



Temporal Landscape Perceptions and Preferences for Tourism Development at the Teaching Factory of Politeknik Negeri Jember

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Abstract

The development of Teaching Factory as an educational landscape Tourism is a strategic step to bring education as a synchronization of learning activities that refers to Merdeka Belajar Kampus Merdeka. Tourism is related to the beauty and relationship of the landscape between its elements. Perceptions and preferences for beauty are needed as a basis for developing a tourist area. The scenic beauty estimation (SBE) method will enable you to evaluate a landscape. Time is one of the landscape elements that will enhance the character of the landscape. The worst landscape is Landscape 19, which was the parking lot for the Department of Language, Communication, and Tourism. The perception of the respondent's memory that states that the Health Department is the landscape with the best value is based on the time when the picture was taken during the day, which is the perfect time in terms of lighting, shadows, and composition. Another thing is that the health department is an icon of Politeknik Negeri Jember.

Keywords: *Landscape Tourism, Scenic Beauty Estimation, Teaching Factory*



1. Introduction

Jember is a city known as a carnival city, which has many carnival activities ranging from arts, culture, religion, and even education. Politeknik Negeri Jember is located on Jl. Mastrip, East Krajan, Sumbersari, Sumbersari District, Jember Regency, East Java 68121, and has an area of approximately 37 hectares (Google Earth, 2024). In 2019, Polije established itself as a Teaching Factories (TeFa) campus. This is because the Polije campus has various TeFa, which are factories on campus with production-centered or service-based learning methods that align teaching and training, or practices based on procedures and standards that have been established in the industrial world and are adjusted to the current situation. Politeknik Negeri Jember (Polije) has several Tefa such as Bakery and Coffee, Culinary and Outlet, Feedlot, Smart Green House, Nursery and Cut Flowers, and several other Tefa. The presence of Tefa in Polije creates an attraction for the public, such as schools, be they study groups, kindergartens, elementary schools and equivalents, junior high schools and equivalents, and senior high schools, to visit Tefa in Polije.

The landscape of Polije as a Tefa campus is certainly inseparable from the appeal of buildings and the external landscape that influences it, such as ornamental plants in the campus environment, not only aiming to be a room divider but also as an aesthetic that makes the Polije campus beautiful. The arrangement of landscape plants on the Tefa Polije campus is carried out at several points, such as roads, rock gardens, parking lots, moratoriums, and around sports facilities, which are designed with various purposes, both as shade and aesthetics that support the comfort of its students. Plants, as one of the landscape elements, have a function to improve environmental quality, especially as a) visual control (glare barrier, space formation), b) room barriers or dividers, c) microclimate control, d) erosion control, e) animal habitat, and f) aesthetics (Porteous, 2013; Tasser et al., 2023). According to Liu et al. (2024) and Tan & Peng (2020), the appearance of plants to the naked eye is very important because plants are a frame for the view to maintain the beauty that has been created and comfort for its users. The aesthetic quality of the landscape is one of the factors that can directly provide satisfaction to users. The aesthetic quality of the landscape, although difficult to express objectively, can be measured through the reaction of human responses. (Asyuni et al., 2023; Indriyani & Makalew, 2020). Human perception is one approach in landscape planning; this perception will emerge because the visual function of the landscape can provide meaning regarding how a landscape can react to its observers. (Indriyani & Makalew, 2020; Wang et al., 2022).

Polije as a campus that has received an award as a Green Campus, has many landscape plants, ranging from trees, shrubs, bushes, and ground cover that need to be evaluated for beauty or assessment of their visual conditions, which aim to maintain and even improve environmental quality, increase comfort, and create beauty on the campus.



Therefore, a study was conducted by identifying and evaluating the beauty of the landscape on the Tefa Polije Campus by observing the scenery through the sense of sight, namely through a questionnaire from selected respondents, or what is called the SBE (Scenic Beauty Estimation) method, which is one method for estimating visual quality through comparisons carried out through questionnaires from selected respondents, and then the data obtained is processed through visual calculations. This method is known to be effective and reliable (Mei & Sun, 2018; Tasser et al., 2023; Yu, 1995). The results of this study are expected to provide input for related parties in terms of its development. This study aims to identify landscape plants in the form of trees and shrubs and obtain the visual value of landscape plants using the SBE (Scenic Beauty Estimation) method on the Tefa campus of the Politeknik Negeri Jember.

