

Teachers and students voice in a participatory school design

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Summary - This article analyses the involvement of teachers and students into rearrangement or creation of school buildings. Participatory design is a long and complicated process, on the other hand involving the users of the building into designing provides a possibility to create educational spaces which would be adapted to their concrete needs. The article analyses primary information collecting methods that help to identify the weakest and the strongest features of the current school buildings. This way, further productive discussions about how to modernise educational spaces are encouraged. The article also presents The Yard project during which creative workshops were organized for teachers, students and their parents. The background of this project is design suggestions made by five standard schools of the country in accordance with the results of researches and excursions that took time in creative workshops.

Keywords – Participatory design, school architecture, modern educational space, post-occupancy evaluation.

Introduction

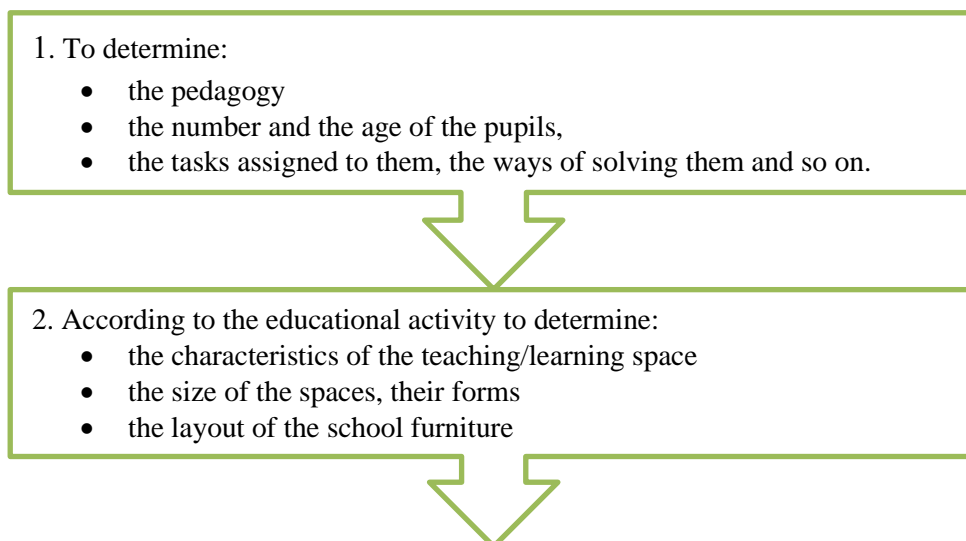
Physical teaching/learning meeting modern educational provisions is probably one of the biggest challenges for many current schools. According to Merrienboer, et al., (2017), if teaching/learning environment is not adapted to teaching content teaching/learning, the results can be negatively affected. That is why it is important to go deep into pedagogical activity carried out at the school and needs of certain user of the school building while creating new or rearranging old educational environments. All necessary information can be received by involving current or future users of the school building in the school designing. This process is called participatory design. It has flourished in 1970 when the workers of iron and metal factory in Norway expressed a wish to participate in creating their work environment (Bødker and Pekkola, 2010). This idea encouraged active further discussions among the creators and users of certain environment all over the world. The article concentrates on projecting school buildings. According to Woodcock and Newman (2010) a user is the key participant who guarantees success for the project of the building, therefore the authors emphasise that it is very important to consult not only students, teachers and school administration but all the community of the school. The problem posed by this article is school building spaces that comply the needs of students and teachers, therefore the biggest part of attention is given to including them into rearrangement or creation of current or new school buildings. Piispanen (2008) claims, that teachers can point out pedagogical teaching/learning environment aspects, students – physical environmental characteristics, and their parents, if necessary – social and psychological teaching/learning environmental features. There are many ways that help to collect all the information that is necessary for the projet from current users of the building. The article uses the method of qualitative analysis of content. The goal of the article is to analyse the process of participatory design. In order to achieve this goal the following tasks are:

1. To identify the problems that arise during the process of participatory design and provided benefit;
2. To analyse possible methods of collecting information about school environment.
3. To introduce The Yard project of modernizing standard Lithuanian schools and its results.

