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KORONAVİRÜS (COVİD-19) SALGINI NEDENİYLE OKUL SINIFI ORTAMLARININ EV TABANLI SINIF ORTAMLARINA DÖNÜŞÜMÜ

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ÖZ

Özellikle küçük çocuklar için eğitim alanları, okul öncesi ve ilkokulun en küçük çocuklar için kullandıkları ve anında tanıdıkları ilk halka açık yerler olduğu için mekânsal algılarında en büyük etkiye sahip mekânlardır. Okul binalarında renk, aydınlatma, akustik, havalandırma ve sıcaklık gibi fiziksel mimari parametreler, öğrenci ve öğretmenlerin davranışları, refahları ve kazanımları üzerinde önemli etkilere sahiptir. Günümüz COVID-19 salgın koşullarında sınıf ortamlarının bilgisayar ekranlarına dönüşmesi ile fiziksel eğitim ortamları aniden bilgisayar ekranlarına taşınmış ve eğitim alanlarındaki sınıf ortamları, evin herhangi bir alanına taşınmıştır. Yani, uzaktan eğitim süreci ile öğrencilerin eğitim ortamı değişim yaşamıştır. Eğitim mekânlarında çocukların konsantrasyonu, üretkenliği ve refahı açısından alınması gereken önemli tasarım kararları varken, bu durum bilgisayar ekranının başrol oynadığı evde yeni oluşturulan sınıflarda da geçerlidir. Bu çalışmanın amacı, bu ev eğitim ortamlarının fiziksel mimari ve tasarım parametreleri açısından ampirik ve teorik kanıtlar ışığında nasıl yaratılması gerektiğine dair bilgi sağlamaktır. Bu amaca ulaşmak için bu araştırmanın temel yöntemi evde oluşturulabilecek eğitim ortamları için bir model sunmaktır.

Anahtar Kelimeler: Sınıf ortamları, koronavirüs salgını, eğitim alanları, ev tabanlı sınıf ortamları, fiziksel mimari parametreler.

TRANSFORMATION OF SCHOOL CLASSROOM ENVIRONMENTS TO HOME-BASED CLASSROOM ENVIRONMENTS DUE TO CORONAVIRUS (COVID-19) PANDEMIC

ABSTRACT

Educational spaces have an impact on young children's spatial perception since preschool and primary school have been the first public places they have known. In school buildings, physical architectural parameters such as color, lighting, acoustic, ventilation and temperature have significant effects on students' and teachers' behavior, well-being and attainment. With the transformation of classroom environments in today's COVID-19 pandemic situation, physical educational environments have suddenly become to being classroom environments at home. While there are important design decisions to be taken in terms of children's concentration, productivity and well-being in educational spaces, this condition is also valid in newly created home-based classrooms in which computer screen has a leading role. The aim of this study is to provide information on how these home-based educational environments should be created with regards to physical architectural and design parameters in the light of empirical and theoretical evidence. In order to achieve this aim, this study presents a model for creating home-based educational environments.

Keywords: Classroom environments, coronavirus pandemic, educational spaces, home-based classroom environments, physical architectural parameters.

INTRODUCTION

Schools as educational spaces are defined as places of learning, in which learning is expected to take place effectively. All schools can provide an appropriate education and training service by maintaining the necessary physical environment and conditions. They can achieve effective and successful learning with improvements in their internal and external environments (Atabay, 2014). Educational spaces, on one hand, constitute the infrastructure of education and on the other hand, they constitute one of the basic inputs for the formation of educated people and of environmental taste preferences, and the development of social and cultural relations (Güzer & Özgenel, 2019). For this reason, qualified education environments assume a vital function in raising youth with critical culture in the environment and restructuring the educational environment and priorities on the other. Space should be in harmony with the other parts of it. Otherwise, Atabay (2014) stated that it can be predicted that malfunctions in educational training activity may occur. The physical environment is determined by the space reserved for educational materials. Several factors, such as table, desk, cabinet etc. with empty spaces, space temperature, and light and color scheme together constitute the variables of the environment and these greatly affect teacher-student relationships. Thus, an educational space organized according to its purpose will contribute to education and training activities; the importance of environmental design in education and training activities cannot be denied.

