



Analysis of Facade Damage and Aesthetic Decline in Educational Buildings: A Case Study of Building C FPTI-UPI

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ABSTRACT

The facade is the outermost part of a building that plays a crucial role in forming a first impression and representing the architectural character of the building. The aesthetics of a facade depend not only on its attractive visual design but also on the physical condition of its constituent materials. This study aims to analyze various forms of physical damage that occur to the facade elements and assess their impact on the aesthetic value of Building C of the FPTI-UPI. The method used in this study is a qualitative method with data collection techniques in the form of direct field observations and in-depth interviews with relevant parties. In the context of assessing the building facade elements, the author adopted the architectural principles of Vitruvius, specifically Venustas, which relate to beauty or aesthetics. Observations include aspects such as color, walls, texture, entrances, openings, columns, signboards, and roofs. The findings of this study indicate that the entrance and opening areas of the building are the areas most frequently damaged. The main causes of this damage are environmental factors, such as climate change and extreme weather, as well as human factors, such as a lack of awareness of the importance of building maintenance. This damage has a direct impact on the decline in the aesthetic quality of the building facade. Thus, the results of this study emphasize the need for a routine maintenance program and efforts to increase student awareness so that the appearance and value of the building are well maintained.

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1. INTRODUCTION

Educational buildings are structures or places used to conduct educational activities, such as schools, universities, and other educational institutions. The function of educational buildings is to provide a comfortable environment for teaching and learning activities. Educational buildings serve as a forum for the formation, development, and learning processes (Kuznetsova & Zhdanova, 2022). Educational buildings, in addition to being a place for learning activities, also serve as a selling point and attraction for the higher education institution (Aithal & Aithal, 2023).

Universitas Pendidikan Indonesia is a university that is constantly developing, both in terms of academic fields and human resources. As time goes on, the number of users of facilities within the Universitas Pendidikan Indonesia environment has increased, especially in Building C of FPTI-UPI. This increase in the number of users is one of the factors causing damage to the facade architecture of Building C FPTI-UPI. The damage occurring to Building C FPTI-UPI not only disrupts the esthetics of the building but also has the potential to lower the institution's image. Therefore, a thorough analysis is needed to identify the form of damage, its causes, and its impact on the esthetics of the building. Ariyanto (2020) stated that building repair and maintenance activities are generally given insufficient attention. To date, no in-depth studies have been found on the causes of damage to campus buildings. Buildings must be planned for long-term proper operation. When building components deteriorate in quality, affecting their functionality and aesthetic appeal, this is known as building damage, and it usually becomes apparent after the building has been used. The use of subpar materials or a failure to perform routine building maintenance can result in this damage. According to Watt (2025), building damage can occur due to 3 factors: the end of the building's lifespan, natural factors, and human actions. Damage to the building's appearance directly affects the esthetic value of the facade. When damage occurs, the quality of the building will decline.

Esthetics is a term in architecture used to visually, symbolically, or monumentally assess the beauty of architectural works (Enjelina et al., 2021). An analysis of facade esthetics requires reference to the Vitruvian architectural principles, which include three main principles: utility, strength, and beauty. Firmness refers to strength, meaning the building must have a solid structure, use quality materials, and have construction capable of supporting the building's load well (Andarini 2024). Utility refers to the arrangement of space and the application of building technology, including ventilation systems, lighting, and other supporting elements (Meisitra Karisoh et al. 2019). The aspect of *venustas* includes axis, symmetry, hierarchy, rhythm, datum, and transformation (Serikat 2024). The beauty and physical condition of a building are two aspects that determine its appeal and function. Esthetics, as a form of beauty that must be considered from the planning stage, so that it remains in harmony with the function of the building

Facade comes from the Latin word "façade," which means the face or exterior appearance of a building. The building facade is the first part seen by the public and serves to create an initial impression of the building. According to Mantondang et al. (2024), a facade can be assessed thru several of its constituent elements, namely color, walls, entrance, openings, columns, stairs, balconies, signage, and roof. A facade is formed by the combination of several elements that interact with each other to produce the esthetic value of a building. Additionally, the facade serves as a boundary between the exterior and interior spaces of the building, and acts as a shield against various weather and environmental conditions.

