

# Design and constructive – technological development for children's art clothing

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**Abstract.** The present study directs research and creative activity towards the realization of a design and constructive-technological concept for children's art clothing. The collection consists of clothes that are inspired by the children's imaginary world - fairy tale characters, animals, fruits. The educational function of the clothing is sought. The choice of models is subject to comfort and freedom of movement. The artistic design of the products in the collection is realized with the help of software for creating and processing images. The process of construction and modelling is algorithmized and performed automatically using a specialized CAD clothing system. The technological and operational maps are algorithmized and developed on CorelDraw. The designed constructions can be used for modelling a wide range of clothing for children.

## 1 Introduction

For millennia, children have been dressed the same way as adults. The children's costume was a scaled-down copy of the adult costume. The creation of clothing for children as a separate segment in fashion develops in parallel with the evolution of the consciousness of adults. Children's clothing, as an independent segment of adult fashion, began to develop only in the transition to modern society in the late eighteenth and early nineteenth centuries. The status of childhood changed for almost 200 years, and this process continued throughout the 19th century and ended in the 20th century - a century that is sometimes called the "age of the child". In the second half of the 19th century, light industry began to develop and marketing increasingly turned its attention to children's fashion. Children's stores appear and with their opening they begin to flourish. This is the period in which haute couture began to show interest in differentiating a particular segment of fashion - clothing designed specifically for children [1].

In the 21st century, children's clothing is a way for them to present themselves in the society [2]. Children's fashion is oriented to the image of the child and his life and to the spheres of his activity. The widespread perception of Sigmund Freud's concept that childhood is the most important stage in a person's development and his future depends on his first five years also changed children's fashion.

At the beginning of the 21st century, parents are starting to pay more attention to clothing as a way for a child to communicate with the world. The dynamics of today bring

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out the way of dressing as a necessary condition for self-realization. Clothing is becoming part of a system of nonverbal communication. Children's clothing is a way for them to make their own free choice, to stand out as members of society with an independent opinion, to state and affirm their individuality. The child is the object of various spiritual influences, he communicates with art in a specific cultural environment. In this direction, the attitude towards the colors of children's clothing is developing more and more, which have their specific influence on the development, temperament and emotions of children. In addition, children's clothing must take into account the peculiarities of growth, the specifics of hygiene habits and, above all, the psychological need for freedom of movement.

## 2 Methods and Results

### 2.1 Creative development of children's collection (fashion sketches, technical drawings)

The present children's collection consists of twenty art garments that are inspired by the children's imaginary world - fairy tale characters, animals, fruits. Fashion sketches of the products in the collection are presented on Fig. 1. The choice of models is subject to comfort and freedom of movement.

The educational function of the clothing is sought. The first ten models direct children to healthy nutrition. The fruits and vegetables used for inspiration, which the clothes remind of, are rich in vitamins and microelements and provoke children to try their taste. Some of them carry additional symbolism. Model 1. **Avocado**. It is an Aztec symbol of love and fertility, most likely because the trees grow in pairs. Model 2. **Pineapple**. It has become a popular traditional feng shui symbol of wealth, luck and prosperity. Model 3. **Strawberry**. The fruit is considered a symbol of Venus, the goddess of love, because of its heart shape and bright red color. Model 4. **Pear**. Pears, which evoke an association with a



