementioned, the issue of manifestation of individuality and self-expression of the pupil through the clothes, the possibility of changes in forms and combinations within a certain set of clothes can be attributed to the modern design problems of the development of assortment of school uniforms. It is known that today there are no clear and prescribed norms for the school uniform in Ukraine; therefore, there is a potential for the development of the uniform with transformation possibilities. It provides the opportunities to solve many problems of products adaptation to the modern needs of the child, in particular, to take into account the intensive growth, the rapid change in the size characteristics of children of junior school age, and the aesthetic transformations of the clothes of this assortment.

**Analysis of previous researches.** Modern researchers consider the school uniform and the children’s clothes as the objects of design-projection, but the problem of transformation of children’s uniform as a method of solution of design problems is practically not solved regarding the issues related to ergonomic features of design. A lot of researches in the field of design-projection have considered the importance of transformations in construction of clothes of various purposes. Akilova Z.T., Petushkova G.I., Patsyavichyute A.A., Nahorna Z.V., and Pryvala V.O. [1; 7; 12] have considered the methods of transformative shaping in the design of the clothes and their classifications. The questions related to the creation of multifunctional ergonomic clothes that maximally consider the changes in shape and size of the body of a pregnant woman on the basis of methods of transformation have been analyzed by Pestsova A.A. [11]. The researches of Omelchenko O.V., Kolosnichenko M.V., Donchenko S.V., Pashkevich K.L. [9; 15] are related to the problems of improving of the process of designing of children’s clothes; in their works the constructive and technological solutions for the children’s clothes for roller skaters-beginners with the elements of transformation are presented that allow the authors to deal with the question of interdimensional clothing adaptation. The authors [4] have analyzed the possibilities of use of the methods of transformation in the creation of multifunctional children’s clothes, which makes it possible to expand the existing assortment range significantly.

The questions of designing of uniform clothes of various assortment and purpose have been studied by such scientists as Craik J. [14], Kolosnichenko O.V. [6], Kolosnichenko M.V., Ostapenko N.V. [5; 10]. In the paper [8] the authors have studied and systematized the special clothes according to the assortment, have proposed the generalized classification of products of special purpose according to various criteria. Craik J. have studied the question of determining the differences between the uniforms due to the decorative elements (signs, stripes, etc.) [14]. The use of the modern uniforms in European countries has been considered by Skripchenko A.G. [13] and Denisova O.I. [4]. In their works, it is pointed that the school uniform remains relevant in countries where it is not regulated, but the approach to the concept of school uniform differs significantly from that adopted in the territory of Ukraine. School uniform can be the traditional uniform or may be determined either by color combinations in regular children’s clothes and in the regulated composition or by a certain unit of the clothes (jacket, cardigan) with the logo of the educational organization. The authors [1; 11] have noted that, in addition to the aesthetics of the pupil’s appearance, the design of school uniform must necessarily represent the educational organization and its values.

**Statement of the problem.** In the last few years, the use and binding of school uniform are not regulated by the state and by many schools in Ukraine, but this type of clothes is still relevant and in demand. The
problem of psychophysiological comfort of the child takes a separate place in the design of school uniforms. Ergonomic peculiarities of changes in the parameters of the child’s body are related to the dynamics of the child’s growth in certain age periods and the mobility of the child’s psyche. In the modern world, the requirements to the child development differ significantly from that which were set as the goals of the educational process in the old Soviet school [3; 4]. The corresponding changes taking place in Ukraine today, cancel out the old concept of uniform clothes in school wear, so the need for revision and modernization of the concept of design is necessary to design this range of clothes for children determines the modernization of design components, in particular: solutions to the issues of dynamic matching of school uniform, taking into account harmonious artistic and constructive solutions for the sets of school uniforms for children of junior school age with the elements of transformation, and development of recommendations for optimization of the set of clothes of pupils on the basis of the study of ergonomic compliance and the use of new technological solutions. The methods of transformation in the design of children’s clothes and school uniforms make it possible to solve these questions and to provide opportunities to search for creative solutions for multifunctional forms.

Results of the research. Clothes-transformers are the multifunctional products that make it possible to create many interesting combinations of school uniform with a small number of items of clothes. The idea of uniform clothes-transformers consists in the collection of clothes that have harmonious uniform composite integrity, moving structure and shape, which makes it possible to complement, to replace the units of clothes, or to transform them into the other variants, substantially changing their properties.

It is known that girls and boys of the younger, older and teenaged age groups have their respective growth dimensions and age proportions of the body structure in measurements: the length of legs, the length of arms, the breast circumference and the width of the back, the changes in body proportions, etc. When designing a set of school uniform for children of the younger, older and teenaged age groups, it is necessary to take into account such changes in dimensions and to design the clothes that could transform and change its parameters, and be used as long as possible, complementing the pupil’s school clothes. The constituent elements of the composition of school clothes must be adapted to these changes, they should be based on the concept of designing of school uniform, designed to meet the pupil’s modern needs (Figure 1).