2. Literature review

2.1. Landscape Evaluation

Landscape aesthetics are one of the most difficult things to measure objectively and scientifically because beauty is partly determined by environmental characteristics and largely depends on human judgment or perception. If “beauty is in the eyes of the beholder,” then public response to aesthetics should be an important consideration for landscape managers. (Daniel & Boster, 1976).

It is stated that landscape evaluation is one of the quantitative landscape aesthetic methods that includes experts. (Porteous, 2013). The rationale for evaluation is that someone can make an aesthetic assessment of a valuable, functional, and generally acceptable landscape. Evaluation involves explaining several factors that may affect variations in landscape quality and a scale for measuring these factors. Evaluation activities are carried out based on a standard, followed by suggestions for improvement in subsequent activities. Different landscapes will have different visual effects. (Cutter et al., 1985; Harrison, 1992).

The visual evaluation of a landscape is based on aesthetic standards that are a function of the social, moral, and ecological values of the group making the evaluation. Landscape quality assessment methods fall into three general categories: (1) descriptive inventories, (2) surveys and questionnaires, and (3) perceptual preference evaluations. Each approach has advantages and disadvantages. (Daniel & Boster, 1976). However, the approach used in this study was a survey and questionnaires. This method is often used because it is efficient and economical in sampling.

2.2. Plants in the Landscape

The term landscape architecture was first introduced in 1858 by Frederick Law Olmsted. The definition of landscape, according to Tunnard & Eckbo (1964), is part of a land area



built or formed by humans outside buildings, roads, and utilities to the wild, which is designed primarily as a place for humans to live. Landscapes have several elements that form a landscape, including vegetation, soil, hydrology, climate, topography, aesthetics, and land use. One of these elements is vegetation or plants; this one element has an important role in a landscape. In addition to being aesthetic, it also functions to improve environmental quality (Lestari & Kencana, 2015). Plants are the main element in the landscape; even in the rock garden, there are still plants around it, so there is no landscape without plant elements (Baskara, 2011; Maudina & Baskara, 2023). Naturally, plants already have beauty, but the arrangement of plants in the landscape is important to create an ideal landscape/site. In the 19th century, the art of planting design was developed using various types of trees, bushes, and vines by plant experts Jemali et al., 2022; Regita et al., (2021). Plants in the landscape have various functions according to their characteristics and morphological properties. Grey & Deneke (1986) divide the function of plants into five parts, namely:

1. Improving the climate (amelioration uses)

Weather and climate have elements that affect humans to get a comfortable area/zone. This can be done by modifying the four elements of weather and climate, namely air, temperature, humidity, solar radiation, and wind flow. Modifications that can be made are planting plants to get a comfortable area/zone for humans.

2. Aesthetic Function

Plants provide their beauty in all settings. The former beauty is caused by lines, colors, and textures. Plants can frame views, soften architectural lines, unite landscape elements, and soften rigid settings.

3. Engineering Function

In addition to having a function in beauty, currently, various fields of science have developed the function of plants in solving environmental problems caused by the use of man-made tools; namely, plants have the function of reducing erosion, air pollution, noise, controlling liquid waste; and controlling glare from sunlight and streetlights.

4. Architectural Function

Plants have an architectural function because each species/type of plant has various characteristics such as shape, color, texture, and size. Planting plants in groups with various textures, heights, and densities will form a canopy or wall.

5. Other Functions

Other functions of plants in the landscape include historical indicators of an event. Because the plant reminds someone of the time, place, and feelings due to the view



shown. In addition, plants also function as a habitat for wild animals such as birds, etc. The arrangement of landscape plants is adjusted to the needs of both small and large scales, taking into account plant characteristics such as crown shape, root area, plant properties, and overall plant appearance, which will affect the location of the planter. As well as height gradation, color composition, and plant growth requirements (Lestari & Kencana, 2015).

