

The Influence of Interior Design in Public Buildings on Gen Z's Safety During Disasters

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Abstract:

Disaster is an event that occurs suddenly and can cause a lot of damage that threatens people's lives. The damage in question is in the form of environmental damage, injury, loss of life, property damage, psychological stress, and economic impact. However, preparation for disasters in the interior design of public buildings such as terminals, airports, and stations in Indonesia is still inadequate in ensuring the safety and security of its users. In dealing with this, a safe interior design is needed for the community, especially in dealing with fire and earthquake disasters. This article will discuss the importance of interior design in public buildings and its impact on visitors, especially Gen Z users, in increasing security and safety in dealing with fire and earthquake disasters. The quantitative method was used to distribute questionnaires to 50 respondents of the Arjosari Malang Bus Terminal's room users in the waiting area. The results of this study are findings of what aspects of interior design elements can help improve the efficacy of room users visually which can help them make decisions and act safely.

Keywords: Interior design, public building, mitigation, social cognitive, gestalt

Introduction:

Disaster is a detrimental event that occurs suddenly and can cause a lot of damage that threatens people's lives. The damage in question is in the form of environmental damage, injury, loss of life, property damage, psychological stress, and economic impact. Disasters can occur due to human actions or naturally and cannot be predicted (BAPPENAS, 2010). This is why disaster preparedness is very necessary in public places such as terminals, airports, and stations.

Fire and earthquake disasters have become problems in all public buildings in Indonesia. For example, it has been recorded that 12 kiosks in the old Leuwipanjang Terminal were burned down due

to an electrical short circuit in 2023 (Fitrat, I., 2023), 16 kiosks in the Bekasi City Main Terminal were also burned down due to a gas leak in 2022 (Andre, J., 2022), a fire disaster on the roof of the Halim high-speed train station in 2023 (Rizky, M., 2023), and so on. In addition, it has also been recorded that there was damage to the Blitar bus terminal due to an earthquake in 2021 (Hasani, A., 2021), Ngurah Rai airport which suffered minor damage due to an earthquake in 2018 (Lismartini, E., 2018), and so on. In this case, mitigation needs to be carried out to reduce the impact of losses that will be obtained from the disaster and increase the security and safety of visitors to the building.

Preparedness in facing disasters can be created by increasing public safety and security in the interior

design of buildings, especially in facing disasters. In addition to the building structure, the condition of the building's interior also greatly influences ensuring that building users remain safe when a disaster occurs. Therefore, this study will discuss how interior design has an important role in increasing security in ensuring the safety of users of rooms in public buildings, namely the general or public building visitors in facing disasters. What is meant is what interior designers can do to increase the safety and security of room users, especially Generation Z, by making safe, functional, and calming interior designs so that room users can evacuate without fear.

Method:

The method used in this study is a quantitative method. According to Sugiyono (2017), a questionnaire is a data collection technique carried out by giving a set of questions or written questions to respondents to answer. The quantitative method is carried out using a questionnaire based on questions that cover three research variables, namely interior design elements, social cognitive aspects, and gestalt aspects. Respondents are focused on Gen Z, starting from the people who are in their 17 to 27 years old. This questionnaire is using Likert scale. The Likert scale is a measure used to measure the opinions, attitudes, and perceptions of a person or group of people about social events (Sugiyono, 2018:152). This questionnaire assessment is using a Likert scale of 1 to 5, where a value of 1 means "Strongly disagree" and a value of 5 means "Strongly Agree" (Sugiyono, 2018:152).

Body Text:

According to Emily's research (2013), it is explained that in modern times there are many concerns about things like preparedness, mitigation, recovery, and response in the built environment. She also explained that if interior designers want to remain committed to people's lives, especially in terms of safety and welfare, then interior designers need to review the meaning of safety and security itself. This is because insecurity and the risk of injury can be caused by various

aspects such as severe natural disasters and other dangerous conditions. In this case, she explained that interior designers must increase awareness, implementation, and application in the interior to deal with these urgent issues. This can be done by applying the minimum in interior design innovations that aim to save lives in the event of a disaster.

