

A Study of the Concept of Behavioural Architecture in Spaces within the Al Hidayah Islamic Boarding School Complex in Jambi City

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Abstract. The spatial arrangement in the Islamic boarding school area that houses various levels of education in one site has the potential to cause a mismatch between the needs of elementary school-age children and adolescent users. This phenomenon was observed in the building of Madrasah Ibtidaiyah in the Al Hidayah Islamic Boarding School area, Jambi City, where children converted building elements such as poles and fences as a means of play due to the lack of adequate play space. This study aims to examine the application of behavioral architecture concepts in the arrangement of outdoor and indoor spaces in the area, focusing on five variables, namely space, size and shape, furniture and its arrangement, color, as well as sound, temperature, and lighting. The research uses a qualitative descriptive method with a case study approach, through field observation, interviews, and analysis of physical data of the plan as well as documentation of existing conditions. The results of the study show that the application of behavioral architecture has been considered at the stage of formulating design criteria, especially through spatial zoning, the shape of the building mass without sharp angles, and the selection of colors and materials that are adapted to the child's psychological character. However, the fundamental problem still lies in the outdoor space, especially the lack of adequate play space and the presence of dangerous elements around the child's activity area. These findings confirm the importance of a special and proportionate allocation of outdoor space for the needs of elementary school children in cross-age education areas.

Keywords: Behavioral Architecture; Child Safety; Child-Friendly Schools; Islamic Boarding Schools; Playgrounds.

1. BACKGROUND

Islamic boarding schools are one of the oldest and largest pillars of education in Indonesia. The Ministry of Religion's Education Management Information System (EMIS) data recorded that the number of Islamic boarding schools in Indonesia reached 42,300 institutions, some of which oversee formal education levels such as Madrasah Ibtidaiyah, Tsanawiyah, and Aliyah in the same area (Pontren, 2025). This scale emphasizes that spatial planning issues in the pesantren environment are not just local issues, but problems that have the potential to be faced by thousands of similar pesantren throughout Indonesia (Halimatusa'diyah et al., 2025).

As an educational institution that has its roots since the time of Wali Songo in the 16th and 17th centuries, pesantren continue to transform following the development of educational needs, including by overseeing more than one level of formal education in one area (Mufidah, 2019). This condition also occurs at the Al Hidayah Islamic Boarding School, Jambi City, where the Madrasah Ibtidaiyah building is in the same scope as the learning rooms of Madrasah Tsanawiyah and Aliyah students. In fact, psychologically, elementary school-age children in the age range of seven to twelve years old have different needs for movement space, exploration, and social interaction than adolescents at the secondary level (Izzaty, 2022). When

these needs are not accommodated separately in the design of spaces, the mismatch between the physical environment and the behavior of its users becomes even greater.

These inconsistencies are evident in the field. Madrasah Ibtidaiyah children who do not have adequate play space convert building elements as a means of play, such as climbing poles, leaning on guardrails, and standing on benches. This phenomenon is not just a matter of discipline, but an indication that the existing fostered environment has not provided an appropriate forum for children's movement and exploration needs, as well as potentially endangering their safety. These findings are in line with the view that visual and spatial environments that are not designed appropriately can affect children's attention and behavior in activities (Fisher et al., 2014).

Behavioral architecture is present as an approach that emphasizes the relationship between space, the appearance of buildings, and human psychology as both actors and users of buildings (Laurens, 2004). This approach distinguishes closed behavior, in the form of perceptions and attitudes that have not been directly observed, from open behavior, in the form of real actions (Notoatmodjo, 2003, in Tandal & Egam, 2011). Architectural design can thus act as a facilitator of positive behavior, or conversely, as a barrier that triggers deviant behavior from the proper function of the space (Arvani, 2026).

The urgency of this approach is reinforced by previous studies. Research on the application of behavioral architecture in the concept of child-friendly schools confirms that the physical environment of elementary schools requires special attention that is different from other levels of education (Fakriah, 2019). Another study on elementary school design shows that the activity pattern and needs of children's age users should be the main basis for space design, not just following the standard of classrooms in general (Manibuy & Asri, 2018). These two studies strengthen the argument that the equalization of space between elementary school children and older users, as happened in the Al Hidayah Islamic Boarding School, is a problem that deserves in-depth study.