2.3. Characteristics of Trees and Shrubs

The selection of plant types for landscape needs must consider several things, including plant growth requirements, ecology, and other physical requirements. The assessment considers the response and tolerance to temperature, sunlight, water requirements, soil requirements, pests and diseases, and physical requirements, namely the purpose of reforestation, cultivation requirements, canopy shape, texture, color, and aroma (Eckbo, 2015; Tunnard & Eckbo, 1964). The research on the implementation of reforestation in Jakarta with a case study of South Jakarta (Dlukha et al., 2018; Noor et al., 2018; Putra et al., 2018) Showed that the types of plants that are most widely planted are *Acacia auriculiformis* (acacia), *Pterocarpus indicus* (angsana), *Swietenia macrophylla* (mahogany), *Mimusops elengia* (headland), *Filicium deciepens* (kiara payung), *Delonix regia* (flamboyant), *Lagerstromia indica* (bungur), and *Polyalthia longifolia* (glodogan). The selection of the type of plant is based on the type of plant that is easy to obtain, easy to grow, shady, and has low species diversity. In the research conducted, namely only on tree and shrub types, the following will explain the characteristics of trees and shrubs, namely as follows:

1. Tree Characteristics

Morphologically, trees are plants with woody stems, deep roots, and branches far from the ground and are more than 3 meters tall. Trees have four design elements that play an important role and must be considered in landscape design, namely shape, color, size, and texture. (Booth, 1989; Holden, 1984). The most interesting part of the plant is the canopy or tree crown because it provides character identity to the environment (Bell, 2001, 2012). Each type of tree shape has a unique character and different functions in design. The architectural forms of plants are stated by Jemali et al. (2022) to consist of globular, dome-like, columnar, cube, irregular, cylindrical, oval conical, palmate, fan-like, bell-like, spiky, and umbrella.

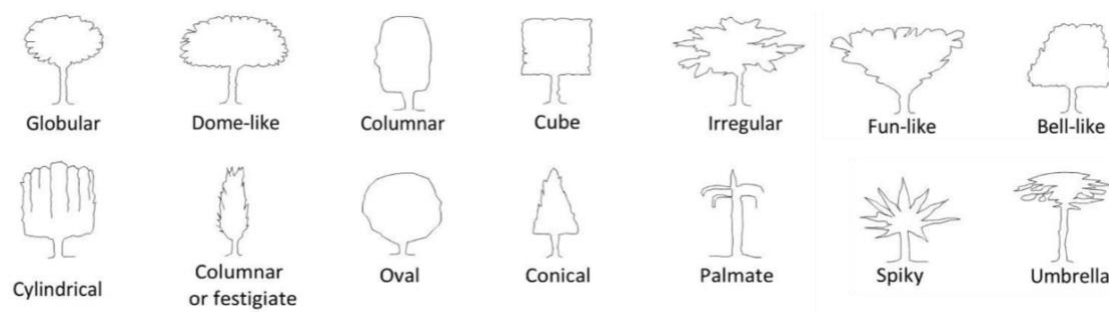


Figure 1. Classification Tree According to Form (Carpenter et al., 1975; Daniel & Boster, 1976)

The placement and height of trees that vary can create an impression of space and artistic beauty. In addition, according to Booth (1989), an interesting composition in the landscape can be created from the size of the tree, which will directly affect the scale of the space. Types of trees based on their height are divided into three types (Table 1). In addition to the height, the type of tree is divided into several types, namely the type of tree that is deciduous/shedding leaves (deciduous), broad-leaved and always leafy (evergreen), and types of trees with needle-shaped leaves such as pine, fir, etc. (Cook et al., 2023; Royal et al., 2022).

2. Characteristics of Shrubs

Shrubs are often called small trees because they have woody stems and grow tall. However, these plants have beauty and charm that are widely used as ornamental plants in pots and to add to the attraction. Shrubs can function as borders if planted in mass quantities and arranged. (Li et al., 2021; Luo et al., 2023). Based on their height, shrubs are divided into two types (Table 1).

