

HOW STUDENTS PERCEIVE SCHOOL BUILDINGS?: A POST-OCCUPANCY EVALUATION THROUGH ZALTMAN METAPHOR ELICITATION TECHNIQUE (1)

Veysel ŞENYİĞİT*, Hasan Basri MEMDUHOĞLU**

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INTRODUCTION

"We shape our buildings; thereafter they shape us"
Winston Churchill

Especially in the recent decades, rapid changes across sociocultural, scientific, political, and economic aspects, have led to swift adjustments in educational paradigms to meet evolving workforce needs. Consequently, it has become necessary for learning environments to adapt to the emerging needs of modern society in both design and operation. As Lackney (2005) noted, learning environments possess the ability to either motivate or restrain students (and teachers) in their educational endeavors, highlighting the importance of recognizing this spatial effect.

Understanding the impact of space on users is a crucial area of research (Sánchez-Pantoja, Vidal, and Pastor, 2018). People, including children, possess deep knowledge into their own lives and experiences (Askins and Pain, 2011), with children offering unique perspectives on their environment compared to adults. This perspective allows adults to better understand the needs and interests of children (Sahimi, 2012). However, the diversity of children's experiences is often overlooked, and there remains limited understanding their daily encounters within school environment (Holloway and Valentine, 2005; Upitis, 2004).

The various physical dimensions of different environments may have distinct effects on children (Fein, Plotnikoff, Wild and Spence, 2004). Architecture is considered to have a pedagogical value based on the idea that the physical elements in the environment can provide clues for learning (Wilks, 2010). Therefore, the physical environment is conceptualized as a three-dimensional textbook or silent curriculum that influences learning experiences (Taylor, 2009, 25). In this regard, a child's immediate environment is deemed primary in the learning process (David

* *Corresponding Author*; Department of
Educational Sciences, Faculty of Education,
Siirt University, Siirt, TÜRKİYE.

** Department of Educational Sciences,
Faculty of Education, Siirt University, Siirt,
TÜRKİYE.

and Weinstein, 2013). The design of physical spaces can provide a better understanding of the relationship with the environment (Wilks, 2010).

While a school building serves as a physical structure, it also communicates visual messages about appropriate emotions and behaviors within it. This communication can positively (or negatively) affect conditions suitable for learning and social dynamics (Veloso, Marques and Alexandra, 2014). According to Sanoff (2002), attributes such as shape, color, and layout help students and teachers in forming clear mental images of their environment. However, buildings and environments convey messages reflecting the inner life, activities, and social values their users. Students interpret these messages, form judgments, and act accordingly. Thus, any environment comprises not merely objective entities organized in space, but a collection of meanings (Daniels, Stables, Tse and Cox, 2019, 89).

School buildings greatly influence students' learning, impact academic performance (Villarreal Arroyo, Peñabaena-Niebles and Berdugo Correa, 2023). Studies indicate that well-designed school buildings correlate with various positive outcomes, including exam proficiency (Hong and Zimmer, 2016; Neilson and Zimmerman, 2014), attendance rates (Maxwell, 2016, Christle, Jolivet and Nelson, 2007), school climate (Uline, Wolsey, Tschannen-Moran and Lin, 2010), and general health and well-being (Walsemann, Fisk and Dues, 2020; Eitland et al., 2017). Conversely, inadequate building conditions drive teacher mobility, limiting students' access to quality learning environments and effective educators (Uline et al., 2010; Horng, 2009;).

In the 21st century, research now focuses on students' experiences and satisfaction rather than solely on student behavior or grades (Daniels et al., 2019). This shift aligns with Marmot's (2017) concept of the *sticky* campus, where students are drawn to learning environments they find attractive. A well-designed school building fosters a sense of value among students (Maxwell, 2016), which can be further enhanced through aesthetically pleasing buildings and classroom designs that encourage students to spend time on schools (Booth and Sheehan, 2008; Maxwell and Chmielewski, 2008). Design elements, such as spatial layout, furniture, and equipment significantly contribute to students' positive experiences (Walden, 2015). In the school setting, allowing students to personalize their spaces, such as arranging their classroom, yielding positive outcomes, including a heightened sense of self (Maxwell and Chmielewski, 2008) and stronger identification with the school (Killeen, Evans, and Danko, 2003). School commitment, reflecting a sense of belonging to the school environment, serves as a protective factor for children's health, education, and social well-being. It is widely acknowledged that school commitment and school a sense of belonging improve children's mental and emotional well-being (Bond et al., 2007; Hawkins et al, 2005), Shielding them from detrimental influences like substance abuse, violence, sex, and alcohol use (Bisset, Markham and Aveyard, 2007; Kliewer and Murrelle, 2007; Springer, Parcel, Baumler and Ross, 2006).

The school environment significantly impacts students' physical and mental well-being including emotional, psychological, and social aspect. Emotional well-being is defined by student's commitment to the school environment and it thrives when spaces cater to the diverse needs of students. Spaces that encourages interaction impacts social well-being, while adaptable learning environment impact psychological well-being

positively (Hughes et al., 2019). Finally, physical well-being is associated with increased physical activity and less sedentary behavior (Marmot and Ucci, 2015), suggesting the importance of outdoor spaces for sports activities in school designs (Stein, 2007). Overall, according to Hughes et al. (2019), a safe and energetic environment fosters physical well-being, while problem-solving and creativity enhance cognitive well-being. Social well-being is influenced by interactions and peer relationships, emotional well-being by feeling happiness and satisfaction, and, existential well-being by comfort at school.

In this regard, interpreting the effects of design on students' physical and mental well-being goes beyond examining student academic achievement (Anderson and Graham, 2016). This is because holistic well-being enhances learning efficacy, information retention and fosters social behaviors in children (Awartani, Whitman and Gordon, 2008). However, many school systems overlook the significance of school spaces in the learning process, often adhering to traditional architectural models with classrooms resembling shoeboxes along corridors. Architects, considering pedagogical value, can propose designs rooted in child development knowledge. However, meaningful change must primarily stem from the school community's desire for improvement (Hertzberger, 2008).

As Gifford (2014) suggests, beauty should be experienced not only by architects but also by non-architects. When it comes to school building, students are the primary users, and the design process should prioritize their needs over architectural trends (Schalz, 2015). Thus, schools should feel like second home for students (Daniels et al., 2019). Achieving this requires a deeper understanding and collaboration between those who use and design school buildings, moving away from conventional educational facilities (Rigolon and Alloway, 2011). Moreover, risks such as early school dropout rates, stemming from feeling of anonymity, alienation, and insignificance, can be mitigated by ensuring that students—the primary users of school buildings—are heard during the design and evaluation stages (Smyth and Fasoli, 2007). This is because architecture is a deep social practice (Daniels et al., 2019,156).