According to Jansen, et al., (2017), participation in projecting of educational environments is still in its early stage and it faces challenges, because the projecting participants who are not professionals can face some difficulties in expressing their wishes to the designers. Nordquist and Watter (2017) claim that the architects and constructors have their own assumptions and perception about educational activity, therefore the discussions of interested parties can be ineffective. That is why the article analyses possible primary information collecting ways, from all interested parties, that lead to further productive discussions and common school project decision making.

Participatory design: challenges, benefit and information collecting ways

Nordquist and Watter (2017) claim that one of the biggest goals in creating educational environments is to involve students and teachers into the process of creating educational environments. This method urges the users of the building to express their wishes and ideas, while regarding that the designers are trying to create educational environment that would comply the needs of users of the building. Merrienboer, et al., (2017) distinguish three stages of school designing (Fig. 1). At the first stage it is important to determine the pedagogy used at the school, the number and the age of the students, the problems given to them, the ways of solving them and alike. All these features have an impact on constructing process of physical environment. Current schools encourage the use of as various teaching methods as possible, because each individual learns differently. In case when one teaching/learning activity fails, an application of another one is recommended. This practice is particularly common in Finnish schools where students stand out because of their achievements which are among the highest in the world. The main participants of this stage are teachers, students and the school administration. At the second stage following the determined pedagogic necessary teaching/leaning spaces features such as size and form of the space and an arrangement of the school furniture according to educational activity are enlightened. This stage can be distinguished as the most important and most complicated because Merrienboer, et al., (2017) say that all the interested parties from the users of the school building to designers and constructors must participate in this stage. Therefore the diversity of opinions in the second stage is the biggest. The third stage is based on previous insights used for preparing the project of the school building, selecting materials and constructions. This stage is more related to architects and constructors. The participation of the teachers and students is especially important at the first two stages, where the architects and constructors often lack competence. Koutamnis, et al., (2017) highlight that in order to prevent deviance from initial idea, observance during project realisation process is necessary.



3. A school building project is being prepared, materials and constructions are selected

One of the most important goals while projecting or rearranging schools is space flexibility. According to Nordquist and Watter (2017), while creating or rearranging current educational spaces it is important not to forget the space sustainability and to think not only about modern teaching/learning activities but also the perspectives of these spaces in the future. Education requires adaptation of spaces, therefore schools must also be designed in a way that the spaces could be adapted to new educational needs. According to Sanoff (2002), the success of each school project requires common teamwork and although the members of the team can change over the whole school building creating process, the final result ensures the main idea and successful overcoming of challenges and the project.

Pedro, et al., (2017) also encourage the transformation of the current educational spaces into flexible, motivating, communication encouraging, integrity and individual thinking providing educational spaces. Based on afore mentioned features, the authors distinguish four attention requiring directions of modernising current schools:

- Layout concerning aspects: observing the separation and usage of teaching/learning space, rearrangement of students' desks, chairs, teacher's working place, equipment, possibilities to change their location.
- Human concerning aspects: analysing special relationship between the teacher and students, how can the teacher and young people move around teaching/learning space.
- Physical aspects: observing aesthetical condition of the class, furniture ergonomics, the age and quality of used equipment.
- Environmental aspects: checking the quality of air, noise, the quality of light and temperature.

The rearranged teaching/learning spaces must have a possibility to change according to pedagogical activity. The space of the classroom, layout of furniture and equipment have to encourage the interaction among the students and to keep contact with the teacher. Classroom furniture has to be mobile, durable and ergonomic. Light, portable furniture forms a possibility to organise teaching/learning in the groups or individually. Suitable temperature, humidity and ventilation encourage concentration of teachers and students, stimulate working efficiency and ensures comfort. Natural day light and suitable artificial lighting that helps to maintain students' activity is no less important. It is not difficult to determine the prevailing disadvantages of each educational environment if these aspects of current schools are analysed during the process of participatory design.