Model 1. Avocado



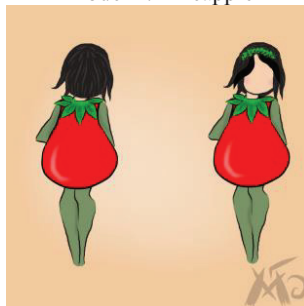
Model 2. Pineapple



Model 3. Strawberry



Model 4. Pear



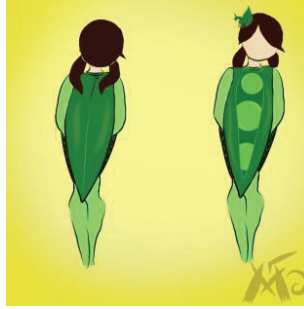
Model 5. Tomato



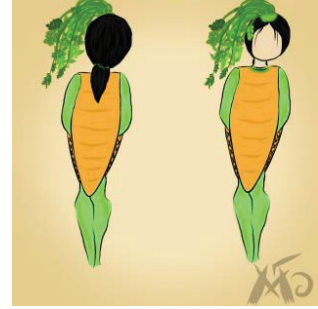
Model 6. Watermelon



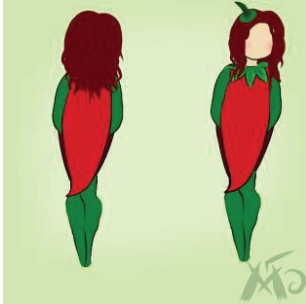
Model 7. Pumpkin



Model 8. Peas



Model 9. Carrots



Model 10. Red pepper



Model 11. Bee



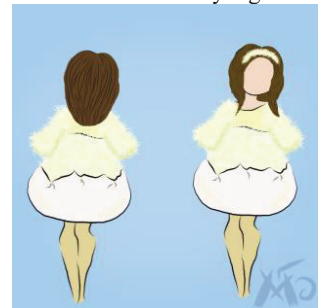
Model 12. Ladybug



Model 13. Butterfly



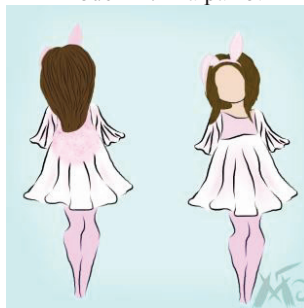
Model 14. Ara parrot



Model 15. Chicken



Model 16. Fox



Model 17. Rabbit



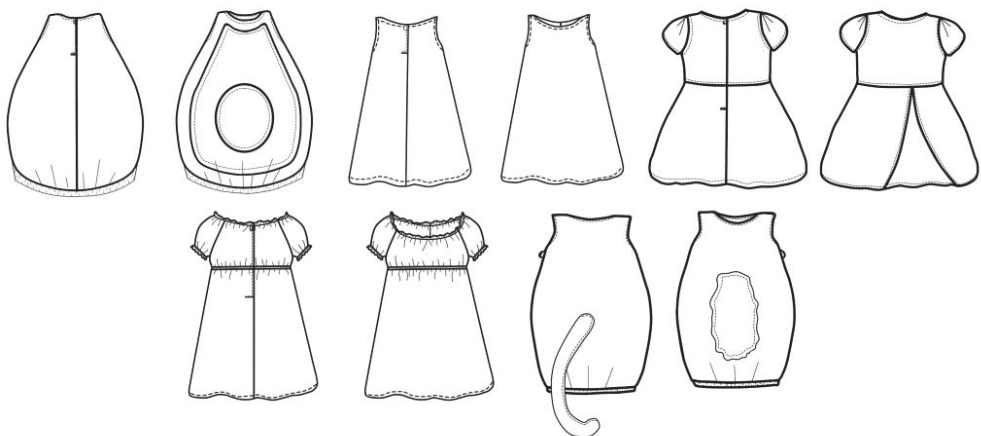
Model 18. Bear



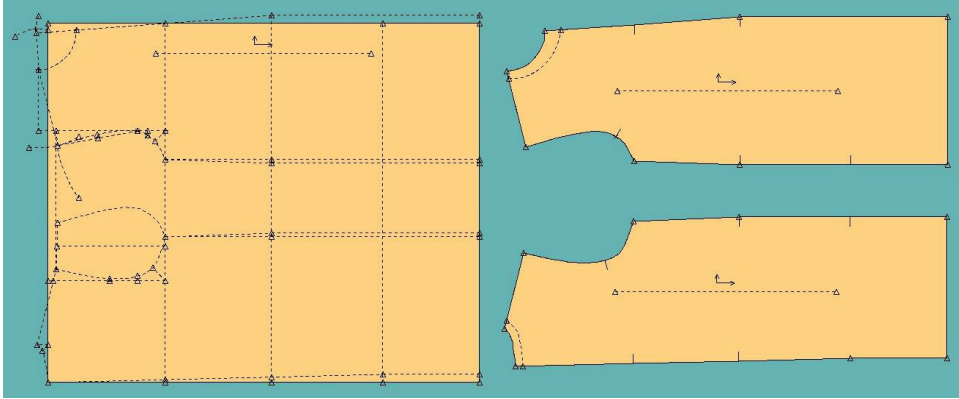
**Fig. 1.** Fashion sketches of the garments from the designed collection.

woman's body, play an important cult role in the rituals of the holidays dedicated to pregnancy, childbirth and motherhood. Model 5. **Tomato**. Model 6. **Watermelon**. Symbolizes fertility, abundance, well-being. Model 7. **Pumpkin**. Symbol of good health, permanence, immortality. In the Catholic diaspora there is a cult presence in the rituals of All Saints' Day. Model 8. **Peas**. In China, this vegetable is a symbol of fertility and wealth. Model 9. **Carrots**. Model 10. **Red pepper**. For Neapolitans, the red pepper is a symbol of happiness, success, luck and money when it is given as a gift, and it often happens that shopkeepers give such gifts to passing tourists.