Table 1. Types of Trees and Shrubs According to Height

No.	Type Tree	Tall (m)	No.	Type shrub	Tall (m)
1.	Tree big/tree mature	12	1.	Shrub low	> 2
2.	Tree currently	9 – 12	2.	Shrub Tall	< 2
3.	Tree small	4.5 – 6			

2.4. Aesthetic Quality of Landscape

Quality is defined as something intangible, such as high or low quality or the quality of a landscape. Quality is formed by the visual character of its constituent elements, while aesthetics is defined as a condition of sensory perception that can arouse a person's feelings. (Stange et al., 2022). The aesthetic quality of a space is the result of a combination of landscape appearance with the psychological process (response, understanding, and emotion) of the observer of the landscape (Stange et al., 2022). Aesthetic quality plays a role in forming the character and identity of a space. Aesthetics



are closely related to visual appearance because an object is judged by its visual appearance first (Tan et al., 2021). The aesthetic quality of a landscape can be measured based on the observer's reaction. The reaction will arise because of perceptions that are connected to memory and emotion. The observer's reaction to something visually is considered beautiful because it has harmony between all its parts (Brink et al., 2016; Wimmer & Swaffield, 2003). One of the important parts of the landscape element is plants and the presence of plants can improve the aesthetic quality of the environment and significantly affect the aesthetic quality. People tend to like landscapes with comfortable conditions, shady, and the presence of plant shade. (Edikusuma et al., 2021; Thoifur et al., 2018). The presence of plants in the landscape can create a trend in the selection of types and arrangement of plant composition in the green planning concept in an area. However, the selection and arrangement must be by certain criteria to create a functional and aesthetic landscape. The following are the criteria for assessing plant aesthetics.

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Table 2. *Criteria for assessing aesthetic aspects of plants, Source: (Booth, 1989; Murdaningsih, 2020).*

Component Aspect Aesthetics	Criteria Evaluation
Election Plant	Form title and branching are exciting, Size Scalise; there are color variations (stem, leaf, flower, fruit), and the Texture plant is interesting.
Arrangement Plant	A. Gradation/repetition 1. There is a change in color for each group of plants at a certain distance. 2. There is a change form for each group plant on distance certain 3. There is a change in texture for each group plant on distance certain B. Unity/theme Own unity theme (line, form, color) with the environment around like arrangement of the hard material (paving) road), element <i>furniture</i> road, or building support. C. Accent (Contrast/point interest) 1. Own accent yes aspect grouping plant in a way mass or individual with unique structure (typical) 2. Own accent from grouping color/form/texture certain from plant D. Dominance 1. There is a plant/pattern that can record with Good 2. Impressive, neat and make it easier orientation E. Balance



Component	Criteria Evaluation
Aspect Aesthetics	The creation balance from composition plant in a way visuals, both formal (geometric/symmetrical) or in a way informal (nongeometric/ asymmetric)

2.5. SBE (Scenic Beauty Estimation) Method

When the paper requires a separate literature review, put it in section 2. In this section, please use the most updated and relevant studies for your research. When the paper requires a separate literature review, put it in section 2. In this section, please use the most updated and relevant studies for your research. Evaluation estimation of visual quality of plant landscape can be done via Scenic Beauty Estimation (SBE). SBE is a method of estimating visual quality through comparison. The concept of SBE is an interactive concept and assessment covering the condition felt from a landscape. (Wang et al., 2022). This method is known as its own effective and feasible procedure so Lots of research uses the SBE method in calculation. (Tan et al., 2021). The SBE method is based on the average z value (normal distribution) for every landscape with calculation as follows:

$$SBE_x = (Z_{Lx} - Z_L) \times 100$$

Description:

SBE_x : SBE value of the x landscape

Z_{Lx} : Average z value of the x landscape

Z_{Ls} : Average z value of the standard landscape

The Lx value is the landscape average Z value to -x ($x=1, 2, 3 \dots 25$) and ZLS is the landscape mean z value standard, and the closest value is 0 (zero). In research, this criteria evaluation is grouped into 4 kinds of configuration, namely: (1) Very not beautiful, (2) not beautiful, (3) ordinary only, and (4) Very beautiful. Rating with the SBE method can seen in the image below.