Despite the link between learning theories and space, there remains insufficient information regarding the use of school buildings (Franz, 2019), warranting further investigation (Daniels et al., 2019) through Post-Occupancy Evaluation (POE) (Olatunji, 2013). Over the past two decades, various definitions of POE have emerged. Broadly, the technical concept of POE can be categorized into three paradigms: evaluation of user's psychological satisfaction emphasizing environmental behavior, subjective evaluation of environmental performance focusing on the perception of the physical environment, and extensive performance evaluation (Huang et al., 2022). POE reveals the effects of school design on building functionality and student activities (Daniels et al., 2019). Additionally, as emphasized by Whyte and Gann (2001), POEs serve multiple purposes, such as enhancing design skills, improving user requirements, informing design guidelines and regulatory processes, and supporting stakeholders in achieving renewal goals.

Centering Turkey, during the Republican administration, schools which were established after the collapse of the Ottoman Empire adopted the same architectural language to create a nation-state in all public buildings (**Figure 1**).



A state school



A military building



A town hall



A community health center

Figure 1. Selected public buildings adopting the same architectural language in Turkey (Created by authors, 2024)

Examining Turkish schools reveals the significant influence of the nation-state concept on both education and architecture. Following the transition from the Ottoman Empire to the Republic, school buildings were designed in accordance with this paradigm. The current school system aligns with the standardised structure of mass compulsory education, a direct consequence of the modern nation-state paradigm. Consequently, school structures resemble other state-operated public buildings, lacking distinct educational features. Notably, large administrative offices and school corridors exemplify this trend (Karataş, Yaman and Bayrak, 2019; Kul, 2011).

Students, as the primary users engaging actively within the school buildings, play significant role in shaping the interpretation the school concept. As such, it becomes necessary to reconsider the traditional concrete-dominated architecture with multiple narrow windows, and classrooms facing each other opening to narrow corridors in light of student experiences as emphasized by Cole, Robinson, Brown, and O'Shea (2008) in promoting students expression through the POE process. Considering the importance of school buildings on well-being and performance, examining their environmental and design conditions is critical (Jiang et al., 2018). This study aims to gather student perceptions of existing school buildings, using the POE methodology.

METHOD

In this paper, our aim was to get the profound insights of students, the main users, regarding the complex issue of post-occupancy evaluation in school buildings. Using the ZMET method for the first time in the POE process, we considered the effectiveness of visuals and metaphors in engaging with child participants. Our aim is to contribute to the enrichment of the POE process by using a visual, entertaining, and tailored method that will reveal the deep thoughts of children based on their

experience while considering their cognitive characteristics within their age range.

Open inquiry, an approach that identifies factors and hidden information inaccessible to structured surveys, stands out as one of the best approaches for POE, especially for research necessitating multiple interviews with the same participants (Stevenson, 2009). However, using this unstructured method with children presents some difficulties. Researchers question the use of non-critical social science methods such as focus groups with children (Vogel, 2009), advocating instead for the development of 'child-friendly and tailored' approaches. In this regard, there is a preference for art-based methods, which rely less on verbal or written communication skills when studying with child participants (Hall, Jones & Thomson, 2011). In this study, we used the Zaltman Metaphor Elicitation Technique (ZMET) (Zaltman, 1996), to explore the deep feelings and thoughts of children, who serve as the main and end users of school buildings, regarding their experiences in these buildings. The necessity for a technique beyond verbal and written expressions to understand complex subjects such as design, environment, and architecture informed our choice of this technique.

The Zaltman Metaphor Elicitation Technique (ZMET), developed by Zaltman and Coulter in 1995, offers a unique and innovative approach to understanding student perceptions within school buildings. This method involves participants selecting images during interviews to explore complex issues using metaphors, allowing them to express their thoughts and emotions in a non-verbal manner. Subsequently, these images undergo analysis through various interview techniques, enabling a deeper understanding of participants' perspectives (Hancock and Foster, 2020). ZMET features participant-driven discussions, photo prompts, and interviews structured within a laddering framework, collectively facilitating a comprehensive exploration of perceptions (Ji and King, 2018). Zaltman emphasizes the success of ZMET, noting that it is a hybrid methodology grounded in various domains, including verbal and nonverbal communication, visual sociology, visual anthropology, literary criticism, semiotics, mental imagery, cognitive neuroscience and phototherapy" (Zaltman and Coulter, 1995, 47). This hybrid methodology aims to uncover the fundamental structures that shape individuals' thinking, providing valuable insights applicable in various contexts, including marketing and research. Through the utilization of ZMET created by Zaltman and Coulter (1995), a fresh and unconventional method is presented for obtaining in-depth student perceptions and understandings within school buildings.

ZMET enables participants to select images reflecting their thoughts and emotions, subsequently examined through various interview techniques. This method not only explore effectively explores perceptions but also draws from an arrays of disciplines to provide a holistic understanding of individuals' experiences and perspectives. Additionally, it acknowledges that social communication mostly takes place nonverbally, with thoughts usually emerging as images. According to ZMET, metaphors lie at the center of consciousness, ingrained in embodied experience, and accessing the deep structure of thought involves acting together with mind, emotion, and experience (Zaltman and Zaltman, 2008; 14).

| Participants' School | Age | Girls n=11 | Boys n=10 | Total N=21 |
|---------------------------------------|-------|---------------|--------------|------------------|
| Uluğbey Middle School | 11-14 | 4 | 3 | 7 (Focus Grup 1) |
| Hürriyet Middle School | 11-14 | 4 | 3 | 7 (Focus Grup 2) |
| Şehit Ahmet Oktay Günak Middle School | 11-14 | 3 | 4 | 7 (Focus Grup 3) |

Table 1. Distribution of students participating in the study

As suggested by Coulter & Zaltman (1994), a ZMET typically requires 20-25 participants for reliability. Therefore, the study group consists of 21 student volunteers students from three middle schools (**Figure 2, 3 and 4**). Before commencing the study, the administrators of the relevant schools were informed. Upon receiving approval from the school administrations, we provided clarification to students regarding content and procedures, in collaboration with visual arts teachers and school counselors.



Uluğbey Middle School

| | |
|--|--------------------|
| Number of Floors Including Entrance | 4 |
| Number of Classrooms | 24 |
| Building Surface Area Including Garden | 2138m ² |
| Location | City Center |
| Number of Students | 1011 |
| Number of Staff | 40 |

Figure 2. School ID Card of Uluğbey Middle School (Created by authors, 2024)