The second ten models direct children to the world of fairy tales and animals. Since the lives of humans and animals are intertwined in everyday life, quite logically animals embody certain qualities that children want to have. The fairy-tale characters also pay attention to some negative traits of the character, which facilitates the parents in the educational process. Awareness of nature protection can also be nurtured through animals. Model 11. **Bee**. Bees are a symbol of hard work, and honey - abundance. Model 12. **Ladybug**. The presence of the ladybug is connected with the family, protection and fulfillment of various wishes. Model 13. **Butterfly**. The butterfly is emblematic of transformation and significant change. Model 14. **Ara parrot**. They cultivate a taste for a combination of bright colors and sociability due to the nature of these birds. Model 15. **Chicken**. Symbol of new life, home and care. Model 16. **Fox**. The cunning fox has a



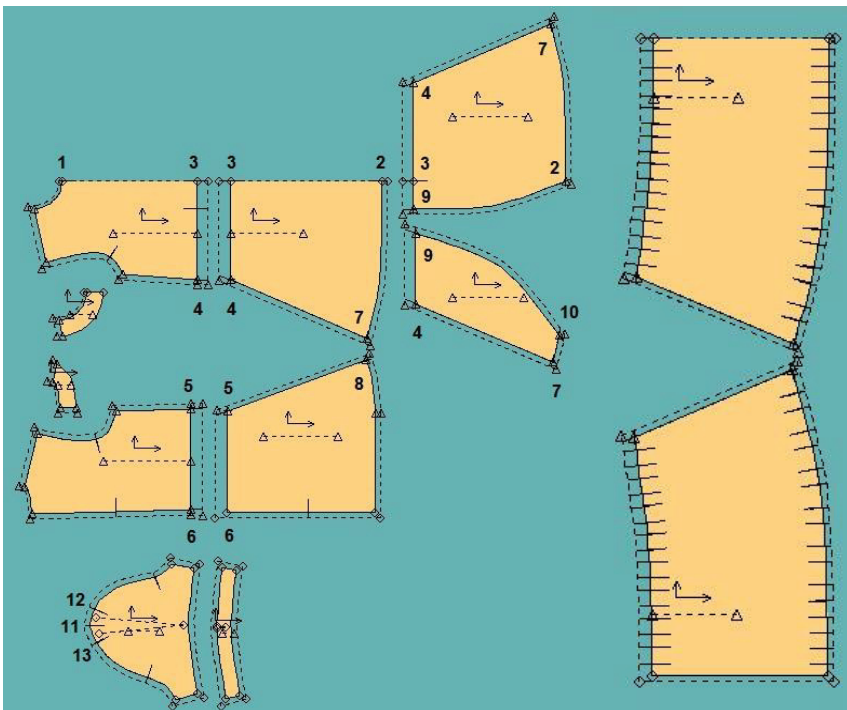
**Fig. 2.** Technical drawing of the garments, selected for sewing samples (from top left to bottom right side): Model 1. Avocado, Model 3. Berry, Model 6. Watermelon, Model 12. Ladybug, Model 20. Cat.



**Fig. 3.** Basic construction of children's dress 116/60/67,4.

reputation for being a cunning and deceitful character. Model 17. **Rabbit**. Always on-the-move, the rabbit is known for its alert nature. Model 18. **Bear**. It regarded as the symbol of resurrection and coming of new life. Another meaning associated with the bear is strength and power. Model 19. **Mouse**. It symbolizes modesty and innocence. Model 20. **Cat**. It varies from negative aspects such as being linked to witchcraft to very positive characteristics such as independence and intuition [3].