However, participation of interested parties in the process of creating or rearranging educational environments often face certain challenges. According to Nordquist and Watter (2017) different perspectives and assumptions of the participants often make the discussions about teaching/learning environments more difficult. While talking about future project architects and constructors use their language which often is not understood by the school building users without difficulty. At the same time educators use their teaching language which is alien to designers, this leads to ineffectiveness of the discussions about school spaces. Janssen, et al., (2017) claim that often it is difficult for the

educators to form and express their wishes concerning educational environments by using words or drawings. Nordquist and Watter (2017) claim that the simplest way for the teachers to analyse what their teaching environment should look like is to answer the following question: what kind of teaching/learning activity is organized and what does the space need so that the activity could be carried out. An activity carried out in a classroom or in any other school space provides information about layout of the furniture, size and form of the space, technical equipment and alike. It can be claimed that organisational process of teaching/learning activity and its content dictate the conditions of creating educational environments. Nordquist and Watter (2017) highlight that in order to avoid interpretations, clear requirements for the educational environment must be formed. Mäkelä (2018) claims that in order to avoid bias, the opinions of interested parties must be assessed with balance. In any case educational environment complying modern education goals and the needs of the school building users are considered to be the final and the most important goal.

According to Woolner, et al, (2012) participation in the school designing process faces negative attitude of students and teachers. According to the authors while trying to change teaching/learning spaces teachers show their conservativeness and the students resist the new educational methods which will be implemented in an innovative educational environment. On the other hand, according to Sanoff (2002), participation in school designing helps teachers to broaden their perception about the usage of teaching/learning spaces and their impact on the results of the students. Students' resistance to the new teaching/learning methods can be associated with dictatorial teaching that is still being carried out at schools. The latter is convenient for the students because according to Byers, et al., (2014) in this case students become passive absorbers of knowledge and information, they lose the opportunity to actively participate in the teaching/learning process, therefore the biggest part of work goes with the teacher.

One more problem of participatory design according to Woodcock and Newman (2010) is a long-term projecting process and complexity. Authors claim that it greatly limits the opportunities for participation of school users, since there is a considerable lack of time, experience, trained mediators and good practice guide when teachers and students are involved into various designing levels.

Despite the arising challenges and problems, according to Anderson and McCabe (2018) the participation of teachers and students in the school designing has a few advantages:

- The future school building users get the right to freely express their opinion and wishes concerning future school building. This leads to a much successful school project which will be presented to concrete expectations according to used pedagogics and the needs of the students and teachers.
- Participation in school creating process encourages communication and collaboration. Both of these factors are among the most important goals of modern education which is relevant to students because it encourages the ethics of their communication and collaboration.
- Involvement of teachers and students into the school designing encourages democracy. All people who often don't have the right to vote because they are in lower organisational structures, get an opportunity to express their wishes. In such case the school project ensures the fulfilment of the needs of less powerful or less influential people.

School designing or rearrangement contain responsibility and complexity. They require designers to have thorough knowledge. When taking up designing or rearranging educational buildings, it is

important to be aware of not only physical teaching/learning environment forming pedagogics that is being carried out at the school but of the needs of the school building users. There are a lot of ways of information collecting that allow to analyse the latter. Most often when studying them, visual and spacial methods that make the perception about needs, ideas and wishes of a person much easier are used. However Mäkelä (2018) claims that visual presentation of thoughts can be constrained by the lack of artistic skills of the participants. There is also a danger of misinterpreting the data, therefore it is recommended to add an interview or some remarks that would explain one or other choice of the participants. According to Clark, et al., (2013) application of visual methods to various studies is a significant way to involve the users of the building into the data collecting process.