In previous research on damage, Ertemir (2023) and Nwankwo et al. (2024) stated that nonuniformity in building facades leads to a decline in visual quality and a lack of building maintenance. Additionally, research by Ariyanto (2020) states that building damage occurs due to three factors: natural factors, human factors, and the age of the building. In another study on facades, by Sudaryanto & Winandari (2023), the form of the mass, roof, walls, texture, openings, and ornaments are the sequence of facade elements considered important in shaping the character of the facade. According to Meisitra Karisoh et al. (2019), beauty (*venustas*) in Vitruvius's theory is related to proportion and symmetry, which are considered essential elements in creating beauty in a building. Previous studies have tended to focus only on residential buildings and schools. However, not much research has been done on campus buildings in depth. Previous studies have only examined the aspect of damage or esthetics, and not many have combined both aspects. Unlike previous studies, this research will be conducted on campus building research subjects because campus buildings play an important role in shaping the visual image of educational institutions in the public eye. This research complements and combines both the aspect of damage and esthetic value. The focus of this research is limited to only one building subject, namely the FPTI-UPI Building C, and only uses Vitruvius' theory for the *venustas* section because it focuses more on the esthetic aspects to be studied.

The purpose of this study is to identify facade damage and evaluate its impact on the esthetic value of Building C FPTI-UPI. This study aims to explore the perspectives of building users and relevant parties regarding the physical condition of the building. Additionally, it is hoped that it can provide new insights into the damage and esthetic decline of Building C FPTI-UPI and serve as a basis for efforts to repair and preserve the facade of Building C FPTIUPI. Building maintenance is carried out to restore the performance and lifespan of a building structure that has experienced damage (Rohmat 2020).

2. METHOD

This study used a descriptive qualitative method with an intrinsic case study design. Qualitative research is the activity of collecting data obtained from observations, interviews, and documentation, which can be in the form of words, pictures, notes, and others (Fiantika et al., 2022). According to Septiana & Khoiriyah (2024), an intrinsic case study is selecting a case based on personal interest in a particular problem. If the case has interesting aspects, then it can be called intrinsic.

Evaluation is carried out using descriptive analysis, this process aims to assess and interpret the influence, meaning, and value of the observed phenomenon (Gusach et al., 2023). The subjects of this study were Building C FPTI-UPI, 2 building staff in general and equipment, 1 expert lecturer in the field of buildings, and 5 direct building users with a focus on aspects of facade damage and its aesthetic value.

The research instruments for this study are interview guidelines and observation guidelines. Data was collected using 3 techniques: (1) direct observation using a checklist to identify damage to the facade, (2) in-depth interviews with building management staff and users, and (3) visual documentation to record details of the damage, as well as its esthetics, such as color, walls, and so on. Management personnel were interviewed in order to determine the causes of the damage to the building's facade components. In the meantime, direct users were interviewed to find out how they felt about the building's aesthetics.

A qualitative approach was used because the focus of this research was on visual interpretation of facade damage and aesthetic perception. The data obtained were descriptive in nature, consisting of documentation and visual observations, and therefore could not be analyzed qualitatively. The number of informants did not reduce validity because qualitative research emphasizes depth of context and meaning.

The data were analyzed using a thematic approach that combines qualitative and visual techniques. Thematic analysis can be applied to various types of qualitative data, including visual materials, interviews, and texts (Nowell et al., 2017). This analysis refers to two main aspects, namely damage and aesthetics. The damage aspect consists of 3 factors, namely the age of the building, environmental factors, and human actions. Meanwhile, the aesthetic aspect of the facade involves eight main aspects, namely color, walls, texture, entrance, openings, columns, signs, and roofs. After the data was collected, the data was grouped based on the aspects that have been mentioned. The results of this analysis are used to identify the most dominant factors in the damage to the facade of Building C FPTI-UPI, as well as to determine the aspects that most influence the decline in esthetic value.