The educational space is an important factor when evaluating student's well-being. Considering that students spend up to one-third of their day inside classrooms, the significance of providing comfortable environments for learning is obvious. Previous findings in the literature have shown that variable such as physical, academic, and social dimensions' have an influence on school environments. There is strong and consistent evidence for the effect of basic physical variables (air quality, temperature, noise) on learning. Other physical characteristics affect student perceptions and behavior. Especially for young children, educational spaces have an utmost impact on their spatial perception, since preschool and primary schools are the first public places that they used and came to know instantly (Orr, 1992). At this time, the experience of school starts to be a dominant force in their lives. Maxwell (2016) stated that the proximal settings of home, school, and neighborhood are where children spend most of their waking time and play a critical role in child development. These are the places where the child most closely interacts with the physical environment. Relationships with the physical and social environment are the principal context for development. It is important to analyze the type of environments that are provided for young children in the school setting since the nature and quality of the environment are influential on how and what students learn. It is usually accepted that in the architectural design of educational environments, certain features of the physical parameters such as lighting, color, ventilation, temperature and acoustics, among others, have an influence on the attitudes, behavior and achievement of students (Aquilar, 2019).

It is obvious that the main purpose of educational spaces is to provide children with the ideal learning environment where children's development and learning process are promoted (Chatzidiakou et al., 2012). Educational spaces are complex spaces to design as they need to execute all the facets of physical

environmental features that are mentioned above. While the design approach to educational spaces is such a complex subject especially for children, this problem has gained a different interpretation with the transformation of classroom environments into home-based classroom environments in today's coronavirus (COVID-19) pandemic situation.

COVID-19, which has been declared as pandemic by the World Health Organization (WHO), has spread very rapidly such that within two weeks from the first cases diagnosed 1000 patients were tested as positive (Spinelli & Pellino, 2020). The COVID-19 pandemic is considered as the most crucial global health disaster of the century and the greatest challenge that humankind has faced since World War II (Chakraborty & Maity, 2020). The emergence of the virus in China at the end of 2019 has caused a large global outbreak and is a major public health issue. It is a leading cause of hospitalization and death, particularly for middle and old aged people in the affected countries. Thus, some global strategies have been undertaken to prevent and control the COVID-19 disease, such as restricting mass gathering, controlling human population growth, forestation etc. (Chakraborty & Maity, 2020).

COVID-19 spreads from person to person via direct contact. Thus, the spread of respiratory illnesses during mass gathering is a major public health concern with the potential of distribution of these infectious diseases. Especially in Turkey, the most effective measures are lockdowns, transportation restrictions, restrictions of social activities, postponement of all kinds of activities where many people come together and transition to a new system. For example, working from home or having flexible working times were some of the methods applied in the business sector. Especially for people aged 65 and over and for many employees with chronic diseases, working from home was applied in this process as a new system of working method in Turkey.

Due to COVID-19, face-to-face education in many countries around the world was suspended. Distance education, in other words, online education replaced face-to-face education. As a result, alternative tools and software have become significant investments in distance education. As there are ongoing uncertainties and the number of COVID-19 cases continues to increase, distance education will continue in many countries in the upcoming period. Especially in Turkey, the Ministry of National Education, in which the primary and secondary education are affiliated, started to broadcast lessons as part of remote education via the national broadcaster TRT's Education Information Network (EBA) channels.

With the COVID-19 pandemic, the physical educational environments were suddenly moved to the computer screens and children had to adapt to this situation in a short time. At this point, the classroom environments in the educational spaces were transferred into a computer screen in a space within the residence. In other words, today the new learning environment classroom is where the computer screen is located. The pandemic required people to create an educational environment in their own homes. Creating this educational environment with healthy and appropriate design parametric features and requirements is becoming critical for the performance and well-being of the student.

The aim of this study is to provide information on how these home-based educational environments should be created with regards to physical architectural and design parameters in the light of empirical and theoretical evidence. In order to achieve this aim, this study presents a model for creating home-based educational environments.