In many studies on physical environmental analysis (Sanoff, 2008; Clark, et al., 2013; Cleveland and Fisher, 2014; Souza and Kowaltowski, 2017), the importance of post-occupancy evaluation in school buildings (or POE) is highlighted. According to Sanoff (2008), when identifying the main success and failures of environment creating, POE is an assessment process suitable for any size and type of school environment. Cleveland and Fisher (2013) claim that POE is an assessment process dedicated to investigate the effectiveness of a man-made environment, or it may be a process dedicated to investigate the features of the building exploitation. During the POE process the information about the school environment is collected by giving questionnaires or interviewing the users of the building or taking part in excursions around the school. While collecting data during POE process the most important thing is to use a few methods. In this way the disadvantages of one method will be compensated by the advantages of the other (Cleveland and Fisher, 2014). The information collected during POE process can be useful to all interested parties which are interested in suitability of the building through the eyes of the users, needs of the users and their suggestions for the improvement of the building. According to Sanoff (2008) by perceiving how does the physical environment affect us psychologically we can better perceive the impact it has on us and our own impact on the environment when changing it. Only then we will start to perceive how it is important to take care of our environment and finally start to improve its quality.

Sanoff (2008) suggests a few information collecting methods that help to perceive the attitude of the school building users towards the school environment. One of the information collecting methods are excursions around the school spaces. Sanoff (2008) claims that if one wants to acquire thorough understanding about the school environment he or she simply needs to observe it. While doing so the attention must be paid to the places of socialization and meetings, the flow and direction of movement, the way the spaces are used and their adaptability for teaching/learning activities and possibilities of the students to individualise their school. Quite often the excursions are led by the school building users themselves, then it is easier to learn their opinion about certain spaces of the school.

One more way to collect information is to give questionnaires to the school building users. Quite often these questionnaires contain open questions to which the participants answer without leaving place for interpretations. Using the questionnaires it is easy to determine positive and negative qualities of the school building, wishes and ideas of the school building users or the new school spaces. It is useful to give these questionnaires to the teachers and students in order to be able to compare the results later. Another similar information collecting method is a questionnaire about school environment assessment. This qualitative method is based on satisfaction or dissatisfaction of the participants. Having received the questions or statements the participants have to assess them by giving marks from the lowest to the highest. Since all the questions of the questionnaires are based on qualitative

indicators, it is useful to apply this method to school staff and students. In this case the difference of the results can be very obvious. Clark, et al., (2013) claim that before starting to study the school environment himself/herself it is useful for the researcher to answer the following questions:

- While planning – what is the goal of the study? Why is the study being carried out? Who should take part in the study? What study methods to choose? Will these methods help to answer the concerning questions? How much time will you need? What kind of equipment will you need? What kind of data will you need?
- While carrying out – are the study participants interested in the matter? Do all the participants know their own role? Does everyone understand the tasks? How can you help the participants? What is their own role? Does the method you use work? Is the activity oriented to the participants of the study? Is the equal participating being encouraged? Are there any valid rules? How much impact does my attitude and perspectives have?
- While considering – What do participants think about the participation? What benefits do the participants get? What works well in the study and what can be improved? What will be carried out next? What kind of changes will the results of the study lead to?

According to Sanoff (2008) the success or failure of the study depends on the skills and information collecting methods chosen by the researcher himself/herself.

To summarize, it can be claimed that participation in the school designing process gives the sense of ownership and dependence which is valued as the biggest benefit of this process. Having received an opportunity to implement their creative ideas teachers and students take responsibility together, acquire experience and skills. Participation in educational environment creation allows teachers and students to understand that their knowledge and experiences are valuable. After participating in educational environment creation the school building users start to take pride in their school and tend to save its environment more. The participation process purifies the already acquired knowledge, allows to base on other people's experience, encourages to solve arisen problems and conflicts, and in this it teaches mutual understanding, tolerance, communication, collaboration and respect.