In thematic analysis, data from interviews and observations in the initial stage will be grouped based on categories, including building age factors, human factors, environmental factors, and eight aesthetic aspects, namely, floors, walls, textures, entrances, openings, columns, signboards, roofs.

3. RESULT AND DISCUSSION

Building C at FPTI UPI is a building used by students for practicums from various departments, such as civil engineering, automotive engineering, culinary arts, and others. Observations have shown various types of damage to the facade of Building C FPTI-UPI, such as on window elements, textures, entrances, openings, columns, and roofs. Meanwhile, several elements that were not damaged included walls and signage. In general, although the structure of Building C FPTI-UPI is still very sturdy, the appearance of the building's facade is very unattractive compared to other buildings.

This has a significant negative impact on the building's aesthetics, as well as the safety and comfort of building users. The aesthetics of Building C FPTI-UPI have decreased in value due to material damage and a lack of regular building maintenance. This emphasizes that building maintenance, especially in educational buildings, is very important to maintain the facade's appearance and aesthetic value. This is in line with the opinion of Wicaksono and Basyaruddin, S.T., M.T. (2020), who stated that good building maintenance can result in good building conditions and conditions, making it comfortable and beautiful to look at.

3.1 Aspects that Shape the Building Facade

Building components are the essential parts or elements that collectively make up a building, ensuring it functions effectively, is strong, and looks attractive. Each element has its own role and is interconnected. A building structure is composed of several elements, such as beams, columns, walls, and foundations, which contribute to the overall structure (Hukama, 2023). The relationships between these elements create structural strength, functional unity, and a complete aesthetic value.



Figure 1. The Entire Facade of Building C FPTI-UPI

Figure 1 shows that Buildings are composed of various interrelated aspects that create function, strength, and beauty, resulting in strong, functional, and useful buildings for humans.

Aspects that form the facade include:

1. Color

Building color is a visual appearance applied to both exterior and interior elements of a building, such as columns, walls, and other ornaments. Color plays a crucial role not only as a decorative element but also as a reinforcement of the building's character, identity, and the visual impression it conveys. In architecture, color can enhance a building's function and identity; bright colors can convey a calming impression. For example, warm colors can feel welcoming, while dark colors can convey a serious impression. This is supported by the statement of Zhu et al. (2024), who stated that warm colors tend to evoke a more positive emotional response than cool colors, while high brightness levels can enhance a building's aesthetics.

Furthermore, color in a building can help distinguish existing elements and serve as an indicator of a building's condition; for example, faded paint can indicate a poorly maintained building. Thus, building color is not only important for its aesthetic appearance but also plays a significant role in determining the building's function, character, and public perception.

The FPTI-UPI Building C's facade reveals that the building's colors have started to fade, that the paint is peeling, that there is graffiti, and that mold is beginning to grow in some areas. This state denotes a deterioration in the finishing material's quality brought on by the erratic weather. This aligns with research conducted by Atika (2021), that color is an important element in building esthetics and also serves as an early indicator of facade visual degradation. The state of Building C FPTI-UPI's facade, which exhibits color fading, paint peeling, and mold growth, suggests that the building's finishing materials have degraded. This is because weather instability has an impact on building colorfastness and paint layers. Thus, the color deterioration on Building C FPTI-UPI's facade highlights how crucial regular maintenance is to maintaining the building's aesthetic appeal and quality.

2. Wall

A wall is a vertical structural element that functions to delimit spaces within a building while also providing protection from the external environment. Walls serve to separate spaces within a building, support the building structure, and provide insulation against weather and sound (Yuliadewi et al., 2025). Walls serve not only as structural elements but also as aesthetic elements, which can influence the overall visual appearance of a building. Various materials, such as concrete, brick, or other materials, are used for walls, selected according to the building's needs and architectural design.