In this study, the focus is on fire and earthquake disasters. The reason why these two disasters are discussed is because according to Baquedano Juliá et al., (2021), post-earthquake fires can occur even though the possibility of this disaster is relatively small. If it occurs, the impact of this disaster can cause very high damage. It should be noted that earthquakes can cause structural and non-structural damage. According to Nishino, T. (2023), post-earthquake fires in buildings occur within 72 hours after a major earthquake and are usually caused by damage, displacement, or overturning of goods or equipment and can also be caused by electricity, especially during the electricity restoration process. Baquedano Juliá et al., (2021) also wrote that things like electricity, water, gas, and oil can be damaged by the earthquake. Damage to things like electrical systems and gas leaks can cause fires. These unpredictable things need to be mitigated to ensure the safety and security of users in the interior of public buildings.

Determining the right interior design in mitigating fire and earthquake disasters requires an understanding of building interior users through behavioural approaches to their general thinking and studying them more deeply per generation. Where this study focuses on Gen Z. According to McKercher (2023), Gen Z is a generation born in 1997-2012. According to him, Gen Z has a higher level of awareness of the environment, security, and safety than other generations because Gen Z is facing challenges in the form of global climate change, a series of social challenges, and other problems that have not been faced by previous generations. For this reason, awareness of the environment, security, and safety needs to be made easier with the help of interior design so that room

users, especially Gen Z, can save themselves more easily.

a. Interior Design: how can interior design influence people.

Interior design is a series of processes to plan facilities in a room that meet the needs of users both physically and psychologically. Interior design does not stop at planning the facilities, but also provides a nuance and positive impact on the users of the room (Rucitra, 2020). In interior design, there are principles and elements that can be learned to produce good design plans in terms of application and visual output. Understanding the principles and elements of design will help designers produce more meaningful works in detail (Rafsanjani & Rezaei, 2021). In this study, researchers focused on the design elements in interior design only. The interior design elements used in this study are space, shape or form, mass, line, texture, pattern, light, colour, time, and structural and decorative design (Rafsanjani & Rezaei, 2021).

b. Gestalt Psychology: how visuals can guide human behaviour.

Ways to guide human behaviour can be traced with Gestalt psychology. Gestalt psychology explains how a person's visuals work and helps designers convey the desired message or information visually to their audience to attract their attention (Suprayitno, 2017). This psychological theory explains that the human visual system can be optimally arranged to understand a structure that we create to guide them in understanding something (Li & Fu, 2023). This is because gestalt theory helps designers study the psychological side of humans in processing visual information that they interpret through their respective conscious perceptions (Mubarok, 2023). A person's perception of something does not work directly based on their senses such as direct capture of a colour, shape, and size, but is also influenced by the user's experience and behavioural environment. The information received by the user from a visual perspective will later form a perception of

something (Li & Fu, 2023). There are six aspects of gestalt used in this study, namely:

1. Figure and Ground

Figure and ground or subject and background is an understanding of two different objects (ambiguous) that explain positive space (subject) and negative space (background) (Suprayitno, 2017). This leads to a person's visual focus. The subject and background will change according to the direction of focus of a person's eyes, where the greater the difference between the subject and the background (both colour and shape) the shorter the time needed to understand it (Li & Fu, 2023).

2. Proximity

Proximity or closeness explains how human perception considers that the distance between objects influences a person's visual perception, where those that are close together are in one group and those that are far apart are considered not in a group (Li & Fu, 2023).

3. Similarity

Similarity explains how humans perceive similar elements as a combination (Li & Fu, 2023). Objects arranged in parallel tend to be perceived as a group just as humans perceive lines as something connected in the same direction. When this similarity occurs, designers can create a focal point to attract the user's attention by giving a difference to the group because the human mind tends to identify a pattern, so if there is something different, they will immediately know it (Metwally, 2021).

4. Symmetry

Symmetry explains how humans tend to focus on objects that are balanced and symmetrical rather than the opposite because the nature of the human mind tends to simplify a complex shape to make it easier to understand (Li & Fu, 2023).

