

SERVQUAL ANALYSIS OF STUDENT SATISFACTION WITH EDUCATIONAL FACILITIES AT AKADEMI PENERBANG INDONESIA BANYUWANGI

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Abstract

This study examines student satisfaction with educational facilities at Akademi Penerbang Indonesia Banyuwangi using the five SERVQUAL dimensions. A quantitative descriptive design was applied to a population of 164 students. The study calculated a minimum sample of 63 respondents using the Slovin formula, while 79 usable responses were included in the final analysis. Data were collected through field observation, a four-point Likert questionnaire, and literature review, then analyzed using Partial Least Squares Structural Equation Modeling with SmartPLS 3.0. The reported measurement model met the specified loading, average variance extracted, composite reliability, and Cronbach's alpha criteria. The structural model explained 93.5% of the variance in student satisfaction (adjusted $R^2 = 0.931$). Assurance had the strongest significant effect on satisfaction ($\beta = 0.653$, $t = 6.918$, $p < 0.001$), followed by empathy ($\beta = 0.375$, $t = 4.188$, $p < 0.001$). Tangibles, reliability, and responsiveness were not significant at the 5% level. Because the report did not provide aggregate descriptive satisfaction scores, an overall satisfaction category cannot be validly assigned.

Keywords: aviation education; educational facilities; PLS-SEM; SERVQUAL; student satisfaction

INTRODUCTION

Educational facilities and infrastructure are not peripheral components of higher education. They shape the conditions under which students learn, practice, access academic resources, and evaluate the quality of institutional services. In service-quality theory, satisfaction develops through an evaluative process in which perceived performance is compared with expectations (Oliver, 1997), while the physical and interactional environment contributes to the overall service experience (Bitner, 1992; Gronroos, 1984). In higher education, this relationship is especially relevant because students simultaneously experience academic services, facilities, administrative procedures, and interpersonal support as an integrated institutional service. The issue becomes more consequential in vocational aviation education. Unlike many general higher-education environments, flight education depends on specialized and safety-sensitive facilities that directly support professional competence. The research report documents that Akademi Penerbang Indonesia Banyuwangi (API Banyuwangi) provides dormitories, classrooms, flight simulators, a language laboratory, a library, and training aircraft. The institution reports three dormitory buildings with a total capacity of 218 rooms, 11 classrooms with a capacity of 168 persons, eight flight simulators, two language-related rooms, a library collection of 2,447 titles and 3,059 copies, and a training fleet consisting of Cessna 172-SP, seaplane Cessna 172-SP, and Piper Seneca aircraft. These assets establish a substantial physical basis for aviation education, but the existence of facilities alone does not demonstrate how students evaluate their quality or how facility-service dimensions shape satisfaction.

Student satisfaction is important because it provides evidence from the principal users of institutional facilities. The SERVQUAL framework developed by Parasuraman et al. (1985, 1988) conceptualizes service quality through tangibles, reliability, responsiveness, assurance, and empathy. Although originally developed for service settings, these dimensions offer a useful lens for educational facilities because student experience includes physical conditions, dependable availability and functioning, responsiveness to problems, confidence in safety and service procedures, and individualized attention. Zeithaml et al. (1990) further emphasize the importance of balancing customer perceptions and expectations when evaluating service quality. Empirical studies in higher education

generally report associations between facilities, service quality, and student satisfaction. Briyantoro et al. (2023) reported a positive contribution of campus facilities and academic services to student satisfaction, while Hidayati et al. (2023) found positive and significant effects of facilities and environmental conditions. Ismail et al. (2024) similarly reported that campus facilities and lecturer services jointly explained a substantial portion of student satisfaction. More recent studies continue to position facilities and higher-education services as relevant antecedents of satisfaction (Afriansyah et al., 2025; Nayma et al., 2025; Subekhan et al., 2025). These findings support the need to evaluate facility-related service quality, but they do not eliminate the possibility that different dimensions operate differently in a specialized vocational setting.