Within two sections, the relevant literature on the interrelations between physical parameters that are color, lighting, acoustic, ventilation and temperature of educational spaces and their effects on student's behavior, well-being and academic performance are evaluated. In addition, relations between potential risks and the satisfaction of students with educational space exposures are examined. In the second section, the transformation of the traditional classroom environments to home-based learning environments through distance education system are discussed. Suggestions are made on how to apply physical architectural and design parameters to create home-based learning environment.

PHYSICAL PARAMETERS OF ARCHITECTURE AS DESIGN CRITERIA FOR EDUCATIONAL SPACES

An efficient educational space should pave the way for learning in an environment that children feel secure, cozy and challenged. Successful schools should adapt their spatial offerings to being learner centered. Physical architectural parameters as environmental elements in school buildings have significant effects on students' and teachers' behavior, well-being and attainment. Likewise, the physical characteristics of the building have an important role on students' environmental perception and navigation (Higgins et al., 2005). Each of the physical architectural parameters in educational spaces directly affect the educational processes by influencing the perception of children.

Color

Children need their environment to be interesting. Read (2003) reported that "color is a useful design element for space definition in children's environment" (p.233). The application of color is used to improve children's abilities in their environment. Especially young children make associations with color and shapes rather than with form. Therefore, using color in their environments can provide visual interest to supply maximum efficiency (Dalke et al., 2005). Coloring the environment with warm hues, which consist of yellow, orange and red, and bright accents improves children's sensory stimulation (Read, 2003). The choice of color used in schools can either improve or impair learning, morale and behavior. It can reduce absenteeism and vandalism, affect a student's attention span, and perception of time (Thompson, 2003). Thus, it is obvious that children are wonderfully sensitive and responsive to nuances in both color and lighting (Fielding, 2006). Engelbrecht (2003) recommended cool colors, which are green, blue and purple, for upper grade and secondary classrooms to aid their ability to focus while elementary schools prefer warm and bright color schemes. According to Thompson (2003) the function of a space is particularly important when using colors in school environments. He suggested that in classrooms, painting the teaching wall deeper and in brighter shade than the sidewalls helped to draw the attention to the front of the classroom and when looking at the sidewalls it gave the eyes a visual break; in

libraries using warm colors and brighter spaces encouraged students to read; in auditoriums, gymnasium and cafeterias using lighter warm tones or neutral colors helped to prevent the overwhelming effect of the space; in corridors and stairwells using combinations of color for creating color code sections of the building helped navigation and traffic flow.

In addition, Engelbrecht (2003) stated that color is an important element in school interiors since 1) it relieves eye fatigue: the end wall colors should be a medium hue, the end wall treatment helps to relieve the visual monotony of a classroom and stimulate students' brain, 2) increases productivity and accuracy: helps the student and teacher stay focused on the task at hand, 3) helps to create a system of order and helps to perceive important and unimportant elements in the environment. The use of color and graphics to aid finding way is particularly important for primary school children who start to recognize and match colors at the age of three, 4) supports developmental processes (Engelbrecht, 2003).

Lighting

Like color lighting is another design element that affects the quality of interior spaces in educational environments. Today, it is well established that light stimulates visual responses and influences performance, mood and attention. Providing a good lighting quality in an educational environment is a complex task since many people who spend most of their time in it, carry out various activities and belong to different ages such as children, teachers, staff, etc (Bellia et al., 2015). Moreover,

> "in an educational environment very different visual tasks are performed, such as communication between children and between them and the teacher; reading and/or writing on desks and on the blackboard; etc. Frequently these visual tasks are carried out at the same time and, therefore, to accurately analyze lighting quality in existing educational environments, there is the need of instruments that allow to carry out fast measurements on several visual tasks at the same time" (Bellia et al., 2015, p.3139).