Table 2. ZMET Process and its adoption to our study

| Stages | Application of ZMET Technique | Adopting ZMET To Explore Students' Perceptions of School Buildings (What we did in our study) |
|--|---|---|
| Stage 1: Briefing phase | <p>According to Coulter, Zaltman and Coulter (2001) it is recommended that a cohort of 20-25 participants is essential for the credibility of a ZMET study. Participants should be briefed using a standardized script to maintain consistency. This script should outline the study's objectives, obtain participant consent, and address concerns like anonymity, confidentiality, and the right to withdraw. Moreover, the briefing should clarify the participants' tasks regarding the selection of images for subsequent discussion. Participants are given a week to choose images from various sources like personal photos, the internet, or magazines that best represent their perceptions on the topic.</p> | <p>We received the approval of schools for conducting the study and informed the volunteer students about the study. Following the briefing of students we allowed students one week to choose images from various sources like personal photos, the internet, or magazines that best represent their perceptions on their school building</p> |
| Stage 2: In-depth interview | <p>Step 1 Storytelling: According to Zaltman (2003), this approach enables participants to spontaneously express their personal interpretation of the image. Through storytelling, metaphors inspired by the images naturally surface during the interview process, researchers prompt interviewees to explain the content, reasons for selection, and interpretations of elements within each chosen picture. When images serve as metaphors, interviewees are asked to elaborate on the relevance and connections of these metaphors to their personal experiences (Ji & King, 2018).</p> <p>Step 2 Missed issues and images: Zaltman and Zaltman (2008) recommend that researchers inquire about any images participants prefer not to share or were unable to find, along with the reasons behind these choices.</p> <p>Step 3 Triad task: Employing a 'triad task' enables the examination of the meanings and distinctions among the images selected by the participant (Zaltman, 2003). Encouraging participants to contrast the images can prompt additional profound reflections, leading to a more comprehensive understanding of the subject (Hancock & Foster, 2020) The researchers prompt interviewees to categorize their selected images into coherent groups (similar/different) according to their own logic. This process aids in identifying key themes that hold significance for the interviewees (Ji & King, 2018).</p> <p>Step 4 The metaphor probe: Zaltman (2003) asserts that a successful probe prompts the participant to contemplate the personal significance of the image. These probes should employ neutral language, avoiding any bias or influence from the researcher's perspective on the participant's interpretation of the image</p> <p>Step 5 Expanding the frame: Coulter (2006) recommends that in the probing phase, participants should be prompted to explore elements beyond the immediate content of the image. Participants are encouraged to consider what additional aspects might exist outside the boundaries of the current frame that are not depicted in the image.</p> <p>Step 6 Sensory (non-visual) metaphors: The researchers prompt interviewees to utilize all five senses (sight, hearing, taste, smell, and touch) to articulate the attributes linked to their experiences. For instance, researchers might inquire, 'Can you use a specific scent to depict your experience?' (Ji & King, 2018)</p> <p>Step 7 The vignette: Zaltman (2003) emphasizes the significance of participants crafting a narrative about the subject under investigation, aiming to sum their comprehensive thoughts and emotions.</p> <p>Step 8 The mind (consensus) map: According to Zaltman (2003), it is suggested that an individual's thoughts and emotions regarding a phenomenon are frequently intertwined. These interconnections can be symbolically depicted in a "mind map".</p> <p>Step 9 The visual executive summary/montage: Participants are tasked with generating a composite image or a 'collage' utilizing the images they have selected. This aids in constructing a comprehensive perspective of an experience that has been interpreted through the storytelling of individual pictures.</p> | <p>Although individual interviews are recommended in the ZMET, focus group interviews were conducted due to the fact that the students in the study group were between the ages of 11-14, they could feel more comfortable emotionally and mentally in group interviews, and they could trigger different thoughts during interaction (Rallis & Rossman, 2017). As mentioned by Zaltman (1996), deep and secret thoughts emerge as soon as they are recalled from memory.</p> |
| Stage 3: Transcription, data analysis and developing constructs | <p>Transcriptions of all interviews are completed, including observations of pertinent non-verbal cues. These records are combined with the participant's selected images, the visual summary (montage), and mind maps. This comprehensive dataset should be thoroughly analyzed to uncover metaphors and associated constructs, ultimately forming a "consensus map" that emphasizes prevalent themes arising from ZMET (Zaltman, 2003).</p> | <p>We transcribed all interviews and created the codes, categories, and themes. Then we got expert review (member-checking) and participant confirmation. We formed consensus map along with visual executive summaries (collage) in the final stage.</p> |



Şehit Ahmet Oktay Günak Middle School

| | |
|--|--------------------|
| Number of Floors Including Entrance | 5 |
| Number of Classrooms | 32 |
| Building Surface Area Including Garden | 1240m ² |
| Location | City Center |
| Number of Students | 1041 |
| Number of Staff | 64 |

Figure 3. School ID Card of Şehit Ahmet Oktay Günak Middle School (Created by authors, 2024)

Following the first briefing, students who volunteered for the study were interviewed three to four days later. They were instructed to bring three visuals, either digital or printed, showing existing school building like classroom, corridor, playground, etc. The students were informed that there should be elements that evoke school buildings in the visuals instead of direct school buildings. A few sample images related to a different subject were shared with the students to clarify the requested. For example, images “money, diamond, and men’s suit” which symbolize statue and wealth, were paired with Mercedes-Benz. After this briefing, the students were given one week to prepare their their visuals and interviews commenced as soon as the visuals were ready. To ensure privacy and anonymity (Halai, 2006), students were coded as $S_1, S_2, S_3... S_{21}$.



Hürriyet Middle School

| | |
|--|---------------------|
| Number of Floors Including Entrance | 5 |
| Number of Classrooms | 32 |
| Building Surface Area Including Garden | 1876 m ² |
| Location | City Center |
| Number of Students | 1122 |
| Number of Staff | 49 |

Figure 4. School ID Card of Hürriyet Middle School (Created by authors, 2024)

Despite that individual interviews are recommended in ZMET, focus group interviews were conducted due to the ages of the students (11-14), since they might feel more emotionally and mentally comfortable in group interviews and could motivate different thoughts through interaction (Rallis and Rossman, 2017). As mentioned by Zaltman (1996), deep and secret thoughts emerge as soon as they are recalled from memory. Following ZMET guidelines, approximately 2 hours of interviews were held with each focus group (n=7) in the first stage. The interviews started with the question “Why do you think this image reflects the school building?” based on the visuals brought by the students. During the interviews, students were asked whether they had missed images that they thought reflected the school building but could not find. The students responded that they had not missed any images.

Next, students were requested to group the images they brought and were asked “What is the difference between two images and the third one?” (triad task). This expanded the frame of the visual through metaphor probe questions. Additionally, to encourage students to use sensory metaphors (color, smell, taste, sound, touch) regarding the visuals they brought (Coulter, 2007), questions such as “What would you hear/smell if you were



Figure 5. An example of a montage

in this picture?" were asked. The visuals brought by the students during the interviews were displayed on smart boards for the entire group to engage with. Following individual comments, ideas were gathered from the whole group.

In the third stage, ICT teachers helped to prepare a collage (montage) from the visuals brought by the students as they desired (Figure 5).

Each student's three images were combined into a single collage. While creating the collage with the students, attention was paid to factors such as placement and size of the visuals. The position and size of each image in the collage created by the students provided additional insight into their preference. The visual that best summarised the participants' perception of the school building was allocated a larger space. For example, in the collage in Figure 5, more space was given to images reflecting the school building's crowdedness and the inconsideration of students' physical differences in the classroom. When working with children, the *vignette* stage of the ZMET was sidestepped in favor of child-friendly and tailored techniques. This consideration arose because the vignette stage could be challenging for the students' mental and cognitive stages and that storytelling through visuals, similar to the first step, were more effective.

Content analysis was used to interpret the data obtained from the interviews, representing a systematic and objective method for describing phenomena in qualitative studies (Schreier, 2012). Researchers took observation notes and identify meaningful words that provided clues

about school buildings. Focused coding (Saldana, 2016) was then employed to refine codes useful to the focus of the study hence, generating themes related to the evaluation of school buildings

Following comparison and discussion of the notes, both raw data and the created themes created were sent to a POE expert for review. Peer debriefing was conducted to strengthen dependability, feedback were provided to the students on the themes and interpretations created. Member checking was performed to determine the consistency between the researchers' interpretations and participants' statements. Finally, a consensus map (see Figure 6) was developed to outline the context, analysis units, and categories relevant for school building use.