The artistic design of the products in the collection is realized with the help of software for creating and processing images FireAlpaca. This program is free digital painting software that is compatible with both Mac and Windows [4]. Technical drawings of the garments, selected for sewing samples, are presented on Fig. 2: Model 1. Avocado, Model 3. Berry, Model 6. Watermelon, Model 12. Ladybug, Model 20. Cat.



**Fig. 4.** Production patterns of Style 6. Watermelon.

## 2.2 Computer development of the production patterns



















The object of the study was a child figure of a girl from the first height group with values of the main body dimensions as follows: height 116.0 cm, chest circumference 60.0 cm, hip circumference 67,4 cm. The basic construction of a children's dress without darts is calculated and developed, using 12 body dimensions by methodology [5]. The front and the back pieces of the basic construction of the dress are shown in Fig. 3. According to the features of the model, five selected garments from the collection are constructed. The graphic part was developed with automated use of the capabilities [6] of the specialized clothing software AccuMark, version V10 of Gerber Technology, USA. An example algorithm for making the patterns of Style 6. Watermelon is given in Table 1, and the corresponding production patterns are presented in Fig. 4. In the process of modeling the dress is separated along the waist line, widen by 20,0 cm along the hem line and in the bottom front part two asymmetrical details for the outer layer of the skirt are formed. The sleeves are short and puffed. The gathered element is a double-side fold at the shoulder area.












**Table 1.** Algorithm for construction modelling of Style 6. Watermelon.

| No | Name of the step  | Function in the CAD system   | Parameters/ Elements of the drawing   |
|----|---|--|---|
| 1  | 2   | 3  | 4   |
| 1  | Reshape the front middle line                           | Create/Ln/<br>2 Pt/ 2 Pt   | 1-2   |
| 2  | Replace the contour line                                | Modify/Ln Act/<br>Replace  |   |
| 3  | Rotate the front piece                                  | Modify/Piece Act/<br>Rotate  | Perform X-<br>alignment   |
| 4  | Reorient the direction of the grain line                | Modify/Piece Act/<br>Realign grain   | FR  |
| 5  | Split the front and the back piece along the waist line | Modify/Piece Act/<br>Split Vertical  | FR: 3-4<br>BK: 5-6  |
| 6  | Measure the length of the side seam at the bottom part  | Verify/Measure/<br>Ln Length   | Dist: 27,0 cm   |
| 7  | Widen the bottom part from the side seam                | 1. Create/Ln/<br>Circles/ Center<br>2. Modify/Ln Act/<br>Clip<br>3. Create/Ln/<br>2 Pt/ 2 Pt<br>4. Modify/Ln Act/<br>Replace | Radius: 27,0 cm<br><br>End: 10,0 cm<br>2-7-4  |
| 8  | Transform the front as a symmetrical piece              | Modify/Piece Act/<br>Mirror  | Notch mirror line   |
| 9  | Construct the outer layer of the skirt in front piece   | 1. Create/Ln/<br>2 Pt/ 2 Pt<br>2. Create/Ln/<br>2 Pt/ Perp on Ln<br>3. Create/Ln/<br>Digitized<br>4. Create/Piece/<br>Trace  | 9-2, Beg: 13,0 cm<br>9-10, End: 5,0 cm<br>Midpoint<br>Dist: 4,0 cm<br>Midpoint<br>Dist: 2,0 cm<br>Piece Name: |
| 10 | Extract the separate pieces from the assembled drawing  | Create/Piece/<br>Trace   | Piece Name:   |

| 1  | 2   | 3   | 4                           |
|----|---|---|-----------------------------|
| 11 | Shape the short puff sleeve                       | Advanced/Pleats/<br>Tapered Pleat                             | Spread value:<br>2 x 1,5 cm |
| 12 | Construct the neckline and the sleeve hem facings | Create/ Piece/<br>Facing                                      | Width: 3,0 cm               |
| 13 | Add seam allowance and hem                        | Advanced/Seam/<br>Define                                      | 1,0 cm<br>2,0 cm            |
| 14 | Place notches for assembling the details          | Create/Notch/<br>Standard<br>Advanced/Seam/<br>Regular Corner |                             |