A methodological distinction is also important. Some satisfaction studies focus on a descriptive index that allows institutions to classify students as dissatisfied, fairly satisfied, satisfied, or very satisfied. For example, Nurhidayah and Slamet (2024) used a Customer Satisfaction Index and reported an overall category together with dimension-specific scores. The API Banyuwangi research instead used PLS-SEM to examine the relative contribution of SERVQUAL dimensions to a latent student-satisfaction construct. Consequently, the available results are stronger for explaining determinants of satisfaction than for assigning a descriptive category to the overall level of satisfaction. This distinction is essential so that conclusions do not exceed the available data. Accordingly, this article aims to analyze the measurement quality of the SERVQUAL-based facility model, determine the explanatory power of the structural model, and identify which dimensions significantly affect student satisfaction at API Banyuwangi. The study contributes context-specific evidence from aviation vocational education, where confidence in safety, standards, procedures, staff competence, and equitable access to specialized facilities may be particularly salient. At the same time, the analysis explicitly recognizes the limits of the dataset: aggregate descriptive satisfaction scores, facility-specific satisfaction indices, academic achievement outcomes, and before-after measures of facility improvement were not reported in the source research.

LITERATURE REVIEW

Student Satisfaction and Educational Facilities

Student satisfaction can be understood as a post-use evaluation of whether an educational experience sufficiently fulfills student expectations and needs. Oliver (1997) places satisfaction within a fulfillment-evaluation process, while Tjiptono (2018) emphasizes the relationship between service performance, expectations, and perceived quality. In a higher-education setting, the object of evaluation extends beyond classroom instruction to the accessibility, condition, function, and management of the facilities that support learning. Physical surroundings may also operate as service cues that influence users' perceptions of quality and institutional seriousness (Bitner, 1992).

Educational facilities therefore have both functional and experiential roles. Functionally, they make learning activities possible; experientially, they shape comfort, confidence, convenience, and perceptions of institutional support. Usman (2014) describes educational facilities and infrastructure as resources that support the learning process, while the API Banyuwangi research operationalizes facility quality through observable issues such as cleanliness, physical feasibility, completeness, capacity, availability, equipment function, maintenance, information, safety, procedures, and service support. In aviation education, this logic extends to specialized facilities such as simulators, training aircraft, and language-proficiency facilities because these resources are closely linked to professional skill formation.

Prior empirical findings generally support the relevance of facilities. Rangga et al. (2020) reported that infrastructure and learning quality affected student satisfaction, and Briyantoro et al. (2023) found that campus facilities and academic services positively influenced satisfaction. Hidayati et al. (2023) similarly reported significant positive effects of facilities and the campus environment. These studies show that facilities matter, but they typically treat facilities as a broad variable. A dimension-level analysis is needed to determine whether the physical condition of facilities, the reliability of their operation, responsiveness of facility services, assurance, and empathy contribute equally once they are analyzed simultaneously.

SERVQUAL Dimensions in the Educational Facility Context

SERVQUAL identifies five service-quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1985, 1988). Tangibles refer to the physical evidence of service, including facilities, equipment, and visible conditions. In the present research, tangibles cover cleanliness, physical feasibility, completeness, capacity, and comfort. This dimension is directly connected with the facilities themselves and is consistent with the servicescape perspective in which physical surroundings affect service evaluation (Bitner, 1992).

Reliability concerns the institution's ability to provide services consistently and dependably. Applied to educational facilities, reliability means that facilities are available according to schedule, equipment functions as intended, maintenance supports continuity, and services consistently support learning. Responsiveness concerns the speed and willingness with which the institution addresses student needs, including repair, information, staff assistance, and requests for facility use. These dimensions capture the operational side of facility management rather than the mere existence of physical assets.

Assurance concerns confidence and trust produced by security, relevant standards, staff competence, clear procedures, and confidence that facilities support student competence. In an aviation-education environment, these indicators are substantively important because facilities are used within training activities where standardization, safety, procedural clarity, and professional competence are central. Empathy refers to individualized and fair attention, represented in this study by friendliness, attention to needs, fairness of access, adjustment of services, and individual solutions. These elements are especially relevant when students must share specialized resources with scheduling and access constraints.

