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The Storage furniture for preschool children

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V Brně, dne 24. 4. 2015

podpis studenta.....

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title: The Storage furniture for preschool children

author: **Kristýna Slezáková**

Abstract

This work is focused on an issue of furnishing a public interior for preschool children. It's aimed mainly on the space of changing room and bathroom. The chosen topic was solved from the viewpoint of psychology, security, hygiene and materials. Resulting information was made into a study case, which was finally realized under the author's supervision. Single pieces together with decoration have made a very safe, comfortable and optimistic space for children and also for their staff. It was put into practice in the Primary and nursery school in Uherčice in years 2013 and 2014.

Key words

Pre-school children, furniture, nursery, public interior, bathroom, fitting room

titul: **Úložný nábytek pro děti v předškolním věku**

autor: **Kristýna Slezáková**

Abstrakt

Práce je zaměřena na problém veřejných interiérů pro děti v předškolním věku, věnuje se především prostorům šatny a koupelny. Zvolené téma bylo řešeno pomocí rešerše na poli psychologie, bezpečnosti, hygieny a materiálů. Získané informace byly převedeny do případové studie, která byla realizována pod autorčiným dozorem. Jednotlivé kusy nábytku společně s dekoracemi vytvořily velmi bezpečný, příjemný a optimistický prostor pro děti i zaměstnance. Realizace byla provedena na ZŠ a MŠ Uherčice v letech 2013 a 2014.

Klíčová slova

Děti v předškolním věku, nábytek, mateřská škola, veřejný interiér, koupelna, šatna

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Introduction

„Things that I grew up with stay with me. You start a certain way, and then you spend your whole life trying to find a certain simplicity that you had. It's less about staying in childhood than keeping a certain spirit of seeing things in a different way.“

Tim Burton

A preschool period of children's life is devoted to discovering. Children explore themselves and their surroundings, they learn to respond to different incentives, to communicate with other children during this lifetime period. These are reasons to make an appropriate and safe space for them, because this time it is significantly important to form their minds into natural curiosity and ability of assertive communication.

Children should experience and understand empathy, tolerance and help in an institution of nursery school. An environment is supposed to be harmonic and supportive. It should provide a space for well-rounded growth of both psychical and physical skills of each small user.

Space for children shouldn't be only well functional, but also tasteful. There should be some space left for children's endless fantasy to imagine their own worlds and explanations. Every piece of furniture has to respect the needs of its users - children. There are many safety, ergonomic and hygienic requirements which must be kept on mind and suitably fitted to design of the whole space.

Goal

The main goal of this work is to design furnishing for a bathroom and a changing room of a village nursery school. The furniture needs to fulfil all the requirements of the given space. The author's effort was to collect maximum information about a spatial arrangement and furnishing of nursery schools with respect to the legislation and technical standards. The special attention was paid to safety, hygiene, functionality, the construction materials and overall appearance in order to support healthy physical and psychological growth of children.

Based on the gained information there was the collection of bathroom and changing room furniture together with decorations designed and carried out in the course of 2013 and 2014. The furniture was custom-made by local craftsmen in Uherčice. Of course the solution respects legislation and standards and complies with the needs of its users. For collection the cabinets, shoe holders, benches, coat hooks, towel hangers and toilet dividers were designed. In addition, the whole space was decorated in the same style as the furniture.

Part of the work is also devoted to research of a local market and inspiration sources from abroad.

Methodology

A theoretical part deals with furnishing of preschool children's interior in the view-point of legislation, standards and needs of users. Needed information were taken from literature (university textbooks, magazines, books, catalogues) and online sources (websites), in cooperation with the nursery school staff, local craftsmen and professionals from supplying companies. It also included a research of local market.

A practical part contains the design of the collection of furniture for the bathroom and the changing room of the Nursery school in Uherčice. All pieces were designed on the basis given in the theoretical part and during consultations. In the work there is also the communication with different persons entering the process of the interior realization. The design is added with 3D visualization and technical drawings, which were the ground for craftsmen and suppliers. Most of the furnishing is custom made, only sanitary ceramics and some decorations are chosen from contemporary supply on Czech market. This interior was realized under supervision of the author.

Theoretical part

1. The target group

The target group are mainly preschool children, which means children in age from 3 till 6 years. At the outset, there must be mentioned that children's development varies for different individuals since every child is unique and has diverse needs and own pace of acquiring them.

1.1. Features of children between 3 and 4 years old

Children are tall between 90 and 100 cm, their weight is around 15 kg. They can stand on one leg and walk straightly backwards. Their attention is focused mainly on themselves, they are not able to imagine that other people may have different emotions, and due to this fact they sometimes don't feel sympathetic. They learn yet to control their emotions, patience, fear and aggression. They become more skillful, they are able to get dressed and to undress themselves. Their vocabulary has about 1000 words.

1.2. Features of children between 4 and 5 years old

In period between 4 and 5 children's stature is from 97,5 to 109 cm and the weigh between 14,5 and 19 kg. Children feel high need of movement and activity. They jump, roll out, play the tag. They gain more self-confidence, realize that they are individual human being. Girls and boys start to play separately. Manual skills grow rapidly better, a drawing of persons appears to be more realistic. Children are able to write their name and lace up their shoes. The turn of phrase also improves, they understand a notion of time - they are able to use correctly past, present and future.

1.3 Features of children between 5 and 6 years old

After fifth year of age children reach a height between 105 and 115 cm, a weight is from 16,3 to 21,3 kg. Their movements become much more precise. They are able to consider somebody's behavior as good or bad based on parents' and teachers' upbringing. They are more patient and sensitive. Girls copy mother's role and boys adopt features of fathers. The manual skills a characterized by preference of one more skillful hand, vocabulary has about 2000 words, they try to recognize words. In a field of hygiene they are fully self-contained. (Bacus, 2004)

1.4. Body proportions

If the furniture should fulfil its function. It must be adapted to human proportions. These dimensions are ascertained by anthropometrical measuring. Last official measuring in the Czech Republic was taking place during 2001, 2002 and 2003. There were measured the height, the weight and two more length dimensions and four more width dimensions, five parametrical dimensions and eight head dimension. Based on gained information, there were counted 20 chosen proportional relations. (Bláha, 2010)

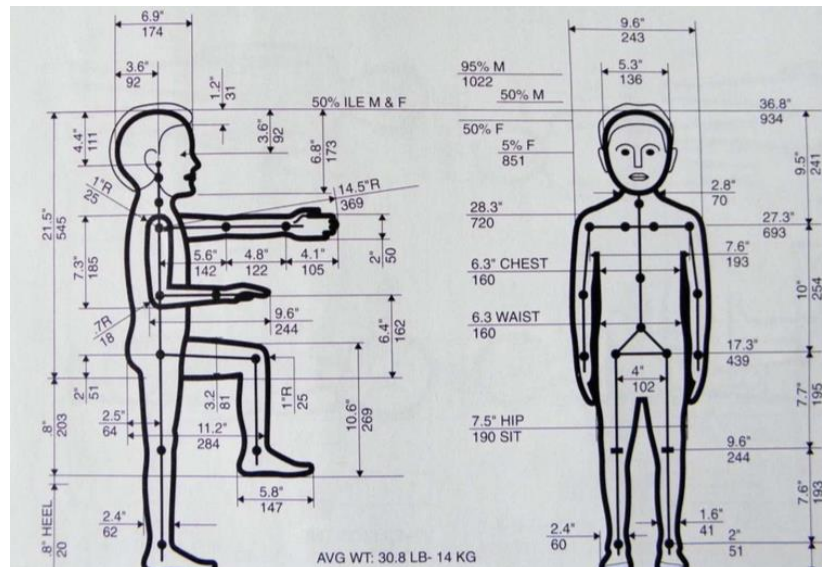


Fig. 1: Body proportions in 3 years (Tittley, Dreyfuss, 2002)

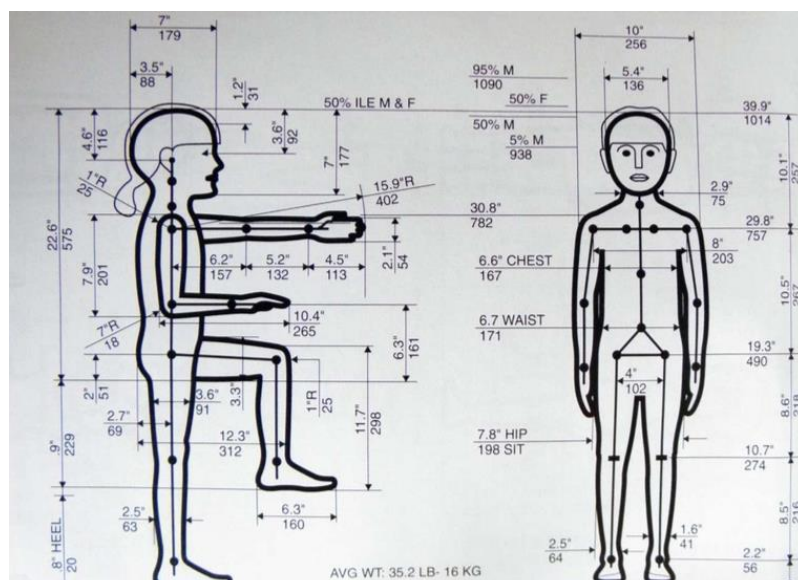


Fig. 2: Body proportions in 4 years (Tittley, Dreyfuss, 2002)