The Yard - the project of modernizing standard Lithuanian schools

The majority of general education schools were built in Soviet times according to standard, school projects. According to Valančius (2007), in the beginning of 20th cent, as the number of the students was increasing, new the so called typical projects were started to be prepared. Dudek (2015) claims that good architecture is expensive, therefore, this and economical reasons of that time led to appearance of typical repetitive school projects. In order to save the plot area, building materials, energetic and other kind of resources and equipment, a few floor mono-block educational buildings were formed. The majority of such projects didn't have a suitable functional solution because at that time the schools were viewed as a teaching factory in which the students become passive absorbers of information. The premisses of standard school classrooms are laid out rationally along one or both sides of a corridor which performs recreational function. In such repetitive school projects the attention was paid to physical safety requirements and hygiene standards that ensure suitable quantity of the light, sound and temperature in educational premises. However after the changes in education it was realised that standard schools and their present spaces do not comply with modern requirements for education anymore. Quite often the modernisation of schools in the country is being carried out by improving

technical indicators of the school building but absolutely ignoring the inner spaces of the educational institution. In the majority of the schools rectangle shape classrooms with heavy desks and chairs laid out in rows prevail. During breaks students spend their free time in the corridors, where the variety of activities is often limited by narrow, dimly light space. Dissatisfaction with such situation caused a wish for modernising of educational quality in progymnasiums (1st-8th grade) and main schools (1st-10th grade). In order to create educational spaces that would comply with the needs of students and teachers The Yard project that aims for modernising 5 standard schools in the country was prepared (Fig. 2).






	Typical school scheme	Year of construction
1		1929
2		1952
3		1957
4		1970
5		1971

Figure 2. Five schemes of typical schools. Schemes by the author.

To collect information about educational spaces during this project, visual and spatial methods were used. When analysing the spaces of the school excursions were organised, students were given questionnaires with beforehand prepared questions, they had an opportunity to project spatial school model of their dreams, while teachers were working with the projects of schools. While trying to regard the community needs of a concrete school and its working principles creative workshops in seven selected schools were organised. During them, teachers, students and their parents had an opportunity to share their visions and ideas about what kind of school environment they would like with the designers. The information collected during these workshops helped to create modern educational space visions which were expressed in design proposals.

The Yard - the project of modernisation of seven standard general education Lithuanian schools was organised in three stages. The participants of the first stage were 1st-8th grade students from

progymnasiums and middle schools. The students of 5th-8th grades from progymnasiums were given questionnaires with questions about how they feel at school, what makes them happy there or causes tiredness, how they imagine the school of their dreams would look like, what they do after school, what kind of activity and equipment they need and alike. Later, during the creative workshops the 5th-8th grade students were divided into teams and with the help of architects and by using various creative tools they designed the spaces for lessons, yard, canteen and after school activities of the schools of their dreams (Fig.3).

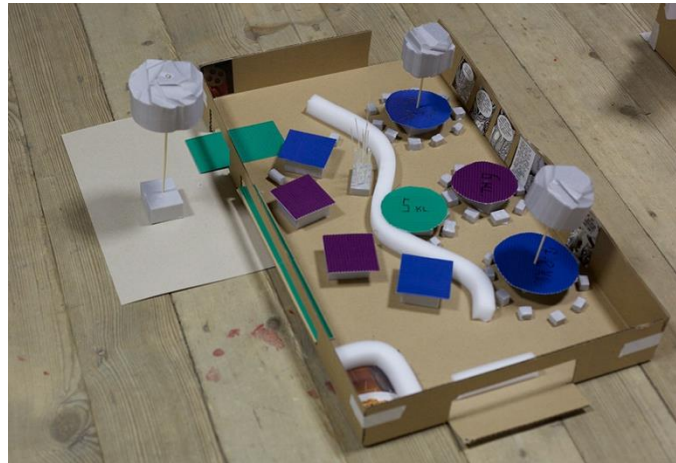


Figure 3. One of the students works in creative workshops at Klaipėda Gedminai progymnasium.
Picture from www.projektas-aikstele.lt