Existing higher-education evidence does not point to one universally dominant SERVQUAL dimension. Nurhidayah and Slamet (2024), using a descriptive satisfaction index, reported different scores across the five dimensions. Other studies have found that facilities and service components jointly contribute to satisfaction (Ismail et al., 2024), while broader reviews emphasize the combined role of facilities, administration, and academic services (Yusuf, 2025). This variation supports testing the dimensions simultaneously rather than assuming that the most visible physical factors are automatically the strongest predictors.

Research Gap and Analytical Position

The studies reviewed in the source research are dominated by general university contexts and broad constructs of facilities, academic services, or learning quality. The aviation-vocational context is analytically different because facilities include equipment that is closely tied to safety, procedural compliance, and competency development. The research gap addressed here is therefore not simply whether facilities are associated with satisfaction, but which SERVQUAL dimensions provide unique explanatory power for satisfaction when specialized educational facilities are assessed in one structural model. PLS-SEM is used to estimate these relationships simultaneously while assessing the measurement properties of the latent constructs (Hair et al., 2017; Tenenhaus et al., 2005).

METHOD

The study used a quantitative descriptive design and was conducted at Akademi Penerbang Indonesia Banyuwangi in Banyuwangi, East Java. The target population consisted of 164 students distributed across D-III Penerbang Sayap Tetap, D-III Operasi Pesawat Udara, Non-Diploma Penerbang, and Executive programs. The research design specified random sampling. Using the Slovin formula with a 10% margin of error, the report calculated a minimum sample of 63 respondents; however, the final dataset analyzed in the results section contained 79 usable responses. This final number exceeded the calculated minimum.

Primary data were collected through field survey or observation and a questionnaire, while secondary data were obtained from literature relevant to facilities, service quality, and satisfaction. The questionnaire used a four-point Likert response format: strongly disagree, disagree, agree, and strongly agree. Facility service quality was operationalized through the five SERVQUAL dimensions of tangibles, reliability, responsiveness, assurance, and empathy. Student satisfaction was modeled as the dependent latent construct. The indicators reported in the final measurement model covered physical condition and availability, functionality and maintenance, response and information, safety and procedures, individualized attention and fairness, as well as students' expectations, perceived benefits, overall satisfaction, and positive responses.

Data analysis used Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3.0. The measurement model was assessed using outer loadings, average variance extracted (AVE), composite reliability, and Cronbach's alpha. The report applied thresholds of greater than 0.70 for outer loadings, composite reliability, and Cronbach's alpha, and greater than 0.50 for AVE. The structural model was evaluated using R² and bootstrapping. A path was treated as statistically significant when $p < 0.05$ and the t-statistic exceeded 1.96. These procedures are consistent with the general PLS-SEM workflow of evaluating the measurement model before interpreting structural paths (Hair et al., 2017; Ringle et al., 2015).

The available report does not provide a separate HTMT or Fornell-Larcker table for discriminant validity, nor does it report an aggregate mean or satisfaction index that can be used to categorize the overall level of

satisfaction. Accordingly, this article restricts inferential conclusions to the measurement statistics and structural-path results that are explicitly available.

RESULTS AND DISCUSSION

Respondent Profile

The final analysis included 79 respondents. Most respondents were male (83.5%), aged 21-25 years (69.6%), enrolled in the Operasi Pesawat Udara program (64.6%), and had studied for more than two years (67.1%). The respondent composition is summarized in Table 1. These characteristics indicate that the dataset is dominated by students with relatively long exposure to the institution, which is relevant because repeated use is important when evaluating facilities and facility-related services.