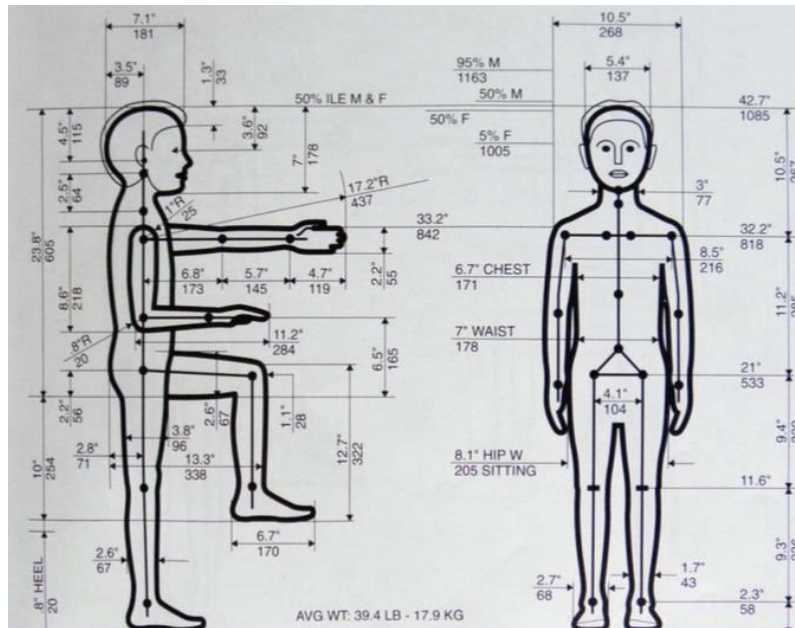


Fig. 3: Body proportions in 5 years (Tittley, Dreyfuss, 2002)

1.5. A teaching care

A teaching care has two types. The first is personal and the second is indirect care according to environment. From the very first moments a material environment affects children's perception. The emotions of children are primarily influenced by their surroundings. Teachers keep children in their logic and help to improve their motion and activity (walking, dining and getting dressed). Children are purposefully captained to tidiness and for this reason the storage system should follow children's dimensions. (Marholtová, 2010)

2. Target area

The nursery school is the second most important socialization facility, right after the environment of family. Children come there to widespread their present knowledge. It's important for the physical health, the mental and moral development of children.

Nursery school can be characterized as an institution for preschool children who gain new experience with same-age peers there. It continues the family upbringing and procures a versatile care. It cooperates with parents in order to organize beneficial activities for children. Teacher should allow to children to develop their individual needs and encourage them to learn. (Turečková, 2011)

2.1. A historical development of nursery school

Early daily care institutions for working mothers emerged at the turn of 18th and 19th century and gradually, the day's care function started to apply also educational content. In 1869 the Educational Acts allowed to emerge the nursery school as a part of a primary school. The first nursery school was founded the same year in Prague. As the nursery schools today they were dedicated for children from 3 to 6 years of age. Between The First and Second World War 20% of children population was attending were nursery schools. From 1948 they became first part of educational system and its number rapidly increased. As a result of decreased natality the number of nursery schools was reduced in 2005. (Svobodová, 2010)

2.2. Present of nursery schools

After 1990 the attention has changed from collective goals to individual emotional and socialization education. Now the approach is focused on the development of each child individually and the support of the relations in a group. The big change is also the possibility of mixed age level and health condition which provides space for integration healthy children with handicapped ones. The overall psychology has changed, the main goal is to create positive relationship between children and parents, nursery schools try to involve the whole family into different activities. (Svobodová, 2010)

There is a general educational program which makes some boundaries for a program of every nursery school. On the other hand each nursery school creates its own system, which depends for example on a location, needs of attending children and interests of parents. (Koťátková, 2005)

2.3. Law and standards for nursery schools in the Czech Republic

The space of nursery school needs to be safe and comfortable for kids' stay and movement. It must fulfill some hygienic and technical standards. Furnishing and other equipment of the nursery school must comply with safety standards.

2.3.1. Related legislation in the Czech Republic

Basic conditions which have to be observed in an educational institution are defined with the legislation (laws and regulations).

Preschool education supports the development of every child and participates on his healthy emotional, intellectual and physical development and on adoption on the adoption of basic rules of a behavior, life values and interpersonal relations. Preschool education makes a foundation for a future education. It helps to equalize unbalances and provides a pedagogical care for children with special needs.

Nursery school is anchored in the legislation of educational system as a type of school. In the process of education and organization it has similar rules like other schools. (Výzkumný ústav pedagogický Praha, 2003)

Material conditions of the nursery school are acceptable in case that:

- the nursery school has a sufficient area and air volume (as per the relevant regulation) and an arrangement is convenient for different group as individual activities,
- the children's furniture, hygienic facilities (toilets, bathrooms) and relax facilities (beds) are anthropometrically suitable, tally to number of children and are harmless for the health,
- the equipment and accessories comply with the number of children and their age, it's continuously renewed, refilled and fully used,
- the children are involved in decoration of interior, surroundings is prepared to exhibit the children's work,
- there is a garden or playground in the close vicinity to the building of nursery school,
- both the outside and inside areas fulfil safety and hygienic standards (tidiness, temperature, humidity, lighting, noise, level of allergens or poisoned substances). (Výzkumný ústav pedagogický, 2004)

Selected legal regulations:

(Legal regulations in Czech Republic are issued only in the Czech language.)

General product safety: Zákon č. 102/2001 Sb. o obecné bezpečnosti výrobků

Protection of public health: Zákon č. 258/2000 Sb. o ochraně veřejného zdraví a o změně některých souvisejících zákonů

Technical requirements of products: Zákon č. 22/1997 Sb. o technických požadavcích na výrobky a o změně a doplnění některých zákonů.

Hygienic requirements for facilities for education and training of children and adolescents: Vyhláška č. 410/2005 Sb. o hygienických požadavcích na protory a provoz zařízení a provozoven pro výchovu a vzdělávání dětí a mladistvých se změnami vyhlášky č. 343/2009 Sb.

Hygienic requirements for toys and products for children under 3 years: Vyhláška č. 84/2001 Sb., o hygienických požadavcích na hračky a výrobky pro děti ve věku do 3 let.

2.3.1. Related standards in the Czech Republic and the European Union

Technical standards determine required features of product. Recently the standards are qualified as a recommendation and their use is not obligatory. The Czech standards are not legally binding but in practice there can emerge an obligation of a product review in compliance with them.

The product review from the point of view of safety and lifetime period is accomplished in compliance with standards and the testing of furniture is done in certified laboratories.

Selected standards:

Furniture, safety requirements: ČSN 91 0100 Nábytek. Bezpečnostní požadavky.

Daylight in buildings (part 3: Daylight in school): ČSN 73 0580 – 3 Denní osvětlení budov. Část 3: Denní osvětlení škol

Furniture. Chairs and tables for educational institutions: ČSN EN 1729 Nábytek. Židle a stoly pro vzdělávací instituce.

2.4. Relations of functional zones

A fundamental demand for safe interior is fulfilling all the functional, ergonomic and hygienic requirements. Important parts are psychological aspects which stop children from tiredness and support activities. Light and well aired spaces, ergonomically appropriate sitting, good acoustics are basic prerequisites. (Petelen et al., 2003)

Rooms' layout and a material choice of educational space are of complex nature. It has to proceed from the fact that child use all his or hers senses during the educational process. Significant attention must be paid to the light, color and acoustics in rooms from the point of view both practical and aesthetical one. (Metodický portál RVP, 2006)

Every nursery school must have a changing room, a bathroom and toilets for children, a day room, a storage room for beds, a storage of toys and room from cleaning ladies. Moreover there must be included following zones: a management, an eating, a laundry and a technical room.