Based on observations, the walls of Building C of the FPTI-UPI are still in very good condition, although fine cracks appear in several parts of the building. However, these cracks do not affect the structural strength of the building; they are caused by the building's age. This is relevant to research by Olurotimi (2023), that found that wall damage, particularly cracks, is caused by several factors, such as the building's age, weather, and lack of maintenance. Therefore, although the walls show fine cracks due to the building's age, this damage does not significantly affect the building's structural strength. The cracks in the walls of Building C of the FPTI-UPI are a common indication of wear and tear in buildings over time. But still within limits that do not endanger the entire structure.

3. Texture

Wall texture refers to the physical surface or pattern found on a building's walls, which can be felt by touch or seen clearly. This texture can vary, from smooth, rough, wavy, or other patterns. Damaged wall texture includes the removal of paint or plaster, which detracts from the wall's aesthetics.

Furthermore, cracks in the wall are a form of texture damage. Damaged texture can result from moisture, deterioration, or inadequate maintenance. According to Erdiyanto et al. (2024), changes in a building's texture can affect the architectural identity and overall appearance of the facade.

The surface of the facade of Building C, FPTI-UPI, was found to have an uneven texture, with some parts of the building showing a rough and peeling texture. The cause of the rough texture on Building C, FPTI-UPI, is environmental factors, such as exposure to rain and excessive heat. Research conducted by Anfansyah et al. (2024), found that facade damage is caused by environmental factors, such as pollution, solar heat, and strong winds. Texture is important because it provides insight into the aesthetics and quality of a building's maintenance. Differences in texture reflect poor supervision during the final finishing stage.

4. Entrance

In an architectural context, an entrance is the main entrance or access to a building. Besides its function as an access point, an entrance also plays a crucial role in providing a first impression of a building, enhancing both aesthetics and comfort (Mulyati et al., 2025). As a crucial part of a building's facade, an entrance must be designed to ensure it reflects the building's character and function. It serves as protection from external weather and provides a sense of security for its occupants.

In Building C of the FPTI-UPI (Family Planning and Planning Institute), there are eight main doors. However, several of the main doors are damaged or even non-functional. The damage to the entrances is caused by infrequent use, resulting in damage and dust accumulation, which disrupts their function. Entrances are the primary interface between users and the building and therefore require proper care and maintenance to ensure their continued functioning. However, this contradicts PerMen PU Nomor 24 (2008) concerning Guidelines for Building Maintenance and Care, which states that routine maintenance of building elements, including doors, is crucial to prevent damage due to the accumulation of dust and dirt. In reality, building maintenance and care management has not been carried out routinely and periodically in Building C FPTI-UPI, there is no priority scale so that areas such as the entrance which are always passed are actually neglected which causes damage to Building C FPTI-UPI to increase.

5. Opening

Openings in a building refer to the elements present in the building that allow light, air, or views from the outside to enter the building. Openings are generally windows, vents, and other features. Openings in a building play an important role in the esthetic design of the structure because they affect both the exterior and interior appearance.

The correct shape, size, and placement of openings will create an appealing visual effect and support optimal building functionality, both in terms of utility and the beauty of the facade itself. Openings function as air circulation within a building, which plays an important role in humidity, also affecting the comfort of the building's users (Rahmat et al., 2020).

Several openings in Building C of the FPTI-UPI, such as windows and vents, show significant damage, particularly to the window elements, which are beginning to rot and become porous. These damaged openings are influenced by environmental factors, such as unpredictable rain and hot weather, which cause the window elements to rot. This aligns with research by Nuswantoro (2018), which found that excessive rainwater and solar heat can accelerate and exacerbate the weathering process. Weak supervision of openings can impact the comfort of building users.

6. Column

Columns in buildings are structural elements that function to support loads from above and transmit them to lower structural elements, such as the foundation. Pradipta et al. (2025), state that columns are structural elements that support loads and transmit them to the foundation, including live loads, dead loads, and earthquake loads. In addition to their structural function, columns are often used as aesthetic elements in architectural design. In a building, columns must be carefully designed, not only in terms of technical strength but also in terms of placement and appearance to maintain harmony with other building elements.