The availability of daylight in educational spaces where various users spend several hours and various activities take part is extremely important since it heighten alertness and performances (Bellia et al., 2013). Thus, daylight and its interaction with artificial light are important to guarantee the students wellbeing. In the design of education buildings, daylight is an important factor as it creates a pleasant environment, promotes healthier conditions and ensures energy saving (Michael & Heracleous, 2017). Fielding (2006) stated that uniform illumination levels in the classroom and focused brightness on the teaching wall made good sense for students. Therefore, using a larger percentage of ceiling and wall surfaces with a higher Light Reflectance Value (LRV) boost the lighting efficiency. The recommended illuminances for different types of classroom environment are ranged from 300lux to 500lux to confine glare to reasonable levels (CIBSE, 2004). If the ratio between the maximum and minimum illuminance in the same room becomes high, in other words, when there is no uniformity in the illuminance level, user comfort decreases, and the problem of glare emerges. Thus, the

control of artificial lighting in different classroom areas becomes important (Winterbottom & Wilkins, 2009). Hence, automatic lighting control is a sensible solution for this issue such as classrooms may have automatically dimming luminaire. However, it is almost never used. Additionally, luminance glare spot from the whiteboard can lead to discomfort. At this point the glare spot and the reflected ambient lighting causes discomfort. Winterbottom and Wilkins (2009) suggested that data-projectors should never be installed with a dedicated wireless backhaul (DWB). Indeed, projection onto a matt white or light-colored wall would be preferable. The study of Michael and Heracleous (2017) asserted that high lighting contrast and bright visible light source in the field of view caused glare issues, especially in classrooms with east and west orientation.

Acoustics

In indoor educational spaces where information is transmitted from a teacher to students mainly by verbal communication, providing good acoustics is important (Astolfi et al., 2017). Klatte and colleagues (2013) reported that children are much more impaired than adults by noise in tasks involving speech perception and listening comprehension. Non-auditory tasks such as short-term memory, reading and writing are also impaired by noise. Depending on the nature of the tasks and sounds, these impairments may result from specific interference with perceptual and cognitive processes involved in the focal task. Thus, "unfavorable acoustic conditions in learning environments, such as excessive ambient noise and reverberation, interfere in the verbal communication and have adverse effects on learning, the academic achievement and the cognitive development of the students" (Klatte et al., 2013, p.3).

Aquilar (2019) stated that

> "classroom acoustics acquires more relevance when considering that children and youngsters under 20 years old have not reached a full auditory brain development. Children educated in classrooms with bad acoustics –noisy or reverberant classrooms, or with little speech intelligibility- learn less and show a lower academic achievement and cognitive development" (p.121).

In addition, negative effects start showing at 4 years of age, and children up to 13 years old are regarded as a risk population in the face of bad classroom acoustics. The uncontrollability of chronic noise exposure affects children's' emotional and motivational states (Evans & Lepore, 1993). Nelson (2003) highlighted the issues that affect children as: "inefficient listening strategy; inability to put together missing pieces; immature weighting of acoustic information; increased susceptibility to distractions and decreased ability to segregate signals from noise" (Evans, 2006, p.2). Additionally, Nelson (2003) listed four primary sources of noise in classrooms: "building services and utilities, including Heating, Ventilating and Air Conditioning (HVAC), exterior noise transmitted through the classroom building envelope, interior noise transmitted through partitions, floors, ceilings, ventilation ducts, etc., and noise generated within the classroom by occupants and classroom equipment" (p.2). Shield and Dockrell (2003) especially emphasized external noise as a source of noise that is

likely to "consist of a range of environmental noise including noise from transportation sources, industrial noise, plant noise and the noise of people outside the school" (p.98).

In line with the mentioned sources of noise, obligatory regulations with technical standards can provide a more informed and sound reference. At that point, it is necessary to determine and manage adequate, modern and inclusive acoustic performance criteria for the design and construction in educational base. Evans (2006) reported that effective use of acoustically absorptive building materials can improve speech clarity, while reducing background noise incrementally, via room effect. At this juncture the room effect may also weaken the teacher's voice as well. However, where the teacher-to-student distance is less than the distance from mechanical, HVAC or exterior intrusive noise sources, the student benefits. He also mentioned that through partitions and exterior walls, the intrusion of building equipment room noise-or exterior noise into classrooms can be reduced. These enhancements would reduce upward masking of speech and maintain better learning environments that are free of annoyance, fatigue and behavior problems (Evans, 2006).