Table 1. Respondent characteristics

Characteristic	Category	n	%
Gender	Female	13	16.5
Gender	Male	66	83.5
Age	< 15 years	0	0.0
Age	16-20 years	23	29.1
Age	21-25 years	55	69.6
Age	> 25 years	1	1.3
Program	Penerbang Sayap Tetap	23	29.1
Program	Operasi Pesawat Udara	51	64.6
Program	Executive	1	1.3
Program	Non-Diploma Penerbang	4	5.1
Study duration	< 1 year	6	7.6
Study duration	1-2 years	20	25.3
Study duration	> 2 years	53	67.1

Source: Primary data processed, 2026.

Measurement Model

All reported outer loadings exceeded 0.70, ranging from 0.75 to 0.93 across the five SERVQUAL constructs and the student-satisfaction construct. The reported AVE values ranged from 0.70 to 0.79, composite reliability from 0.92 to 0.99, and Cronbach's alpha from 0.89 to 0.99. These values satisfy the thresholds specified in the research report and support the internal consistency and convergent measurement quality used for subsequent structural analysis. Table 2 consolidates the reported measurement statistics.

Table 2. Measurement-model statistics reported in the study

Construct	Outer loading range	AVE	Composite reliability	Cronbach alpha
Tangibles (X1)	0.76-0.92	0.71	0.92	0.90
Reliability (X2)	0.82-0.89	0.74	0.93	0.91
Responsiveness (X3)	0.75-0.88	0.70	0.92	0.89
Assurance (X4)	0.86-0.92	0.79	0.95	0.93
Empathy (X5)	0.86-0.92	0.75	0.94	0.92
Student satisfaction (Y)	0.80-0.93	0.77	0.99	0.99

Source: Primary data processed, 2026.

The source report labels its AVE table as a discriminant-validity assessment. In PLS-SEM, AVE primarily supports convergent validity; a complete assessment of discriminant validity normally requires additional evidence. Because no HTMT or Fornell-Larcker statistics are reported, the present article does not make a separate claim that discriminant validity has been comprehensively demonstrated. This qualification does not alter the reported path estimates, but it is important for transparent methodological reporting.

Structural Model and Hypothesis Testing

The structural model produced $R^2 = 0.935$ and adjusted $R^2 = 0.931$ for student satisfaction. Thus, the five SERVQUAL dimensions jointly accounted for 93.5% of the observed variance in the latent satisfaction construct in this sample. The result indicates high explanatory capacity within the estimated model, but R^2 should not be interpreted as an aggregate satisfaction score or as evidence that 93.5% of students were satisfied.