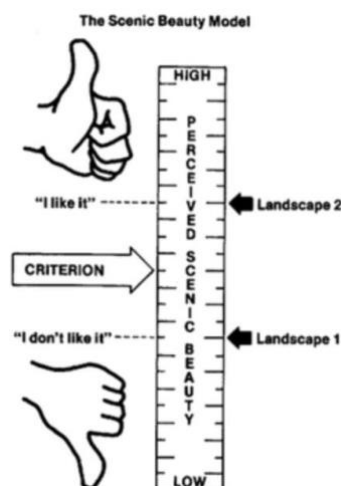


Figure 2. Assessment with the SBE method (Daniel & Boister, 1976)



Evaluation with the SBE method is performed with a component model double from the beauty landscape illustrated by close-up image criteria of the desired landscape. Evaluation is shown as a combination of perception and an observer's view of beauty in the landscape. As seen in figure 2, Landscape 1 did not fulfill the minimum criteria for a beautiful landscape, so it got the evaluation negative ("I don't like it" or "this is ugly") from the observer. However, landscape 2 felt to exceed the minimum criteria of a beautiful landscape so that the observer will give a positive response such as ("I like it" or "This is it"). beautiful"). If the standard observer raised several considerations, things would allow the second landscape to be evaluated negatively, although the second beauty that is owned is different. So, the evaluation of the beauty landscape will depend on the beauty landscape and the criteria evaluated by the observer.

Component evaluation of the beauty landscape with the SBE method is also performed using marks or scoring on dimensions of beauty of the perceived view. Value or scoring This is obtained from observers or panelists. The assessment was carried out in a form number scale of 1 to 10. When the observer gives a value of 6 out of a scale of 1-10 things show that the landscape is beautiful enough as well, and several components in the landscape have fulfilled the criteria. In this case, the background behind the observer needs to be noticed because at the time, evaluation required knowledge about the aesthetics of the landscape as well as the criteria for a suitable landscape (Namjoo et al., 2016).

3. Method

3.1.Place and Time of Research

Study This was conducted at Politeknik Negeri Jember in July – September 2024 with the area being the spot and Tefa Building on Campus Polije.

3.2.Research Methods and Data Analysis

Retrieval samples were only done on the landscape between buildings and vegetation on TEFA. Taking samples is done through shooting with notice of proportions and angles of view, taking photos to get a full view based on the view of a human in a normal position so that taking photos is done several times, even if not limited. Taking landscape photos based on time starts from morning (07.00-09.00), afternoon (11.00-13.00) and evening (15.00-17.00). The photoshoot was done using an Android mobile phone camera, the Mi 11 Lite. The area to be assessed consists of 39 images (Figure 3) which represent the types of campus landscapes.

Data obtained was analyzed with the use of descriptive with method-analyzed in a way statistics to get the SBE value. Data for each landscape was grouped based on scale evaluation from 1-10 then every scale counted amount frequency (f), frequency cumulative (cf), cumulative probability (cp), and z value. Result in data analysis in a way



statistics Then entered the SBE formula. Lots of landscapes were chosen or liked by respondents as the beautiful landscape is a landscape with a high SBE value or the lowest Z value / closest to 0. Factors that make landscape/plants the Lots liked Respondent among them own form beautiful title, composition full plant, pattern plant regular and combination unique and harmonious colors. Respondents have the criteria of having experience with landscapes, environmental aesthetics, and beauty with a background in knowing the beauty factors in landscapes.