A direct contact must be between:

- a changing room and a day room
- a bathroom and toilets for kids
- a dayroom and a bathroom for kids

(Štěpák, 1990)

2.5. Aspects affecting children's psyche

2.5.1. Spatial dimensions

Psychologists confirm that an amount of activity depends on a space where a child is. The most significant aspects for child's socialization are a sufficient space and the possibility of discovering it. This space is becoming to be an educational space in case that there are enough possibilities of different activities. Child's space should evoke impulses for an individual activity and above all to encourage creating of responsibility, self-confidence, honor and tolerance (Dlabal, 1986)

2.5.2. Materials

Materials used in a human's surrounding have a big influence on psychological and aesthetic perception. It's not just about a visual contact but also about a touch, so called haptic feeling. For instance glass, metal and stone are haptically very cold in contrast to wood and textile that make warm feeling (Brunecký, 1995)

2.6. Colors and decorations

An effect of colors on humans' psyche is substantial. Some colors raise a feeling of calmness, other can evoke excitement and activity. Color choice usually respects fashion, taste and also subjective preferences. Appropriately chosen colors enable to optically modify space (to widen or make it smaller etc.).

Child gets to know a color gradually; he or she tries to express the feelings, thoughts and reflections with the most basic symbols. A color becomes a go-between of his or hers thoughts. For this reason it's very important how the child familiarizes colors. Child in age from 3 till 4 doesn't have fully developed visual perception. At the beginning of this period he or she is able to recognize four basic colors. Child is unable to express and name a specific color.

There are many ways how to meditate colors to children. They can be used on walls, flooring, furniture and also as signs for better orientation. (Marholtová, 2010)

BLACK sophistication power mystery formality evil death	GRAY stability security strength of character authority maturity	PURPLE royalty luxury dignity wisdom spirituality passion vision magic
YELLOW joy cheerfulness friendliness intellect energy warmth caution cowardice	WHITE freshness hope goodness light purity cleanliness simplicity coolness	PINK romance compassion faithfulness beauty love friendship sensitivity
RED danger passion daring romance style excitement urgency energetic	BLUE peace stability calmness confidence tranquility sincerity affection integrity	GREEN life growth environment healing money safety relaxation freshness

Fig. 4: Psychological interpretation of colors (www.interiordesignpedia.com)

Decorations can be applied as wallpapers, stickers or as a part of furniture. Lately plywood motifs became very popular. They can be painted or shaped. Those decorations are usually used in thematic collections.

Another category of decorations are textile components. Textile makes a cozy atmosphere. There is wide range of ornaments, colors and materials which can be used as a shading of windows, toy's storage or upholstery of furniture. In public interior there is the need to focus on a hygiene and safety (inflammability) of those components.

2.6.4. Light

A daylight is necessary for most of interiors and its sufficiency creates positive effect on human psyche. An application of artificial light helps to use an interior even if it's dark in the same way as a day light it has a big effect on human perception. It's defined by an amount, color and temperature

2.6.5. Equipment

An arrangement of objects in interior and their mutual influence affects the perception of a space. Variable components make a playful interior. Contrasts may cause unrest the lack of the attention; symmetry and curves create a feeling of safety (Brunecký, 1995)

3. Furnishing

Furnishing and equipment of a nursery school is subject to technical, ergonomic, material and construction requirements. Furnishing is one of the most significant parts of interior from point of view of space quality. In nursery school it becomes a part of children's games, a working space and also space for eating and relax; because of this it must be fully functional and safe.

3.1. Typology

3.1.1. Seating

A chair for a nursery school has to have right dimensions in consideration of children's height and also has to provide the support of spine during sitting. The chair must be stable that it doesn't come to upsetting. While child sits foot should fully reach a floor and there should be the right angle in child's knees. The requirements are given in ČSN EN 1729-1 Nábytek. Židle a stoly pro vzdělávací instituce (standard ČSN EN 1729-1 Furniture. Chairs and tables for educational institutions.).

3.1.3. Tables

In a nursery school there is ordinarily just one type of tables which is used for eating and creative activities. The surface must be easily cleanable and with rounded edges. Surface should be matte so that doesn't task eyes too much. A glass desk is entirely unfit with respect to security and temperature. It is also difficult to keep it clean. Requirements are written in the standard which was mentioned in a seating paragraph.

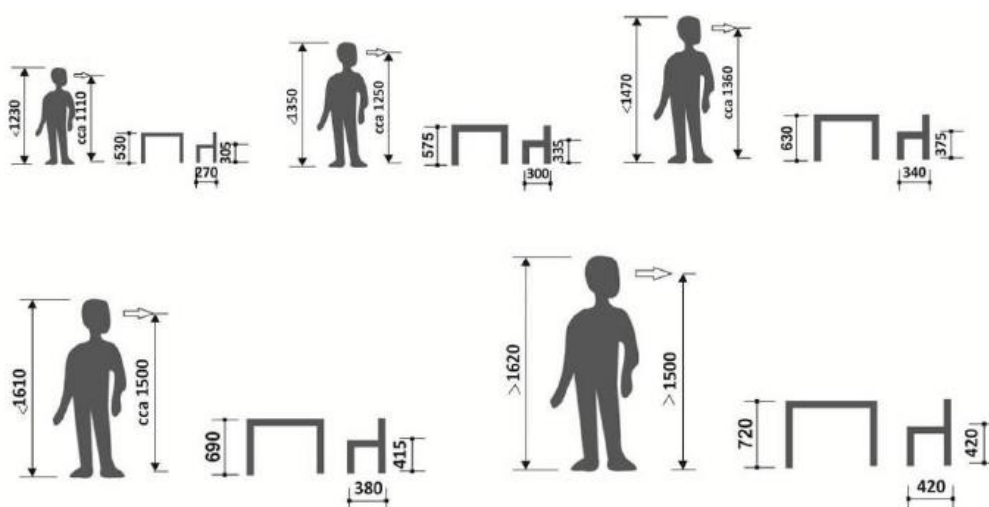


Fig. 5: Dimensions of tables and chairs according to children's height (Dlabal 1976)

3.1.3. Storage furniture

In an interior of a nursery school are different types of storage furniture. The biggest part comprises cupboards for storing of toys, books and educational equipment. The furniture for children must have the dimensions which allow for easy accessibility and opening. There are often used some open cabinets with boxes. The height of horizon of preschool children is approximately 83% of adult's one. (Dlabal, 1976)

3.2. Safety

From the point of security view there are special requirements on furniture. Edges must have a minimum radius 3mm. Corners of cupboards, shelves and tables can be equipped with rubber cover. There shouldn't be any overhangs or apertures to cause catching or getting stuck on different parts of body or clothes. The construction must be strong enough and stable. It is good to attach the furniture to walls.



Fig. 6: A corner cover (pampaliny.cz)

3.2.1. Construction and materials

A sufficient choice of furniture and material is a basic prerequisite for an elimination of different dangers. In the construction there is necessary to use a proper joints and materials which maximize the functionality and lifespan of the furniture. Neither furniture component can be cause of an injury. It must be constructed in such a way that it does not do any harm with its ergonomic parameters, construction and function. Materials also cannot damage the health of consumers. It must fulfil limits of toxic and VOC substances and cannot support a development of mildew, mites and bacteria. Material for children's furniture must not contain toxic substances and soluble metal. The construction and material safety is described by ČSN 91 0100. Nábytek – bezpečnostní požadavky (standard ČSN 91 0100. Furniture – safety requirements).

For children in age from 3 till 6 years the most suitable are high dry based UV-hardened acrylic paints and lacquers, a water-soluble polyurethane substances and a water-soluble substances based on acrylic dispersion. Both systems guarantee sufficient resistance to physical-mechanical stress and to effects of liquids. In view of named requirements there can be used also laminated chipboard with rounded edges and corners. This kind of materials is affordable, secure and fully harmless in term of health. (Tesařová , 2006)



Fig. 7: Post-formed edges of chipboard (www.miseco.sk)

3.3. Hygiene

An interior and furniture has to fulfil hygiene requirements for preschool institutions. It is the regulation 'Vyhláška č. 410/2005 Sb., o hygienických požadavcích na prostory a provozy zařízení a provozoven pro výchovu a vzdělávání dětí a mladistvých, se změnami vyhlášky č.343/209 Sb. And there can be found hygiene requirements for space and operation of institutions for education and upbringing of children and minors.