5. Continuity

Continuity explains where the human mind perceptually tends to follow an object that is arranged in the same direction (Suprayitno, 2017). Human perception will fill in vague information and guide their focus in creating a visual flow in their minds (Li & Fu, 2023). Continuity directs humans in the direction we want by providing

elements that are harmonious (continuous) so that they can attract more attention and can be followed more easily by them (Metwally, 2021).

6. Simplicity

Simplicity explains how the human mind receives visual messages that are transformed into simpler and more stable forms for them (Suprayitno, 2017). This explains that the human mind tends to delete redundant and less important parts of information to focus on more important information from what they see (ZHAO et al., 2016).

c. **Social Cognitive: how visual information affects a person.**

Information processing through visuals can have an impact on human self-efficacy and ultimately result in behavior based on a person's personal efficacy. This can be studied more deeply with social cognitive theory. Social cognitive theory is a theory discovered by Albert Bandura that explains how human behavior is controlled by environmental influences as well as by the personal's own internal influences. This cause and effect model is explained by Bandura in triadic reciprocal determinism where he explains how the environment, behavior, and human mind interact with each other.

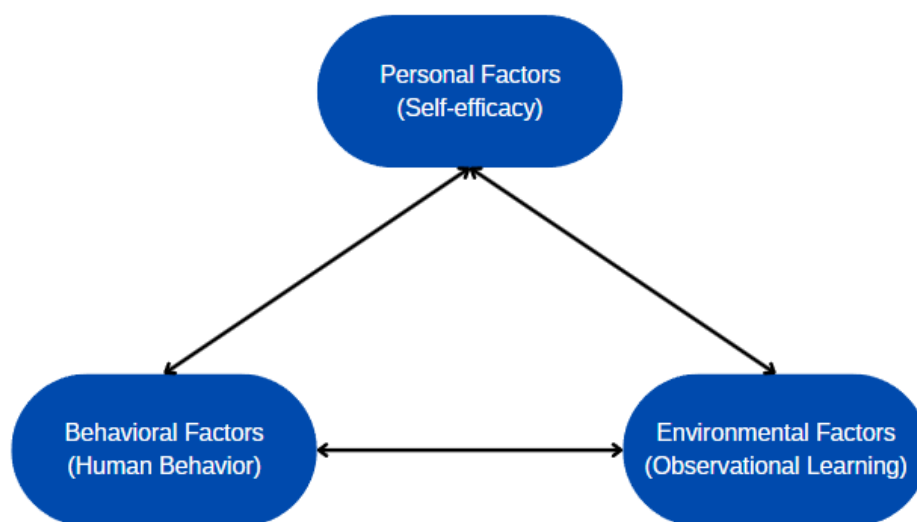


Figure 1. Triadic reciprocal determinism (Author Document, 2024)

In this triadic reciprocal determinism model, it is explained that:

1. Relationship between personal and behavioral factors

This reciprocal relationship explains how intrapersonal factors can influence how a person perceives the environment and understands the things they encounter, where a person's actions (intentions, goals, beliefs, self-perceptions, and expectations) can influence the state and process of forming a person's efficacy which influences the formation of their behavior (Bandura, 1986).

2. Relationship between personal characteristics and the environment

The social environment can provide different reactions to an individual's physical characteristics, be it age, race, gender, body size, and physical attractiveness, as well as to their role and status in the environment (Abdullah, 2019).

3. Relationship between behavioral and environmental factors

The conditions in question are how the physical and social environment surrounds a person and limits them in moving and acting as they please, thus causing reactions of like and dislike. Behaviour will determine which environment has more potential to influence the individual's behaviour and how the

environment will shape and develop the individual's behaviour (Abdullah, 2019).