When designing the design solutions for school uniforms according to the principles of transformation, the tasks of ergonomic compliance of the products to the child’s body and the possibility of diversification of the formal ensemble arise [2]. The purpose of the tasks of transformation of school uniform can be determined by the functions of clothes: utilitarian and social and aesthetic ones. Utilitarian tasks solve the issues related to physical comfort: ergonomics, static and dynamic compliance, and so on. Social and aesthetic tasks of transformation of school uniform solve visual communicative and informative issues, and responsible for child’s psychological comfort. The possibility to transform the school uniform corresponds to the modern direction in the formation of the child’s personality and self-expression.

The development of school clothes-transformers provides the opportunities for the formation of set of modern school clothes. The clothes that can transform have a number of advantages over the ordinary clothes, namely:
such clothes create the possibility to combine multifunctional clothes within each set (pants – shorts, jacket – vest, skirt – skirtalls, etc.);
- they allow the formation of new set of multifunctional clothes that can transform and are the parts of different sets;
- such clothes provide for the separate use of any cloth from the set;
- such clothes create the possibility for various transformations of the clothes and for the change of the purpose;
- they allow the users to change the proportions and sizes of the clothes.

For the effective use of principles of transformation in the design of models and constructions, as well as in the creation of rational set of children’s clothes, it is necessary to systematize information on the transformational principles and the possibilities of designing of school uniforms. The transformation is determined by the following means:
- the conversion of one form into another form (it may be flat or volumetric, simple or complex);
- the transformation of details within one form – that is, the change in the size of the form (its assembly, deployment, subtraction, etc.).

Figure 1. The concept of designing of school uniforms and its tasks

All this can be realized by the provision of the change or the formation of the silhouette form of the product/part; the adjustment of the degree of butt against the body; the provision of the change or the regulation of length/width of the product/part; the adaptation of the product to the morphological characteristics of the consumers; the provision of the change or the regulation of volume and spatial form of the product/part; the assurance of the change in appearance of the product; the provision of the change of operational properties of the
product; the improvement to product repair; the change of configurations of the product/parts of the product; the fixation/bracing of the product on the desired place or in a certain position; the connection of details/products/parts of the products; the performance of constructive and decorative or simply decorative function. On the basis of the conducted analysis of literary sources and the study of various sets of school uniforms and children’s clothes for children of junior school age group, it is determined the methods of transformation and their characteristics, which can be used in designing of school clothes (Figure 2).

In our days, the design of school uniform can be considered in the direction of corporate design and corporate style. The components of the design of “corporate” style in the suit are: completeness, visual symbol (overall suit geometry and proportions), color range and brand marks [3]. The analysis of the types and compositions of the school uniform in different countries shows that the school clothes can be: a clearly regulated set of a certain color and with a certain proportions; the set consisting of casual clothes and a formal element of clothes (jacket/jumper with embroidered patch and/or emblems); the set of casual clothes with embroidered brand mark (emblem, embroidered patch, distinctive mark); the set of casual clothes of a certain color range. According to the above, we can conclude that considering the today’s realities in Ukraine, where the school uniform is not regulated and it can be of different types, the optimal composition of the sets of such clothes for boys and girls and their silhouette forms should be determined.

A survey was conducted among 100 pupils of elementary schools aged 7 – 10 years old and their parents in order to create the actual and modern assortment and sets of school uniform for children of the junior school group. The results of the survey showed that girls and boys of the younger age group preferred school uniforms, which contained sweaters, jumpers and blouses/shirts. It was determined that when choosing jumpers and knitted sweaters, both boys and girls preferred classical models with sewed sleeves that had been cut from the cloth or knitted on flat frame knitting machine. When choosing shirts, boys preferred classical forms with a small number of constructive and decorative elements and decorations, and girls preferred blouses with long wide sleeves, various collars,
ruffles and trims. When choosing trousers, 70 % of boys and 58 % of girls preferred jeans. The sets that contained jackets were selected by 60 % of the consumers among girls of the younger school age, considering that 80 % of girls from this sample selected knitted jackets and 20 % of girls selected jackets made from the fabric. The analysis of the results of the survey showed that less than 20 % of boys of the younger school age preferred sets that had jackets and suit jackets both from fabrics and knitwear, although today this assortment is an integral part of up to 90 % of all sets of school clothes for boys, manufactured by domestic enterprises. Among the assortment of clothes for girls, the skirtalls and skirts have the biggest percentage of variations within the sets (47.6 % and 45.3 % respectively), while the dresses have the smallest one (7.1 %).

The analysis of the results of the survey on the choice of silhouette forms and volumes of the products of the schoolwear assortment for children of the junior school group (Figure 3) showed that about 85 % of respondents (boys, girls and their parents) preferred average degree of product volume. The results of the analysis showed that the preferences of boys and girls about silhouette forms of jumpers or sweaters differed significantly, but practically were the same when choosing the blouses/shirts of straight silhouette.