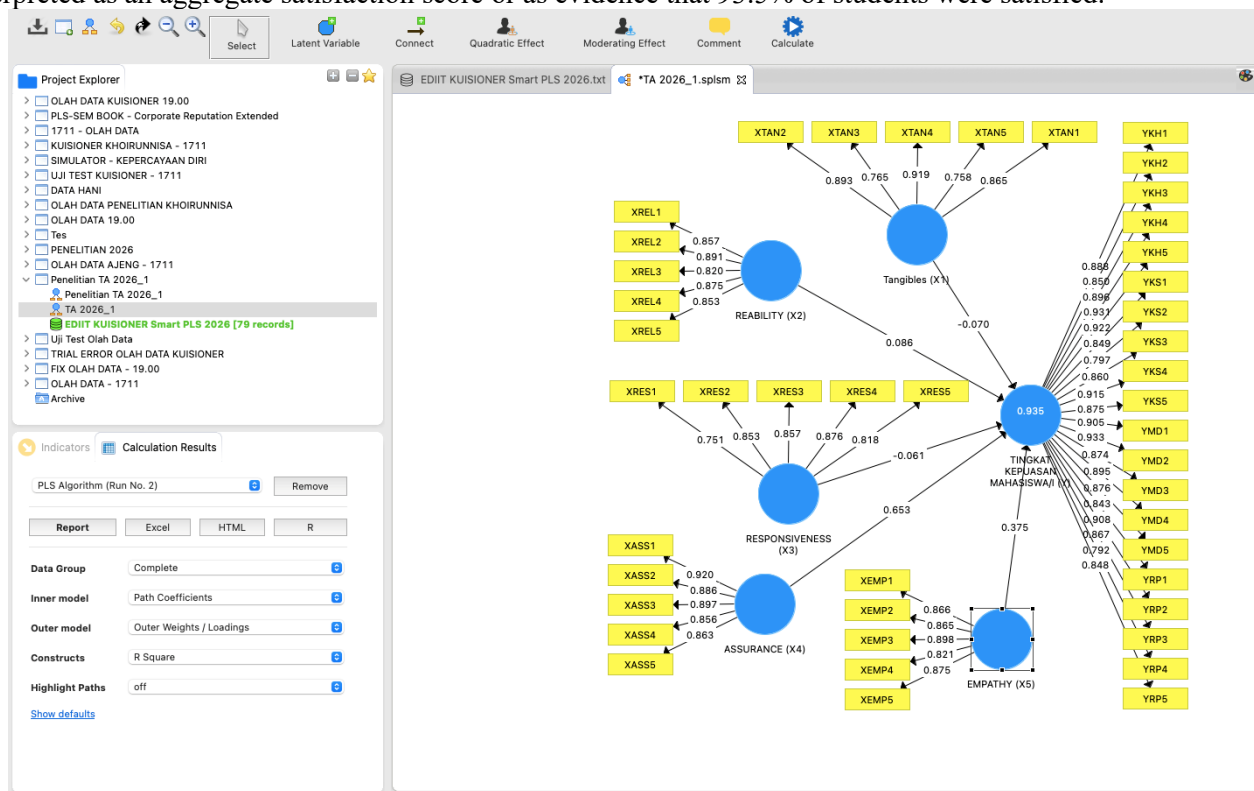


Image 1. SmartPLS structural model and reported path coefficients

Source: SmartPLS output in the research report, 2026.

Bootstrapping showed that only assurance and empathy had statistically significant direct effects on student satisfaction. Assurance was the strongest predictor ($\beta = 0.653$, $t = 6.918$, $p < 0.001$), followed by empathy ($\beta = 0.375$, $t = 4.188$, $p < 0.001$). Tangibles, reliability, and responsiveness were not significant at the 5% level. Table 3 presents the complete path results.

Table 3. Structural paths and hypothesis results

Path	Original sample	Sample mean	SD	t-statistic	p-value
Tangibles -> Satisfaction	-0.070	-0.054	0.089	0.784	0.434
Reliability -> Satisfaction	0.086	0.087	0.103	0.835	0.404
Responsiveness -> Satisfaction	-0.061	-0.044	0.095	0.646	0.519
Assurance -> Satisfaction	0.653	0.634	0.094	6.918	<0.001
Empathy -> Satisfaction	0.375	0.362	0.089	4.188	<0.001

Source: Primary data processed, 2026.

Discussion

The central finding is that assurance and empathy, rather than the three other SERVQUAL dimensions, provide the significant unique contributions to student satisfaction in the estimated model. Assurance captures security, compliance with relevant standards, staff competence, procedural clarity, and confidence that facilities support student competence. These indicators are substantively coherent with aviation education, where the value of facilities is inseparable from safe use, standardized procedures, technical competence, and confidence that training

resources genuinely support professional readiness. The large assurance coefficient suggests that students' confidence in how facilities are governed and supported is more discriminating for satisfaction than physical appearance alone.

Empathy is the second significant determinant. In the instrument, empathy covers friendliness, attention to needs, fairness of access, flexibility or adjustment of services, and individual solutions. These aspects are particularly meaningful for facilities that are costly, specialized, and potentially capacity constrained. Students may evaluate not only whether a simulator, aircraft, laboratory, or library exists, but also whether access is fair, staff understand their learning needs, and problems are resolved in a way that allows training to continue. This finding aligns with the broader service-quality proposition that interpersonal attention is a core component of perceived service value (Parasuraman et al., 1988; Zeithaml et al., 1990).