Ventilation

Ventilation refers to supply of outdoor air to a building. The purpose of ventilation system is to supply satisfactory microclimate in the space being ventilated (Awbi, 2003). Microclimate refers to thermal environment as well as air quality. In the design of a ventilation system for a room or a building, it is crucial to consider that they are fundamental to the comfort and well-being of the occupants. The satisfactory microclimate is supplied by Natural Ventilation (NV) or/and Mechanical Ventilation (MV). NV can improve indoor air quality through appropriate passive designs and regarded as one of the effective strategies for solving cooling problems within the interior space of a building. Additionally, NV plays an important role in sustaining the air flow in a building zone to nurture the health and comfort levels of the students in an educational environment. However, most modern buildings today devolve on artificial ventilation for their daily operations heavily (Chan et al., 2013). Mechanical ventilation on the other hand, increases energy usage, has become critical and needs to be resolved. The allotment of adequate passive design elements is one of the strategies used to maximize the utility of NV in buildings through air penetration (Chan et al., 2013).

School buildings present an increased air-tightness and have adopted MV systems, operating several hours daily to achieve adequate indoor air quality recently. Gil-Baez and colleagues (2017) reported that

> "by using a NV and even when heat losses due to winter are taken into account, the energy use over the academic year is clearly lower than when a MV is used. The primary energy savings lie within the range of 18–33% with the NV system while maintaining classroom comfort levels" (p.1186).

Kleiven (2003) also stated that the MV systems dominated over NV in twentieth century due to the advantages of MV as it has offered a stable airflow, possibilities for air treatment (e.g. air conditioning) and allowed heat recovery. Fisk (2017) suggested the following reasons for low ventilation rates in schools operated MV system:

> "many ventilation systems are operated, potentially to save energy, such that ventilation is provided only when there is a need for heating and cooling; ventilation systems are turned off because they are noisy and the noise is bothersome and interferes with learning; ventilation systems are poorly maintained; and to reduce energy cost, ventilation is intentionally limited in some schools by closing outdoor air intake dampers" (p.1049).

In a way, by using NV, efficient heat recovery is difficult to achieve. Improvements in computer technology have provided sufficient control and prediction of airflow in NV systems. Hybrid ventilation systems or mixed-mode ventilation systems are used in combination with natural and mechanical ventilation in order to utilize the advantages and eliminate drawbacks from both. Fisk (2017) reported that

> "an association of increased student performance with increased ventilation rates is compelling. There is a relationship between reduced respiratory health effects and reduced student absence with increased ventilation rates. Increasing ventilation rates in schools imposes energy costs and can increase HVAC system capital costs" (p.1049).

Bakó-Biró and colleagues (2012) studied the effects of ventilation rates on students' performance. They reported that

> "poor ventilation rates in classrooms impair children's attention and vigilance significantly. In poorly ventilated classrooms, students are likely to be less attentive and to concentrate less well on instructions given by teachers. The magnitude of the negative effects with inadequate ventilation was even higher for tasks that require more complex skills such as spatial working memory and verbal ability to recognize words and non-words" (p.222).

Flourentzou and colleagues (2017) reported that the NV system of especially large spaces must be designed by an architect, or by a collaborative team with at least an architect and a building physicist. The architect must decide the position, shape and protection of openings and the air pathway and simulations must be done to predict the airflows and dimension openings and air passages by an experienced building physicist.

Temperature

The classroom environmental quality in schools is of utmost importance due to the relationship between the temperature level and learning outcomes. Indoor environmental quality in classrooms is an influential factor in the learning process (Wargocki & Wyon, 2013). Thus, improving the temperature level should be given as much priority as improving teaching materials and methods.