FINDINGS

The study obtained data from this the students, the main end users of school buildings, using visual metaphors and interpretation. The data were categorized into three themes: a) ergonomics and comfort, b) individualization, and c) school atmosphere.

The number of students who brought visuals for each space (garden, corridor, and classroom) was denoted by *N*. For example, 9 students brought visuals about the garden. However, the frequency of the clue words expressed during the interview was represented by *f* within their

Figure 6. Codes, categories, and themes for school buildings: Consensus map.



Pic 1.



Concrete and ugly

Pic 2.



Students as flowers in jail-like school

Pic 3.



Colourful students in colourless building

Pic 4.



Poor air quality

Pic 5.



Bad smell

Pic 6.



Poor light quality

Pic 7.



Classroom windows

Pic 8.



Classrooms and corridors

Pic 9.



Feeling to be prisoner

Pic 10.



Burning in summer and freezing in winter

Pic 11.



The same facilities for everyone. Lack of ergonomy

Pic 12.



Nonfunctional

Pic 13.



Corridors at break

Pic 14.



School garden and outer world

Pic 15.



School vomiting students after the courses

Pic 16.



The same concrete face everywhere. No identity.

Figure 7. The most reflective images of students' perception of the school building

respective theme. In accordance with the focused coding technique, the visuals provided by students (totaling 63 visuals) were grouped based on similarity. The visuals that best reflected the experience of school buildings were assembled into collaged (Figure 7) alongside their explanations:

Ergonomy and Comfort

The experiences of the students in the study group related to the existing school building were mostly categorized under the theme of ergonomy and comfort, with a frequency of 93 ($f=93$). Considering the effect of school starting hours (7-8 a.m.), interpretation suggested that existing buildings had heating and lighting problems, especially during winter.

S₃: In winter, we go to school in almost dark and the first lesson hours are spent in the unheated and dark classroom. We can't focus at all in the first hours, so I wish lessons like mathematics and science weren't in the first hours.

It was stated that insufficient ventilation and excessive heat negatively affects classrooms facing direct sunlight, particularly in April-May and June when the temperatures rise, especially in the Southeastern Anatolia region. This is due to the building structures and classrooms design. The consistent use of architecture and building materials across regions was considered to have effectively influenced this finding, regardless of the positioning and regional characteristics of the school buildings.

The uniformity of the desks and tables used classroom layout and design, depending on the teacher-centered approach based on the narrator-listener relationship, was negatively experienced by the students, regardless of height and weight. Additionally, the insufficient capacity of school restrooms (averaging 10-12 toilets per 1000 students), unpleasant odors caused by overcrowding, and the height of taps and sinks in the restrooms also contribute to negative experiences for students.

S₁: The bench we sit on is both narrow and hurts our back. I am tall but my deskmate is short. I'm trying to pull the desk forward so that I can stretch my legs, and my deskmate is trying to pull it to himself/herself so that she can write comfortably. It is quite difficult for both of us to spend 7 lessons like this every day.

The inadequacy of classroom windows and the absence of a ventilation system in the classrooms were among the important factors that contributed to students' negative experiences. The classrooms were not sufficiently ventilated, as the windows were closed due to the cold weather in winter, while noise disturbance (such as traffic, etc.) were common around the schools during spring and summer.

S₁₇: Everyone is sweating, especially after Physical Education (PE) classes, and the classroom smells awful. I don't want to go to class after PE classes. Apart from these, everyone starts getting sick when someone gets sick in the classroom because we can't get fresh air.

Considering the school corridors, it was striking that they were narrow, with boards positioned at heights unreachable for students, and devoid of individual spaces. Additionally, the fact that school gardens were mostly concrete deprived students of comfort zone, emerged as important points regarding the ergonomics and comfort experiences of the students.

Individualization

A recurring theme expressed by students ($f=78$) with significant frequency regarding school buildings as a whole pertains to individualization

experiences. Students expressed concern about their inability to change seating arrangements, the absence of personalized corners with traces of ownership within classrooms, and teachers' involvement in the selection or creation of materials to be exhibited on classroom boards. These factors contributed significantly in shaping students' expressions regarding individualization. Also, the students shared the same sentiments regarding the corridors, while noting that lack of structural, and cosmetic elements for students to spend quality time and relax, either individually or as a groups, during break.

The corridors were largely perceived as mere "entrance-exit tunnel" (S₈). This perception arise from several factors: the classrooms facing each other, opening onto narrow elongated corridors; the absence of permissions reflecting the studies or preferences of students; and failure to meet the need for relaxation or social interaction.

S₅: Let alone rest, the corridors are like tunnels where we get extra tired to avoid the crowds and congestion. It is very difficult, especially for the girls, to go out during the breaks because all the classes almost run at the same time. We cannot even think of eating or drinking anything in the corridors as they can run into us.

School gardens, predominantly made of concrete and devoid of safe rest or play areas were perceived more as gathering centers. In summary, students felt that their school areas did not adequately reflect them and thus felt alienated from the school environment.

School Atmosphere

Based on the visuals and data obtained from in-depth interviews, another noteworthy theme that arose from end-user experiences of school buildings was the school atmosphere (f=64). Questions about how it was felt within the school buildings and the message the school conveyed served as references for arriving at this theme. The sensory images (sensory metaphors), in particular, obtained together with the visuals revealed how much the students interpreted the message conveyed by the school buildings.

Students generally expressed their feelings about the school building, describing feelings of alienated, loneliness, and isolation (anger and silent



Figure 8. Some of the sensory images used by students

requiem). Furthermore, they express discomfort emanating from structural and cosmetic features, like feelings of crankiness, rust, dampness, stifling, and addled smell, pitch together with a sense of gloom (brown and gray). They regarded the school environment as merely compulsory rather than inviting (brackish herbal tea). In this regard, it can be interpreted that the inability of school buildings to respond to the needs and individual differences specified in the themes of ergonomics, comfort, and individualization contributes to a structure intertwined with the perceived school atmosphere.

DISCUSSION AND CONCLUSION

Based on the findings of this study, in generally, there were negativity surrounding experiences about the existing school architecture. The multi-story, concrete-dominated with inflexible structural elements of the school design were considered to be the determining factors of these experiences. The most reported experiences regarding the classrooms were related to overcrowded conditions, as well as concerns regarding the thermal, acoustic, and lighting characteristics. Insufficient natural lighting from classroom windows and a lack of ventilation circulation to maintain indoor air quality standard led students to describe classrooms as “unhealthy and smelly.” However, the fact that the benches-desks had a uniform structure disregarding the individual physical characteristics, limited different arrangements and resulted in two students sharing the same desk. These aspect played a part in the negative experiences among the students in terms of ergonomics, health, and comfort.