Based on this description, this study aims to examine the application of the concept of behavioral architecture in the arrangement of outdoor and indoor spaces in the Al Hidayah Islamic Boarding School area, Jambi City, by focusing on the discussion on five behavioral architecture variables, namely space, size and shape, furniture and its arrangement, color, and sound, temperature, and lighting. This study is expected to be the basis for formulating spatial planning criteria that are more in accordance with the needs and behavior of Madrasah Ibtidaiyah students, as well as enriching references for similar pesantren managers in Indonesia who face spatial planning problems across age levels.

2. THEORETICAL STUDIES

Behavioral Architecture

Behavioral architecture is an approach that emphasizes the relationship between space, the appearance of buildings, and the basic understanding of human psychology as actors and users of buildings (Laurens, 2004). This approach views human behavior in two forms, namely closed behavior in the form of responses in the form of attention, perceptions, and attitudes that cannot be observed directly, and open behavior in the form of responses in the form of real actions (Notoatmodjo, 2003, in Tandal & Egam, 2011). Through this approach, architectural design can act as a facilitator of positive behavior for its users, or conversely, as a barrier that triggers behavior that deviates from the proper function of the space.

Behavioral Architecture Variables

There are five main variables that affect user behavior in a space, namely space, size and shape, furniture and its arrangement, color, and sound, temperature, and lighting (Maabuat, 2018). Space variables are related to the function and use of space by its users. Furniture is concerned with its arrangement and its influence on user behavior in the space. Color plays a role in creating a spatial atmosphere that can affect the psychological of its users, including in supporting concentration and comfort (Pile, 1998, 2003). The circulation of air and light openings is related to the quality of physical comfort of the space which affects the activities and mood of its users. The five variables are interrelated and analyzed in two units of space in the research area, namely the inner space and the outer space of the Madrasah Ibtidaiyah building.

Characteristics of Elementary School Age Children and Space Needs

In the stages of cognitive and social development that demand a wider space for movement, exploration, and social interaction than the adolescent age group (Izzaty, 2022). This characteristic is the conceptual basis that the design of a space for elementary school children cannot be equated with a space for older users, because the excessive visual and spatial complexity of a space can distract children from the activities that should take place in it (Fisher et al., 2014). This principle is strengthened by studies on the concept of child-friendly schools that emphasize the need for special attention to the physical environment of elementary schools (Fakriah, 2019), as well as studies on elementary school design that place activity patterns and needs of children's age users as the main basis for spatial design (Manibuy and Asri, 2018).

3. RESEARCH METHODS

This study uses a qualitative descriptive method with a case study approach on the building of Madrasah Ibtidaiyah in the Al Hidayah Islamic Boarding School area, Jambi City. This approach was chosen because the research aims to describe and interpret the physical conditions of space based on direct observations in the field, rather than testing the relationship between variables statistically (Sudaryono, 2018). The data used consisted of primary data in the form of observation results and interviews with building users, as well as secondary data in the form of physical data on the plan, appearance of the building, and documentation of the existing condition of the space. The determination of informants is carried out by purposive sampling technique, which is the selection of data sources based on certain considerations according to research needs, considering that the object of research is specific to one pesantren area.

The variables used in this study refer to five behavioral architecture variables as described in the theoretical study, namely space, size and shape, furniture and its arrangement, color, and sound, temperature, and lighting (Maabuat, 2018). These five variables are the basis for analyzing the conditions of outdoor and indoor spaces in the research area. Data analysis is carried out continuously from the time the data collection process takes place, through the stages of data editing, data analysis, interpretation of results in the form of zoning descriptions and drawings, to drawing conclusions (Sugiyono, 2016).