**Table 2.** Technological sequence map for manufacture the Model 6. Watermelon.

| №            | Name of the operation   | Symbol  | Stitch type | Comments         |
|--------------|---|---|-------------|------------------|
| 1            | 2   | 3   | 4           | 5                |
| <b>01.00</b> | <b>Top Front</b>  |   |             |                  |
| 01.01        | Overedge the seam allowances  |    | 504         |                  |
| <b>02.00</b> | <b>Top back</b>   |   |             |                  |
| 02.01        | Overedge the seam allowances  |    | 504         |                  |
| <b>03.00</b> | <b>Skirt</b>  |   |             |                  |
| 03.01        | Overedge the hem allowances, middle line and the side seams               |    | 504         |                  |
| 03.02        | Stitch a decorative seam on the hem                                       |    | 301         | With bar-tack    |
| 03.03        | Sew the pieces of the front part in the side seams and waist of the dress |    | 301         | Without bar-tack |
| 03.04        | Sew the back middle seam to the marking                                   |   | 301         | With bar-tack    |
| 03.05        | Press the seam 03.04  |  | Steam iron  |                  |
| 03.06        | Sew the side seams  |  | 401.504     | With bar-tack    |
| 03.07        | Press the seam 03.06  |  | Steam iron  |                  |
| <b>04.00</b> | <b>Sleeves</b>  |   |             |                  |
| 04.01        | Overedge the hem  |  | 504         |                  |
| 04.02        | Sew the folds   |  | 301         | Without bar-tack |
| 04.03        | Sew the inner seam of the sleeve  |  | 401.504     |                  |
| 04.04        | Press the seam 04.03  |  | Steam iron  |                  |
| 04.05        | Sew the hem   |  | 301         | With bar-tack    |
| <b>05.00</b> | <b>Neckline</b>   |   |             |                  |
| 05.01        | Fuse the neckline facings   |  | Steam iron  |                  |
| 05.02        | Overedge the facings  |  | 504         |                  |
| 05.03        | Assembly the pieces of the neckline facings                               |  | 301         | With bar-tack    |
| 05.04        | Press the seam 05.03  |  | Steam iron  |                  |

| 1            | 2  | 3   | 4          | 5             |
|--------------|--|---|------------|---------------|
| <b>06.00</b> | <b>ASSEMBLY</b>                                    |   |            |               |
| 06.01        | Sew the shoulders and the side seams               |  | 301        | With bar-tack |
| 06.02        | Press the seam 06.01                               |  | Steam iron |               |
| 06.03        | Sew the top part and the skirt                     |  | 401.504    |               |
| 06.04        | Press the seam 06.03                               |  | Steam iron |               |
| 06.05        | Stitch a decorative seam on the waist of the dress |  | 301        | With bar-tack |
| 06.06        | Sew a zipper                                       |  | 301        | With bar-tack |
| 06.07        | Assembly the facing and the neckline               |  | 301        | With bar-tack |
| 06.08        | Press the seam 06.07 with a edge                   |  | Steam iron |               |
| 06.09        | Stitch a decorative seam on the neckline           |  | 301        | With bar-tack |
| 06.10        | Assembly the sleeves and the armhole               |  | 401.504    |               |
| 06.11        | Press the seam 06.10                               |  | Steam iron |               |
| <b>07.00</b> | <b>FINISHING</b>                                   |   |            |               |
| 07.01        | Threads and chalk cleaning                         |   | Handwork   | Handwork      |
| 07.02        | Final ironing                                      |   | Steam iron |               |

### 2.3 Technology for manufacture

The chosen children's art dresses, for which there are automatically developed patterns, are to be sewn. At the Table 2 is presented an example technological sequence map for manufacture a physical sample of the Model 6. Watermelon. Photos of some of the finished garments ("Watermelon", "Cat" and "Avocado") are shown in Fig. 5.

### 2.4 Areas of application of clothing from the collection

- ✓ children's birthdays, children's parties;
- ✓ celebrations in kindergarten and in the primary group at school;
- ✓ children's amateur performances, theater, masquerade balls.

## 3 Conclusions

In the present article, 20 unique models of children's art clothing inspired by children's imaginary world have been created. An educational effect on the child's character has been achieved. The applied part of the development includes fashion sketches of the designed clothes, technical and construction drawings, algorithms for computer aided pattern making, technological and operational maps.

The selected five models, for which patterns have been automatically developed, are to be sewn and their perception by a children's audience will be studied. The results of the present work open a field for further creative developments. The designed constructions can be used for modelling a wide range of clothing for children.





Fig. 5. Photos of the physical samples of the Styles “Watermelon”, “Cat” and “Avocado”.

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