According to Bandura (1983), the reciprocal relationship does not have a stimulating effect because the interaction between these factors does not operate at the same time but at different times where the factors depend on the circumstances, situations, and nature of the ongoing activity. In social cognitive theory, there are three main components, namely observational learning, efficacy beliefs, and human behavior. In the observational learning aspect, Bandura explains how modeling can help someone learn the rules and skills in behaving because negative modeling can produce negative behavior for someone, and vice versa (Bandura, 1986). In the observational learning aspect which is included in the environmental factor, there are 4 important processes, namely:

1. Attentional Process
2. Retention Process
3. Behavior Production Process
4. Motivation Process

In the aspect of self-efficacy which is included in personal factors, Bandura explains how a person's self plays an important role in influencing a person's behavior through cognitive processes that provide guidelines, evaluations, perceptions, and behavioral regulation. Self-efficacy is how a person sees their ability to face certain situations and whether they can do what they expect. This self-efficacy belief can be obtained, increased, changed, or decreased through one to four combinations of sources, namely:

1. Performance Experience
2. Vicarious Experience
3. Social Persuasion
4. Emotional and Physical State

Lastly, in the aspect of human behavior that is included in behavioral factors, Bandura explains how self-perception and self-efficacy can influence

the actions they will take because these things determine what they will do, how many things are done, and the level of resilience in facing obstacles in what is being done (Bandura, 1982). In 2001, Bandura further explained human agency with the following aspects:

1. Intentionality
2. Forward Thinking
3. Self-reactivity
4. Self-reflectivity

Result and Discussion:

This research is located at Arjosari Malang Bus Terminal, where this terminal is a Class 2 Type A terminal. This bus terminal is the largest terminal in Malang City because this terminal provides inter-city inter-provincial buses, inter-city buses within the province, and public transportation within the city. According to the Head of UPT Arjosari Terminal Malang, the average number of passengers coming to the terminal is around 2000 to 3000 passengers per day. During the homecoming period, the average number of passengers coming increases to 4000 to 6000 passengers in 2023 and the average number of passengers reaches 5456 in 2024. Bus passengers not only get on and off the bus but they also do activities inside the terminal building such as buying food, buying drinks, buying other necessities, and waiting in the waiting area. Therefore, the safety and security of passengers when using the terminal building needs to be considered, especially in the interior of the building.

This research focuses on disaster risk reduction with mitigation efforts in the interior design of public buildings, namely Arjosari Malang Bus Terminal. The role of mitigation in interior design here is to ensure safety and security, and as a means of influencing visitors or prospective bus passengers, especially Gen Z, in making decisions in carrying out evacuations that are not dangerous and are able to help the evacuation process when a disaster occurs more easily, safely, and calmly.



Figure 2. Arjosari Malang Bus Terminal: Waiting Area

Source: Author Document (2024)

In this study, a questionnaire was conducted on 50 Gen Z respondents to see what aspects were most important to them in helping mitigate fire and earthquake disasters when the disaster occurred. The questions in this questionnaire were created by fulfilling three main variables in this study, namely

interior design elements, social cognitive aspects, and gestalt psychology aspects. This questionnaire was answered spontaneously to simulate their thoughts when hit by stress and panic when a disaster occurs. The following are the results of the questionnaire on Gen Z:

Table 1. Questionnaire Results

No.	Interior Design Aspects	Social Cognitive Aspects	Psychological Aspects of Design	Core Statement	Min	Max	Mean	Std. Deviation
1.	<i>Space</i>	Environmental Factors (Observational Process - Motivational Process)	<i>Figure and Ground</i>	The abundance of open space (maximum circulation area) in interior design helps increase confidence in carrying out evacuation.	1	5	4.26	0.889
2.		Environmental Factors (Observational Process - Production Process Behavior)	<i>Proximity</i>	Designed division and placement of indoor areas can improve decision-making during disaster mitigation efforts.	1	5	4.14	0.990
3.	<i>Shape or Form</i>	Behavioral Factors (Behavior Human – Intentionality)	<i>Symmetry</i>	The use of organic or geometric shapes in evacuation routes in interior design can influence personal strategies for reducing disaster risk.	2	5	3.88	0.918
4.		Behavioral Factors (Behavior	<i>Symmetry</i>	The shape of the furniture and equipment in the interior design of	1	5	3.88	0.872