Since children cannot easily choose to attend another school and they have fewer ways of registering complaints than adults have, they must attend to schools even when the air quality and thermal conditions in the classrooms are unsuitable. The work that "children are obliged to perform in school is almost always new

to them, while adults frequently perform routine, well-practiced tasks" (Wargocki & Wyon, 2013). Accordingly, the control of temperature levels especially in elementary and primary school environments has become critical. Children cannot concentrate and can be distracted when temperatures in classrooms are too high (Wargocki et al., 2019). This has negative consequences for an effective learning process. High classroom temperatures may also have negative consequences even for the work of teachers. Dear and colleagues (2015) stated that warm indoor temperatures and the ensuing thermal discomfort result in decreased productivity and mental acuity in educational spaces. In their research, an indoor operative temperature of about 22.5°C was found to be the students' neutral and preferred temperature. This is generally cooler than expected for adults under the same thermal environmental conditions.

In the study of Wargocki and colleagues (2019), the effects of temperature in school classrooms on children's performance were investigated. The findings of the study showed that "the performance of psychological tests and school tasks can be expected to increase on average by 20% if classroom temperatures are lowered from 30°C to 20°C and that the temperature for optimal performance is lower than 22°C" (p.197). Psychological tests measuring cognitive abilities and skills, school tasks including mathematical and language-based tasks, rating schemes, and tests used to assess progress in learning. The relationship is valid only for temperate climates, thus it requires verification for other climates and extensions to temperatures lower than 20°C and higher than 30°C.

FROM SCHOOL CLASSROOM ENVIRONMENTS TO HOME-BASED CLASSROOM ENVIRONMENTS

With the implementation of distance education model, education has transformed from the classroom environments that we were accustomed to into a new environment that we have set up in our home environments where computer screens take the leading role. Since adults are more involved with technology and computers, it is relatively easier for them to adapt to this process. However, adapting to this process has developed differently for primary school children who have just met with technology and have experienced the place called classroom at school. For them, the classroom has now become the place that it is the most suitable place at home. Some children are attending the distance education either from their own rooms, either from the living room, or from the kitchen. The important thing here is that the space should support the lesson technologically and be physically suitable for the student to receive the education. Problems can be caused by the differences in home education opportunities provided by the digital environment. Although most of the students do not have the same learning environment at home, they have established their own organization. The images 1a and 1b demonstrate the different organization styles for their new learning environments.

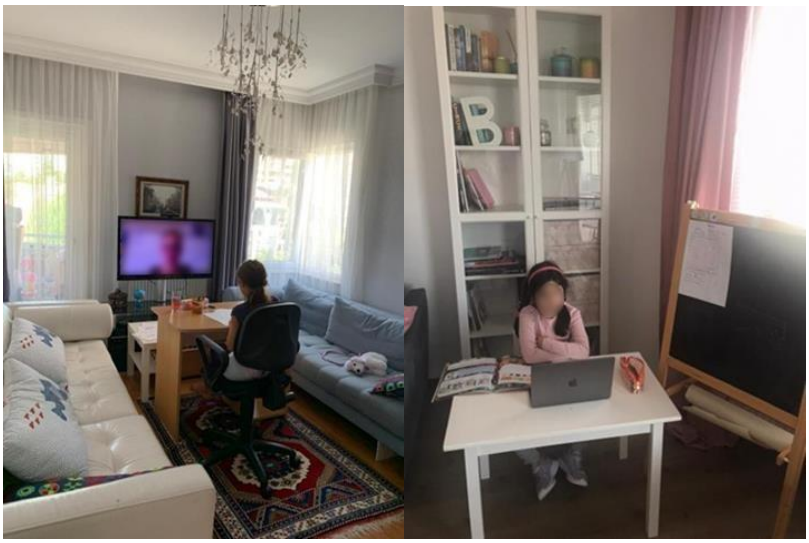

Image 1a and Image 1b. Home-Based Learning Environments
(photographed by the researchers with the consent of the parents)

These images present primary school children during their distance education lesson in their home-based classroom environment where the screen is the major element. Each child has set up her own classroom layout in different parts of their house. As it can be seen, the child from the first image chose the living room as her new classroom environment, while the child from the second image chose her own room as her new classroom environment.