Observations revealed damage to several columns; this damage was only minor, such as chips. However, it did not significantly impact the building's structural strength. Column damage is caused by human activity. This aligns with research by Septiawan et al. (2024), that suggests column damage can be caused by human activity, natural phenomena, or a combination of both. Although minor damage to the columns was found, it did not impact the building's structural strength. The relatively good condition of the columns indicates that the building's damage was limited to non-structural and visual aspects. However, it still requires attention to prevent more significant damage.

7. Signboard

Signage is a visual information element installed on the exterior or interior of a building to provide guidance, identification, or specific information to users and visitors. Research by Calista et al. (2024), stated that signage plays a crucial role in creating a sense of comfort and security for users and aiding navigation. Within the context of facades, signage typically displays the building name, institutional identity, or other important instructions. Observations showed that the signage for Building C of the FPTI-UPI building was the only element undamaged.

The signage for Building C of the FPTI-UPI building is still in excellent condition, clearly visible, and easy to read. The good condition of the signage reinforces the building's identity. This reinforces Minggra (2020), research, which identified the characteristics of a good educational area as having a structured signage system and good legibility. The good condition of the signage reflects attention to information aspects. This can serve as an example for other facade elements that also require attention. Well-maintained signage not only facilitates user orientation but also reinforces the professional impression of Building C of the FPTI-UPI building and contributes to the building's image.

8. Roof

A building's roof protects a structure from weather-related factors like wind, rain, sunlight, and dust by acting as its uppermost covering. Apart from providing protection, the roof also influences the building's overall form, personality, and aesthetics. The roof surface of Building C FPTI-UPI appears to be covered in weeds and moss, according to observational findings. Environmental factors brought on by the high level of current humidity have an impact on this condition. Moss accumulation on the roof covering can lead to weathering and increase the possibility of leaks. According to Zechmeister et al. (2023), moss growth on buildings is a result of high humidity and inadequate drainage systems, which hasten weathering and raise the possibility of leaks. This state is an example of a building maintenance failure, which needs to be addressed on a regular basis. It may have an impact on building occupants' comfort and safety if ignored.

The following table illustrates how current factors impact damage to the building facade:

Table 1. Damage Criteria Based on Building Aspects

Factor	Criteria
The end of a building's lifespan	Entrance and opening
Human actions	Columns, walls and entrances
Environment	Color, entrance, openings, texture, roof

Building facade damage happens gradually and is caused by preexisting factors. As can be seen in **Table 1** above, environmental elements like heat, rain, and other elements that gradually improve the building facade's condition are the primary markers of facade appearance damage. This state demonstrates how crucial it is to provide ongoing care and maintenance in order to reduce possible damage and preserve the building facade's aesthetic appeal. The durability of the facade is greatly influenced by the maintenance and care efforts carried out to maintain the facade's condition and appearance to maintain its optimal (Celadyn & Celadyn, 2025).

3.2 Factors Causing Building Damage

Numerous interconnected factors can result in building damage. The primary causes of material deterioration and moss growth are environmental elements like heat, humidity, rain, and strong winds. Additionally, neglecting regular upkeep like cleaning, repairs, and repainting can lead to damage getting worse over time. Therefore, understanding the causes of damage is crucial for maintaining a building's long-term durability, function, and aesthetics (Berg Oppedal & Kvande, 2024).

1. Building age factor

Based on observations in **Table 1**, the building's age contributed to 25% of the damage in Building C of the FPTI-UPI. Age is one of the factors that causes damage to the building's physical elements over time. The older a building is, the greater the likelihood that its constituent materials will experience degradation or a decrease in quality, such as weathering, cracking, and other factors. This can occur because the materials have exceeded their ideal lifespan or have not received regular maintenance.



Figure 2. Building age damage

Damage that falls into the age category of a building includes the main door and window elements, which have experienced extensive damage, as seen in **Figure 2**. This is supported by research by Wardhana & Pontan (2022), which states that buildings that are 20 years old or older are more likely to experience damage to components, such as doors and windows, especially if they are not regularly maintained. This means that age-related damage cannot be prevented. However, the process can be slowed by performing regular building maintenance. Maintenance includes routine inspections, recording the condition of elements, and replacing components before they reach critical points.