Table 3. Category Beauty

Min SBE value	Max SBE value	Category
41.68	112.38	Tall
-29.03	41.68	Currently
-99.74	-29.03	Low

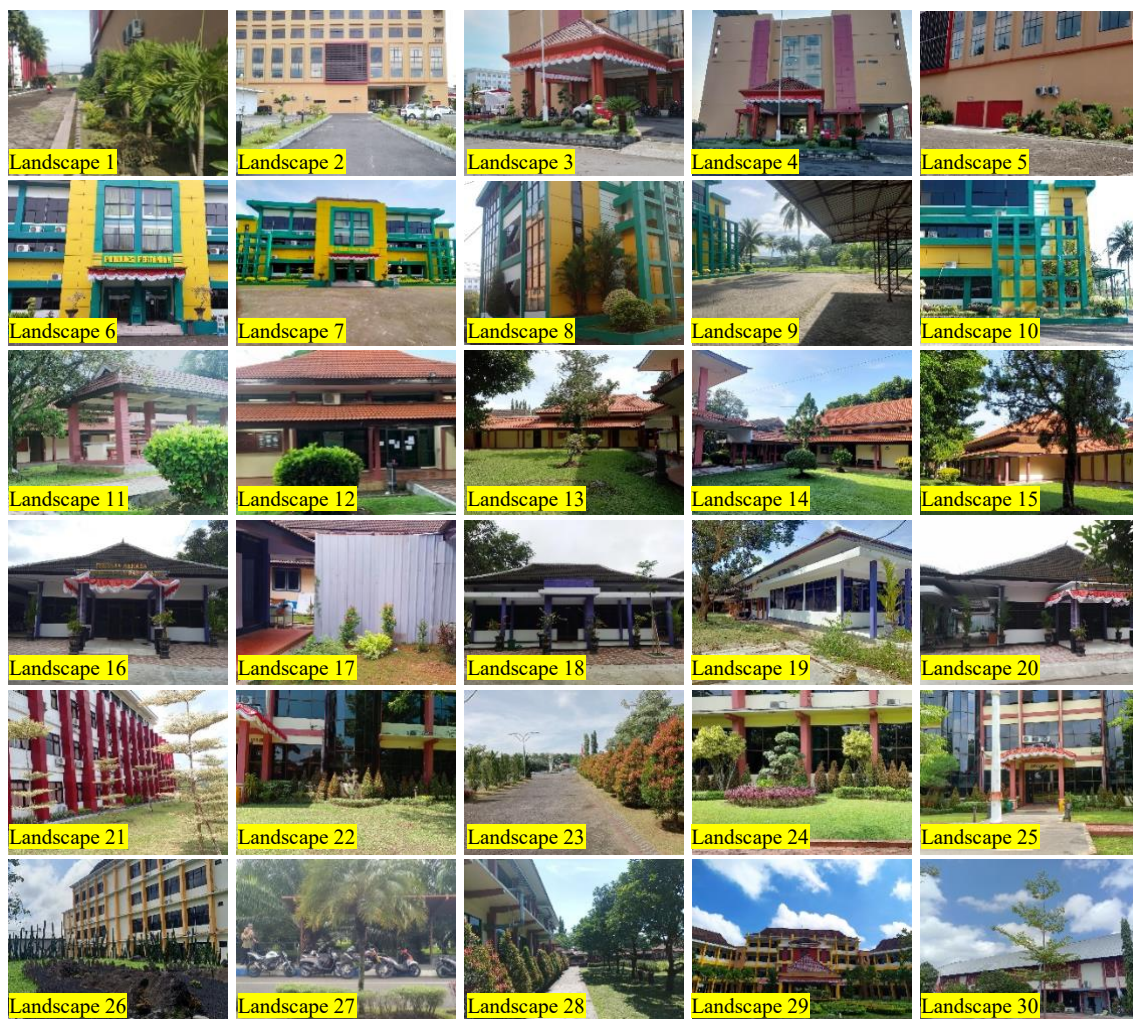


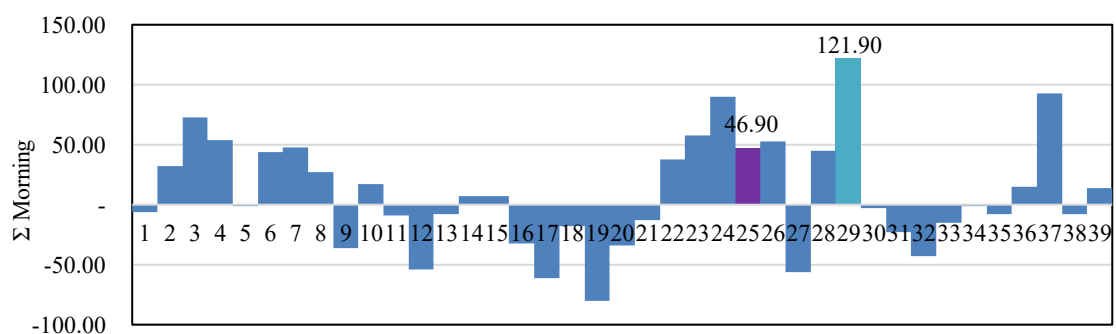


Figure 3. Types of Assessed Landscapes

4. Findings and discussion

Assessment results in visual quality by respondents with various backgrounds at Tefa Politeknik Negeri Jember, in the form of score for each photo or landscape. The data is then entered into the SBE formula. High SBE values show that landscape the Lots selected by respondents as beautiful landscapes whereas low SBE values show landscapes that are not liked or not beautiful. Rating beauty plants are grouped into 3 types according to layout landscape based time taking Photo.

Data obtained from Respondent as many as 42 students Polije with background behind students who have ever get eye studying Management Landscape and Cultivation Plant Decorate then analyzed in a way statistics so that it can be done SBE value with range -99.74 to 112.38. Assessment results landscape Then classified into 3 categories: SBE values are high, medium, and low with use level Simplified rating. Result data evaluation plants on all types of plant in form graph.