Indoor environmental conditions should be both functional and also support people’s needs (Vasquez, Rupp, Andersen and Toftum, 2022). As in Earthman (2004), the two building elements that impact student achievement the most are temperature control and air quality. In a built environment, maintaining temperature and ventilation within reasonable ranges is crucial element for thermal comfort. Studies reveals that unsuitable thermal conditions can decrease overall alertness and increase physiological stress (Zhang and Barrett, 2010). Therefore, thermal, visual, and acoustic comfort provided in physical spaces is recognized as the basic condition for creating a livable, healthy, and productive environment (Szokolay, 2012).

In general, a well-coordinated and integrated system of daylight and electric lighting benefits the students’ learning and well-being (Erwine, 2006). Besides, a recent study revealed that classroom illuminance affects students’ memories at psychological and neurophysiological levels (Castilla, Higuera-Trujillo and Llinares, 2023). Similarly, Juan and Chen (2022) revealed that changes in lighting, sound and temperature significantly impact students’ concentration level, and changes in light and sound more likely to affect students’ anxiety levels. However, it was observed that existing school buildings failed to consider east-west orientation to maximizing daylight use. As Zhang and Barrett (2010), emphasized, the main source of the amount of natural light in a space is the sky, making building orientation a fundamental factor for daylight control. To maximize daylight use and enhance natural light exposure, we suggest incorporating ample windows, skylights, and light wells. These elements will improve occupants’ well-being and reduce reliance on artificial lighting. Replacing traditional incandescent bulbs with energy-efficient LED lights is also suggested for longevity, energy savings, and improved

illumination. Additionally, we suggest using warm (yellowish) light in relaxation zones such as corridors and the canteen, and cool (bluish) light for active spaces like classrooms.

Indoor air quality is important for children's well-being and comfort and has an indirect impact on their academic achievement. Bad air quality can lead to sickness or discomfort, resulting in students' reluctance to attend school, reduced motivation to participate in learning activities, and decreased engagement with school (Batterman et al., 2017; Gifford, 2014; Evans, 2006). A recent study by Zhang et al. (2023) suggests that as indoor temperature increases, the outdoor air supply rate should be increased to ensure air freshness in classrooms, as calculated carbon dioxide emission rate by students increased by 0.54 L/h per person for every 1 °C rise in indoor temperature. To enhance indoor air quality (IAQ) and improve the comfort of occupants, we recommend installing mechanical ventilation systems capable of effectively replacing indoor air with clean outdoor air. For example, functional, easy to use and affordable heat recovery ventilators can be used in classrooms. Moreover, school buildings should be designed with operable windows or vents to allow natural airflow when weather is suitable. Existing school building can be modified to include these features.

In this paper, it was interpreted that the classrooms, corridors, and even the garden were crowded during breaks and, therefore inhibiting students from having effective and healthy course process or sufficient rest. According to Maxwell (2003), high spatial density is associated with lower academic achievement for girls and increased behavioral problems for boys. However, studies have revealed that chronically long reverberation time and high noise levels negatively affect phonological processing (speech perception), academic motivation (Klatte, Hellbrück, Seidel and Leistner, 2010), psychological health (Stansfeld et al., 2009), cognitive abilities, and auditory language processing abilities (Hollander and de Andrade, 2014). To address this, we recommend integrating natural wood elements for warmth and authenticity, as wooden floors, ceilings, and furniture can enhance the overall aesthetic. Besides, using cork for bulletin boards or wall coverings is beneficial as it is sustainable, sound-absorbing, and visually appealing. Student experiences in informal learning areas such as corridors and gardens were emphasize the need for more individualization and green space. The standardizing, formative, and heavily gloomy bureaucratic design does not allow for flexible and individualized spaces, resulting in the difficulty to responds to the socialization and play that students need most. The ignored aesthetic concern is in parallel with the message of the hegemonic power of the state. However, the aesthetic characteristics of a school can foster a strong sense of belonging, which in turn can create an enthusiasm for learning (Jarman, Webb and Chan, 2004).

To disperse the gloomy bureaucratic atmosphere of school buildings, using bright and lively colors such as blue, green, and yellow can be beneficial. Blue encourages tranquility and focus, green symbolizes nature and equilibrium, and yellow sparks creativity and positivity. The walls in shared spaces or classrooms can be accentuated with different colors to enhance visual appeal. Vibrant hues can energize certain areas, while softer shades can establish a calming atmosphere. Distinct colors can be allocated to different zones in the school (e.g., classrooms, hallways, recreational spots) for better color segmentation which aids student orientation and

fosters a unique identity for each area (Ma, Liu, Zhang & Li, 2023; Armaki and Farhadnia, 2021; Jonauskaitė et al., 2019; Hanada, 2018; Al-Ayash, Kane, Smith and Green-Armytage, 2016 Azad).

Green spaces in schools positively impact the physical, mental, social, and spiritual well-being of students (Bell and Dymont, 2008), and, therefore, decreasing contact with nature can lead to negative physical, social, and psychological consequences on children (Zhang, Goodale and Chen, 2014). To tackle this, new school buildings should be planned and design to have more green areas and playgrounds that connect students directly to nature. However, in existing schools, vertical gardens can be both functional and educational, allowing students to learn about different plant species and their care. Incorporating potted plants, hanging planters, or vertical gardens in classrooms, hallways, and common areas can serve as visual focal points and positively contribute to the overall atmosphere of school buildings. Informal learning spaces are defined as areas that offer students with opportunities for interaction and self-directed activities (Knapp, 2007), encouraging students' collaboration (Mutekwe et al., 2013). Self-directed activities of students develop their curiosity and desire for knowledge, and this happens more likely in playgrounds, school corridors, or under trees (Knapp, 2007, 16). These areas let children create their own comfort zone outside of formal learning spaces (Loyens, Magda and Rikers, 2008). The ability of children to individualize their space provide them with a sense of control, competence, and self-confidence (Maxwell and Chmielewski, 2008). Flexible spatial arrangements and furniture contribute to the psychological well-being of students during different learning practices. In addition, a school design supported by a student-centered pedagogical program positively affects students' social well-being by encouraging positive interactions (Kariippanon et al., 2018). According to Anderson and Graham (2016), school environments that allow students to individualize their spaces, socialize with their peers, and collaborate in sharing knowledge contribute positively to their mental well-being. In this context, using adjustable and tailored furniture catering to diverse learning styles and preferences can enhance individualization. Besides, creating separate areas in classrooms for different activities like silent reading, group projects, and practical experiments, and using outdoor spaces for interactive learning and sensory exploration, can further contribute to this. We also recommend to tailor spaces both in classrooms and in corridors to meet individual needs, allowing students to personalize their learning environment.

This study was conducted in Şanlıurfa province. Turkey. Conducting similar studies in different socio-cultural, geographical, and climatic regions would offer a more holistic perspective. On a large scale, we recommend that policymakers, decision-makers, and designers pay more attention to the perceptions of the end users in designing new school buildings. It is crucial to ensure maximum harmony between building design, pedagogy and environmental psychology.

REFERENCES

- AL-AYASH, A., KANE, R. T., SMITH, D., GREEN-ARMYTAGE, P.
(2016) The Influence of Color on Student Emotion, Heart Rate, and Performance in Learning Environments. *Color Research & Application*, 41(2), 196-205.