The students of 1st-8th grade led the excursions around the school spaces for the five assigned teams of architects. In this way the quality and usage of the inner school spaces were assessed. Most of the attention was paid to the spaces meant for breaks, after school activity and private time, also the attempts were made to find out which lessons were the most interesting and which were the most boring for the students themselves. During these excursions the students were attaching stickers of the certain colour to the school objects they liked and to the objects they didn't like. During the first stage it was noticed that the most important thing for the children at school was social relationship with other children and teachers. Students negatively assessed worn and untidy school environment and its equipment like sanitary units, doors, floors of the sports halls and alike. Students from almost all classes admitted that prevailing noise which is too big and the lack of light at certain spaces of the school are negative factors. Remote and poorly lit school spaces were defined as unsafe.

During the second stage the questionnaires were given to teachers and parents of the students. The attempt was made to find out whether the adults thought that the students go to school willingly, if they feel safe there. They were also asked what kind of spaces and equipment the schools lacked what mark would they give to the inside and outside spaces of current schools. In order to find out the attitude of the teachers and parents towards the possibilities of learning outside the classrooms and sharing school spaces with the school community these ideas were also contained in the questionnaires.

In order to identify the problematic aspects of the school spaces, teachers and parents were invited to participate in a strategic game. In this game the participants analysed the functions of present spaces and their alternatives by laying out special cards. They also went deep into qualitative indicators of the

school spaces such as sound, light, temperature and alike. While analysing inner and outer spaces of the school the participant paid a lot of attention to students' safety and suggested to fence the school territories. They also supported functional educational spaces and their possibility to transform into multi-functional spaces and approved an upgrade of the equipment.



Figure 4. Strategic game using school plans in Vilnius Baltupiai progymnasium. Picture from www.projektas-aikstele.lt

In the third stage the designers came back to schools with summarised results of the questionnaires, creative workshops and strategic game. The latter were presented to the representatives of the school community during a common discussion in which the final task of the designing was confirmed. Five teams of architects prepared designing suggestions for the construction of individual teaching /learning spaces of each school. Later, technical projects of the school parts selected by the communities of the schools and architects were prepared. These projects can also be used by other standard general education Lithuanian schools.

Modern educational requirements complying ideas of modernising teaching/learning spaces became the final result of the project. During the project it was noticed that most of the selected schools of the country are of the hull type connected by halls and corridors. These spaces are easily accessible from most places of the school building, therefore they have most potential for installation of multi-functional spaces. Such current spaces are used only as transitional passage ways because there are no conditions for any other kind of activity. The halls and corridors could be applied not only for the transitional but also recreational and educational function by installing spaces for working in groups or individual learning, relaxing and communication. It is suggested to functionally and visually connect other important spaces of the school like classrooms, canteens, sports halls, school hall and other.

It was noticed that current school libraries and reading rooms are closed and have limited access. They are encouraged to make their spaces more open for the building users or to set them up in multi-functional spaces of the school (Fig. 5). In order to reach openness and to avoid too much of the noise that comes from transitional passages it is recommended to separate the spaces of the library and the reading room with sliding glass partitions. It is recommended to organise these reading spaces by creating places for group and individual working. In this way the space of library and reading room would be used as school community gathering and reading encouraging spaces. In current schools the canteen spaces are used only for eating functions, therefore it is also suggested to turn them into multi-functional spaces where various gatherings, after school and informal activities would be possible.