4. RESULTS AND DISCUSSION

The Al Hidayah Islamic Boarding School in Jambi City is a modern Islamic boarding school that combines Islamic religious education with general education, overseeing several levels of education in one area, namely PAUD, Kindergarten, Madrasah Ibtidaiyah at the Elementary School level, Madrasah Tsanawiyah at the Junior High School level, and Madrasah Aliyah at the Senior High School level (Komalasari, 2021). This characteristic makes the pesantren area fundamentally different from elementary schools in general, because the available space must shade a much wider range of users in the same site. Space as the main component of behavioral architecture has an important role because its function and use directly affect user behavior in it (Maabuat, 2018), so that the more heterogeneous the age range of users of an area, the greater the demand for the precise distribution of space functions in it.



Figure 1. Al Hidayah Islamic Boarding School, Jambi City.

Space

The Madrasah Ibtidaiyah building accommodates 177 students consisting of 110 male and 67 female students, with facilities in the form of one teacher's and principal's room and six study rooms each accommodating around 25 to 30 children (Komalasari, 2021). Accessibility analysis on the site shows that the achievement uses the main entrance and exit lanes parallel to the road, with the position of both on two different sides of the site, while the service circulation is placed at the back of the site which is directly adjacent to residential areas (Komalasari, 2021). The separation of the main circulation line and the service line is the right step in reducing movement conflicts, but it is necessary to look further whether the same entrance route is also used jointly by Tsanawiyah and Aliyah students, because the mixing of circulation routes between different age levels has the potential to pose new risks for Madrasah Ibtidaiyah children who are physically much smaller and vulnerable.

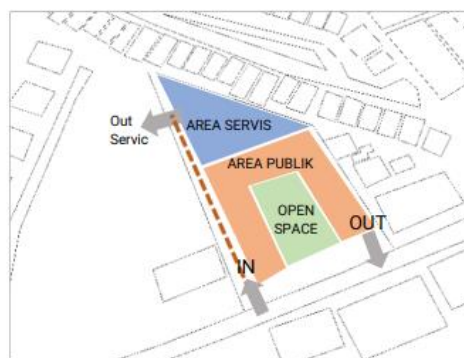


Figure 2. Outdoor Space Analysis.

Based on figure 2. The space in this area is divided into three main zones, namely public areas that include classrooms, principal's rooms, teachers' assembly rooms, meeting rooms, libraries, and science laboratories, service areas that include canteens, prayer rooms, warehouses, and toilets, and open space areas intended for play rooms and gardens

(Komalasari, 2021). The division of these three zones in principle already reflects the logic of good separation of functions, but its effectiveness depends on how strict the physical boundaries between the zones are realized in the field, considering that the pesantren area is basically open and integrated between educational units.

The criteria for building mass shape developed lead to a shape without sharp corners with open circulation among the building masses, aiming to create a transition space that functions as well as an interaction area (Komalasari, 2021). The choice of a shape without sharp corners has special relevance for children's educational buildings, because in practice elementary school-age children tend to be active and have not fully been able to anticipate the risk of impact, so that building elements with sharp angles have the potential to increase the risk of injury when children run or play around buildings.



Figure 3. Building Mass Material.

In the classroom, the materials used are a combination of aluminum and wood on the frames and openings such as windows and doors, which give a natural and light impression to the appearance of the space (Komalasari, 2021). These material characteristics are in line with the principle that the choice of building materials also affects the impression and psychological comfort of the space for its users, as affirmed in the approach to behavioral architecture in general (Laurens, 2004).

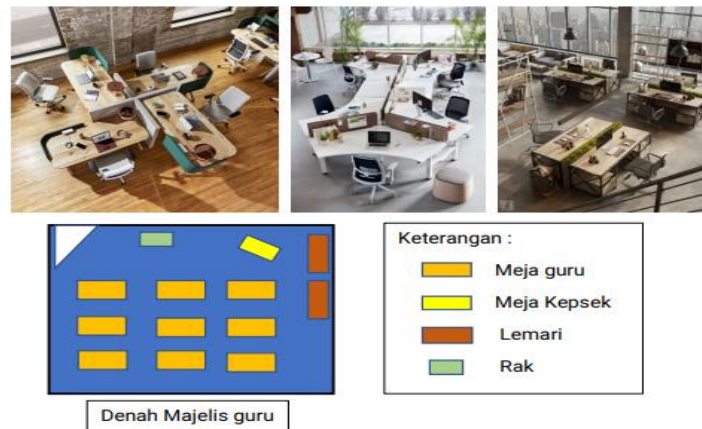


Figure 4. Arrangement of Teacher Room Materials.