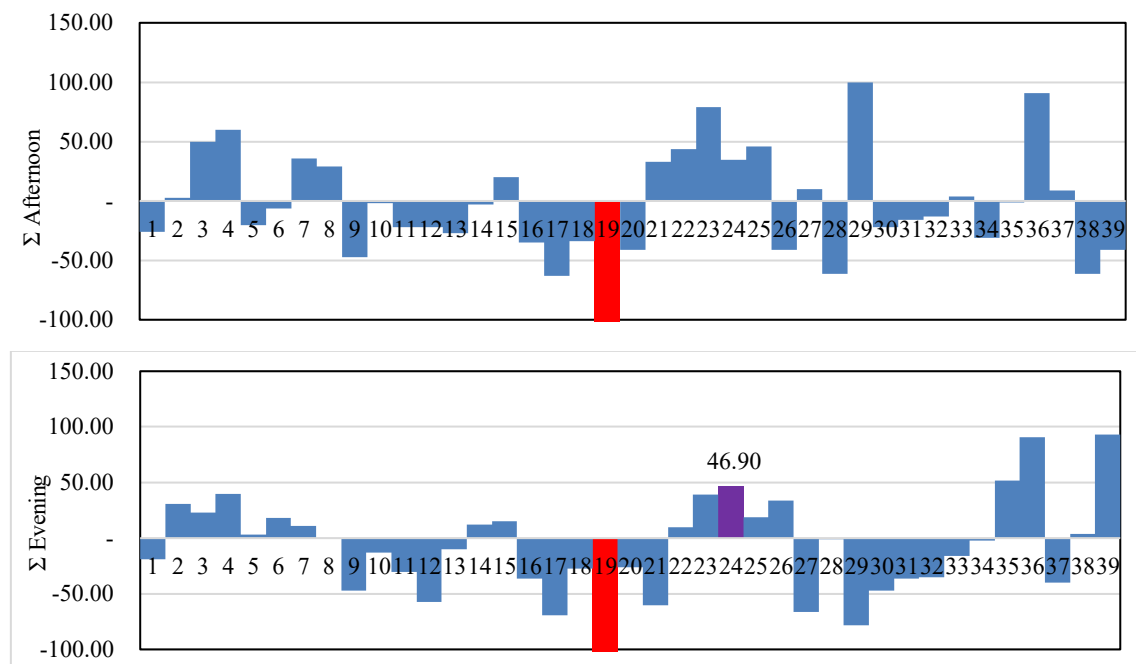


Figure 4. Scenic Beauty Estimation (SBE) Value Diagram of Tefa Polije Landscape

4.1. Beauty View High Category

Assessment of the landscape tree solitary with category tall is on Landscape 29 in the Morning with SBE value 121.90, namely GOR 45 Polije with characteristics landscape that is buildings, roads, medians, and plant director The road is at the Polije double way door show form architectural title as well as appropriate branching with the condition around. The tree also has wide, oval-shaped leaves that provide beauty. Tree Ketapang which is located in Gedung Jurusan Kesehatan is a plant that has grown maximum by character genetics and has a title shaped horizontally which can give a mark positive for plant visuals.



Figure 5. Assessment of SBE with high category on Landscape 29 Morning

4.2. Beauty View Medium Category

The evaluation landscape in the category currently is Landscape 24 evening and Landscape 25 morning with SBE value 46.90, namely Gedung Asah Asih Asuh Polije with characteristics landscape that is buildings and ornamental plants. The combination



of the building landscape and neatly trimmed plants also has a combination of colors from ground cover, bushes, and trees, with the background of the building making the characteristics of the medium landscape quite good. But because of the lighting factor and the dense composition, the beauty is reduced. The red-bud tree (*Syzygium oleina*) is known as a very popular ornamental plant in Indonesia and other tropical regions due to its high aesthetic value. The young leaves of the red-bud tree have a striking bright red color, which gradually changes to dark green as the leaves age. This combination of red and green creates a dynamic and captivating visual effect, making this plant a focal point in any garden or landscape (Muna et al., 2024; Sanni & Indrawati, 2024).



Figure 6. Assessment of SBE with medium category on Landscape 24 evening and Landscape 25 morning

4.3.Beauty View Category Low

Assessment on category low showing on Landscape 19 Afternoon and evening with SBE value -102,10, namely *Mangifera indica* L./Mango which is in the parking area Department of Language, Communication, and Tourism. Trees are the category low Because of not enough proportion Their shape is caused by the tree is still young and marked with growth Not yet maximum as well as Not yet perfect branching so