These are the selected points of the regulation:

- In the institutions for upbringing and education of preschool children toilets and bathroom must be accessible from a day room. They are not separated for boys and girls. They must be illuminated and ventilated. A requirement of number of hygienic equipment is given in the first supplement.
- Taken out from the first supplement: A number of hygienic equipment in institutions for upbringing and education of preschool children is determined: for five children there must be one toilet and one sink. Instead of two toilets there can be installed two urinals. The toilets are usually placed 40 cm above floor and sinks are placed in height of 50 cm. A tap outlet is usually 60 cm above floor. Sinks must be connected with one mixing tap which is out of children's reach. Every sink has tap with only one outlet. A bathroom is equipped with one or two showers.
- In institutions for upbringing and education of preschool children there aren't used disposable towels, the textile towels must be placed in the way that they do not touch each other.
(www.tzb-info.cz, 2015)

3.4. Local market research

On the Czech local market there dominates furniture with wooden decor which is supplemented with details in basic colors. The company Nomiland provides some bigger range of colors and innovative design, nevertheless, there isn't a big possibility to customize furniture to fit it to a designer's concept.

3.4.1. Storing furniture for a changing room



Fig. 8: A locker-room cabinet (Tvar Klatovy)



Fig. 9: A panel with shelves and hooks (FAMI Truhlářství)



Fig. 10: Cabinets for changing room 'Emental' (Nomiland)



Fig. 11: A standing cabinet with bench (Nomiland)

Storage furniture for changing room is of the four types. The first are cabinets with hooks hanging on a wall, the second is a panel with hooks and shelves standing on a floor, the third are cabinets standing on a floor and last one are cabinets standing on floor which includes seating. Interesting is a possibility of shaped motifs into doors of cabinets. The decoration works as an individual sign for every child.

3.4.2. Seating in a changing room



Fig. 12: A bench (Nomiland)



Fig. 13: A bench (Tvar Klatovy)



Fig. 14: A bench (Nábytek Honza)



Fig. 15: A bench (EDUCAplay)

A seating in a changing room is usually solved with benches. There is the domination of wooden decor even more than substantial than in means if storing furniture. Benches are offered in two types, with shelf for shoes or without it.

3.4.3. Towel hanging



Fig. 16: A shelf for bathroom (Nábytek Jiroušek)



Fig. 17: A panel with shelf and hooks (Nomiland)



Fig. 18: A towel hanger (Tvar Klatovy)



Fig. 19: A towel's trolley (Nábytek Honza)

The regulation requires that the towels cannot touch each other, which certainly complicates the possibility of creative solution of a towel hanger. Most of the companies use panel with partitions, which guarantee a complete division of towels. Some hangers include the possibility of placement of cups for tooth brushes, this was introduced by regulation couple years ago and there is constant discussion it should be implemented again. (The Public Hygienic Office in Břeclav, word of mouth)

2.4.4. Toilet's dividers



Fig. 20: A toilet divider (Nomiland)



Fig. 21: A toilet dividers (Vybavení škol)

Toilet dividers have almost no divergence in a shape. It is attached to a wall and has one supportive leg. It exists in wooden décor design and also in solid color laminated chipboard design. From the view of safety there are no doors. That provides a full control for teacher.

2.4.4. Mirror frames



Fig. 22: A mirror (EDUCA play)



Fig. 23: Bathroom equipment (Laufen)

Mirror frames provide many more diversification than other mentioned pieces furnishing. The frame is usually made of laminated chipboard and is shaped to many different motifs, often inspired in nature.

Practical part

4. Design

As already said in the introduction the furnishing was designed for the Nursery school in Uherčice. The building of the Nursery school is from 70's and from that time there comes also the furnishing; by 2014 it was highly insufficient to the needs of current nursery school standards.

The project was financed from two sources, directly from Primary and Nursery school, Uherčice, and also from the sources of the borough of Uherčice. The reconstruction was carried out during summer 2014. The author was the chief of the project from the beginning till the handover to the school headmaster.

4.1. Moodboard

The upcoming pictures were an inspirational source for the whole interior in the Nursery school in Uherčice. The author has followed the work with shape and stylization, either play of colors and contrasts.



Fig. 24: Children bathroom (jika.cz)

This bathroom interior (fig. 24), designed by Czech company JIKA has a special atmosphere for two reasons. The first one is a nice stylization of nature which doesn't use a usual naive approach. There isn't any smiling sun neither blowing clouds. And the second reason is the complete absence of tiling which makes very welcoming atmosphere, less sterile and cold than most of tiled spaces.



Fig. 25: Children's bathroom
(Agatha Ruiz de la Prada)



Fig. 26: Children's bathroom
(Agatha Ruiz de la Prada)

Both bathrooms (figs. 25 and 26), designed by Spanish designer Agatha Ruiz de la Prada, who is mainly focused on children's fashion, bear the same signs. Vivid colors, unexpected shapes of sinks, asymmetry – together all of them create playful and cheering space. The shapes took an inspiration from free hand drawing, which certainly must seem familiar to every child with his or hers own drawing.

The furnishing in bright colors is exposed on white wall. It keeps a color balance. Even though there is a significant mixture of colors and shapes, it doesn't give the impression of chaos. De la Prada also worked with repetition (in furnishing and motifs on tiling); this effect brings the feeling of stability to the interior.

Last but not least important point which could be seen on those pictures is the influence of fitting accessories. They are usually underestimated but, as a matter of fact, wrong accessories and details have power to destroy the whole impression of otherwise well done interior.



Fig. 27: A serigraphic poster
(thedsnblog.com)

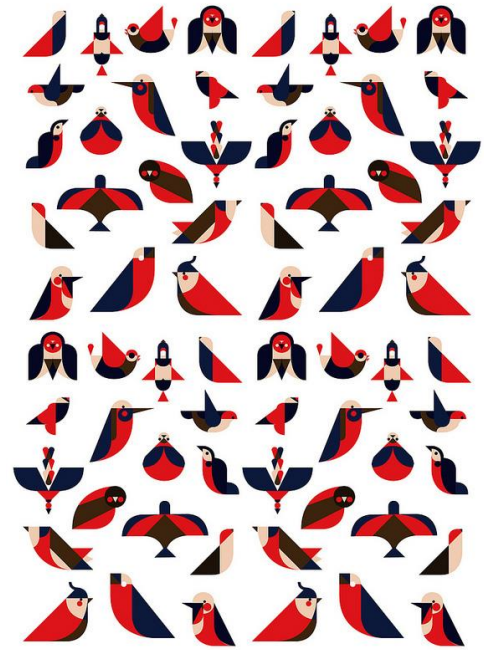


Fig. 28: A bird's illustration
(illoyoo.com)

Figures 27 and 28 are purely graphic design inspiration. For the interior in Uherčice we chose topic of a safari and a zoo and animals in general. This inspiration was used and displayed for its master work with geometric stylization. In general, children try to make their drawings as real as possible, the purpose of these graphics is to show them that there is another way to express themselves, the way that could be also little easier for them.

4.2. An earlier condition of the space

An interior of the bathroom and the changing room was made just after a finishing the construction of the building. The space was determined for preschool children. During the years the decorations and paint of walls were changed couple of times but furnishing stayed untouched for nearly 40 years. There were tall cabinets standing on the floor with built-in sliding benches, which is not bad idea in general, except the bench didn't have neither wheels nor gliders and it was constructed of medium density fiberboards, which made them very heavy. So for children in age of 3 years it is an impossible task to slide the bench out.

At the beginning there were just cabinets and no other hangers or hooks in the changing room, but soon there appeared a need of placing wet jackets and raincoats out of the cabinets. The management of nursery school bought panel with hooks in different design than the design of cabinets. Together with wood paneling of walls there were three types of wooden decor (two as a solid wood, one as a foil on MDF).



Fig. 29: An earlier condition



Fig. 30: An earlier condition 2

A painting of walls was styled into fairy tale village. Even though the painting is quite likeable, there is no visual linking to the furnishing and equipment in the space. All together are the different elements confusing and unaesthetic.



Fig. 31: An earlier condition 3



Fig. 32: An earlier condition 4

On figures 31 and 32 there is a view of the condition of the original bathroom. On the first sight it is evident that the sanitary equipment is outdated. The effect of an imperfect cleaning and too long usage of the furnishing creates not a very welcoming surrounding. The visual distraction had been completed by an unpleasant smell.

The standard which determined that towels have to be separated applies already for 40 year. The solution for it hasn't been changed very much since that time. There is a hanger from the same design series as the cabinets in the changing room. It is made of a composite material which is covered with plastic foil on a woodgrain.



Fig. 33: The original towel hanger

Even though the bathroom is all white with light blue elements, there is no more an effect of pureness due to age of all equipment.

4.3. Concept

The main goal of the author was to create some more welcoming and playful space, which perhaps will bring an innovative approach to shapes of furniture construction. There was an effort to link the space of the bathroom and the changing room with colors, shapes of furniture and decorations, that there will be a new basement for a visual identity of the class. Last but not least the conception is creating space which encourages children's fantasy and shows them another possible approach to drawing and perception of space.