Based on Figure 4, in the teacher's assembly room and principal's room, aluminum material is used for windows, doors, and ventilation, while tables, cabinets, and shelves use wooden materials, so as to give a natural and minimalist impression to the work room of educators (Komalasari, 2021). In the service area such as the toilet in figure 10, the materials used emphasize the practical aspect in the form of ceramics on the walls and floor for easy cleaning, with squat closets for students and sitting closets for educators, a distinction that shows that the design has considered the physical ability of children to use sanitation facilities independently.



Figure 5. Toilet Color and Shape.

The outdoor space in this area is a crucial point in the study, because the results of field observations show that inadequate play areas cause children to use building elements such as poles, columns, and guardrails as a means of play, a behavior that has the potential to endanger their own safety (Komalasari, 2021). This phenomenon is a tangible form of what is called open behavior, which is the user's response to environmental stimuli that is manifested in actions that can be observed directly (Notoatmodjo, 2003, in Tandal and Egam, 2011). When spaces that are functionally intended for other activities, such as structural poles or guardrails,

are actually converted into playgrounds, this is a strong indicator that outdoor space design has not fully answered the basic needs of children to move and explore.

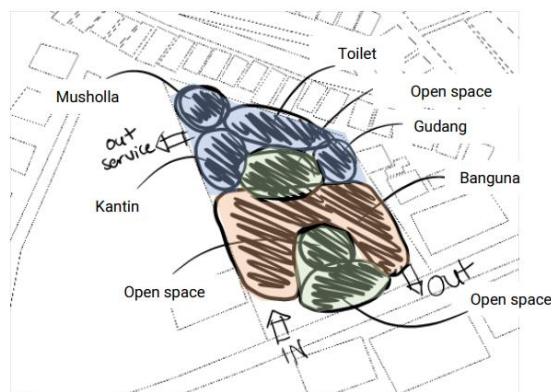


Figure 6. Outdoor Space Zoning.

Outdoor space zoning divides the area into public areas, service areas, and open space areas intended for playgrounds and parks, with the proportion of open space that is still relatively limited compared to the total area of the site (Komalasari, 2021). This limitation is increasingly felt considering that the pesantren area must also provide space for the Tsanawiyah and Aliyah education levels, so that the land left for the specific needs of elementary school age children is limited. This condition strengthens the argument that the arrangement of playgrounds for Madrasah Ibtidaiyah cannot only rely on the remaining land from the needs of other levels of education, but needs to be allocated specifically from the planning stage, in line with the principle that the design of elementary schools must be based on the pattern of activities and needs of children age users, not following the standards of educational spaces in general (Manibuy and Asri, 2018).

In addition to the problem of the play space, the ablution place which is located in a position close to the ditch is also a problem in the outdoor space that requires special attention in terms of safety (Komalasari, 2021). The combination of the lack of a safe playground and the presence of dangerous elements such as ditches near children's activity areas shows that safety aspects have not been the main consideration in the arrangement of existing outdoor spaces, even though safety is a basic requirement before comfort and aesthetic aspects can be further considered within the framework of child-friendly schools (Fakriah, 2019).

Size and Shape

Regarding the variables of size and shape, the space program in the Madrasah Ibtidaiyah building is designed in two floors. The first floor consists of a prayer room, ablution place, warehouse, toilet, canteen, principal's room, classroom, teacher's assembly room, and garden, while the second floor is allocated for toilets, classrooms, science laboratories, language

laboratories, and libraries (Komalasari, 2021). The need for classroom area is determined based on the standard of two square meters per child with an average capacity of 30 students per class, so that one classroom requires an area of about 60 square meters, with the total need for the overall building area reaching around 1,665.6 square meters after adding 20 percent circulation (Komalasari, 2021). This standard-based area calculation per child shows that space planning is not done originally, but rather considers the density of users proportionally, which is an important basis so that the classroom is not crowded and still supports the comfort of children's movements during the learning process.