the plant the seen as not ideal. To get beautiful visual value, maintenance of physical and engineering forms (Pertami et al., 2021; Wardani et al., 2023). Mango trees have beautiful crowns, typically dome-shaped, oval, or elongated. Their spreading crowns and horizontal branches create a broad canopy, providing a shady and symmetrical effect that is highly valued in the aesthetics of gardens and green spaces (Ramadhan et al., 2024; Regita et al., 2021b). The spreading crown also enhances the visual value and environmental comfort by providing extensive shade.



Figure 7. Assessment of SBE with low category on Landscape 19 afternoon and evening



4.4.Recommendation

Recommendations have been made to increase the visual quality of the plant. In some landscapes at Tefa Polije Campus, some landscapes include categories good, bad even very bad which means recommendation increases the visual quality of the landscape.

5. Findings and discussion

Routine maintenance is needed, such as pruning so that there are no plants that have irregular crowns that can reduce the visual quality of the plants. Planners must pay more attention to the availability of growing space for plants in the future because plants will grow and develop with increasingly wider crown sizes and shapes. It is important to pay attention to plant composition to create landscape balance. Recommendations for improving aesthetic quality that managers can carry out include selecting plant types by considering plant composition to improve landscape balance and regular planting patterns.

6. Conclusion

Based on the results study of the evaluation visual quality of plants in the landscape that has been done can concluded that the most visually appealing plants are those with clear and regular branching, harmonious composition with their surroundings, and a well-organized planting pattern., pattern regular planting, and combination proper planting. The highest SBE value is in the category Landscape 29 Morning with a value of 121.90, and the lowest value currently on Landscape 19 Afternoon and Evening with an SBE value of -102,10. Therefore, Polije must maintain the landscape that has been assessed as having high aesthetic quality and even improve its quality through regular maintenance. The low-value landscape must be revitalized as a step in developing the tourism area on the Polije campus

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