- ANDERSON, D. L., GRAHAM, A. P. (2016) Improving student wellbeing: having a say at school. *School Effectiveness and School Improvement*, 27(3), 348–366.
- ASKINS, K., PAIN, R. (2011) Contact Zones, Participation, Materiality and the Messiness of Interaction. *Environment and Planning D: Society and Space*, 29, 803–821.
- AWARTANI, M., WHITMAN, C. V., GORDON, J. (2008) Developing Instruments to Capture Young People's Perceptions of How School as a Learning Environment Affects their Well-being. *European Journal of Education*, 43(1), 51–70.
- AZAD ARMAKI, M., FARHADNIA, N. (2021) The Effect of Color on Learning Efficiency Among Primary School Students in Noorabad Delfan, Iran. *International Journal of Pediatrics*, 9(7), 14003-14010.
- BATTERMAN, S., SU, F. C., WALD, A., WATKINS, F., GODWIN, C., Thun, G. (2017) Ventilation Rates In Recently Constructed US School Classrooms. *Indoor Air*, 27(5), 880-890.
- BISSET, S., MARKHAM, W. A., AVEYARD, P. (2007) School Culture As An Influencing Factor On Youth Substance Use. *Journal of Epidemiology & Community Health*, 61(6), 485-490.
- BOND, L., BUTLER, H., THOMAS, L., CARLIN, J., GLOVER, S., BOWES, G., PATTON, G. (2007) Social And School Connectedness In Early Secondary School As Predictors Of Late Teenage Substance Use, Mental Health, And Academic Outcomes. *Journal of adolescent health*, 40(4), 357-e9.
- BOOTH, M. Z., SHEEHAN, H. C. (2008) Perceptions of People and Place: Young Adolescents' Interpretation Of Their Schools In The United States And The United Kingdom. *Journal of Adolescent Research*, 23(6), 722-744.
- CASTILLA, N., HIGUERA-TRUJILLO, J. L., LLINARES, C. (2023) the Effects of Illuminance on Students' Memory. A Neuroarchitecture Study. *Building and Environment*, 228, 109833.
- CHRISTLE, C. A., JOLIVETTE, K., NELSON, C. M. (2007) School Characteristics Related To High School Dropout Rates. *Remedial and Special education*, 28(6), 325-339.
- COLE, R., ROBINSON, J., BROWN, Z., O'SHEA, M. (2008) Recontextualizing the Notion of Comfort. *Building Research & Information*, 36(4), 323–336.
- COULTER, R. A. (2007). *Consumption Experiences as Escape: An Application of the Zaltman Metaphor Elicitation Technique* (400-418). Northampton: Edward Elgar.
- COULTER, R. A., ZALTMAN, G., COULTER, K. S. (2001) Interpreting Consumer Perceptions of Advertising: An Application Of The Zaltman Metaphor Elicitation Technique. *Journal of advertising*, 30(4), 1-21.
- COULTER, R. H., ZALTMAN, G. (1994) Using The Zaltman Metaphor Elicitation Technique To Understand Brand Images. *ACR North American Advances*.

- DAVID, T. G., WEINSTEIN, C. S. (EDS.). (2013) *Spaces for Children: The Built Environment and Child Development*. Springer Science & Business Media.
- EARTHMAN, G.I. (2002) School facility conditions and student academic achievement. UCLA's Institute for Democracy, Education
- EITLAND, E., KLINGENSMITH, L., MACNAUGHTON, P., CEDENO LAURENT, J., SPENGLER, J. (2017) *Schools for Health: Foundations for Student Success*. Harvard TH Chan School of Public Health
- ERWINE, B. (2006) Lighting. In H. Frumkin, R. Geller, I. L. Rubin, J. Nodvin (Eds.), *Safe and Healthy School Environments* (pp. 20_33). Oxford, UK: Oxford University Press.
- EVANS, G. W. (2006) Child Development and the Physical Environment. *Annual review of psychology*, 57, 423.
- FEIN, A. J., PLOTNIKOFF, R. C., WILD, T. C., SPENCE, J. C. (2004) Perceived Environment and Physical Activity in Youth. *International journal of behavioral medicine*, 11(3), 135-142.
- FRANZ, J. (2019) Towards a Spatiality of Wellbeing. In H. Hughes, J. Franz, J. Willis (Eds.), *School Spaces For Student Wellbeing And Learning* (pp. 3–19). Springer.
- GIFFORD, R. (2014) *Environmental psychology: Principles and Practice*. (5th edition). Coleville, WA: Optimal Books
- HALAI, A. (2006). Ethics in Qualitative Research: Issues and Challenges. *EdQual A Research Programme Consortium on Implementing Education Quality in Low Income Countries*. *EdQual Working Paper Number, 4*, 1-12.
- HALL, C., JONES, K., THOMSON, P. (2011) Snapshots, Illustrations and Portraits: Re-Presenting Research Findings. In P. Thomson and J. Sefton-Green (Eds.), *Researching Creative Learning: Methods and Issues* (pp. 126–142). London: Routledge.
- HANADA, M. (2018) Correspondence Analysis of Color–Emotion Associations. *Color Research & Application*, 43(2), 224-237.
- HANCOCK, C., FOSTER, C. (2020) Exploring The ZMET Methodology In Services Marketing. *Journal of Services Marketing*, 34(1), 48-58.
- HAWKINS, J. D., KOSTERMAN, R., CATALANO, R. F., HILL, K. G., ABBOTT, R. D. (2005) Promoting Positive Adult Functioning Through Social Development Intervention In Childhood: Long-Term Effects From The Seattle Social Development Project. *Archives of pediatrics & adolescent medicine*, 159(1), 25-31.
- HERTZBERGER, H. (2008) *Space and Learning: Lessons in Architecture 3* (Vol. 3). 010 Publishers.
- HOLLANDER, C., DE ANDRADE, V. M. (2014) The Effects Of Aircraft Noise On The Auditory Language Processing Abilities Of English First Language Primary School Learners In Durban, South Africa. *Urban Education*, 49(7), 783-805.
- HOLLOWAY, S. L., VALENTINE, G. (2005) Children's Geographies and the New Social Studies of Childhood. In C. Jenks (Ed.), *Childhood: Critical Concepts In Sociology* (pp. 163–188). London: Routledge.