		Human – Thinking Forward)		the Arjosari bus terminal (for example, rounded corners, sharp corners, etc.) affects confidence in moving safely in an emergency.				
5.	<i>Mass</i>	Environmental Factors (Observational Process - Attention Process)	<i>Proximity</i>	How the mass and placement of furniture (e.g. heavy vs light) affects self-perception of safety and helps in identifying safe areas to pass through.	1	5	3.94	0.978
6.		Behavioral Factors (Behavior Human – Intentionality)	<i>Figure and Ground</i>	The use of furniture that looks large and heavy creates a feeling of discomfort, which has an impact on self-calculation in seeing the risk of obstacles in preparing for disasters (the possibility of the furniture hitting you when a disaster occurs).	1	5	4.12	1.003
7.	<i>Line</i>	Personal Factors (Self - Efficacy – Persuasion Social)	<i>Continuity</i>	Having marked guidelines (e.g., directional arrows on the floor, running lights, etc.) helps increase confidence in one's ability to follow evacuation routes and engage in disaster mitigation practices.	1	5	4.24	0.981
8.		Environmental Factors (Observational Process - Retention Process)	<i>Simplicity</i>	The use of dynamic lines (curved or zigzag) in interior design influences the user's focus during evacuation.	1	5	3.98	0.892
9.	<i>Texture</i>	Personal Factors (Self- Efficacy – Emotional and Physical State)	<i>Figure and Ground</i>	The use of certain textures in the interior of the Arjosari bus terminal (for example: non-slip floors, smooth textured walls, etc.) reduces the level of anxiety to move safely.	1	5	4.14	0.904
10.		Environmental Factors (Observational	<i>Figure and Ground</i>	The use of certain textures in the interior design of the Arjosari	1	5	3.92	0.877

		Process - Attention Process)		bus terminal (eg: glossy floors, rough textured walls, etc.) affects confidence in evacuating safely and calmly.				
11.	<i>Pattern</i>	Environmental Factors (Observational Process - Motivational Process)	<i>Continuity</i>	The presence of repeating patterns in design elements (e.g., consistent/repeated emergency signs/signs on a route) helps motivate oneself to strengthen disaster preparedness behaviours observationally (visual memory).	1	5	4.22	1.036
12.		Behavioral Factors (Behavior Humans – Reactivity self)	<i>Simplicity</i>	The use of elaborate decorative patterns can distract attention from focusing on emergency procedures.	1	5	3.78	0.932
13.	<i>Time</i>	Personal Factors (Self-Efficacy – Performance)	<i>Figure and Ground</i>	Changes in design conditions over time in the interior (e.g.: fading colors, eroded wall textures, etc.) affect the view and confidence in mitigating disasters.	1	5	3.58	1.162
14.			<i>Figure and Ground</i>	The changes in interior design at the Arjosari bus terminal in the future (changes in the furniture used, development of technology in the interior, etc.) will have an impact on the level of confidence in mitigating disasters.	1	5	3.82	0.919
15.	<i>Light</i>	Personal Factors (Self - Efficacy – Vicarious)	<i>Simplicity</i>	The presence of emergency lighting (illuminated evacuation route signage) increases my hope of navigating the evacuation route safely, easily, quickly, and efficiently.	1	5	4.28	0.904
16.			<i>Figure and Ground</i>	The presence of natural lighting and a well-lit space can affect the ability and focus to	1	5	4.20	0.857

				observe and follow others during an evacuation.				
17.	<i>Colour</i>	Personal Factors (Self-Efficacy – Circumstances Emotional and Physical)	<i>Figure and Ground</i>	Using calming colors (eg: blue and green) in a room can help reduce anxiety and improve decision-making.	1	5	3.98	1.097
18.		Environmental Factors (Observational Process - Retention Process)	<i>Similarity</i>	Having color-coded emergency exit and signs can help anticipate success in dealing with emergencies.	1	5	4.32	0.868
19.	<i>Structural and Decorative Design</i>	Personal Factors (Self - Efficacy – Persuasion Social)	<i>Simplicity</i>	The presence of additional information regarding procedures for dealing with disasters, such as on posters or digital information boards in the interior of buildings, can help increase self-confidence in participating in the disaster mitigation process.	1	5	4.24	0.894
20.		Environmental Factors (Observational Process - Production Process Behavior)	<i>Simplicity</i>	The use of decorative elements that incorporate emergency information (e.g., digital posters with safety tips, safety signs, etc.) can enhance learning and preparedness through observational learning.	1	5	4.04	0.880
21.		Behavioral Factors (Behavior Human – Thinking Forward)	<i>Similarity</i>	The structural design inside the Arjosari bus terminal (steel columns, iron fences, etc.) can influence decision-making in terms of the security of the structure.	1	5	3.98	0.869
22.		Behavioral Factors (Behavior Humans – Reactivity self)	<i>Simplicity</i>	Having design features to deal with emergencies (e.g., visible exit signs, emergency equipment, fire extinguishers, etc.) can increase preparedness.	1	5	4.20	0.881
23.		Behavioral	<i>Simplicity</i>	Having information	1	5	4.26	0.777