Figure 5. Visualization of Marijampolė J. Totoraitis progymnasium reading room in common space.
Picture from www.projektas-aikstele.lt

It is obvious that in the majority of schools traditional rectangle classrooms with heavy desks and chairs applied for frontal teaching prevail. It is recommended to modernise the spaces of the classrooms by creating conjunctions the so called clusters of teaching/learning spaces. The latter have large space with various prevailing space organisational models: a space for group, collective and individual work. Next to traditional furniture, chairs and desks, it is recommended to use settees and places for personal belongings of the students. Regarding the different physical features of the students it is necessary to use ergonomic, light furniture in the classrooms so that they could be relocated whenever needed. In order to connect a few classes or corridor spaces it is also recommended to use transparent sliding partitions. The worn out equipment in specialised learning classrooms must be changed. It is encouraged to install separate entrances from the outside into laboratories, IT and other specialised teaching/learning spaces. In this way these spaces would become easily accessible to the school community and used actively and conveniently for after school activity and informal education. Science laboratories are urged to be divided into three separate spaces that have connections. The first would be used for theory, the second – practical lessons and in the third – various testings would be carried out using the newest equipment. In order to provide students with an opportunity to observe various testings and studies it is recommended to separate the laboratory from the corridor with transparent partitions.

School halls are recommended to be used for as various activities as possible by providing an opportunity to carry out artistic and cultural activity, reviews of performances and community gatherings. In order to reach the variety in usage of the school hall it is recommended to use portable constructable scene and easily transportable and stored chairs. It is necessary to take care of multimedia, sound and lighting systems. A possibility to divide the school hall space into a few smaller ones and in this way ensuring a possibility to work for a few student groups at the same time must also be created.

In current schools there is a lack of spaces applied for sport session activities. Often physical activities are carried out in non-adapted spaces. That is why it is urged to install additional or to apply unused school premises for sports lessons and active leisure activities. The attempts to apply the sports hall not only for physical activity but also community gatherings and cultural activity are being made. Therefore, these spaces as well as that of school hall must be provided with suitable equipment of multimedia, sound and lighting. It is recommended to form a separate entrance to the sports halls so that they could be used not during the lessons. It is also urged to create sitting and observing places for

the audience (Fig. 6). In present sports halls the sufficient amount of changing, sanitary facilities and showers must be ensured. A suitable requirements complying floor covering must be installed as well as mounted inventory for various physical activity and suitable ventilation.



Figure 6. Visualization of Kaunas V. Kudirka progymnasium sport hall. Picture from www.projektas-aikstele.lt

To sum up, it can be claimed that the creating ideas of modern teaching/learning spaces have to comply with functioning principles and community needs of a concrete school. That is why in order to involve as many users of the school building, parents and school community members in the designing process as possible it is necessary to conduct surveys, organise creative workshops before starting to modernise the spaces of current schools.

Conclusions

Involving the teachers and students into school designing gives an opportunity to create educational spaces adapted to the concrete needs of school building users. Having contributed to creation of their school environment themselves they tend to value and save the school environment more, this gives them the feeling of ownership. Participatory design is a long and complicated process because educational environment is used by many different people, therefore, one single educational environment model that would suit everybody does not exist. The latter depends on individual needs of each school, place identity, carried out pedagogics, age and number of the students. In order for this information to be identified it is important to choose the appropriate information collecting methods. In order to avoid possible interpretations it is useful to use a few complementary visual and spatial methods, which would allow to analyse social and physical school aspects.

The yard - the implemented typical Lithuanian school modernising project gave teachers, students and their parents a possibility to express their opinion about the spaces of current schools and possible ways to reconstruct them. The summarised results of the workshops and design suggestions based on them indicated the weakest places in current schools and the alternatives to these spaces. Most often the school building users were not happy about wornout environment, used equipment, noise and the lack of light. During the project it was noticed that multi-functional spaces that can change according the needs of the uses are most wanted. However, it can be assumed that organisation of school spaces depends a lot on the activity carried out in that space. For this reason when creating or rearranging school buildings it is important to hold common discussions between architects and school building users to find out what kind of activities they carry out and what kind of environment they need to carry out that activity. If used during the participatory design and its process, suitable methods can help to

create physical teaching/learning environment complying with modern education goals and needs of teachers and students.

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