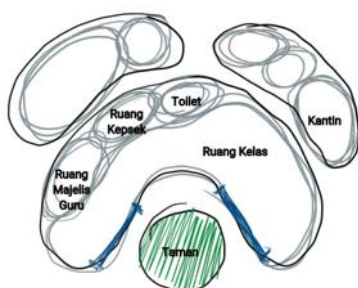


Figure 7. 1st Floor Room Program.

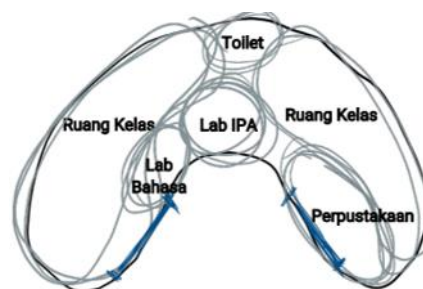


Figure 8. 2nd Floor Room Program.

Furniture and Its Arrangement

As part of the furniture and arrangement variables, students' desks and chairs are designed so that they can be changed according to learning needs, so that children do not feel saturated in one static space configuration. In the teacher's assembly room and principal's room, furniture in the form of tables, chairs, and cabinets is arranged according to the needs of the space and can change positions at any time to support group work or change of atmosphere (Komalasari, 2021). This flexible furniture arrangement is in line with the principle that the furniture and its arrangement must be adapted to the activities that take place in the space, because the right arrangement also affects the comfort and interest in learning of children (Maabuat, 2018). This kind of flexibility principle is relevant to be applied to the classroom of Madrasah Ibtidaiyah, considering that the learning character of elementary school-age children tends to require a variety of activities, ranging from sitting in groups, sitting in a circle, to standing and moving activities, all of which are difficult to accommodate if the furniture layout is permanent.

Color

Color is one of the important variables in behavioral architecture because it plays a role in shaping the atmosphere of the space as well as influencing the psychological condition of its users (Pile, 1998, 2003). Classrooms use primary colors such as red, yellow, green, and blue

on the furniture, with the aim of attracting children's attention while supporting a fun and non-monotonous learning atmosphere (Komalasari, 2021). The choice of bright colors in the classroom is consistent with the psychological traits of elementary school-age children who are in a period of active cognitive and social development, so that the right visual stimulus can support their interest in learning activities (Izzaty, 2022). However, the use of bright colors needs to be applied selectively and not excessively, because a visual environment that is too crowded risks distracting children from the learning activities themselves, as found in a study on the influence of visual complexity of space on children's attention allocation (Fisher, Godwin, and Seltman, 2014).



Figure 9. Classroom Materials.

The teacher's assembly room and principal's room use neutral colors such as white, beige, and brown with wood accents, while the prayer room uses calm colors such as white and light green to give a calming impression that is in accordance with the function of the worship room (Komalasari, 2021). This difference in color approaches between types of spaces shows that colors are not applied uniformly, but rather are tailored to the activity and psychological character of the users in each space, a strategy that reflects the understanding that one color palette cannot meet the psychological needs of all types of spaces in one educational area.



Figure 10. Teacher Room Material Color.



Figure 11. Color and Form of the Musholla.

Sound, Temperature, and Lighting

This study did not specifically measure noise levels, so the discussion on this variable was focused on the temperature and lighting aspects for which the data were available. The placement of openings on the right and left sides of the building combined with the addition of vegetation in the corridor and garden areas serves to filter the incoming air while reducing excessive sunlight intensity (Komalasari, 2021). This approach is consistent with the principle that the openings in the space cover plane affect the orientation and flow of the space, the quality of lighting, and the movement patterns in it (Ching, 1996).