The main inspiration was taken from wild nature of African safari. The color palette (fig. 34) was chosen in warm colors due to gloom north-western light in both rooms. Red and orange represent here assertiveness, energy and motivation, violet stands for fantasy worlds, and grey and white are used to balance strong vivid colors.



Fig. 34: The color palette

Shapes of the furniture were designed with respect to children's needs. Naturally there were chosen curved and rounded shapes and edges, the main inspiration motif follows and it also keeps on mind the safety. In nature we can observe a repetition especially in microstructures and, as it was written earlier, the repetition brings stability into an interior. Due to this there was a hexagonal shape chosen which can be found in nature in couple different examples

and in the interior it has repeated in few different forms (wall paint, furniture shape, tile shape and mirror shape).

The decorations also take up the chosen topic – the Safari. By painting the walls and different personal symbols stuck on the furniture there is a tight linking between the equipment, the space and the functionality.

4.4. Development of furniture pieces

All the furniture has been designed on the basis of earned theoretical information and aswell as consultations with the staff from the Nursery school and craftsmen who produced it. From the first design many changes and compromises to improve the quality of construction, to support functionality and also to respect the budget had to be done.

Furniture was manufactured by HR interier, the local cabinetmakers from Uherčice. They were using the tilting arbor panel saw Tecnomax S350 WS and the edge bander Robland KM 550. The metal mounting was supplied exclusively by Austrian firm BLUM.



Fig. 35: Tecnomax S350 WS



Fig. 36: Robland KM 550

4.4.1. Cabinets

The first idea (Fig. 35) for cabinets was to let them flow few centimeters above the floor to allow for an easy cleaning and emptying the space. At the beginning, the cabinet contained a shoe holder and it used basic and old fashioned style of tagging, a placement of an individual symbols in the middle of the door under a plastic sheet.

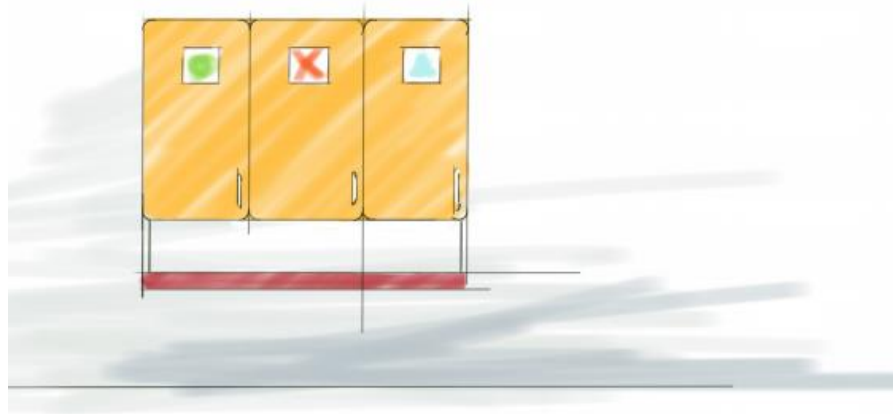


Fig. 37: A sketch of the cabinets 1

In the next step (fig. 36) the space between doors with the open cabinets had to be considered. In practice there are moments when all the children are changing clothes in the same time and a chaos may be dangerous, if the children have a feeling of having more space for dressing up. As a good solution, it has shown up the opening of two adjoining doors opposite each other.

The shoe holder was completely separated from the volume of cabinets which brought nice lightness. After discussions with the nursery teachers the holder is embedded deeper than cabinets. This has been done for simple reason, it makes impossible to stand on it while the child is hanging on the cabinet. The depth of the holder is just enough for size of children's feet.

The individual symbols were supposed to be carved out into the door made of MDF and afterwards the entire surface ought to be coated with paint. But during the consultations there appeared different aspects, which led to a different solution. The teachers from nursery school pointed out the fact that 3 years old child is not able to recognize shapes based just on different depth, it is not contrasting enough. Their perception is able to recognize basic colors and cannot work well with the space. Also craftsmen have counted the price of implementation of carved shapes and it's simply too expensive. Carving can be applied only into MDF which are coated with paint; this option is much more expensive than basic laminated chipboard.

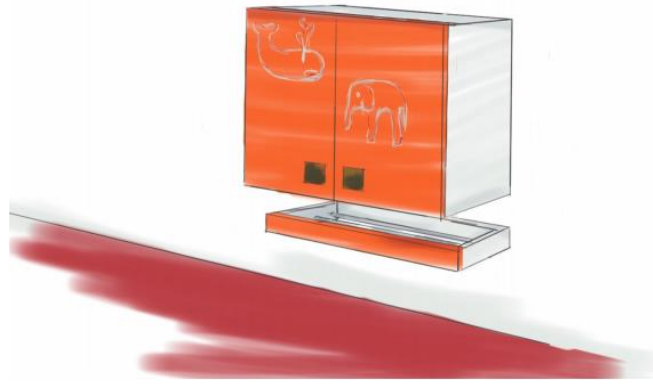


Fig. 38: A sketch of cabinet 2

Another important point in the design of cabinets were handles. Even for adults an improper handle is quite dangerous spot on furniture; in case of preschool children is the risk even higher. After researching many different possibilities a completely opposite approach chose. The handle was replaced with a hole. In addition, this solution offers a very good possibility of air flow in an inner space. The corners of the hole must have at minimum radius 5 millimeters because of available technology in the workshop where the cabinets were made. Smaller radius can be cut on CNC machine, but there is with an application of ABS edge, fastened on the edged surface and with zero radius it is impossible to apply it perfectly. The corners of the hole on cabinet have radius 5 millimeters.

The final dimensions 300/600/400 mm (width/length/depth)(the Appendix 1), inside there is one shelf. It is enough space to place the indoor clothes there, outdoor clothes and some small toys. For the jackets there are hooks out of the cabinets. Cabinets have reinforcements in back to be safely hanged on the wall. As a safety lock, the screws are attached into walls by chemical anchors that prevent pulling out from wall even in the case when the child hangs by full weight on it.

Cabinets are made preferably in double version with opening vis-a-vis, in case that the odd number of cabinets is needed, there is also a single cabinet which is placed at the end of the cabinet row.

4.4.2 Shoe holder

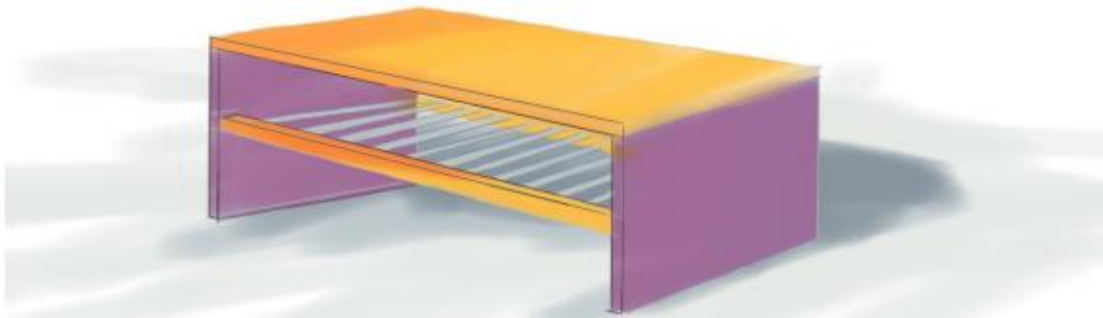


Fig. 39: A sketch of a bench with a shoe holder

Apart from the shoe holder a part of cabinets is possible to combine with the bench and holder (fig. 37). The option was rejected on account of weight. One of the given goals was to keep the space dynamic and airy. Also the placement of shoes on other place than clothes might be confusing and brings an unnecessary chaos.

Final solution (fig. 38) was the creating of a single piece of furniture which is placed directly under the cabinet. There exists the width identical to cabinets (double and also single versions). It's made of laminated chipboard and the railing for placing shoes is made of stainless steel tubes (the Appendix 2).

The holders can be attached to the wall in the same height but the different ones are possible too. The layout is more playful, the only thing that must be kept on mind during the attaching on walls is to preserve enough space for cleaning the floor under it.