- HONG, K., ZIMMER, R. (2016) Does Investing In School Capital Infrastructure Improve Student Achievement? *Economics of Education Review*, 53, 143-158.
- HORNG, E. L. (2009). Teacher Tradeoffs: Disentangling Teachers' Preferences for Working Conditions and Student Demographics. *American Educational Research Journal*, 46(3), 690-717.
- HUANG, X., CHEN, G., ZHAO, C., PENG, Y., GUO, W. (2022) Post Occupancy Evaluation of Indoor Environmental Quality of Sports Buildings at Hot And Humid Climate From The Perspective Of Exercisers. *Building and Environment*, 226, 109760.
- HUGHES, H., FRANZ, J., WILLIS, J., BLAND, D., ROLFE, A. (2019) High School Spaces and Student Transitioning: Designing For Student Wellbeing. In *School Spaces For Student Wellbeing And Learning* (pp. 97-119). Springer, Singapore.
- JARMAN, D., WEBB, L., CHAN, T. C. (2004) A Beautiful School Is A Caring School. *School Business Affairs*, 70, 37-38.
- JL, M., KING, B. (2018) Explaining The Embodied Hospitality Experience With ZMET. *International Journal of Contemporary Hospitality Management*, 30(11), 3442-3461.
- JIANG, J., WANG, D., LIU, Y., XU, Y., LIU, J. (2018) A Study on Pupils' Learning Performance and Thermal Comfort of Primary Schools in China. *Building and Environment*, 134, 102-113.
- JONASKAITE, D., ALTHAUS, B., DAEL, N., DAN-GLAUSER, E., MOHR, C. (2019) What Color Do You Feel? Color Choices Are Driven By Mood. *Color Research & Application*, 44(2), 272-284.
- JUAN, Y. K., CHEN, Y. (2022). The Influence of Indoor Environmental Factors on Learning: An Experiment Combining Physiological and Psychological Measurements. *Building and Environment*, 221, 109299.
- KARATAŞ, İ. H., YAMAN, A., BAYRAK, V. M. (2019) Türkiye'de Okul Tasarımı Ve Estetiği: Tespitler, Eğilimler, İlkeler, Öneriler. İstanbul: Öncü Okul Yöneticileri Derneği Yayınları.
- KARİPPANON, K. E., CLİFF, D. P., LANCASTER, S. L., OKELY, A. D., PARRISH, A. M. (2018) Perceived Interplay Between Flexible Learning Spaces and Teaching, Learning And Student Wellbeing. *Learning Environments Research*, 21(3), 301-320.
- KLATTE, M., HELLBRÜCK, J., SEIDEL, J., LEISTNER, P. (2010) Effects of Classroom Acoustics on Performance and Well-Being in Elementary School Children: A Field Study. *Environment and Behavior*, 42(5), 659-692.
- KLIEWER, W., MURRELLE, L. (2007) Risk And Protective Factors for Adolescent Substance Use: Findings From A Study in Selected Central American Countries. *Journal of adolescent health*, 40(5), 448-455.
- KNAPP, E. (2007) School Building In Developing Countries: Is Quantity The Only Relevant Dimension Of The Problem? In E. Knapp, K. Noschis, C. Pasalar (Eds.), *School Building Design and Learning Performance: With a Focus on Schools in Developing Countries* (pp. 9-34).

- KUL, F. N. (2011) Erken Cumhuriyet Dönemi İlkokul Binaları. *Mimarlık Dergisi*, 360, 66-71.
- LACKNEY, J. A. (2005) New Approaches for School Design. In F. W. English (Ed.), *The Sage Handbook Of Educational Administration* (506–537). Los Angeles, CA: Sage.
- LOYENS, S., MAGDA, J., RIKERS, R. (2008) Self-Directed Learning in Problem-Based Learning and Its Relationships with Self-Regulated Learning. *Educational Psychology Review*, 20(4), 411–427.
- MA, X., LIU, H., ZHANG, Z., LI, Y. (2023) How Does Indoor Physical Environment Differentially Affect Learning Performance In Various Classroom Types? *Building and Environment*, 234, 110189.
- MARMOT, A. (2017) Educational Innovation through Building Adaptation. *Architectural Design*, 87(5), 96–105.
- MARMOT, A., UCCI, M. (2015) Sitting Less, Moving More: The Indoor Built Environment as a Tool for Change, *Building Research & Information*, 43(5), 561-565.
- MAXWELL, L. E. (2003) Home and School Density Effects on Elementary School Children: The Role of Spatial Density. *Environment and behavior*, 35(4), 566-578.
- MAXWELL, L.E., CHMIELEWSKI, E.J. (2008) Environmental Personalization and Elementary School Children's Self-Esteem. *Journal of Environmental Psychology*, 28, 143-153.
- MUTEKWE, E., NDOFIREPI, A., MAPHOSA, C., WADESANGO, N., MACHINGAMBI, S. (2013) A SWOT Analysis of the Rise and Pedagogical Implications of the Social Constructivist Epistemology in Educational Practice. *The Anthropologist*, 15(1), 53–65.
- NEILSON, C. A., ZIMMERMAN, S. D. (2014) The Effect Of School Construction On Test Scores, School Enrollment, And Home Prices. *Journal of Public Economics*, 120, 18-31.
- OLATUNJI, A. A. (2013) Post-Occupancy Evaluation of Lagos State Polytechnic Facilities: A User-Based System. *Journal of emerging trends in engineering and applied sciences*, 4(2), 229-236.
- RIGOLON, A., ALLOWAY, M. (2011) Children and Their Development as the Starting Point: A New Way to Think About the Design of Elementary Schools. *Educational and Child Psychology*, 28(1), 64.
- ROSSMAN, G. B., RALLIS, S. F. (2017) Gathering Data in The Field. *An Introduction To Qualitative Research: Learning in the Field* (4th ed). Thousand Oaks: Sage Publications Inc, 146-180.
- SAHIMI, N. N. (2012) Preschool Children Preferences on Their School Environment. *Procedia-social and behavioral sciences*, 42, 55-62.
- SALDAÑA, J. (2016) *The Coding Manual For Qualitative Researchers* (3rd ed.). London: SAGE.
- SÁNCHEZ-PANTOJA, N., VIDAL, R., PASTOR, M. C. (2018) Aesthetic Perception of Photovoltaic Integration within New Proposals for Ecological Architecture. *Sustainable cities and society*, 39, 203-214.
- SANOFF, H. (2002) *Schools Designed With Community Participation* National Clearinghouse for Educational Facilities, Washington, DC