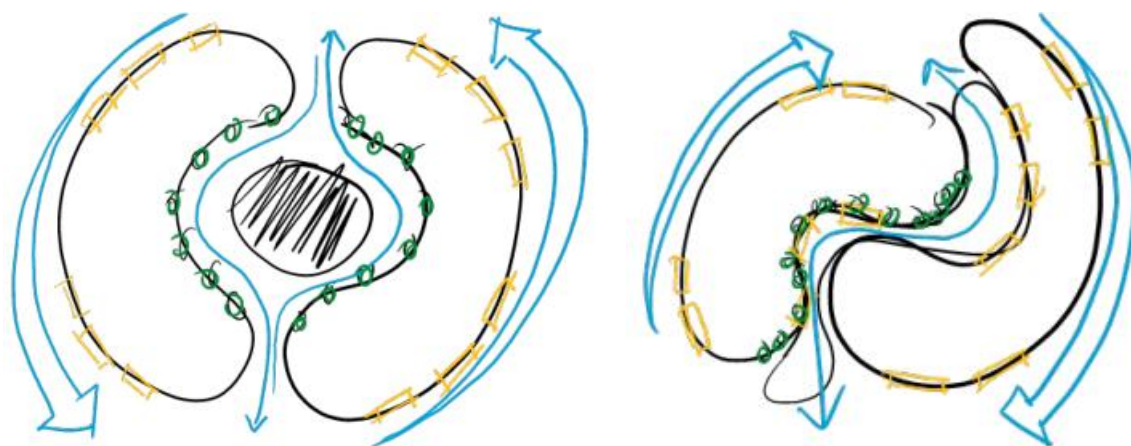


Figure 12. Alternative Air Circulation.

The use of high ceilings in several design alternatives also functions to naturally flow air into the room, so that it can reduce dependence on artificial ventilation while maintaining the coolness of the classroom. This kind of natural ventilation strategy is relevant to be applied in pesantren areas that generally prioritize operational cost efficiency, because dependence on artificial air conditioning will increase the burden of electricity costs that need to be borne sustainably by pesantren managers. The combination of shade vegetation and directed openings is also in line with the initial finding that existing classrooms experience suboptimal lighting problems, so that the recommendation for the placement of openings on the right and left sides of the building can be a direct solution to these problems, as well as showing a coherent relationship between the findings of the problem in the existing conditions and the proposed design criteria.

Overall, the five variables studied, namely space, size and shape, furniture and its arrangement, color, as well as sound, temperature, and lighting, show that the application of the behavioral architecture concept in the Al Hidayah Islamic Boarding School area has been considered at the stage of formulating design criteria, especially through space zoning that separates public functions, services, and open spaces, the shape of the building mass that minimizes the risk of injury, as well as the selection of colors and materials that take into

account the psychological aspects of the child (Laurens, 2004). However, findings on existing conditions consistently show that the fundamental problem lies in the variables of space, especially the absence of adequate play space and the presence of harmful elements around the child's activity area.

The common thread of this entire discussion emphasizes that the application of behavioral architecture in educational areas that overshadow various age levels cannot be solved only through the improvement of furniture and material variables alone, but must start from the allocation of outdoor space that is specifically and proportionately intended for the needs of elementary school-age children. Without a firm space allocation, the specific needs of Madrasah Ibtidaiyah children are at risk of continuing to be marginalized amid the dominance of space needs for Tsanawiyah and Aliyah education levels which are physically and the number of users is much larger. These findings also strengthen the urgency of the child-friendly school approach as a reference framework for other Islamic boarding schools in Indonesia that face similar problems, namely the unification of various levels of education in one area without being accompanied by an adequate division of space for the psychological needs and safety of the most vulnerable users (Fakriah, 2019).

5. CONCLUSIONS

This study shows that the application of the concept of behavioral architecture in the Al Hidayah Islamic Boarding School area of Jambi City has been considered at the stage of formulating design criteria, especially through the zoning of spaces that separate public areas, service areas, and open spaces, the shape of building masses without sharp corners to minimize the risk of injury, the selection of colors that are adjusted to the psychological character of each space, and the arrangement of air and light openings that take into account the thermal comfort of the space class.