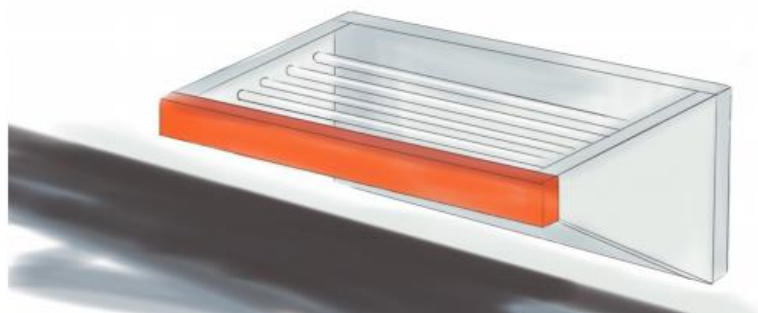


Fig. 40: A sketch of the shoe holder



Fig. 41: Cabinets and shoes holders in the interior

4.4.3. A bench

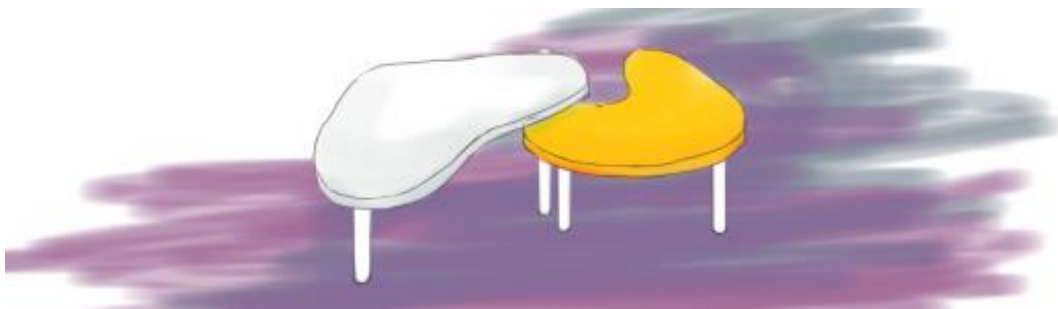


Fig. 42: A sketch of benches

A bench has taken organic rounded shape, which is very suitable for this kind of space, since there are no dangerous corners. The bench is made in two layers, first height is determined for children in age of 3 years, the second for 5 years based on dimensions of children's furniture stated by Dlabal (1967).

The bench was shaped on CNC machine from laminated chipboard. There are 3 metal legs which provide sufficient stability. It was tested on models before manufacturing it. The thickness of 35 millimeters gives enough strength to construction, that there isn't need of any supportive element from the bottom (Appendix 3).



Fig. 43: Benches in the interior

4.4.4. Hooks

For the changing room there were designed hooks which are placed freely on a wall. They are determined for hanging jackets and raincoats for which there is no place in cabinets to avoid getting wet other clothes from jackets.

The hooks have taken a shape of small animals. Two screws serve as eyes of this animal and the bent part represents a tail. There are three kinds of shapes in three different colors to open fantasy. Hooks are placed on the wall which is painted with motif of bushes, so the little animals are as if peeping out from it.

The hooks were cut with laser cutter and then bent. They were finished with the matte spray paint. Screws were chosen in contrast black color (Appendix 4).



Fig. 44: The hooks before applying the spray paint

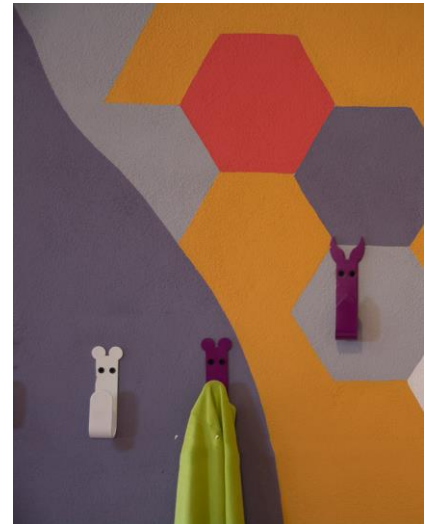


Fig. 45: Hooks placed on the wall

4.4.5. Towel racks

A towel rack has been certainly one of the biggest challenges since the designs offered by local market don't provide any really suitable and interesting solution. During the process there were a few completely different forms and as the most important point to keep the airy space from the neighboring room was chosen.



Fig. 46: A towel rack from reconstruction of another classroom in the Nursery 1

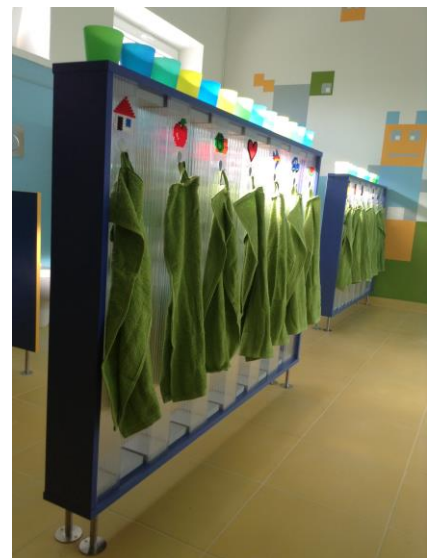


Fig. 47: A towel rack from reconstruction of another classroom in the Nursery 2

Last year the reconstruction of the other classroom in the Nursery was carried out and the combination of a chipboard and polycarbonate (figs. 40 and 41) was chosen. After one year of the use it has shown up that the bended polycarbonate cracked in corners since children were kicking into the racks. For the new classroom another design had to be selected.

The design had taken a top view shape from hexagonal decoration and was only chipboard and metal which resist to children better than plastics materials used. The stability is ensured by anchoring a metal leg into concrete under the tiles. The solution is radical, nevertheless, after the experience from the reconstruction of the first classroom it seemed to be necessary and suitable (appendix 5).

The racks are placed between sinks and toilets to make a space divider which provides at least some privacy even though there are no doors to hide toilets.



Fig. 48: The realized towel racks and toilet dividers

4.4.6. Toilet dividers

Toilet dividers use the same system as most of dividers in the Czech market. It is anchored by side in a metal U profile on a wall and from the bottom there is one supportive leg (Appendix 6). The dividers designed for the Nursery in Uherčice bring new color variations and a little joke. From the side view the dividers makes an impression of hilly countryside (fig. 42). There are four dividers and each of them is slightly differently shaped. It was manufactured on a CNC machine.



Fig. 49: A side view – hilly countryside

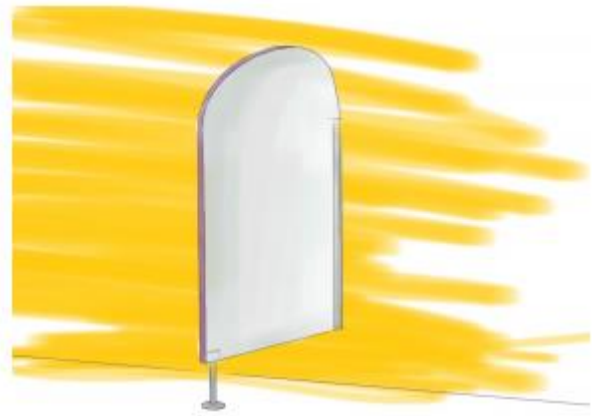


Fig. 50: A sketch of the divider

The emphasis is being put on the width of the gap between dividers. There must be enough place for placing a toilet paper holder (it must be comfortably accessible) and, of course, there must be enough place for a child.

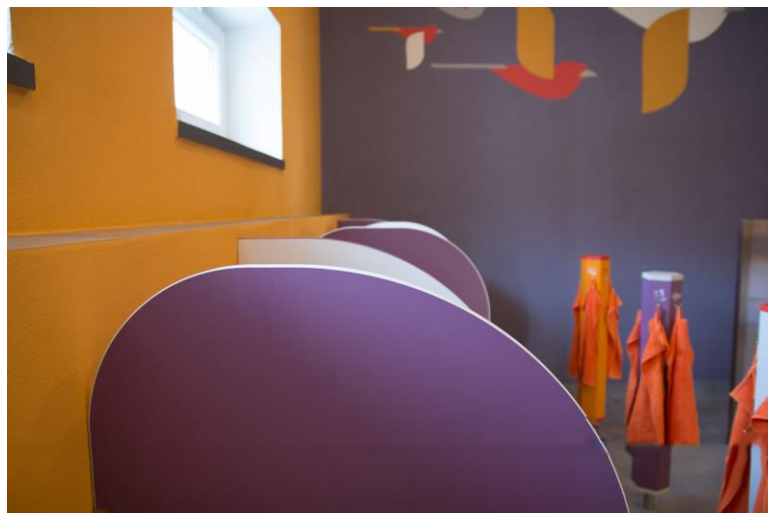


Fig. 51: The realized side view

4.5. Other furnishing and equipment

Other pieces of equipment were selected from supply available on the Czech market. The sanitary ceramics was supplied by company Laufen. They provide a children's collection 'Flora kids' in suitable white-red combination. The shaping of each piece is nicely rounded that it cannot cause any harm. The toilet seat has two handles from sides for children who cannot yet reach floor with their feet.