The nonsignificant paths for tangibles, reliability, and responsiveness require careful interpretation. They do not show that cleanliness, equipment condition, maintenance, scheduling, information, repair, or staff response are unimportant. The coefficients represent unique effects within a model in which all five dimensions are entered simultaneously. A dimension can be operationally necessary but fail to explain additional variance after other correlated dimensions are considered. The current results therefore differ from studies that found a direct positive effect of facilities or infrastructure on satisfaction (Briyantoro et al., 2023; Hidayati et al., 2023; Rangga et al., 2020). This difference may reflect variation in institutional context, measurement design, or the simultaneous dimension-level specification used here, but those explanations were not directly tested and should remain interpretive rather than causal claims.

The contrast with descriptive-index research is also important. Nurhidayah and Slamet (2024) reported a 62.07% satisfaction index and dimension-specific percentages, allowing an explicit category of overall satisfaction. The API Banyuwangi results do not contain an equivalent aggregate mean, index, distribution, or cut-off rule. Consequently, the research can identify which service-quality dimensions are significant predictors, but it cannot validly state that students are, for example, satisfied or very satisfied overall. This distinction resolves an apparent tension between the original research title, which emphasizes the 'level' of satisfaction, and the actual inferential results, which primarily explain determinants of the satisfaction construct.

The high R² value further reinforces the importance of maintaining this distinction. An R² of 0.935 means that the predictor constructs explain a large proportion of variance in the modeled satisfaction scores. It does not quantify the absolute magnitude of satisfaction. Therefore, institutional decision making should use the structural result to prioritize assurance and empathy, while a separate descriptive analysis should be conducted to establish the actual satisfaction level and identify which specific facilities receive the highest or lowest ratings.

From a managerial perspective, the significant assurance dimension points to priorities such as facility safety, compliance with relevant educational and training standards, staff capability, clear operating procedures, and transparent communication about the relationship between facilities and competence development. The empathy result points to fair access, responsiveness to individual constraints, courteous treatment, and solutions when students encounter difficulties using facilities. At the same time, tangibles, reliability, and responsiveness should continue to be monitored as baseline service requirements. Statistical nonsignificance in one multivariate model is not a justification for reducing maintenance, cleanliness, availability, repair speed, or information quality.

The study also has several limitations that should be considered before publication and institutional use. First, the report calculated a minimum sample of 63 but analyzed 79 responses; the final article should ideally document how the additional usable responses were selected within the stated random-sampling procedure. Second, no aggregate descriptive satisfaction score is available, so overall satisfaction cannot be categorized. Third, facility-specific scores for dormitories, classrooms, simulators, the language laboratory, library, and training aircraft are not reported, preventing direct identification of which facility requires the greatest improvement. Fourth, the report does not include student academic achievement or a before-after design, so claims about effects on achievement or the impact of facility improvement are not supported. Finally, discriminant validity should be strengthened in future reporting with an appropriate criterion such as HTMT or the Fornell-Larcker procedure.

CONCLUSION

The SERVQUAL-based PLS-SEM model shows that facility-related service quality has substantial explanatory power for student satisfaction at Akademi Penerbang Indonesia Banyuwangi. The reported measurement statistics met the thresholds used in the study, and the structural model produced R² = 0.935 with adjusted R² = 0.931. At the dimension level, assurance was the strongest significant predictor of satisfaction (beta = 0.653, t = 6.918, p < 0.001), followed by empathy (beta = 0.375, t = 4.188, p < 0.001). Tangibles, reliability, and responsiveness did not have significant unique effects at the 5% level. The practical implication is that facility management should

prioritize safety and standards, staff competence, clear procedures, confidence in competency support, fair access, attention to student needs, and individualized problem resolution while continuing to maintain the physical and operational quality of facilities. The available evidence does not support assigning an overall category such as satisfied or very satisfied because aggregate descriptive satisfaction statistics were not reported. Future evaluation should therefore combine PLS-SEM with a transparent descriptive satisfaction index, report results for each major facility, document sampling implementation, and add appropriate discriminant-validity evidence.

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