According to the results of the questionnaire, it is determined that the main types of the clothes for children of the junior school group, which consumers prefer, are: for girls – jacket, sweater, jumper, blouse, trousers/jeans, skirtalls, skirt; for boys – sweater, jumper, shirt, trousers/jeans, with the most acceptable silhouette forms: for girls – slim, straight and trapeze forms; for boys – semi-slim and straight forms.

**Figure 3.** The analysis of actual silhouette forms of the assortment of school uniforms

The results of the analysis of samples and photos of modern corporate clothes show that when designing the sets of corporate suits, there are variants where: the sets of men’s and women’s clothes differ in composition, in form and in color, but have firm emblems/signs and accessories (kerchiefs, ties, pinafores, hats); the sets of men’s and women’s clothes differ in composition and in form but have the same color, emblems and accessories; the sets of men’s and women’s clothes are exactly the same. Modern school uniform is regarded as the element of corporative style that performs social function: it unites the group of pupils and identifies such group with a particular school. This assortment of clothes can be
considered as the information about the individual and the information about the company (educational institution). Accordingly, when designing school clothes, it is possible to identify the unifying elements: completeness, silhouette form, color, accessories and the elements of identification.

When designing school clothes-transformers for boys and girls of the younger school age, it is important to create basic uniformity of sets of the clothes. In such a case, the clothes from these sets would have the ability to change the length and width and would serve as the base forms for modifications of the appearance of the product. The transformation of the clothes can be accomplished by means of permanent and temporary structural connections between the details. Permanent connections exist in those parts of the product that do not change during the transformation.

Temporary connections are found in the details of the product, which are subject to regrouping during the transformation. Reposition and transformation are carried out with the help of the garment accessories: buttons, blocks, buckles, zip fasteners, snaps, bands, etc. For the ease of use in the designing of new models of school uniforms for the children of the younger school age, the elements of transformation are united in accordance with the main tasks that they perform: the regulation of the degree of butt against the body, the regulation of length of the product and the provision of the change in appearance of the product. The variants of their transformation and the nodes are shown in Figure 4.

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*Figure 4.* The elements of transformation of school uniform for boys and girls that ensure the:  
a) regulation of the width of the product;  
b) regulation/change of the length of the product;  
c) change in the appearance of the product
The study of the actual assortment of the school uniforms, the definition of its transformational elements and the types of their structural connections provide the opportunity to form uniform and optimal sets of school clothes for girls and boys, which consist of the following items: jacket, jumper, sweater, blouse/shirt, trousers and/or jeans. Skirt and/or skirtalls can be offered separately in the set for girls.

The characterization of the general form of the base product and the way of regulation of its length and width parameters makes it possible to distinguish the components of the set, which consider the modern fashion elements and their harmonic combinations. On the example of a skirt, which can be included in the school uniform for girls, it is possible to offer the elements based on trapezoidal or straight form that would diversify the appearance of the skirt or would transform the skirt into the skirtalls. The original elements (Figure 5) and their combination is the base product can form many variations (Figure 6), which makes it possible to diversify the set of clothes on the basis of the base unit of the suit.

**Conclusions.** The question of psychophysiological comfort of the child takes a separate place in the design of school uniforms. The transformation of clothes provides an opportunity to solve many design problems in this direction. This paper presents the classification of types and principles of
constructive realization of functions of transformation of children’s school clothes and clothes in general, which ensures the creation of qualitative samples of the modern school clothes with the increased aesthetics, functional and ergonomic properties. The provided classification gives an opportunity to analyze the known variants of use of elements on the basis of the principles of transformation. The analysis of the transformative components of the school uniforms makes it possible to distinguish two groups of components: internal and external components. External (decorative) components allow the users to change the appearance and the purpose of the uniform, while internal components are responsible for regulation and conformity of the clothes to the dimensions of the child’s body.

The surveys, conducted among the pupils of the younger school age and their parents, identified the optimal school uniforms for girls and boys, and their silhouette forms; such uniforms consisted of the following items: jumper, sweater, blouse/shirt, trousers and/or jeans. Also, the principle of formation of the units of the assortment of school uniform is proposed.
References
ДИЗАЙН ШКОЛЬНОГО ФОРМЕННОГО ОДЯГУ В КОНТЕКСТІ ТРАНСФОРМАТИВНОГО ФОРМОУТВОРЕННЯ
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Мета. Дослідити та визначити основні проектні складові та принципи дизайну шкільного форменого одягу, визначити методи трансформації, що використовуються при розробці даного асортименту виробів. Дослідити оптимальний склад ансамблю шкільного форменого одягу для хлопчиків та дівчаток молодшої шкільної групи, визначити основні елементи трансформації шкільного форменог...
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