Taps are manufactured by the German firm of Schell. The water in a nursery school must be mixed on the right temperature before it goes to children's bathroom, so the taps have only one outlet. In this case a necessary force which has to be developed to push the button and turn on the water was tested. The turning off is made automatically after a time-delay.

Mirrors, lighting, toilet paper holders, and towels were bought in IKEA. Mirrors gave a hexagonal shape which perfectly fits to the concept.

Bulletin boards are made of low-density fiberboards which are covered with an elastic fabric attached by metal staples. There must be enough place for an exposition of children's drawings and also for the official documents as an evacuation plan, a day schedule, information about payments, a daily menu etc.

4.6. Room layout

The layout of the changing room is designed to be spacious enough for children's movement. Twenty cabinets are placed on two walls, on the third wall hooks for jackets are placed and benches stand freely in the middle of the room that they can be rearranged easily.

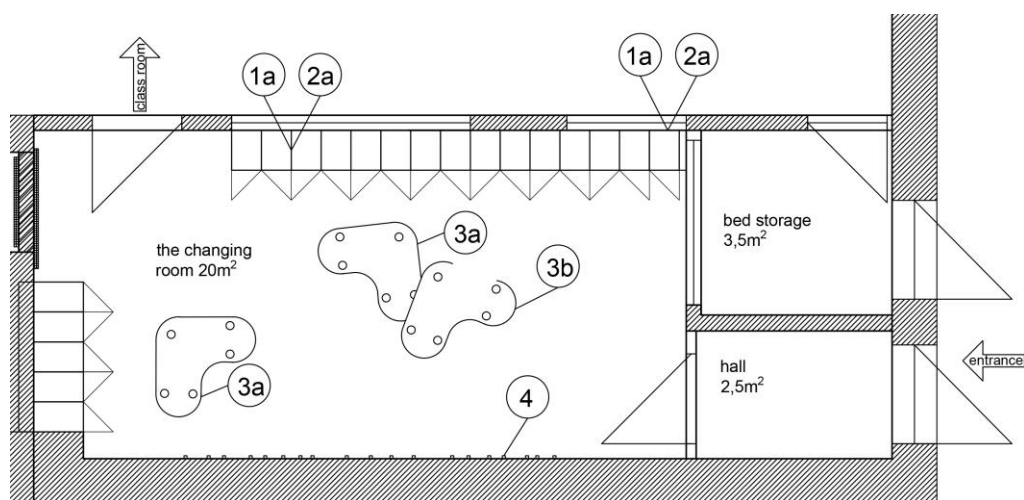


Fig. 52: The layout of the changing room (Appendix 12)

The space of bathroom has significantly changed from the original layout. There was a brick partition in the middle where the sinks were placed. At the moment sinks are moved on the opposite wall than toilets (which remained on its original place) and towel racks are in the middle to serve as a visual divider. The toilet for teachers was moved from the further corner to that closest to the door because there are moments when only one teacher is present in a classroom that the time when children aren't under control needs to be minimized (Appendix 12).

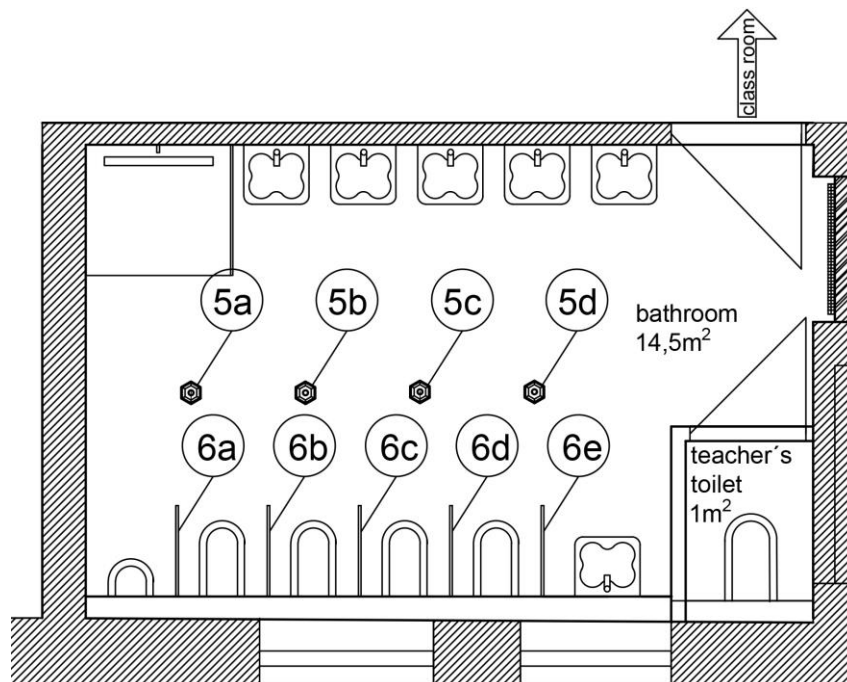


Fig. 53: The layout of the bathroom (Appendix 12)

5. The realization

The realization of the interior of the changing room and the bathroom in the nursery in Uherčice took place in July and August 2014. This crucial point was preceded by budget planning, the time management of each step and supply and of course consultations with the nursery staff and craftsmen.

5.1. The budget

The budget was fixed on 350 000 CZK. This sum had to include building operations, new water and electric installation, all equipment and also the price of the craftsmen and designer's work. The first step there was preliminary calculation and demands sent to suppliers and craftsmen. Each work and piece of furniture had to go through a competitive tendering. The final sum was compiled from the received offers, maximum

quality considered, time management, support of local craftsmen and of course price. This calculation was agreed upon by headmaster of the Nursery and also by the mayor of the borough of Uherčice. The community is the founder of the Primary and Nursery school and promised some financial support in case of unpredictable situations.

Tab 1: The budget

Item	price (CZK)
bricklayers (work and building material)	76 000
plumbing (work and building material, sanitary ceramics and radiators)	105 000
electrician (work and materiel)	3 700
PVC flooring (work and material)	23 400
Tiles	15 600
Custom-made furniture (work and material)	65 300
Paint	10 000
Accessories	20 000
Designer (decorator)	30 000
total	349 000

5.2. Communication with craftsmen and suppliers

The author–designer was also the project-manager and author-supervisor of the realization. In the process as the most important point the direct personal communication with each craftsman has shown up. For all building operations there was technical documentation made in cooperation with professional project engineer. Nevertheless, it was good to control all the operations on the spot, since human creativity and perception are endless. If the author aims to realize the interior perfectly in each detail it requires his or hers constant presence.

The bricklayer's works was demolishing, building, demolishing again and building more the same wall because of an unprofessional approach of summer workers under an unskilled bricklayer's supervision. Also there was a need to buy 10% more tiling material due to a breach of prescribed tile layout and also a tile plinth had to be done twice, because its determined height was only 4 centimeters because of lower placement of children's water closets. Even though craftsmen were warned of the anomalies in the technical drawings they erroneously followed their own instincts.

The space of changing room was widened at the expense of over-dimensioned storage room for beds. Moreover one new window was made to get more light into this quite dark room.



Fig. 54: The interior of changing room in construction 1



Fig. 55: The interior of changing room in construction 2

On the other hand, the communication with cabinetmakers was remarkably beneficial. They provided more efficient and safe construction for designed furniture but every step was discussed with the designer so that they didn't destroy the original intention. HR interior (the cabinetmakers company) provided sample books of laminated chipboards from four different suppliers (fig. 48) and recommended the most reliable and safe mounting.



Fig. 56: The sample book of KRONOSPAN (the variant no. 1 was chosen for the realization)

The local company KOVO Smetana manufactured all the metal pieces such as hooks in an animal shape, supportive legs for toilet dividers, legs for towel racks, also the metal construction for a shower enclosure and metal tubes which are the part of shoe holders.

Companies KOVO Smetana and HR interior had already cooperated in past, thus the communication of three sides (cabinetmakers, metalworkers and the designer) was very easy. KOVO Smetana also took care of polycarbonate sheets which were applied in the shower enclosure and interior windows.

The sanitary ceramic was arranged by plumbing company which also accomplished all the needed works such as new water main and the installation of sinks, toilets, taps and heating system. The company was mainly selected because of their ability to provide all the requested equipment that there wasn't need to check each piece personally one by one.



Fig. 57: The samples of PVC flooring

The flooring is solved in each room differently. The bathroom floor is covered with matte tiles with non-slip surface. In the changing room is PVC flooring intended for high workload (fig. 49).

5.3. Decorating

The decorating of both rooms was simply built in wall paints inspired by safari motifs. The designer painted it herself with the washable and abrasion-resistant paints. For more complicated shapes the designer used paper templates prepared especially for this task. There are motifs of bushes, trees and birds and the shaping is linked to a shape of hexagonal mirrors and wall tiles.