Due to the COVID-19 pandemic, education has moved from the school environment to the home environment with the transition of face-to-face education to distance education. This may seem like homeschooling that is widely used as an alternative to formal education in the USA, Canada and many European countries where parents educate their children at home rather than school (Basham el al., 2007; Şad & Akdağ, 2010); however, this is not a widely known concept and not applied as an educational method in Turkey. Education is provided by the teachers of the students and not by the parents. The teacher reaches the students via the computer screen and the class communicates by the screen. With this system, socialization takes place on the screen and students have the opportunity to chat with each other during the course hours. Since class members are now meeting on the computer screen, in a sense, the class has been moved to the screen. Although the physical architectural parameters mentioned in the first section of the article cannot be evaluated in a real classroom environment in distance education process, the room in which the computer screen is located should be able to meet the parametric properties and requirements specified before as they affect children performance and well-being. At this point, it is not the school administration that provides these conditions, but the family. Therefore, parents play a serious role in supporting their children, just as in the homeschooling process, but with a different role than an educator by creating appropriate physical conditions and properties in the new home-based classroom environment. Examining these parameters by associating them with the home-based classroom environments has the potential to create suggestions for the design of spaces used in distance education processes.

Color

Studies conducted on the visual color stimuli indicated that individuals associate colors with emotions. People's mood and emotions are influenced by color, either individually or in combination can evoke both positive feelings such as happiness, energy, excitement, calmness and negative feelings such as anger, disgust, and sadness (Güneş & Olguntürk, 2020). Boyatzis and Varghese (1994) studied children's emotional responses to colors. They reported that their emotional reactions depended on the brightness of colors. Children had positive reactions to bright colors, which were pink, red, yellow, blue, purple and green, and had negative reactions to dark colors, which were brown, black and gray. Children stated their positive emotions by mentioning happiness, strength and excitement, and their negative emotions by mentioning sadness, anger and boredom. As they had positive emotions to bright colors rather than dark colors, the dominated element of the environment such as walls should be colored accordingly.

Lighting

In the new classroom environment, it is important that the space receives natural light as it influences children's performance, mood and attention (Bellia et al., 2013; Michael & Heracleous, 2017). However, when artificial lighting in the classroom environment is turned on, the amount of light that will occur in the environment will be outside the classroom standard. Since the distance education hours coincide during the daytime, artificial light will not be needed much, which can be considered as an advantage for child. Since the computer screen is a major distance education element, the amount of light coming from the computer screen can cause eye fatigue and headaches. Computer glare is a critical and common factor in causing such problems. To reduce the glare problem, it is important to adjust the brightness and contrast level of the computer screen; relocate the screen by placing it away from direct light (see Image 2); if artificial lighting is used then the lights in the environment should be dimmed. The main aim in the last recommendation is for creating uniform illumination level in the learning environment to reduce glare.

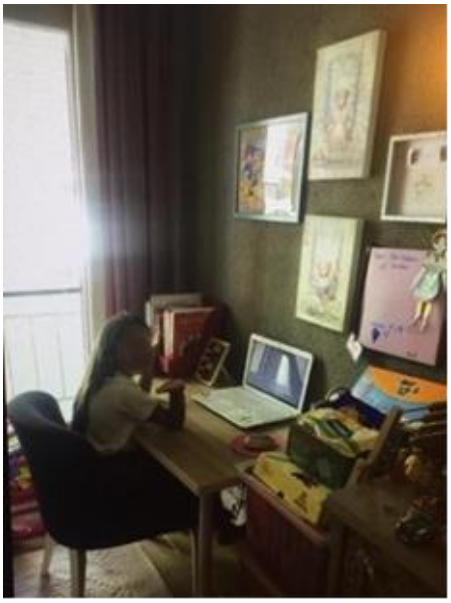

Image 2. Glare on the Computer Screen
(photographed by the researchers with the consent of the parents)

Image 2 indicates a primary school child during distance education lesson in her home-based classroom environment where there is a glare problem on the screen. As can be seen from the photograph, daylight entering directly through the window creates glare on the computer screen. In this case, it is critical to relocate the screen by placing it away from direct light. If direct light comes from behind the computer screen, the problem of glare on the screen will be reduced (see Image 3).