However, the findings on the existing condition consistently show that the fundamental problem lies in the outside space, especially the lack of adequate play space so that the children of Madrasah Ibtidaiyah convert building elements such as poles and guardrails as a means of play, as well as the position of the ablution place adjacent to the trench is quite deep. These two findings confirm that the safety aspect of outdoor space has not been fully prioritized in the planning of the area, even though safety is a basic requirement before the comfort and aesthetic aspects can be further considered.

REFERENCE

- Arvani, K. D. (2026). *Perilaku Lingkungan pada Kelompok Pengguna Remaja terhadap Taman Bunga Merjosari Kota Malang* (Doctoral dissertation, Universitas Tribhuwana Tunggaladewi).
- Ching, F. D. K. (1996). *Architecture: Form, space, and order* (2nd ed.). Van Nostrand Reinhold.
- Diananda, A. (2018). Psikologi remaja dan permasalahannya. *ISTIGHNA: Jurnal Pendidikan dan Pemikiran Islam*, 1(1), 116–133. <https://doi.org/10.33856/istighna.v1i1.79>
- Fakriah, N. (2019). Pendekatan arsitektur perilaku dalam pengembangan konsep model sekolah ramah anak. *Gender Equality: International Journal of Child and Gender Studies*, 5(2), 1–12. <https://doi.org/10.22373/equality.v5i2.5585>
- Fisher, A. V., Godwin, K. E., & Seltman, H. (2014). Visual environment, attention allocation, and learning in young children: When too much of a good thing may be bad. *Psychological Science*, 25(7), 1362–1370. <https://doi.org/10.1177/0956797614533801>
- Halimatusa'diyah, I., Adam, R., Jannah, A. N., Djamaludin, K. W., Khitam, H., & Rachmanda, G. S. P. (2025). *Pesantren Ramah Lingkungan: Tumbuh atau Tumbang?*. Penerbit A-Empat.
- Izzaty, R. E. (2022). *Perkembangan anak usia 7-12 tahun*. Universitas Negeri Yogyakarta.
- Komalasari, L. (2021). *Penerapan konsep arsitektur perilaku dan lingkungan binaan terhadap bangunan Madrasah Ibtidaiyah pada kawasan Pondok Pesantren Al Hidayah Kota Jambi* [Tesis Magister, Universitas Bung Hatta]. Repositori Universitas Bung Hatta.
- Laurens, J. M. (2004). *Arsitektur dan perilaku manusia*. PT Grasindo.
- Maabuat, J. G. L. (2018). Rumah sakit bersalin di Kota Manado, arsitektur perilaku. *Jurnal Arsitektur DASENG*, 7(2), 146–156.
- Manibuy, K. N., & Asri, A. (2018). Sekolah dasar di Sorong. *Jurnal e-Dimensi Arsitektur*, 4(1).
- Mufidah. (2019). *Santri education 4.0 antara tradisi dan modernisasi di era revolusi industri*. Elex Media Komputindo.
- Oxford University Press. (2016). Furniture. Dalam *Oxford English Dictionary*. Oxford University Press.
- Pile, J. F. (1998). *Color in interior design*. McGraw-Hill Education.
- Pile, J. F. (2003). *Interior design* (3rd ed.). Pearson Education.
- Pontren. (2025, 15 Mei). *Jumlah pondok pesantren di Indonesia*. <https://pontren.com/2025/05/15/jumlah-pondok-pesantren-di-indonesia/>
- Purwantiasning, A. W., & Prayogi, L. (2018). Penerapan konsep arsitektur perilaku pada penataan kawasan zona 4 Pekoja Kota Tua Jakarta. *PURWARUPA Jurnal Arsitektur*, 2(2), 83–92.
- Sudaryono. (2018). *Metodologi penelitian: Kuantitatif, kualitatif, dan mix method* (Edisi ke-2). PT RajaGrafindo Persada.
- Sugiyono. (2016). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Tandal, A. N., & Egam, I. P. P. (2011). Arsitektur berwawasan perilaku (behaviorisme). *Media Matrasain*, 8(1), 58–66.