		Factors (Behavior Human – Reflectivity self)		about disaster preparedness in interior design (e.g. emergency procedure posters, evacuation maps) can enhance self-preparedness planning.				
24.		Behavioral Factors (Behavior Human – Reflectivity self)	<i>Simplicity</i>	The use of decorative elements in the interior that have never been encountered before (for example, plant pots with unique shapes, hanging lamps with unique shapes, and so on) can increase readiness in dealing with these foreign ornaments.	1	5	3.68	1.058

Source: Author's Document (2024)

Based on the results of the questionnaire, the most impactful thing with the highest value of 4.32 lies in the aspect of interior design elements of colour, especially the colour of the same exit signage. This colour has a social cognitive influence in the form of environmental factors (observational process), namely the retention process and the gestalt psychology approach in the form of similarity. The retention process in question is how humans process information imaginatively, while similarity is how humans consider the same elements as a group. With these two things combined, users of the room will be able to receive information about the existing signs more easily and quickly.

Other aspects of interior design elements that scored above 4 on both questions fell on the space and light elements. The space element can help in the observational process (environmental factors) that encourages motivation and the process of producing a person's behaviour with the figure and ground approach, namely the ease of users in distinguishing the visuals in front of them, and the proximity approach, namely providing convenience for users in identifying the placement of space and its grouping. In addition, another aspect that has a value above 4 on both questions is the light element that can influence the personal factor, namely self-efficacy at the vicarious point. The light aspect of this questionnaire question uses

a gestalt approach, namely simplicity and figure and ground which helps users find emergency evacuation routes easily and quickly. The light aspect has a point in improving the vicarious experience of users because the presence of light helps the visuals of room users and attract their attention, it can make everyone follow the evacuation route that has been designed and they will learn about the success of others through this experience.

Other aspects that have a mean value above 4 are space, mass, line, texture, pattern, light, colour, and structural and decorative design, with a visual approach in the form of figure and ground, proximity, similarity, continuity, and simplicity. In addition, these interior design elements help Gen Z users improve the social cognitive aspect of all factors, with the following details:

1. In environmental factors, users get support for motivation, behavioural production processes, and retention.
2. In behavioural factors, users get support for intentionality, self-reactivity, and self-reflectivity.
3. In personal factors, users get support for social persuasion, emotional and physical states, vicariousness, and social persuasion.

Conclusion:

Disaster mitigation in public function buildings is very necessary in dealing with unpredictable disasters such as fires and earthquakes. Based on this study, it can be seen that almost all interior design elements can help in the disaster mitigation process for room users, especially Generation Z. However, in terms of visual aspects, the most impactful interior design element according to them is the color aspect of the signs, where this aspect helps them encourages the self-retention process with a gestalt psychology approach in the form of similarity.

Other impactful interior design elements are space and light. The space element helps in the observational process (environmental factors) that encourages motivation and the process of producing a person's behavior with a figure and ground and proximity approach. The light element helps influence a person's personal factor, namely self-efficacy at the vicarious point through a simplicity and figure and ground approach. For this reason, the use of color, space, and light in the interior design of the room needs to be considered and utilized as well as possible as instruments to mitigate disasters and guide room's users in navigating safe evacuation routes without having to think long.

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