Image 3. Daylight Entering From Behind the Computer Screen Reduces Glare
(photographed by the researchers with the consent of the parents)

Acoustics

In a home-based classroom environment, good acoustics is one of the main requirements for a comfortable environment. The verbal communication between the child and the teacher is conveyed by the speaker and microphone. Unwanted sounds in the environment will prevent the child from hearing the teacher and the teacher from hearing the child as well, and may cause the communication between them to break. When choosing the classroom environment at home, the selection should be made eliminating the unwanted exterior noise sources that may occur from the outside such as noise from transportation sources (Shield & Dockrell, 2003). Environments that are independent of these noise sources or that do not have a common surface such as walls, ceilings or ventilation ducts should be selected. Additionally, parents should stay away from using appliances that may be a source of sound during the lessons.

Ventilation and Temperature

Thermal environment as well as air quality in the classroom environment is important as they are fundamental to the comfort and well-being of the children. The control of temperature levels in the environments is critical. Children cannot concentrate and can be distracted when temperatures in classrooms are too high. According to the weather conditions, it is necessary to use NV or MV to clean the air inside and regulate the amount of temperature. Especially in hot weather conditions passive design elements should be used to maximize the

utility of NV in buildings through air penetration by windows and other openings. An indoor operative temperature of about 22.5°C was found to be the students' neutral and preferred temperature (Dear et al., 2015). Therefore, a comfortable environment can be provided by fixing the indoor temperature to this degree.

Especially young children have an inner need to be influenced from their environments. They learn by interacting with their environments. Places that provide positive experiences offer opportunities for children to explore, to manipulate, and to be involved (Wilson, 1997). A disorganized environment suggests children that they are not valued or respected. This does not change whether it is at home or school. Therefore, care should be given to the design of these environments, such as creating new classroom environments in order to support the education process of children and not disturb their concentration. In addition, it is important not to have any material other than books, pencils and pencil cases that the child uses as resources on his/her desk. Having too many stimuli around will distract the child, and it is an issue that needs attention. The background of the computer screen, which is the main material, is very important because the child's attention is completely in that direction. If the background is lightly colored and contains no stimuli, this will help the child to concentrate on the lesson (see Image 4).

Image 4. The Background of the Screen Does Not Contain Stimulus
(photographed by the researchers with the consent of the parents)

CONCLUSION

Education is a phenomenon that should be considered and discussed in every period and condition. Since the education process is a service that the state provides to all its citizens equally, it is an important process that should continue without interruption. Especially in compulsory education, when educational institutions cannot be opened, distance education method can be used. Due to COVID-19 pandemic conditions, new

education conditions have to be continued from the home environment. With the distance education method, the learning environment of the students has changed. Traditional classroom environments have transformed into new classrooms created at homes, and the leading materials of these new classrooms are computer screens. This brings about a process that should be set up regularly for primary school children who have just gained the discipline of study and have just experienced classroom environments. While there are important design decisions to be taken in terms of children's concentration, productivity and well-being in educational spaces, this condition is also valid in newly created classrooms. Important physical architectural parameters consisting of color, lighting, acoustics, ventilation and temperature which especially affect primary school children, are design decisions that need to be considered in educational spaces and new learning environments at homes. With respect to the design issues, the decisions that are taken in the design of a new environment can affect the education process of the child either negatively or positively. In other words, the location of the classroom whether at school or at home does not prevent design decisions to be taken carefully. Decisions may vary depending on the circumstances. With this awareness, it is particularly important to support the education of the child.

Educating children is one of the most important ways of benefiting future generations. Thus, the design of the school and its environment should be seen as a process in which architects, interior architects, pedagogues, administrators, teachers and students even students' families especially in compulsory process work together with a shared responsibility with an interdisciplinary approach.

ETHICAL TEXT

"In this article, the journal's writing rules, publication principles, research and publication ethics, and journal ethical rules were followed. The responsibility belongs to the authors for any violations that may arise regarding the article."

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