- SCHALZ, S. (2015) The Historical Development Of School Buildings In Germany. In *Schools for the Future* (pp. 51-87). Springer, Wiesbaden.
- SCHREIER, M. (2012) *Qualitative Content Analysis in Practice*. Thousand Oaks, CA: Sage Publications.
- SMYTH, J., FASOLI, L. (2007) Climbing Over The Rocks In The Road To Student Engagement And Learning In A Challenging High School In Australia. *Educational Research*, 49(3), 273-295.
- SPRINGER, A., PARCEL, G., BAUMLER, E., ROSS, M. (2006) Supportive Social Relationships and Adolescent Health Risk Behavior among Secondary School Students in El Salvador. *Social science & medicine*, 62(7), 1628-1640.
- STANSFELD, S. A., CLARK, C., CAMERON, R. M., ALFRED, T., HEAD, J., HAINES, M. M., LÓPEZ-BARRIO, I. (2009). Aircraft and Road Traffic Noise Exposure and Children's Mental Health. *Journal of Environmental Psychology*, 29(2), 203-207.
- STEIN, P. (2007) *Multimodal Pedagogies in Diverse Classrooms: Representation, Rights and Resources*. Routledge.
- STEVENSON, F. (2009) Post-Occupancy Evaluation and Sustainability: A Review. *Urban Design and Planning*, 162(3), 123-130.
- SZOKOLAY, S. (2012) *Introduction to Architectural Science*. Routledge.
- TAYLOR, A. (2009) *Linking Architecture and Education: Sustainable Design for Learning Environments*. UNM Press.
- ULINE, C. L., WOLSEY, T. D., TSCHANNEN-MORAN, M., LIN, C. D. (2010) Improving the Physical and Social Environment of School: A Question of Equity. *Journal of school leadership*, 20(5), 597-632.
- UPITIS, R. (2004) School Architecture and Complexity. *Complicity: An International Journal of Complexity and Education*, 1(1), 19-38.
- VASQUEZ, N. G., RUPP, R. F., ANDERSEN, R. K., TOFTUM, J. (2022) Occupants' Responses to Window Views, Daylighting and Lighting in Buildings: A Critical Review. *Building and Environment*, 109172.
- VELOSO, L., MARQUES, J. S., DUARTE, A. (2014) Changing Education through Learning Spaces: Impacts of the Portuguese School Buildings' Renovation Programme. *Cambridge journal of education*, 44(3), 401-423.
- VILLARREAL ARROYO, YP., PEÑABAENA-NIEBLES, R., BERDUGO CORREA, C. (2023) Influence of Environmental Conditions on Students' Learning Processes: A Systematic Review, *Building and Environment*.
- VOGEL, S. (2009) Focus Groups With Children. In J. Fielder & C. Posch (Eds.), *Yes They Can! Children Researching Their Lives* (pp. 86-98). Germany: Schneider Verlag Hohengehren GmbH.
- WALDEN, R. (2015) The School Of The Future: Conditions And Processes-Contributions Of Architectural Psychology. In *Schools for the Future* (pp. 89-148). Springer, Wiesbaden.
- WALSEMANN, K. M., FISK, C. E., DUES, A. N. (2020). A Spatial Analysis of Countylevel Education Context and Population Health and Wellbeing. *Wellbeing, Space and Society*.

- WHYTE, J., GANN, D. M. (2001). Closing the Loop between Design and Use: Post-Occupancy Evaluation. *Building Research & Information*, 29(6), 460-462.
- WILKS, S. (2010) A Charter for Children's Learning at the Royal Children's Hospital. Melbourne, Australia. *The University of Melbourne and the RCH Education Institute*.
- ZALTMAN, G. (1996) Metaphorically Speaking. *Marketing Research*, 8(2), 13-20.
- ZALTMAN, G. (2003) *How Customers Think: Essential Insights Into The Mind Of The Market*, Harvard Business Press, Brighton, MA.
- ZALTMAN, G., COULTER, R. H. (1995) Seeing the voice of the customer: Metaphor-based advertising research. *Journal of advertising research*, 35(4), 35-51.
- ZALTMAN, G., ZALTMAN, L. H. (2008) *Marketing Metaphoria: What Deep Metaphors Reveal About the Minds of Consumers*. Harvard Business Press.
- ZHANG, X., ZHAO, C., ZHANG, T., XIE, J., LIU, J., ZHANG, N. (2023) Association Of Indoor Temperature And Air Quality In Classrooms Based On Field And Intervention Measurements. *Building and Environment*, 229, 109925.
- ZHANG, Y., BARRETT, P. (2010) Findings from a Post-Occupancy Evaluation in the UK Primary Schools Sector. *Facilities*, Vol. 28 No. 13/14, pp. 641-656. .

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ÖĞRENCİLER OKUL BİNALARINI NASIL ALGILAR?: ZALTMAN METAFOR ÇIKARIM TEKNİĞİ İLE BİR KULLANIM SONRASI DEĞERLENDİRME ÇALIŞMASI

Öğrenme teorileri ve mekân arasındaki ilişkiye rağmen, okul binalarının kullanımı hakkında yeterli bilgi bulunmamaktadır. Bu konunun Kullanım Sonrası Değerlendirme (KSD) yoluyla araştırılması gerekmektedir. Öğrenciler, okul binası sistemine en fazla sosyal katılımı olan ana kullanıcılarıdır. Bu nedenle betonarme ağırlıklı, çok sayıda dar penceresi olan, sınıfları birbirine bakan ve dar koridorlara açılan okul konseptinin öğrencilerin deneyimleri ışığında yorumlanması ve KSD süreci ile öğrencilerin okul binası hakkındaki yorumlarını ifade etmelerinin sağlanması gerekmektedir. Bu çalışmada Zaltman Metafor Çıkarım Tekniği (ZMET) kullanılmıştır. Çalışmanın katılımcıları üç ortaokuldan 21 gönüllü öğrenciden oluşmaktadır ve çalışmada derinlemesine veri elde etmek için görsel metaforlar ve aşamalı odak grup görüşmeleri kullanılmıştır. Elde edilen veriler ergonomi ve konfor, bireyselleştirme ve okul atmosferi temaları altında sunulmuştur. Çalışma, ergonomi, konfor ve bireyselleştirmenin algılanan okul atmosferiyle iç içe bir yapı oluşturduğunu açıkça vurgulamaktadır. Görseller, metaforlar ve odak grup görüşmeleri gibi çocuk dostu ve kişiye özel yaklaşımlar, öğrencilerin algılarının derinlemesine anlaşılması için bir fırsat sunmakta ve ZMET,

okul binası performans değerlendirmesi gibi karmaşık konularda veri toplamak için oldukça işlevsel olabilmektedir.

HOW STUDENTS PERCEIVE SCHOOL BUILDINGS?: A POST-OCCUPANCY EVALUATION THROUGH ZALTMAN METAPHOR ELICITATION TECHNIQUE

Despite the relationship between learning theories and space, there is not enough information about the use of school buildings. This issue needs to be investigated through Post Occupancy Evaluation (POE). Students are the main users with the most social participation in the building system. Therefore, it is necessary to interpret the school concept that is concrete-dominated, has multiple narrow windows, and has classrooms facing each other and opening to narrow corridors under the light of the experiences of the students and enable students to express their interpretations about the school building through the POE process. In this study, Zaltman Metaphor Elicitation Technique (ZMET) was used. The participants of this study consisted of 21 volunteer students from three middle schools. Visual metaphors and phased focus group interviews were used for deep understanding. The data obtained were presented under the themes of ergonomics and comfort, individualization, and school atmosphere. The study clearly highlights that ergonomics, comfort, and individualization create a structure that is intertwined with the perceived school atmosphere. Child-friendly and tailored approaches provide an opportunity for a deep understanding of students' perceptions and ZMET is very functional in gathering data on complex subjects like school building performance evaluation.

VEYSEL ŞENYİĞİT; B. Edu, M.Sc.

Received his bachelor's degree in english language teaching (ELT) from Dicle University in 2008 and MSc. in educational administration, supervision, planning and economics from Artuklu University in 2019. Major research interests include learning spaces design, sustainable schools, school buildings and child-friendly research methods. vyslsenyigit@hotmail.com

HASAN BASRİ MEMDUHOĞLU; B. Edu, M.Sc., PhD.

Received his bachelor's and master's degrees from the Department of Educational Administration, Supervision, Planning and Economics from Yüzüncü Yıl University. Earned his PhD. degree in educational administration from Ankara University, Institute of Educational Sciences (2007). Major research interests include critical pedagogy and alternative schools, contemporary management approaches, leadership. hasanbasri@siirt.edu.tr