Fig. 58: A decorating progress 1

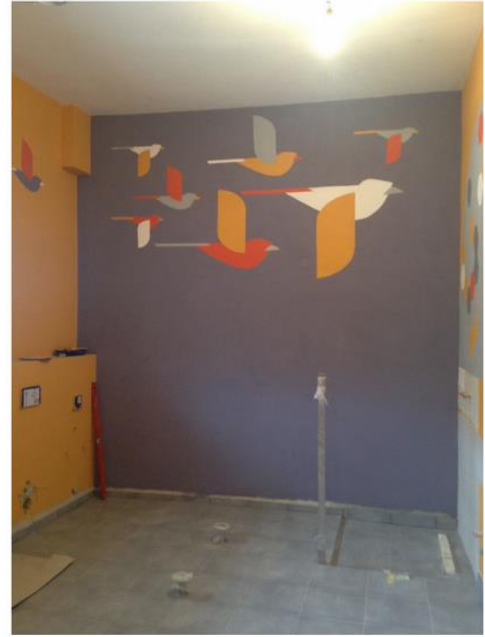


Fig. 59: A decorating progress 2

In a way the individual symbols are also the part of decoration. There are 20 animal symbols (fig. 52) which are placed on cabinets and towel racks. Every symbol is basically in white or black lines printed on sticker, the symbol color is assigned by the background color – the color of furniture.

The part of decoration is the creations of children pinned on the boards and placed on the shelves.

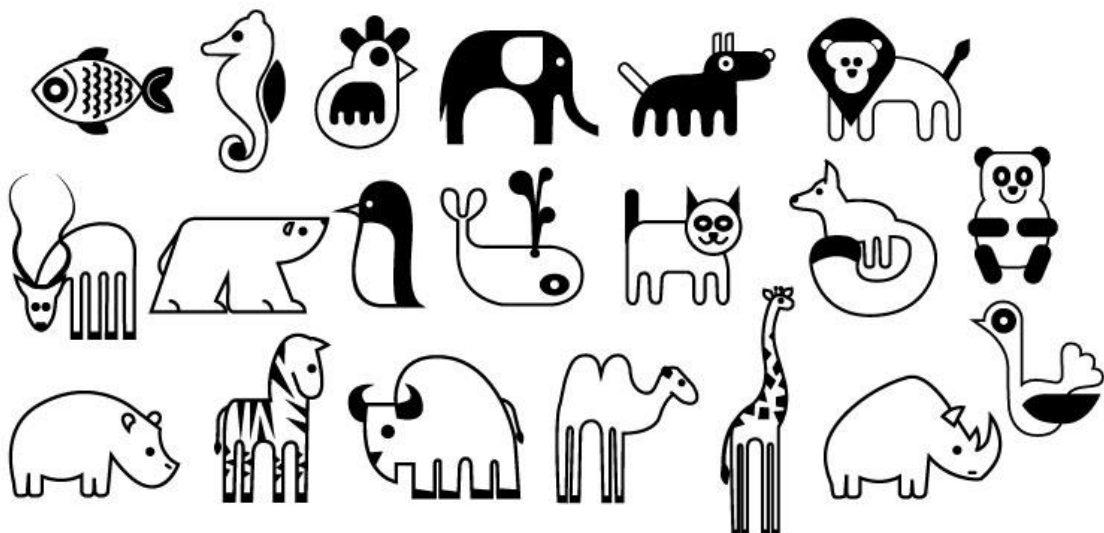


Fig. 60: The individual symbols

5.4. An everyday operation

When the work is written (2015) the interior was already eight months in the usage. During this time, any major problems haven't been found. The furnishing works well without any damage. Only problem are the individual symbols. Even if they are made of plastic foil which is ordinarily used for outdoor long-term advertising labels, the resistance is not enough for load on a nursery school because the children permanently peel off the labels.

The reconstruction brought general satisfaction for kids, parents and also the staff. In the next year there is the reconstruction of classrooms planned continuing the safari topics.

The discussion

The preschool age is typical for substantial development of children's personage in many different spheres. The significant progress is mainly noticeable in a social area. In the nursery school children gain communication skills and realize their own personality. Recently there is an emphasis put on a sufficient place for free plays and the rise of the free game to controlled activities.

Beyond all doubt the environment has an influence on children's growth. A space should be adapted to support all the aspects of physical and psychical developments. By all means nursery school should be a harmonic place where children like to come back.

At the moment the local market does not provide a wide range of furnishing and equipment for nursery schools. Existing producers mainly use the outdated designs. Most of the offered furnishing is made in wooden grain only optionally supplemented with vivid color details. Interesting solutions are provided by Nomiland and Nábytek Jiroušek.

The goal of the thesis was the creation of the collection of furnishing for changing room and bathroom that can be the ground for more playful and airy environment. The new interior should provide space for children's fantasy. Basic lines are use, which creates different inspirational and visual connections; this approach is easily understandable for preschool children. Each piece follows law, standards and well-known ergonomic rules. Chosen material (laminated chipboard and steel) are durable and affordable. The construction provides safety and new shape possibilities.

Nursery schools are dependent on their founders, usually the townships. For the reconstruction of the building they have very limited budgets, so for this project it was vital to offer an interesting solution which is comparably low priced at the local market supply.

Designing new furniture, especially the one for children is a complex process. It includes research of many variable fields. A development of each piece goes through diverse stages. There are many influences which enter into the process and enforce changes and compromises. And at the end of it, when the furniture is manufactured, only the usage shows if the product has been made well or not. It's only up to a designer, a constructor and a manufacturer if they learn a lesson from it or not.

During the designing process every piece was consulted with experts from diverse fields to avoid envisaged failures. An only imperfection which has been shown after almost a year of operation is the problem with the individual symbols stuck on cabinets and towel racks. The plastic foil is not sufficient enough for a children's environment. Children peel the stickers off on purpose. A proposed solution is to cover the surface with transparent lacquer that stickers can't be peeled off, but this solution would raise the price.

The final understanding is that there will always be unpredictable situations showing up after the process of designing of the products. Every designer should try to look at the problem from many different angles and ward off the problem and learn from his or hers own mistakes and also from mistakes which has been done before by others.

Conclusion

There are many books about creating interiors which are basically the collections of pictures; they become old fashioned at the end of the same year they were published. On the other hand there are legislative regulations and standards; they define the functionality and safety, two things which will never go out of fashion.

The main value of this work is the creation of the collection of furniture which provides an affordable option and brings a new refreshing view to a quite a stale possibilities of a local market. Of course, it's almost impossible to make a custom-made furniture of good quality for the same price as purchased from big "over-the-counter" producers. So the real question to resolve is to find convenient material, construction and supplements and decrease expenses among other parts of the calculation.

Children are our future and their proper development should be supported by all means. Designing of functional, safe and aesthetic interiors in private sphere are widely discussed in last decade, but certainly the public interior needs the same attention.

The satisfaction of children, parents and staff is the best reward for the expended effort. Hopefully in future there will be more progressive founders and headmasters who see the importance off well designed space.

Shrnutí

O tvorbě interiéru bylo napsáno mnoho knih, ve většině případů jde o sbírku obrázků, která je vydána v jednom roce, na jehož konci již vychází z módy. Na druhé straně stojí právní předpisy a normy, které definují funkčnost a bezpečnost, dvě věci, které nikdy z módy nevyjdou.

Děti představují naši budoucnost a do jejich zdravého vývoje by měly být investovány všechny dostupné prostředky. Navrzení funkčního, bezpečného a estetického interiéru v privátní sféře je v posledním desetiletí velmi diskutovaným tématem, stejná pozornost by měla být věnována i interiérum veřejným.

V této práci bylo záměrem nabídnout alternativu nábytku na míru, který bude odpovídat cenové hladině lokální nabídky. Po průzkum trhu a materiálových možností byl vytvořen návrh interiéru, který se potýkal s celkovým rozpočtem a jeho částí určenou k výrobě vybavení šatny a koupelny v Mateřské škole v Uherčicích. Samozřejmě, je nemožné vyrobit kvalitní nábytek na míru za stejnou cenu, za jakou ho lze koupit od velkovýrobce. Otázkou křešení bylo tedy najít vhodný materiál, konstrukci a doplňky a snížit náklady v jiných oblastech rozpočtu, tak aby celková částka odpovídala možnostem Základní a Mateřské školy v Uherčicích. Interiér byl realizován dle návrhu autorky a pod jejím autorským dohledem.

Spokojenost dětí, rodičů a zaměstnanců je nejlepší odměnou za vynaložené úsilí. V budoucnosti bude snad více progresivních zřizovatelů a ředitelů škol, kteří vidí význam dobře navrženého prostředí.

List of resources

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