2. Human-caused factors

One significant cause of building damage that frequently occurs in educational settings is human activity. Human activity, both directly and indirectly, can degrade the structural quality and aesthetics of buildings. Human activities that cause damage include inappropriate use, lack of user awareness, and the intensity of practical activities involving heavy equipment or chemicals (Gunjyal et al., 2023). Furthermore, a lack of repairs accelerates building deterioration.

Liu and Faizal Ardhiansyah Arifin (2021), state that a lack of awareness and minimal concrete actions for building maintenance can accelerate damage to a building's physical elements.



Figure 3. Human-caused damage

Human-caused factors account for the second-largest cause of damage, after the building's age, accounting for 37%. Damage categorized as human-caused includes scratches or graffiti on walls, damaged columns due to human activity, and so on, as evidenced by **figure 3**. In Building C, this human-caused damage was unavoidable because Building C, the FPTI-UPI, is the main building used for laboratory activities across various departments. This aligns with research by Wismantoro and Winarno (2024), which found that building damage is caused by a lack of routine maintenance and uncontrolled human activity, such as the use of buildings without regard for their original capacity and function.

The damaged facade, coupled with the disorganized arrangement of laboratory equipment, further diminishes the aesthetic value of Building C's facade. This situation highlights the importance of full awareness among Building C staff and users to mitigate existing damage. This is crucial to prevent further damage and ensure optimal maintenance of the facility (Utami and Saleh, 2022). The formation of this maintenance culture can reduce the percentage of damage caused by human activity and also create an orderly and ethical campus environment.

3. Environmental factors

Environmental damage is a major cause of the decline in the quality, function, and aesthetics of buildings. The surrounding environment can significantly impact the physical condition of a facade. Exposure to weather, such as rain, heat, and other factors, can cause material weathering, moss growth, corrosion, and other factors (Faraji et al., 2021). Air pollution can also make a facade appear dull and dirty. Therefore, regular maintenance and prevention of environmental factors are crucial to ensure a building's longevity and maintain its appearance.



Figure 4. Environmental damage

Judging from the data in **Table 1**, the main cause of damage to the facade of Building C FPTI-UPI is from environmental factors with a contribution of 63%. From the observation data, it shows that the most striking damage is caused by the influence of the existing weather, such as rain and excessive heat, which causes weathering of elements in the openings, moss growth on the roof, weathering of the paint surface and others, as seen in **Figure 4**. This is reinforced by research by Daeli et al. (2025), factors that contribute to material degradation are high rainfall, strong winds, and excessive humidity, these factors affect the structural durability and aesthetics of the building. Environmental damage is a major challenge that must be continuously addressed. While environmental damage is unavoidable, it can be prevented by using materials that are resistant to extreme weather, proper ventilation and drainage, and regular maintenance. Without proper management, environmental damage will continue to erode the strength and aesthetic appeal of Building C FPTI-UPI.

4. CONCLUSION

Based on the research, it can be concluded that human activities and environmental factors are the main causes of damage to the facade of Building C FPTI-UPI. Environmental factors include peeling paint, dust accumulation, weathering of window components, and moss growth on the roof. Cracks in columns, vandalism, and dirty walls due to student behavior are examples of human factors. Furthermore, the inappropriate placement of work equipment further reduces the aesthetic appeal of the facade. Therefore, the main causes of the decline in the aesthetic value of the facade of Building C FPTI-UPI are human and environmental factors.

According to this study, the issue of damage and aesthetic value decline is not isolated; rather, it is the result of a number of unfavorable interactions between human activity and the environment that are not addressed holistically, as well as irregular building maintenance. This study has limitations in its scope of analysis, which focuses only on facade damage based on visual observation and building user perception without using material testing in a laboratory. Therefore, in future research, it is recommended to conduct an in-depth structural analysis and to examine technical solutions using 3D SketchUp or Revit for more specific building repairs and maintenance.

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